

THE Chemical Age

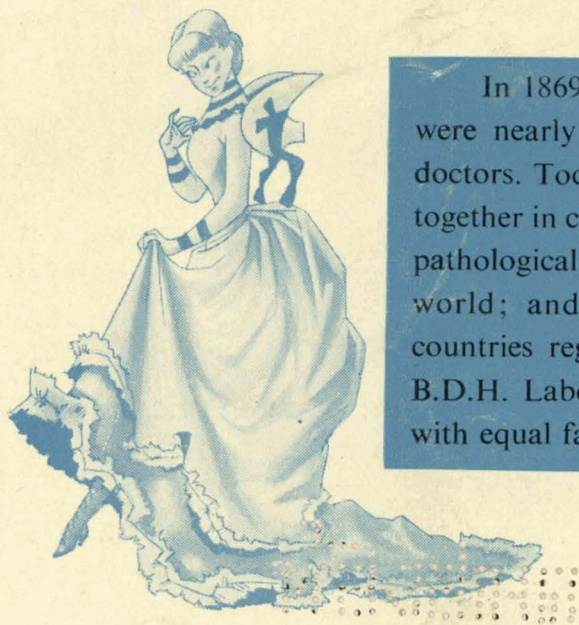
OL. LXXIV

12 MAY 1956

No. 1922

Ladies are to be admitted

"The 'Female Physicians' question, thanks to Professor Masson, has made a great stride during the past week. Ladies are to be admitted to study Medicine at Edinburgh University. Imagine the feelings of the non-contents when Professor Masson, in a final outburst, described their argumentation as 'rampageous mysticism, dashed with drivell from Anacreon!'" (Nature, 1869, I, i, 25)



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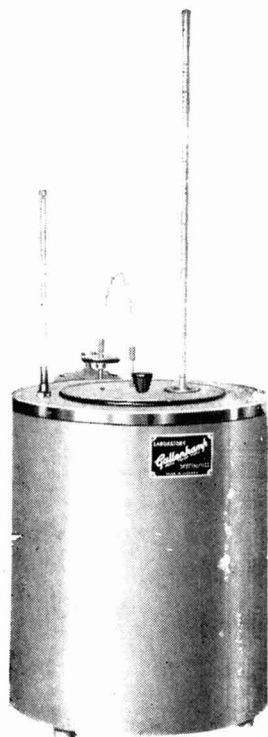
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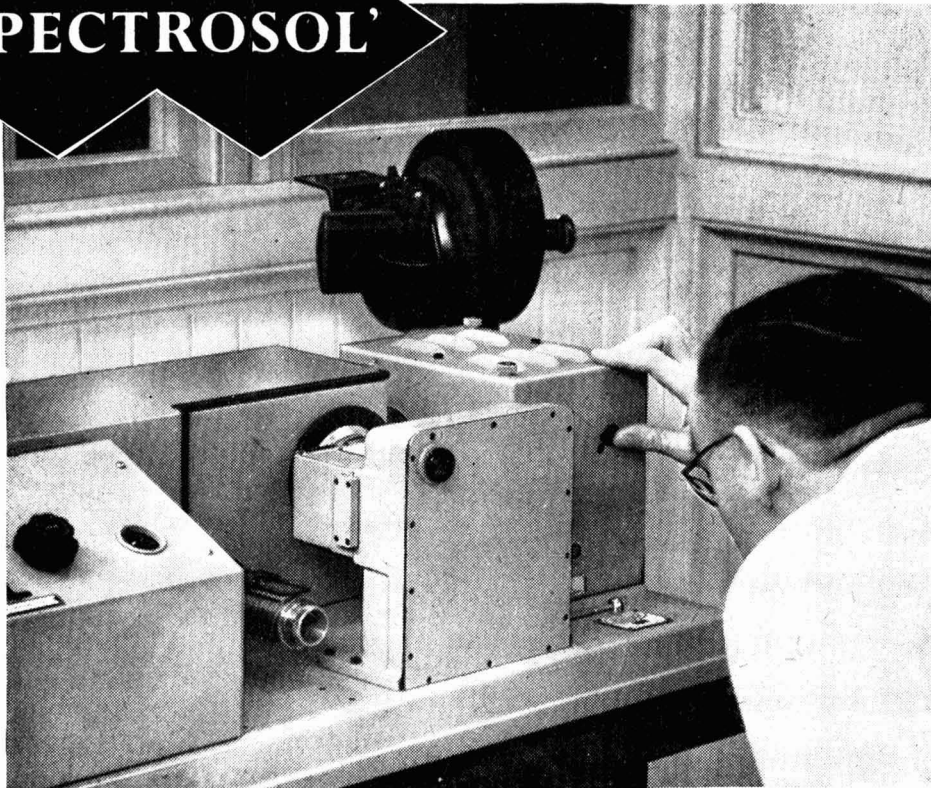
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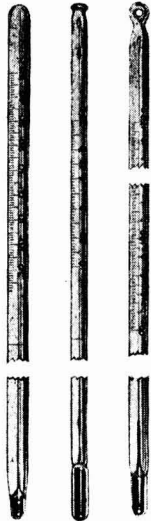
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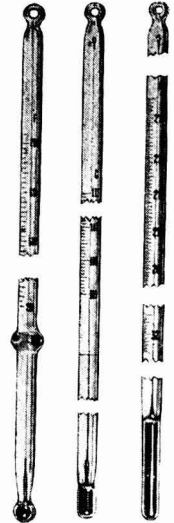
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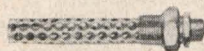
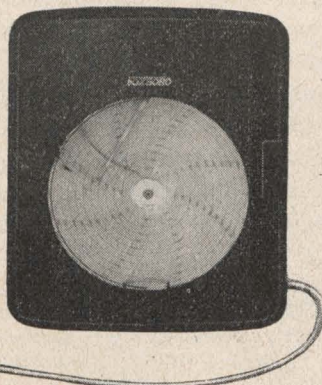


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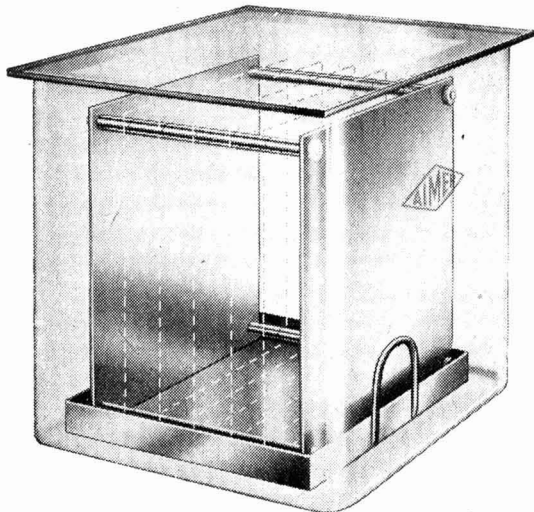


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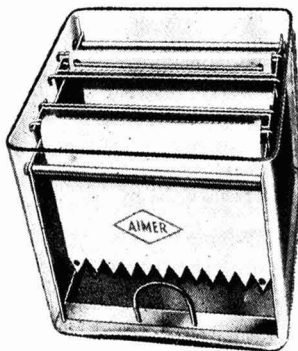
See CHEM. & IND., February 27th, 1954. Page 243



The apparatus is based on an all-glass tank, 12" cube, with a Chromatographic Frame, modified in size from that used by Datta, Dent & Harris (*Science*, 1950, 112, 621) to allow overnight runs on paper 10" square. The frame will accommodate 5 two-way chromatograms, or up to 50 one-way chromatograms, with ascending solvent flow in each case.

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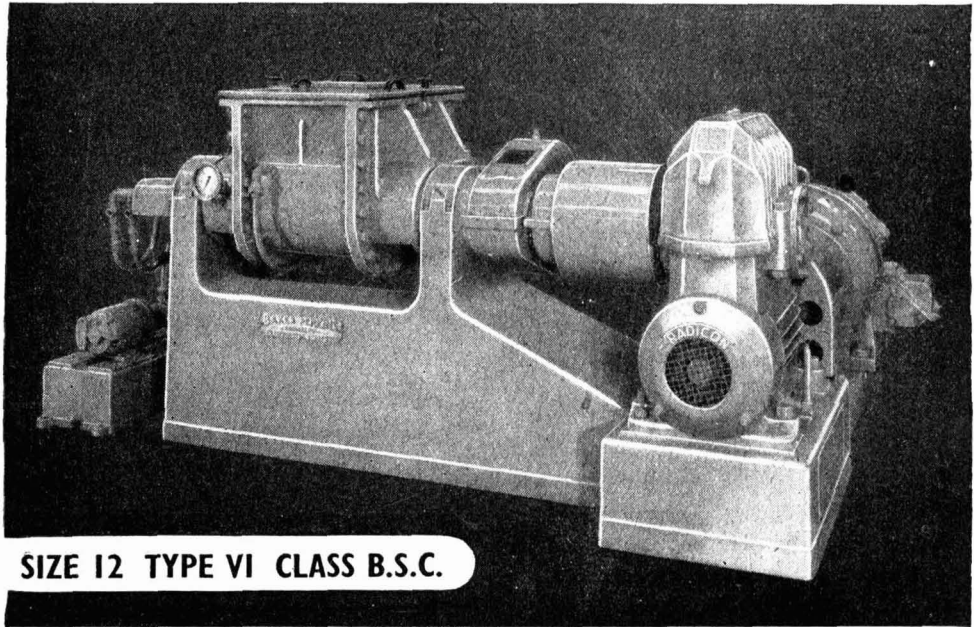
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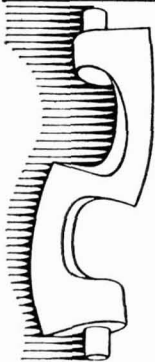
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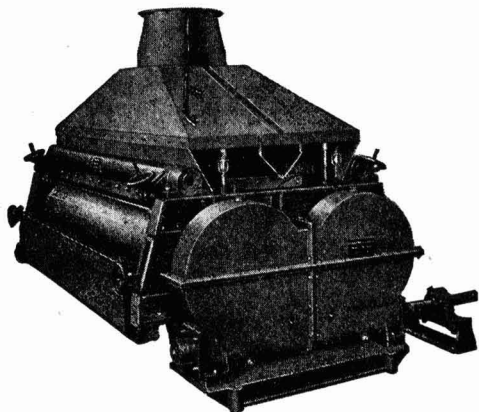
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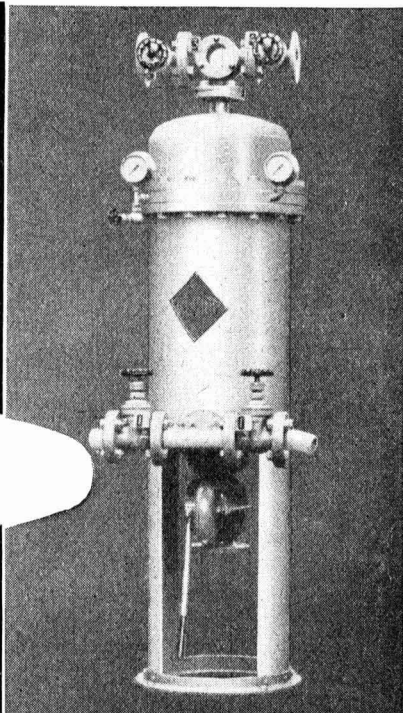
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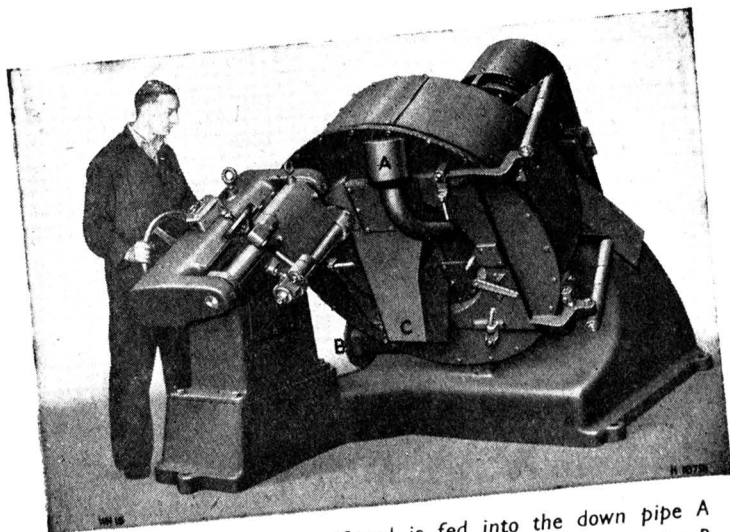
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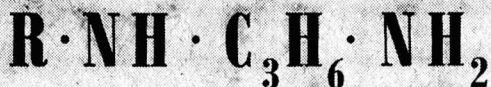
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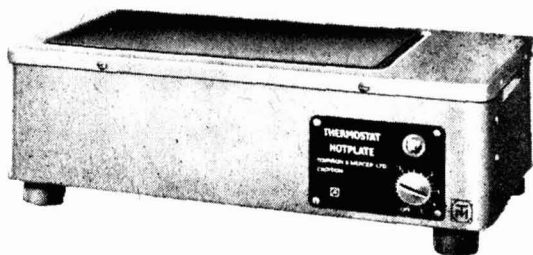
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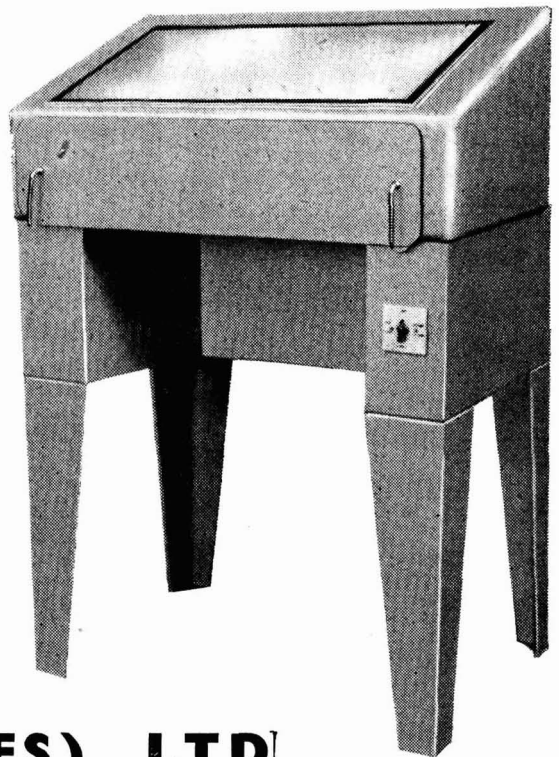
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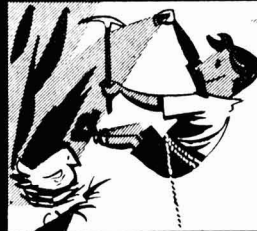
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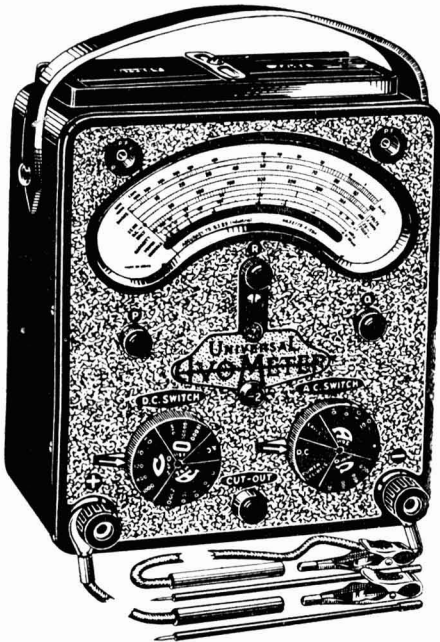
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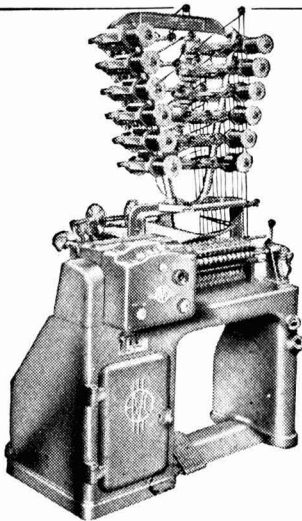
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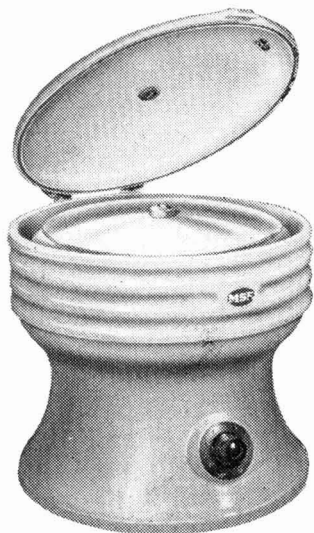
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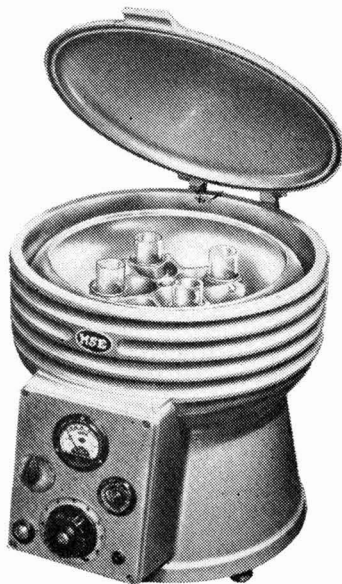
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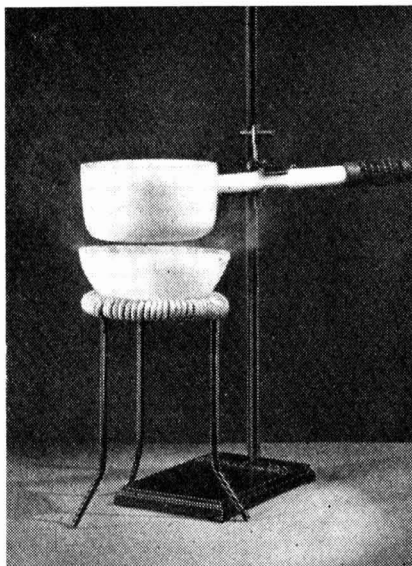
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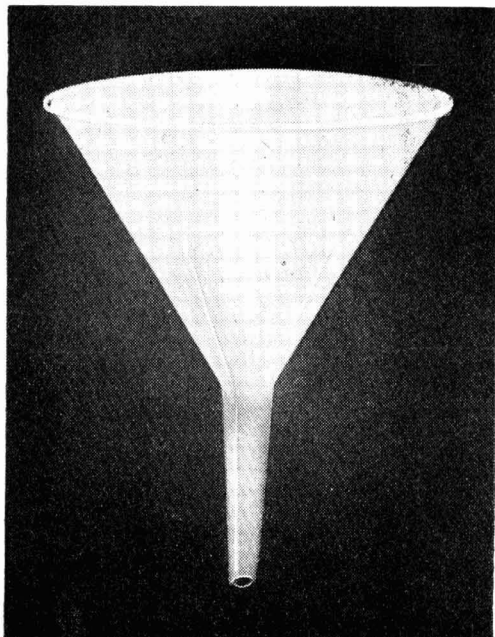
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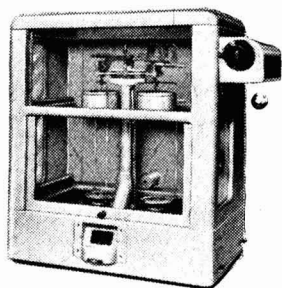
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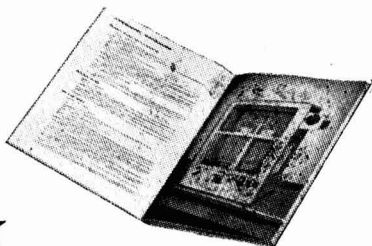
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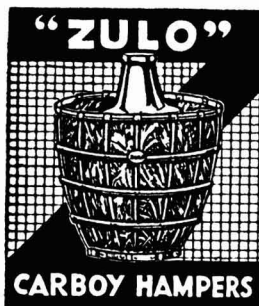
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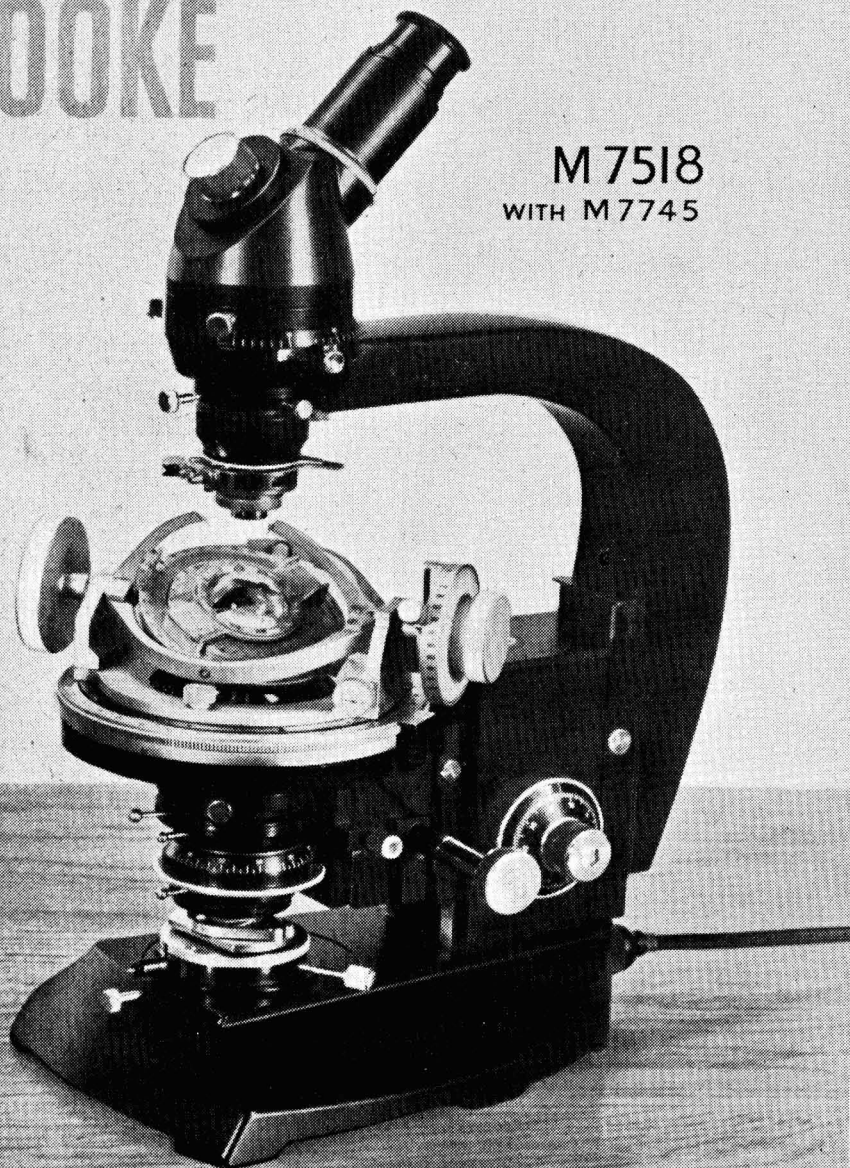
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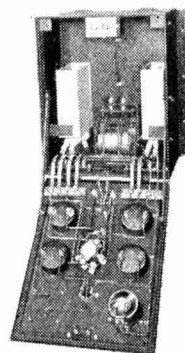
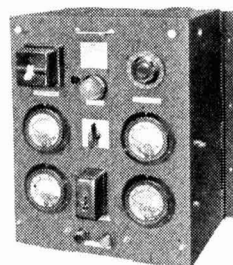
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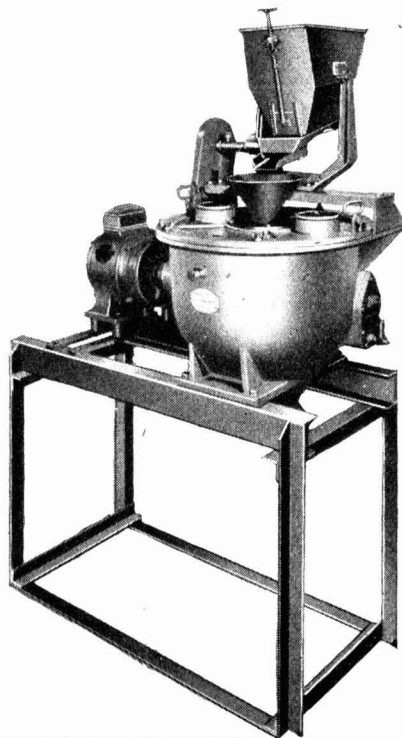
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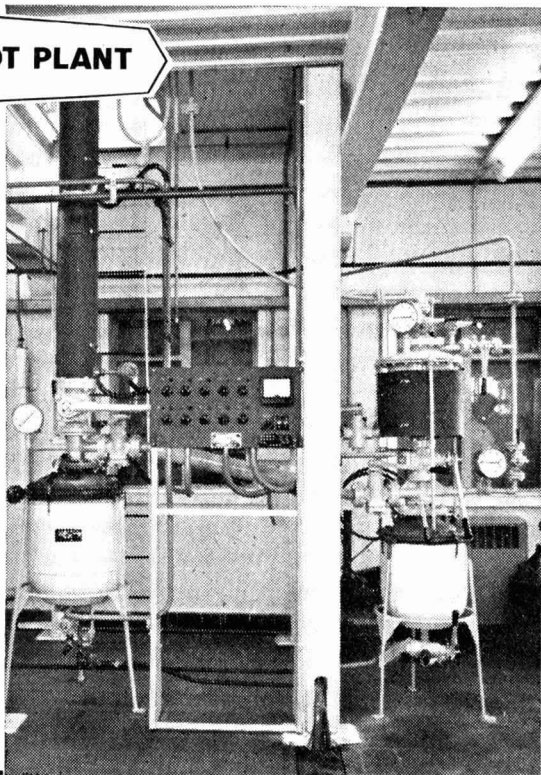
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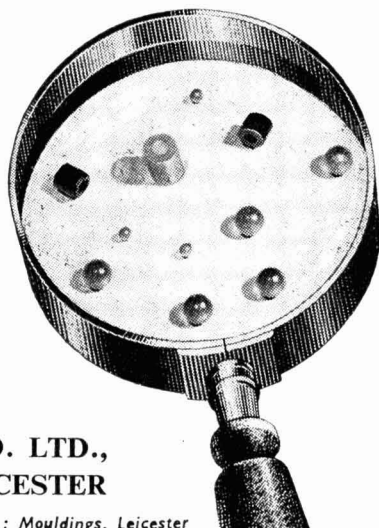
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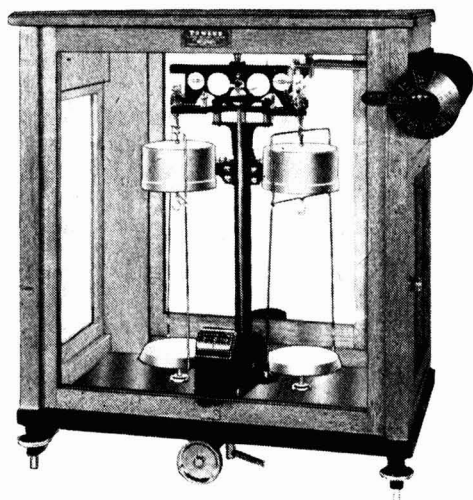
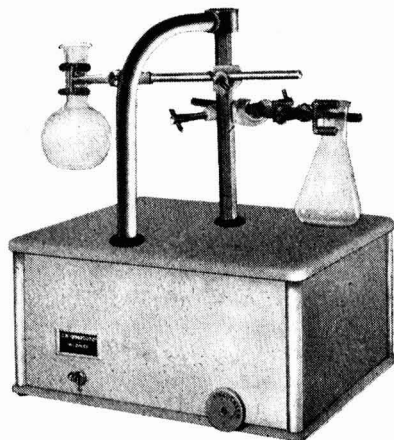


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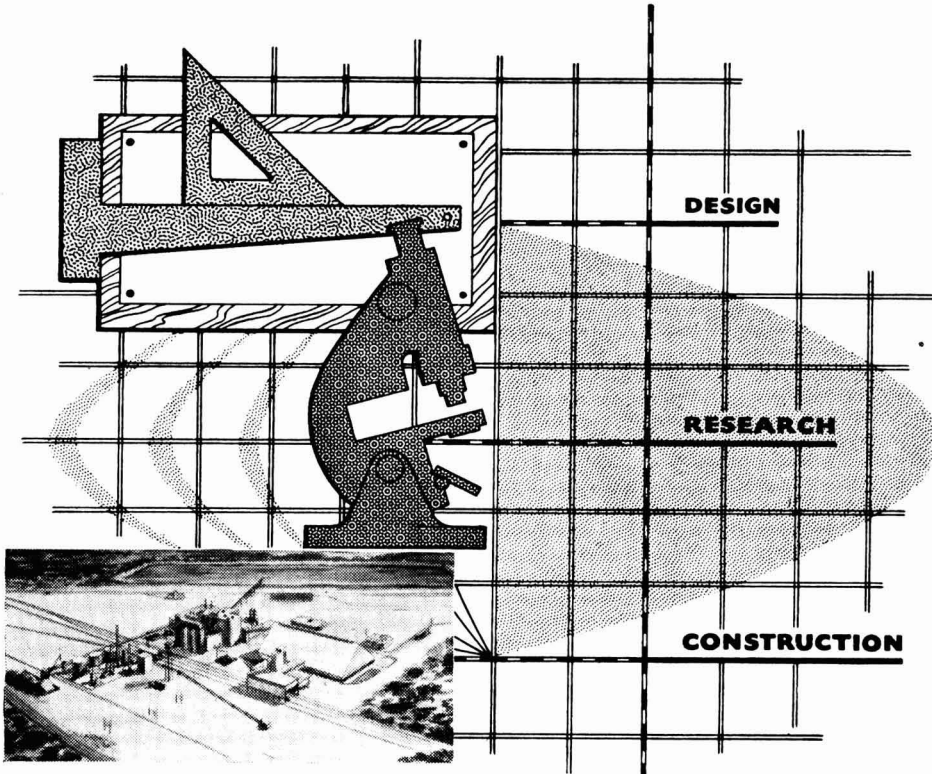
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The Weekly Journal of Chemical Engineering and Industrial Chemistry

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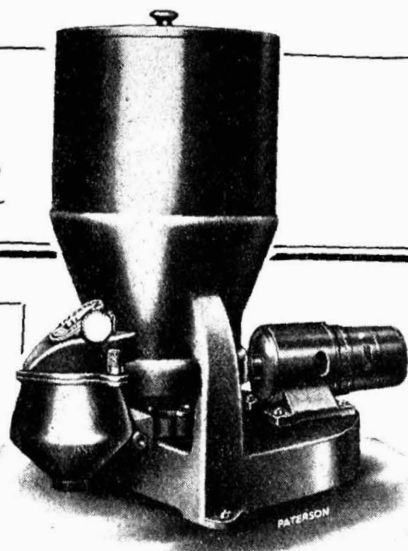
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Polymer Research

THE subject of plastics and polymer research was brought to the fore on two occasions last month by Sir Eric Rideal, when he addressed the Plastics Institute's London Section and when he delivered the dedicatory address at the new Monsanto research laboratories—which have been named after him—at Newport. Sir Eric Rideal's long and distinguished connection with colloid science tends to obscure in many minds his connection with plastics science. It is easy to forget that colloids are macromolecules, that our modern synthetic polymers are colloids no less than the longer-known macromolecules of 'Nature', that in short there is no intellectual dividing-line between the study of colloids and their properties and the study of what we call plastics. That there may be many practical or expedient dividing-lines, sectioning off one topic from another, makes no difference to this over-riding and fundamental unity.

It would be both trite and tedious to dwell upon the great modern expansions in the making and using of plastics. The phase of cheap and perhaps sometimes shoddy substitutions has passed, and an era of entirely new constructional materials, more often than not unique in their combinations of properties, has begun. Today's plastics are first-choice materials for many purposes, and sometimes they alone make new items of construction possible. Nevertheless, we have seen no more than the start of the beginning. As a branch of science or

technology—and obviously the study of plastics is both—is this major field getting enough research or the right kind of research? So far most of the developments have rested upon applied research—specific projects of chemical 'inventiveness' leading to new polymers and subsequently leading to studies of properties and potential utilizations. Empiricism has dominated. It is also true to say that this modern alchemy—it might not unreasonably be called polychemistry—has been largely conducted in private or commercial laboratories and research centres.

It was Sir Eric's main point in his address to the Plastics Institute that present research work in this country is nowhere adequate for the needs of the British plastics industry. He described the deficiencies as 'glaring'. And, as one sinister consequence of this general weakness, we are not training the right kinds of scientists, or enough of them, for the industry. We lack, above all, a centre for co-ordinated, fundamental work to study, for example, the kinetics of polymerization.

There is other evidence of this state of affairs. The DSIR's Chemical Research Laboratory has in recent years established a section or group for studying high polymers. The reports from this group have been concerned with fundamental behaviour, the development of methods for property measurement etc. Today CRL attention to a new field is

generally a sign that attention paid to it elsewhere is considered inadequate. No doubt this DSIR interest in high polymer science has been fostered to no small extent by Sir Eric Rideal's association with the DSIR's Advisory Council.

Another point made by him is that we should not as an industry rely upon the purchase of process rights from Germany and the US as we had done in the past, and as he felt we may have to do in the future. Some readers may not accept this as a fair point of criticism. The past of our twentieth century technology can be morbidly dwelt upon in many other fields. Neglect in research, neglect in scientific education, neglect in scientific reward—these have been general sins. At least and despite this, a single and great achievement can be acclaimed in polythene. Yet pride in this must be offset when the circumstances of polythene discovery and development are honestly analysed, the former with its marked element of chance, the latter with its marked pressure from wartime needs. Still, we should perhaps not indulge too enjoyably in self-denigration.

In his address at the opening of the new Monsanto research laboratories, Sir Eric said this: 'Almost every day we observe the penetration of the polymer into a new industrial field, a witness to the extent to which we can now synthesize and manufacture materials with specific properties. We must observe that the chemical properties as such are less affected by the state of aggregation than the physical, and it is these latter in which co-operative phenomena are involved which are most difficult to evaluate. The ease with which fibres can be drawn, the tenacity, ductility, and flexibility of the resulting filaments, the toughness, brittleness, crystallinity, mouldability, as well as such properties as elasticity, stability to creep, and the like, are all physical properties of importance for industrial purposes *but for many of them we have as yet but the vaguest idea as to their evaluation in any scalar quantity and but little clue as to the manner in which they are dependant on size, structure and intermolecular disposition.* . . . Again these properties are all modified by the incorporation of extraneous materials such as

plasticizers. Here again, even in spite of advanced electron microscopic or light scattering techniques, we find it difficult at present to decide whether we have, in any particular case, a one phase or two phase system. . . . This is the heart of the matter, or most of it. Outside science, or even merely outside this one branch of it, our state of ignorance about the fundamental physical chemistry of polymers may seem almost unbelievable when contrasted with the progress made in making and using new plastics and synthetic fibres.

A teaching centre is required no less than a centre for fundamental polymer research. At the Plastics Institute meeting, Sir Eric suggested a course of study leading to a diploma or Ph.D. in plastics or colloid science. Such a course would be comprised of the normal three-years honours degree, plus two or three years of post-graduate study and one year in the plastics industry. Here a familiarly general point is met once again—the crucial need for recognized schemes of training in specialized technology and which bring with them adequately recognized insignia of qualification.

If we may add comment of our own, we suggest that it is a fairly sound generalization to say that much of the past progress made in plastics creation and development has been the work of individuals. Indeed, in the early days progress was wholly due to the work and undefeated enthusiasm of a few. To this there may be a few exceptions and in recent years planned research operated by teams of workers may increasingly have entered the scene, especially in America. Now that the subject has widened and so vast a range of synthetic and complex possibilities is within our grasp, can we rely any longer upon the intermittent arrival and contributions of brilliant individuals? The answer is surely obvious. It seems no less obvious that out of any thorough attack upon the unknown physical chemistry of polymers there must inevitably come a great flow of important advances in technology, in applied or utilized knowledge. The national cost of any such effort would be trivial when set against its expectable by-products of economic value.

Notes & Comments

'The Drug Club'

AT THE Association of British Pharmaceutical Industry annual dinner recently, Mr. C. M. Hill, president, remarked that the Association began more than 60 years ago as the 'Drug Club'. Few of the original club founders could have visualized the growth of the club or the industry, or the transformation of its products. In 1955 export sales of British pharmaceuticals rose to £36,000,000, an increase of nearly 12 per cent on the 1954 total. At the same time, imports of pharmaceuticals fell from £9,600,000 to £7,700,000. Obviously, new production that reduces the need for importing specific drugs is as important to the country as production that is itself exported. A new committee to concentrate upon the interests of veterinary drug manufacturers is being set up; it is already supported by 27 companies. However, in the main field of human medicine, the basic problem of the British industry remains the same—the National Health Service is virtually a single customer whose needs dominate the home market. Price agreements must be delicate and difficult in such circumstances, and the ability of the industry to trade with an adequate profit margin can be endangered by over-hard bargaining. The advances made in export trading rest upon research and new investment and that in turn rests upon the home trade's profitability. At the dinner, the Minister of Health pointed out that the cost of NHS prescriptions had risen from £31,500,000 in 1949 to £53,000,000 (estimated) for 1956. He suggested that a greater proportion of the profits on export sales might be devoted to research!

Difficult Dilemma

CERTAINLY home trade in pharmaceutical chemicals presents a difficult dilemma in economic desires. Every Minister of Health must seek to keep the NHS bill for drugs down. Inasmuch as this process tends to penalize the industry's prospects, the industry must pay part of the price for an unbalanced national scheme. But it

may be questioned whether the total bill for NHS drugs should be considered as a single factor. Many prescriptions today save much greater costs in other kinds of medical treatment, including the removal of patients to hospitals. Shillings spent on drugs save pounds in other costs. Every increase in 'drug efficiency' works in that direction. Probably the truth is that the NHS drug bill has been inflated by drug progress more than by any other influence. The realistic solution is one that calls for Government courage, one that would be assessed as inexpedient today by most MPs—to raise the 1s charge for NHS prescriptions on the simple argument that a shilling buys less than a shilling did when this charge was first introduced.

Levington Research Station

THOUGH the birth of a research centre is not a rare event nowadays, Fisons' new station at Levington cannot be dismissed as a normal industrial development. It is not just a sop to the demand for research, nor a timidly conceived investment. Its 'plan' is both large and broad. As an example of the appropriateness of the latter term, all chemical research, including small-scale process studies, for the fertilizer and heavy chemicals section of Fisons will be carried out at Levington; yet the centre will also be the company's main station for soil science research, field experiments, horticultural research and similar enterprises. This is an unusual marriage, yet it may well prove to be harmonious and fruitful. Hitherto fertilizer technology research and plant nutrition or plant health research have tended to be carried out separately—at Levington they will proceed side by side and under the same direction.

Home & Foreign Ideas

SUCH a conception might fail if its form was too small, but there seems to be an adequate appreciation of this danger. The four main buildings, when completed, will be large, and surrounded by 400 acres of farmland. The staff will ultimately number more than

100 scientific and agricultural workers, and an estate is being built nearby for landworkers whose nearness to their duties will be essential. An interesting sidelight is that laboratory design has been decided by studying British and Swedish ideas, and emphasis has been placed upon flexibility by providing removable internal walls and demountable benches. Fisons' development as a company has been a most impressive event in British chemical history over the past 25 years. This new expansion of research capacity is characteristic.

Unilever Sales Increase

DESPITE increased labour costs and a cut in selling prices, a greater turnover and more normal trading margins in the US and Germany enabled the Unilever group to increase its profits in 1955. Unilever's sales for the year reached £1,500,000, about five per cent more than in the previous year, and 50 per cent more than in 1950. Combined trading profits are up from £70,095,000 to £85,455,000 and, after paying taxes, the group has retained £34,000,000.

Although all of the group's main branches of business—margarine, soap, synthetic detergents, toilet preparations, and food—did well during the year, one of the outstanding

successes was the rapid increase of synthetic detergents sales in West Germany. In the US the Lever Bros. Co. made a reasonable profit again after reconstruction of the management.

Capital projects approved by the group in 1955 amounted to £41,000,000, an increase of £8,000,000 over similar expenditure in 1954. Final dividends recommended are 9½ per cent on limited ordinary, and 8½ per cent on NV ordinary.

Fertilizer Exports

OUR attention has been drawn to an incorrect statement in the comment on nitrogen fertilizer exports in our issue of 14 April, pages 843-4. The sentence in question said that 'Recent monthly figures from the Board of Trade have shown sharp increases in our export sales of nitrogen' These figures were taken from the Trade & Navigation Accounts for February which, unfortunately, included an abnormally large element relating to exports that actually took place last autumn. In fact, total exports during the present fertilizer season are likely to be less than half the nitrogen fertilizers exported in the previous season (July to June). The Board of Trade informs us that 'suppliers are doing their utmost to meet demand for home agriculture, and have exported very little for the past four or five months'.



Mr. L. F. Waring, managing director of Coalite & Chemical Products Ltd. being presented to HM The Queen at the British Industries Fair on 26 April. In the background is Mr. Herbert Vallender who was in charge of the stand of the Association of British Chemical Manufacturers and who was largely responsible for organizing the Chemical Section at the BIF

Britain's Most Modern Laboratories

Shell's Egham Establishment a Showpiece

UTILITARIAN, convenient, commodious and flexible are the new Technical Service Laboratories of the Shell Chemical Company Limited at Egham in Surrey, but the feature which first attracts the attention is their unusual beauty. As they were only officially opened on 3 May the laboratories can be said to be the most modern in the United Kingdom but it is doubtful if anything so aesthetic is being built or even planned. Outside, the laboratories are impressive; inside, they are unusually pleasant. Undoubtedly they are the *pièce-de-résistance* of British laboratories.

Built and equipped at a cost of £300,000, including site and share of ancillary services, the laboratories have a total floor space of 23,000 square feet. Provision has been made for a total permanent staff of 80 and for additional staff attending courses. Their primary purpose is to give technical service to customers in evolving the most effective use of the company's petroleum chemicals.

Laboratory design, to be truly effective, must be a co-operative effort, a mixture of the architect's skill and the client's

experience. Laboratory techniques and processes are not so stable as some people think and flexibility in laboratory design and layout are absolutely essential. Ample room, services adequate to meet any contingency, correct size and spacing of benches, mobility and interchangeability of benches and other fixtures are only a few of the features which must be taken into consideration when designing chemical laboratories. The architects, Walker Harwood and Cranswick, obviously listened carefully to the advice of Shell experts before they undertook to design the Egham Laboratories.

A laboratory bench, together with the working space around it, was used as the design module giving the length and width of each laboratory as an exact multiple of the standard bench unit. Allowances were then predetermined for thickness of partitions, plaster, finishes, etc. and a permitted tolerance of $\frac{1}{8}$ in. was generally adhered to. The gas, water, electricity, compressed air, vacuum and drainage services, together with lines for the future provision of steam and nitrogen, were so arranged that any bench



The front entrance to Shell's Technical Service Laboratories at Egham. The conference room on the right is built over a spring-fed lake

can be turned through 90° or 180°, removed altogether, or re-positioned within a multiple of its length with the minimum of effort and without interruption to other services. The whole of the lateral partitioning can be removed and re-erected at any point along the unit line without affecting bench spacing or neutralizing service outlets.

The building is fundamentally a framed structure of a composite nature having reinforced concrete columns carrying steel lattice beams, these being so designed as to permit the free passage of ducts and services through the over-ceiling space. Suspended floors are hollow pot units used to reduce the overall weight.

The site was formerly swamp or marshland and the conference room is built over an attractive lake which has been created alongside the main building.

External cladding is generally of facing bricks used in areas of contrasting colour relieved with a limited use of colour-textured rendering and precast textured panels. The roof is of aluminium decking covered with built up mineralized felt.

Reinforced concrete has permitted the building of exceptionally graceful staircases based on the use of a central spine beam with cantilevered treads. The treads of the entrance hall stairs are of solid teak.

A constant temperature and humidity room is insulated with cork slabs sprayed internally with a plastic cocoon as a vapour barrier. The windows are double glazed, solar gain being prevented by the use of non-actinic glass externally and the use of built

in venetian blinds set between the two skins of glass. The air conditioning plant is housed in an adjoining plant chamber which is sound proofed, the equipment being supported on a floating floor so as to minimize the transmission of vibration.

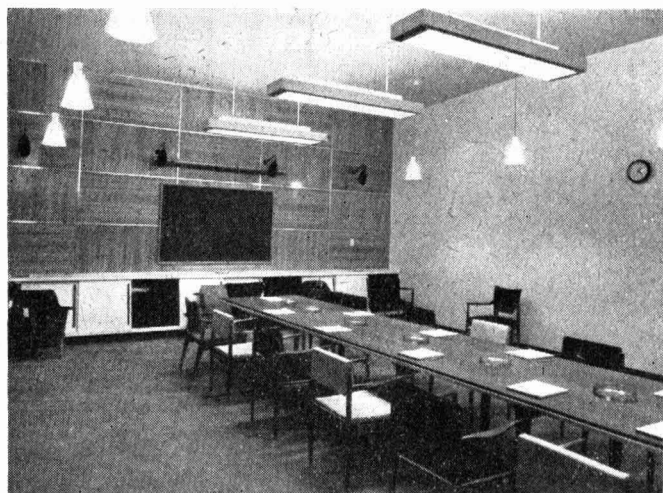
A suspended, or false, ceiling has been used throughout the establishment and the Frenger system of ceiling panel heating has been adopted throughout the laboratories and offices. Convectors have been used, located below the floor in the conference room and built into the walls of the two workshops.

Low pressure hot water is supplied from three oil burning boilers and is pumped through pipe coils forming the ceiling grid to which are attached perforated aluminium radiation panels. Automatic mixing valves control the water temperature in the various zones of the building.

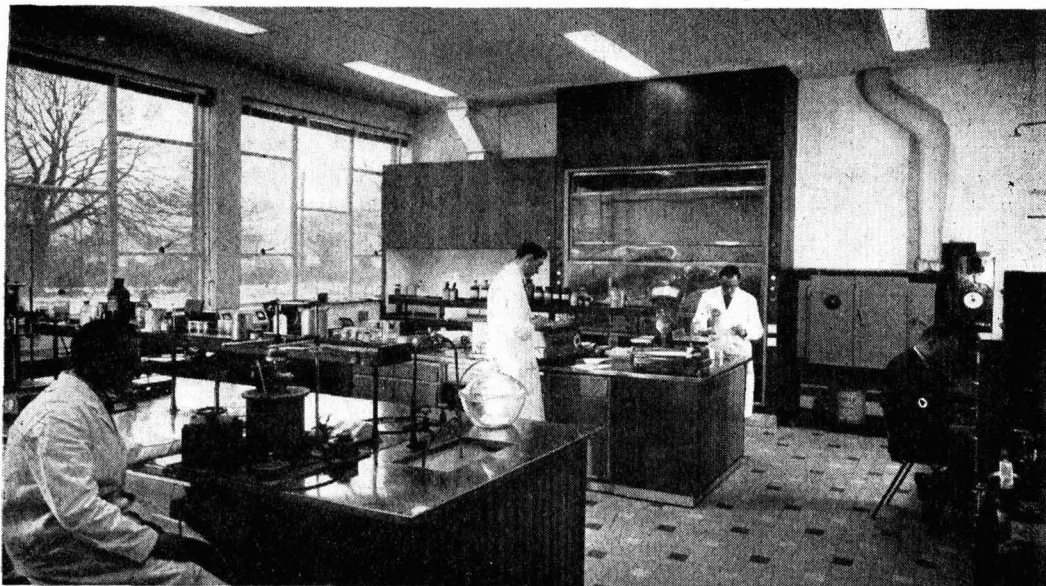
Main services are located in an external peripheral ring duct from which branches are taken into the building at regular intervals to serve benches and to provide simple connections in four positions and in two directions. Each branch service is separately controlled and can be isolated without disturbing or interrupting the mains.

A bus-bar system has been used for electrical services and the supply to island benches terminates in a nautical type water-tight floor box housing a 30 amp. socket outlet. Each bench is wired as a complete unit and simply plugged into the floor box.

The drainage system in the laboratories is of chemical stoneware, the effluent being



The conference room, one of the most attractively decorated rooms of its kind to be seen in any chemical establishment in the UK. The heating system is concealed behind the false ceiling



The plastics and resins laboratory. The benching and fume cupboards at Egham are not only utilitarian but of most attractive design and may well start a new fashion in laboratories

collected and treated in settling tanks before being pumped into the main drainage system.

Fume hoods and extract points have been provided at 10 ft. centres in each laboratory. Each fume cupboard or hooded bench is a self supporting unit and can be moved or re-arranged as required. To counteract the sudden temperature drop consequent upon the withdrawal of air through the fume cupboards, a make-up air system has been provided so that filtered air of the required temperature is drawn into the laboratories as needed.

Cellular ducting is used for all fume extraction, each hood or cupboard being separately ducted so as to obviate the danger of mixing incompatible gases. The ducts are collected through a vertical stack and discharged by means of centrifugal fans on the roof.

The furniture is as interesting as the building layout. It was all designed by the architects to Shell specifications and is based on the unit system, all units being standard and interchangeable. The island benches are double sided with a central rack 8 in. wide to house all services. The bench tops and pedestal units are self supporting and removable, leaving the service rack completely accessible for maintenance. Working

surfaces are generally of Moulmein teak except in the surface coatings and resins laboratories where bench tops are of stainless steel. Other woods used are sycamore and Japanese oak.

The fume cupboards are lined with stainless steel and are designed to give two working levels so as to permit the use of very tall apparatus and both high and low level extraction is provided with adjustable control.

The interior finishing of the laboratories adds greatly to the general attractiveness. In the labs the walls are plastered and finished with emulsion paint and the ceilings are of perforated aluminium finished with heat resisting paint. The walls are white and the ceilings a lemon yellow. The floors, of acid and solvent resisting mosaic tiles imported from Sweden, are green, white and grey. An aluminium foot rail around the benches and Thames Green doors add to the general effect. The Moulmein teak benches are fitted with beech doors and sycamore surrounds and their modern design might well set a new fashion; they are certainly the most attractive the writer has seen.

The floors in the corridors are laid with 18 in. × 18 in. linoleum tiles on the ground floor and pvc tiles of the same size are used on the first floor. In the conference room

the floor is fitted with a mustard Stockwell carpet. In this room the two end walls are faced with veneered panels of Olive Ash, one wall is entirely curtained and the fourth wall is plastered and painted. In the entrance hall the ceiling is painted black and coffered with suspended plywood panels painted dark red. The white walls have a mural decoration drawn from shells in the Shell Tankers Limited collection.

The building was designed by Philip Cranswick, A.R.I.B.A., A.M.T.P.I., of Walker Harwood & Cranswick and the architect in charge was R. A. Cox, R.A.I.B.A.

The principle function of the laboratories was not to fulfil an architect's dream but to provide a place where Shell scientists could study, with their customers in industry, the particular problems which may crop up in the use of Shell products. The aim was to combine a pleasing concept with operational efficiency and no one could say that this aim had not been achieved.

There are three main laboratories at Egham. The first of these, the detergents general chemical lab, will be used for solving technical service problems on detergents and other chemicals which do not come within the province of surface-coatings and resins. Like the other laboratories it is constructed with fume cupboards and hoods at either end and benches of unit design in between.

Special equipment includes a Du Nouy Tensiometer, a Comparator, a Lovibond Tintometer and a Draves Wetting Test apparatus.

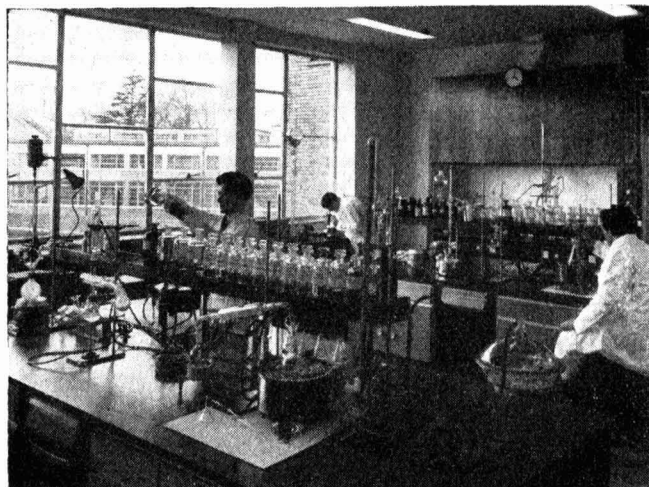
The surface-coatings laboratory contains nothing unusual in the way of equipment, but the resins laboratory contains such items as a Hounsfield Tensiometer, a Clash & Berg Low Temperature Torsion Meter, a Marconi Universal Bridge for measuring the electrical resistance of plastics, ASTM Heat Distortion apparatus etc.

The market development workshop—where sample lots and process thermosetting resins will be prepared—is equipped with a 5-gallon varnish kettle with instrument panel, a 10-gallon reactor with reflux, mills, presses, an extruder, a grinder, a drum drier for detergents etc.

The surface-coating workshop is a paint factory in miniature and equipment includes a sand blast cabinet, a ball mill cabinet, three roll mills, a change pan mixer, an edge runner, a paint rejuvenator, a humidity cabinet and other items too numerous to mention.

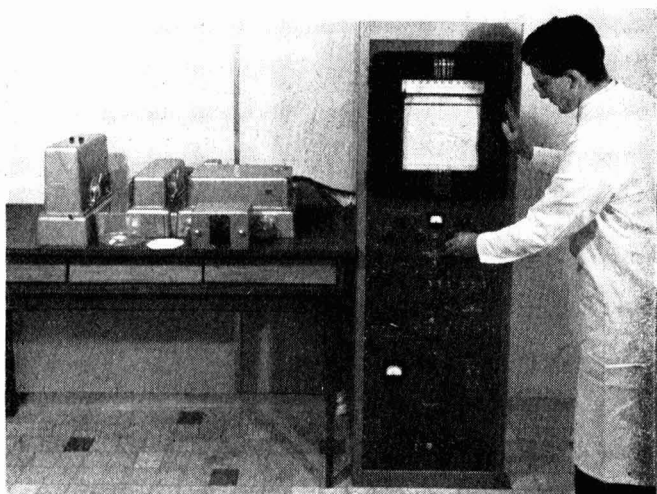
There is also a stoving and spray room, the constant temperature room mentioned previously and an adequate library. A display room illustrates the derivation, manufacture and application of the chemicals marketed by the Shell group. The exhibition is arranged as a series of panels showing the location of chemical plants, a flow diagram illustrating the manufacture of chemicals derived from petroleum refinery gases and a number of working models on the application of these chemicals.

The analytical laboratory will serve the other three laboratories. Among other



Sir Robert Robinson's research team in one of their laboratories. Some of the labs are equipped with stainless steel topped benches but here the tops are of teak

Perkin-Elmer double beam universal spectrophotometer (for infrared-extreme ultraviolet), one of only two such pieces of equipment in Britain



apparatus it contains a portable colorimeter, a flame photometer, a titration bench and a Karl Fischer apparatus for the determination of moisture in samples.

Sir Robert Robinson's laboratory is engaged in fundamental research and is not part of the Egham Technical Service Laboratories. It contains a Perkin-Elmer Universal Spectrophotometer which operates

over a range ultraviolet to infrared including the visible spectrum, and which is used to study the internal structure of organic compounds. The only other instrument of this kind in the United Kingdom is at Glasgow University. Vapour phase chromatography apparatus is used to separate and identify volatile compounds having very similar boiling points.

Borax Forms US Company

Tax Advantages & Research Grants

BORAX Consolidated Ltd. has formed an American company to carry on its mining, refining and distribution activities in the US. At the same time the company's non-US business is being transferred to a new UK subsidiary operating company. Borax Consolidated Ltd. will therefore become a holding company owning shares in British and overseas subsidiary companies.

Members of Lazard Freres & Co., Lee Higginson Corporation, F. Eberstadt & Co., and Rockefeller interests, all of New York, have been invited to join the board of the new US company. They have also agreed to invest approximately \$7,000,000 in the equity capital of the new company.

Provisional loan arrangements have been made with the Equitable Life Assurance Co., of New York, The Chase Manhattan Bank, of New York, and The Farmers & Merchants National Bank of Los Angeles, who have agreed to make available \$16,000,000 at a rate of interest averaging approximately

3 $\frac{7}{8}$ per cent, with repayment over 20 years.

An important step in the company's policy of diversifying its products is the proposal to merge the United States Potash Co., in which Borax Consolidated Ltd. has for many years had a substantial interest, into the new American operating company.

Borax Consolidated Ltd. states that these decisions should enable the new American company to secure the tax advantage which the US depletion allowance is intended to give. UK tax on American profits will arise only in respect of dividends remitted to the parent company. The new American company should also be able to participate in the research grants given in the US to American companies operating in certain fields. It should also be favourably placed to co-operate closely with American official departments in special research work.

According to Borax Consolidated, the three most important advantages to the company of these decisions are:—retention of the company in the UK; reduced burden of taxation; and financial strength to provide for expansion in the foreseeable future.

Ziegler Process Expensive

Shell Cautious About LP Polythene

SPEAKING during a visit of Press representatives to his company's Technical Service Laboratories at Egham, Surrey, on 2 May, Mr. L. H. Williams, managing director of Shell Chemical Co. Ltd. made a cautious statement regarding Ziegler low pressure polythene. It was obvious from his remarks that Shell are not so wildly enthusiastic about the commercial prospects for this commodity as are several American and European companies who have rushed into the building of large-scale plants.

Shell Chemical Co. Ltd. had been criticized in various quarters, said Mr. Williams, regarding announcements about the Ziegler patents for which the company holds sole UK rights. But this type of development was an extremely complicated business and in Shell they did not believe in rushing into things without careful study and so they had deliberately held back.

Brilliant Piece of Work

Ziegler's work was a brilliant piece of chemistry but all they had was the chemistry and it was up to the company to translate it into industry. That was what Shell was doing at the moment—they were in the thick of it now—going through the pilot plant stage. A semi-commercial-scale plant of about 1,000 tons per annum capacity would come on stream in about 12 months' time but where things would go from there it was impossible to say.

The manufacturing process of Ziegler low pressure polythene was complicated and there were several items on the expense account. Among these was the need to kill the catalyst and the high cost of the solvent. No matter how careful you were there would always be some loss of solvent. There was no cheap process and it might well be that the low pressure polythene would be more expensive than high pressure polythene. This would not deter Shell from carrying on their work for the two products had quite different properties; but they were now calculating whether the premium price which could be obtained for low pressure polythene would compensate for the cost of the process.

Shell were sparing no money in investigating Ziegler polythene. In a year's time they would know a lot more about the possibilities than they did at the moment. Ziegler chemistry was an entirely new and exciting field.

Mr. Williams also revealed that of the £20,000,000 which Shell intends to spend on development during the next three years a proportion will be spent on building plant for the production of styrene monomer. Plans have also been laid for the production of ethylene dioxide at Partington. The company (said Mr. Williams) was also doing some pretty deep calculations regarding possible demands for artificial rubber and if some day it was found that a gap existed or was likely to develop between the supply and demand, Shell might decide to fill the gap themselves. In the US their associated company was already in the artificial rubber business on a large scale.

Esso Research Ltd.

ESSO Petroleum Co. Ltd. announces that the name of its research affiliate company in the UK has been changed from Esso Development Co. Ltd. to Esso Research Ltd.

The company was originally incorporated as Esso Development Co. Ltd. in May, 1946, though research had been carried on for some 12 years before then under the name of Esso European Laboratories, first at Vauxhall and later at Abingdon, Berks.

Under its new name, the company will continue to co-operate with the Esso Research & Engineering Co. in the US in carrying out research on behalf of the British, European and North African affiliates of the Esso Group.

The company's head office will remain at 33 Davies Street, London, W1, where the managing director, Mr. C. S. Windebank, will have his headquarters. The laboratories near Abingdon, which form the major part of the company, are principally engaged in research on petroleum products and technical marketing problems. They also undertake chemical and process projects according to the needs of the affiliated companies served by Esso Research Ltd. A five-year expansion programme, recently started at Abingdon, will include new research laboratories, offices and test engine buildings.

Coal Gasification

Our attention has been drawn to the fact that the quantity of coal used annually in the new plant at Dorsten, Western Germany (THE CHEMICAL AGE, 74, p. 954) is 335 thousand tons and not 335,000,000 as published.

Indian Newsletter

FROM OUR OWN CORRESPONDENT

THE Nangal Fertilizers & Chemicals Ltd. has been registered as a private limited company to take over the control and management of the Nangal fertilizer-cum-heavy water project of the Indian Government. The company will have an authorized capital of Rs 300,000,000 (£22,500,000). The fertilizer-cum-heavy water factory to be set up at Nangal will have a capacity of 70,000 tons of nitrogen in the form of ammonium nitrate and about seven to eight tons of heavy water per annum. The secretary of the Ministry of Production, Government of India (Mr. S. S. Khera), will be the chairman of the board of directors which will include eight other members drawn from the Government, the public and private industries.

The Indian Government has decided to erect two additional fertilizer factories. One will be at the steel site at Rourkela (Orissa) and the other at the lignite site at Neiveli (Madras). The Rourkela factory will utilize the coke oven gas from the steel plant which is to come up with German assistance. The fertilizer factory there will have a capacity of about 80,000 tons of nitrogenous fertilizers per annum. The factory at Neiveli will be part of the lignite project and will have a capacity of about 70,000 tons. The factories are expected to cost Rs 300,000,000 (£22,500,000) each.

India's production of nitrogenous fertilizers in 1955-56 (fixed N) is estimated by the Planning Commission at 14,000 tons, while the estimated requirements during 1960-61 are anticipated to be as high as 370,000 tons. Production in 1961 is expected to reach a level of 45,000 tons per annum only. Current production of phosphatic fertilizers (P_2O_5) is estimated to be around 20,000 tons while the requirements in five years' time are expected to be about 120,000. It is hoped to produce this quantity in the country by 1961.

* * *

The Indian Aluminium Company, which is a joint Indian and Canadian enterprise, has finalized an agreement for setting up an aluminium factory at Hirakud (Orissa) with an annual capacity of 10,000 tons. Work is expected to commence shortly.

Under the proposed agreement, the Orissa Government is to supply 20,000 kW from Hirakud to the new smelter, whose ultimate capacity will reach about 20,000 tons. The company has asked for an additional 5,000 kW for an aluminium sheet rolling mill and for about 200 acres of land for the construction of works. This venture will have a capital investment of approximately Rs 75,000,000 (£5,625,000).

* * *

The Indian Tube Company, a joint venture of the Tata Iron & Steel Company, Jamshedpur, and Stewart & Lloyds, of London, was recently inaugurated by the Chief Minister of Bihar at Jamshedpur. The scheme envisages an investment of Rs 80,000,000 (£6,000,000) and an ultimate production of 90,000 tons of steel tubes. The chairman of the British firm, Mr. A. G. Stewart, paid a tribute to Tata and expressed the hope that the new plant would make a valuable contribution to India's second plan.

* * *

A new company, Polychem Ltd., has been formed with a share capital of Rs 8,000,000 (£600,000) to manufacture and deal in styrene, polystyrene, vinyl chloride, polyvinyl chloride, polythene, cellulosic plastics and other thermosetting materials besides a range of other chemicals such as acetylene, plastics, adhesive composites, insecticides, weedkillers, drugs, pharmaceuticals and hormones. The promoters of the company have entered into an agreement with the Dow Chemical Co. of Michigan, US, for the exclusive grant to the company of the formulæ for the manufacture of polystyrene moulding powders in India by the continuous technique of polymerization, and other technical assistance. The Dow Chemical Co. is represented by two men on the seven-member board of directors. The supply of styrene monomer has been provided for a period of five years. The factory will be at Goregaon in the Bombay suburban district. This is the only plant sanctioned by the Government in India for the manufacture of polystyrene.

The consumption of polystyrene in India for the plastics moulding industries has grown from 2,000,000 lb. in 1948 to about

5,000,000 lb. in 1954. The All India Plastics Manufacturers' Association has estimated a consumption of 10,000,000 lb. annually during the second five-year plan period. The company's plant has been designed to a rated capacity of 6,000,000 lb. of moulding powder per annum with provision for doubling the capacity of modified polymer. Scope has been provided for the development of other products such as Styrofoam, Styroflex, paints and important chemicals.

The National Carbon Co. (India) Ltd. plans to produce polythene and ethylene dichloride in a new plant which is expected to go into production in 1958. The company, which began operation in India in 1934 with the manufacture of batteries, plans to establish a fully equipped factory for the manufacture of flashlight cases. A new zinc rolling mill is also under construction for the production of high quality zinc alloy strip for the dry battery trade and the new plant is expected to go into production in a few months' time.

* * *

The export of several categories of ores and minerals will be encouraged in the second plan period with a view to securing a sizeable foreign exchange. The Government of India has under consideration, according to the Deputy Finance Minister in the Indian Parliament recently, a project for additional transport facilities which would enable export of larger quantities of iron ore to Japan. It is likely that the project would be partly financed out of the US President's Fund for Asian Economic Development, for which an amount of \$100,000,000 has been allocated by the US Government this year.

* * *

The Government has decided to nationalize the diamond mining industry in Panna and a copper mine in Rajasthan (not the Indian Copper Corporation). A committee was set up by the Government to investigate the diamond mining industry in Panna, Vindhya Pradesh, which recently recommended top priority for the development of the industry in the country. It was pointed out that the present operations of about 2,000 scattered traditional miners in Panna working over an area of 200 square miles were unsystematic and unscientific. The committee had favoured the creation of an independent corporation with virtual monopolistic rights over the country, and

the Government participating substantially in the finances of the corporation. The committee had hoped that such a corporation would contribute to the efficient working of the valuable mineral in the country.

* * *

A survey of India's pharmaceutical and dyestuff industries has been undertaken jointly by Indian and Russian experts to examine the scope for future development and expansion. The survey by six Russian and six Indian experts is expected to take about three months, at the end of which a report will be prepared. The experts will obtain first-hand knowledge of the conditions by visits to factories and other centres in India.

* * *

The Government of India have now signified acceptance of the detailed project report for the Bhilai Steel Works to the Deputy Minister of Iron & Steel of the USSR. The report, which is a sequel to discussions by the Indian Steel Mission with authorities in the USSR last September, proposes a plant consisting of three blast furnaces for producing iron. The output of the furnaces will be significant in view of the use of high top pressure in the blast furnaces and the sintering of iron ore. Six straight basic open hearth furnaces will produce steel in ingots of six to seven tons in weight. The large 1,150 mm. blooming mill will handle 10 ton ingots and the rolling mills are of modern design. The plant capacity will be 3,00,000 tons of saleable pig iron, plus 1,000,000 tons of ingots yielding 7,77,000 tons of rails, heavy, medium and light structurals, sleeper bars and billets. With slight additions to the plant such as an open hearth and a group of soaking pits, the capacity can be easily raised to 1,300,000 tons of ingots. There is ultimate scope for doubling the capacity. The equipment of the plant and construction will cost Rs 1,10,00,00,000, of which about half will go towards equipment to be supplied by the Soviet Government.

* * *

The Indian Patent Centenary was held in Calcutta recently and attracted considerable attention from the Government, inventors and the trade. The number of patents issued in recent years, particularly in the fields of chemicals and pharmaceuticals, has greatly increased.

Recent Developments in Scientific Instruments

The British scientific instruments industry in recent years has achieved considerable success in overseas markets, because of the excellent quality of its products. During the past 12 months some of the research which is constantly being carried on resulted in the introduction of several new instruments and improved models.

Following are brief descriptions of some of these new improvements.

A NEW Avometer which is claimed to be capable of passing all climatic and durability tests has been produced by THE AUTOMATIC COIL WINDER & ELECTRICAL EQUIPMENT CO. LTD. This instrument, the Panclimatic, is made from a moulding powder which produces mouldings which have good insulation properties and resistance to fungus growth. Externally the instruments in this new range are identical with the standard Avometer but the mouldings are in brown instead of black. Internally, certain components have been potted to protect them from moisture.

The photograph below shows two mouldings which have undergone the Government climatic and durability tests. The right hand panel was produced from standard moulding powder and many white patches of fungus are visible. The left hand panel was made from the new fungus resisting material and is perfectly clean.

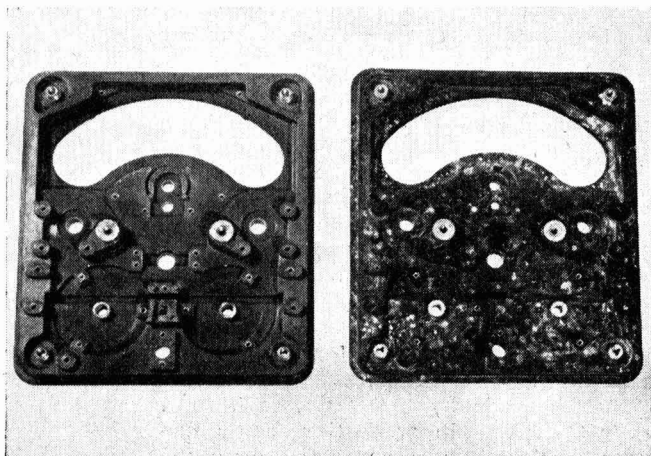
MUCH work has been done by BAIRD & TALLOCK LTD. on the development of the Analmatic laboratory. These instruments are intended mainly for the large scale in-

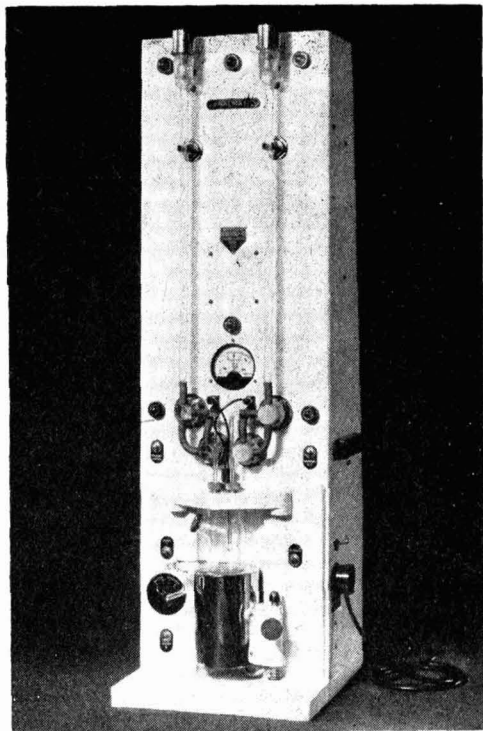
dustrial laboratory where repeated analyses of a standard type are carried out. For the smaller organization where some degree of automatic working is necessary, a range of Analmatic instruments has been developed. These instruments are of a type normally found in an analytical laboratory but they have been developed for partial automation.

The first of this series is the Karl Fischer electrometric titration apparatus for the determination of moisture. This instrument contains electronic circuits which enable it to carry out titrations automatically. The burettes can be refilled by turning a selector switch and the titration proceeds automatically by pressing a button, the end-point being indicated by a red pilot light. The results are claimed to be reproducible to within ± 0.1 ml., which is as accurate as a good manual titration.

OPTICAL instruments with many applications are made by C. BAKER OF HOLBORN LTD. The Baker-Smith interference microscope can be fitted with both fringe and half-shade eyepieces. The fringe eyepiece is fitted when it is desired to make measurements by the

Mouldings for Avometers made by The Automatic Coil Winder & Electrical Equipment Co. Ltd. The moulding on the left was made from special fungus-resisting material and shows no sign of fungus growth after undergoing the Government climatic and durability tests





The BTL Analmatic Karl Fischer Apparatus for the determination of moisture

fringe deformation technique. The half-shade device is claimed to enhance considerably the sensitivity with which visual measurements may be made. A new instrument is the surface finish interference microscope which uses an optical system formulated by Mirau in which the two beams are only separated over a very short distance. The reference surfaces are integral parts of the objectives, and for any given power only one objective, instead of the usual pair, is required. Two new features are incorporated in the series 4 research microscope; a rigid, rack-focusing bracket with sliding changers, and an increase in the width of the slides to $1 \frac{9}{16}$ inch between centres together with the use of $\frac{1}{4}$ inch ball bearings to give a more responsive and stable movement.

A VARIETY of apparatus for the measurement of materials in the course of manufacture is made by the BALDWIN INSTRUMENT Co. LTD. In production is a transverse profile substance gauge for measuring

transverse variations in the weight per unit area of materials such as paper, board and plastics. A prototype has been developed of a comparative densitometer which is claimed to facilitate the comparison of the density of an unknown with that of a standard to a high degree of accuracy.

An instrument used in the textile, rubber, plastics, paper and explosives industries as well as in hospital operating theatres is the Statigun static charge detector which measures potential gradients in air over the range 0-300 kv per foot.

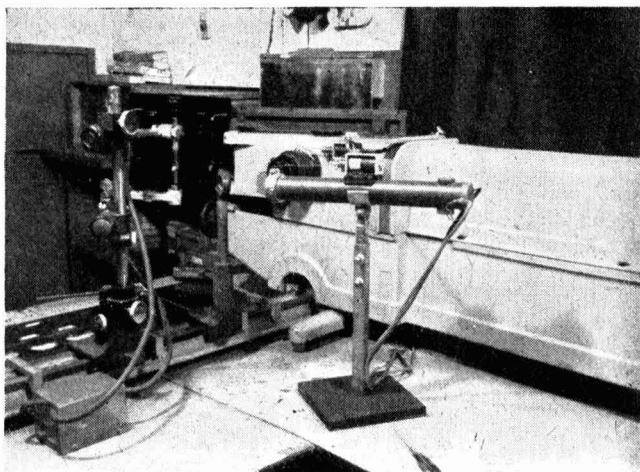
The level of material in hoppers may be controlled by means of the gamma ray hopper level controller, which consists of a suitable gamma ray source such as cobalt 60 or caesium 137 and a detector so mounted that the gamma ray beam passes through the vessel at the required control level. The detector is connected to a separate power pack and amplifier unit. This carries signal lamps and relays to indicate when the level rises above or falls below the radiation beam. The instrument can also be used to detect the boundary between liquids of significantly different densities.

FURTHER development and tests have been carried out on the particle crushing microscope introduced last year by R. & J. BECK LTD. and it is now available as a production model. The crushing technique enables rapid identification and assessment of mixed particle samples, since each material behaves characteristically when subjected to the crushing pressure. This pressure is applied by means of a special sub-stage condenser system having a lens of short radius in contact with the under surface of the specimen mount. The behaviour of the material under test can be studied both during and after the crushing process.

Development work on the micro-spectroscope has now been completed by Beck and the apparatus is now in production. The results of practical experience have been incorporated to improve the instrument still further. The illumination has been improved and minor modifications to increase the versatility have also been incorporated.

A PIPE line refractometer for monitoring the refractive index of a solution in a pipeline is under construction by BELLINGHAM & STANLEY LTD. The instrument will only be suitable for transparent liquids since the light beam passes through a 60° prism composed of the liquid. Any alteration in

This instrument was constructed by the BSA Group Research Centre to control the exposure period in a spectrograph, giving photographs of consistent density for rapid steelworks analysis



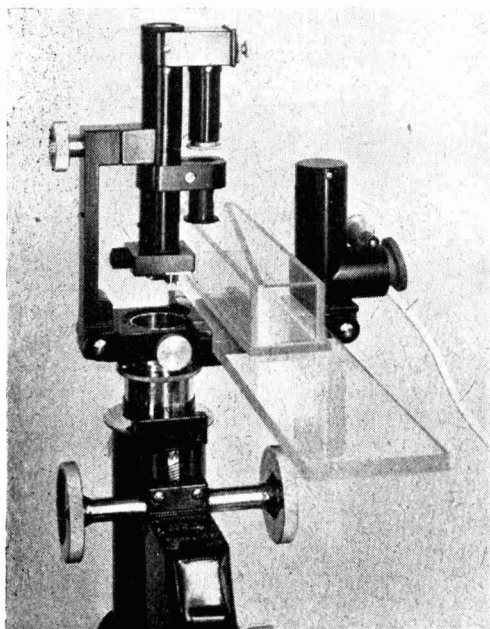
refractive index causes an alteration in the deviation of the light leaving the prism. This change of deviation is corrected by means of an adjustable mirror. The amount by which the mirror has to be adjusted is a measure of the change in the refractive index. The mirror is coupled to a transmitter which operates an indicator, or indicators, situated wherever desired, up to a mile from the instrument. The indicator can be calibrated directly in terms of

refractive index or in terms of some quantity, such as strength of sugar solution, which is proportional to refractive index.

In some branches of polarimetry the visual instrument cannot always be used and Bellingham & Stanley have produced an instrument which uses a photoelectric cell in place of the eye in order to determine the match point. This device cannot be attached to an existing instrument.

AUTOMATIC control of spectrographic equipment is the purpose of an instrument designed by the BSA GROUP RESEARCH CENTRE. This instrument was constructed to control the exposure period in a spectrograph, giving photographs of consistent density, for rapid steelworks analysis. It incorporates two basically similar timing circuits utilizing GTIC thyratrons. On pressing the starter button the spark is ignited and the first timing circuit is energized. When the pre-spark interval (0.50 seconds in 10 second stops) has elapsed, relays are operated opening shutters on the spectrograph and on a photo-cell unit, and the second timing circuit is energized. This circuit recloses the spectrograph shutters after a further interval, determined by the integrated light output from the spark, at the same time switching off the spark.

Filters of various designs including Buchner funnels, aerators, beaker filters etc. are also made by this group and are available in porous stainless steel over a wide range of permeabilities and pore sizes. In addition to their uses in analytical laboratories these filters are aids in the study of air pollution, gas cleaning problems etc.



The Microspectroscope made by R. & J. Beck Ltd.

FOUNDED 75 years ago, THE CAMBRIDGE INSTRUMENT CO. LTD. manufactures a wide range of industrial, scientific and medical instruments.

Development has been progressing in the last year on the dissolved oxygen recording outfit. This apparatus has been designed specifically for recording the extremely low concentrations of dissolved oxygen in the water fed to modern turbo-electric sets. The analysing unit of this instrument is based on an adaptation of polarographic principles. When a small potential is applied between two suitable electrodes immersed in water which has been rendered conducting, a current will flow whose magnitude will depend on the concentration of reducible substances in the water. The value of the potential determines which substances will produce a current. By using two cells with two different potentials it is possible to obtain two currents, one of which is proportional to the concentrations of certain impurities and the other proportional to these impurities plus dissolved oxygen. The difference between the two currents is a measure of the dissolved oxygen.

Interference from other dissolved substances is small and their effect may be determined by polarography.

Designed primarily for the jam making industry is a new type of thermocouple which compensates for changes in barometric pressure when measurements are made of the temperature of boiling jam. The thermocouple is arranged differentially so that one junction is immersed in the jam and the other in steam produced by a hypsometer. Changes in the barometric pressure cause equal changes in the temperature of the jam and steam, and there is no resultant temperature difference (or thermo-emf) occasioned by the pressure change.

AN experimental electronic photographic printer is being developed by CINEMA-TELEVISION LTD. This is designed to give uniform contrast prints from variable density negatives. Basically the negative is scanned by a flying-spot scanning system, the brightness of the spot being controlled by a feed back system such that the density range of the negative is reduced to match the density range of the printing paper.

PROPORTIONAL temperature controllers are manufactured by CNS INSTRUMENTS LTD. Two types are available, resistance

thermometer actuated and thermocouple actuated. These are for the control of furnaces or refrigerators where a high degree of stability is required, or by adaptation where a specified temperature variation is to be followed. Electronic means amplify and integrate the error in temperature. The accuracy is claimed to be within 0.1°C over long periods.

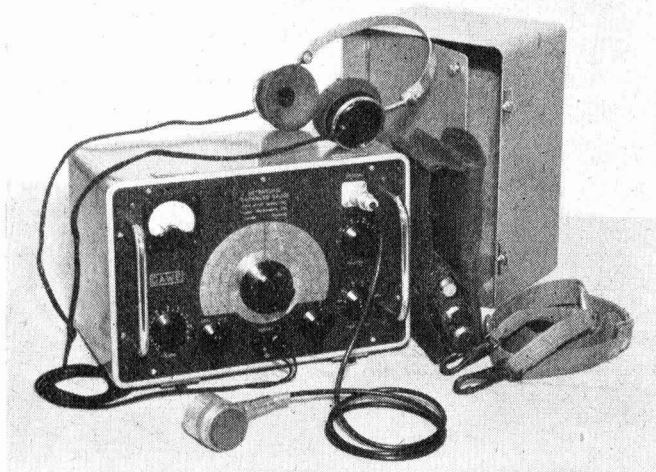
Also manufactured by this company is an extensometer for hygroscopic materials. This is used to measure the dimensional changes of hygroscopic materials under varying conditions of humidity. Complete with self contained air pump and humidifier this instrument will measure changes in length of a test specimen to within 0.0005 inches.

WEAR in vessels, boilers, pipes, etc. can be measured using the ultrasonic thickness gauges made by DAWE INSTRUMENTS LTD. A frequency modulated continuous signal is fed into the component from the accessible side. The signal is reflected from the inaccessible side and is interpreted in terms of thickness on a direct reading scale on the instrument. An important feature is that the instrument can be separated from the probe by up to 1,000 ft. of cable. This enables the instrument to be left in a central position while the probe is taken to the required points on, say, a structure being surveyed for corrosion.

A development by Dawe is the use of ultrasonics to clean small holes in nozzles, spinnerets, instrument mechanisms etc., which would be very difficult to reach otherwise. These parts are placed in suitable solvents in a cleaning chamber and powerful ultrasonic vibration is then induced to achieve cavitation in the solvent. This provides an erosive action which is equivalent to very effective scrubbing of the surface to be cleaned. The scrubbing is effective in the smallest holes and crevices, all dirt being carried away by the solvent.

MEASUREMENT and continuous indication of viscosity during a manufacturing process is the purpose of the Poise-meter electrical viscometer made by DOBBIE McINNES LTD. It produces an output signal which can be fed to a recorder or recorder-controller to give a permanent viscosity record and/or automatic control. Where a material must be maintained at a constant viscosity this instrument is particularly useful. Accuracy is claimed to be ± 2 per

**Ultrasonic thickness gauge
made by Dawe Instruments
Ltd.**

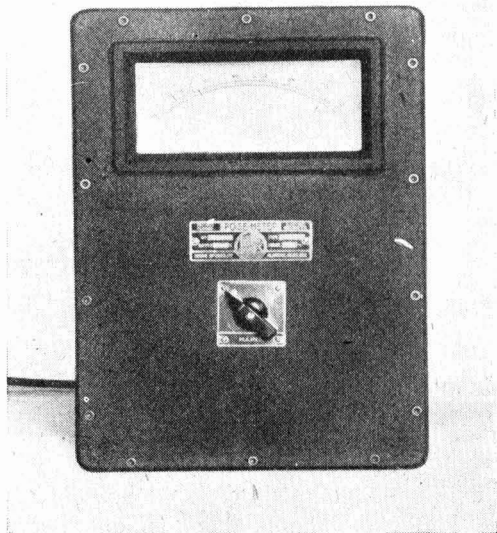


cent, and compensation is provided against variations in supply voltage and frequency.

DORAN INSTRUMENT CO. LTD. have developed a stabilized AC mains unit which has been designed to enable the Unicam SP500 spectrophotometer to be operated from AC mains, thus avoiding the use of the large capacity batteries which are otherwise

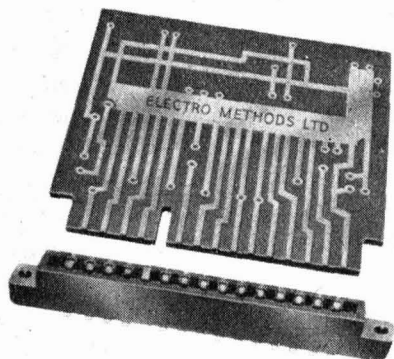
necessary. The unit supplies six amperes AC for the tungsten lamp and six volts DC tapped at two volt intervals for the amplifier. A constant voltage transformer device is employed in conjunction with a bridge rectifier system using barreters. The stabilization is such that no detectable change can be observed in the voltage across the DC output terminals under load conditions when the mains supply is varied from 60 to 260 volts.

An automatic titration apparatus is also manufactured by Doran Instrument Co. This equipment consists of a standard pH indicator which may be fitted to either a controller or recorder. The standard arrangement employs an indicating regulator, the operation of which is controlled by adjustable pointers on the scale. These control points are set, one to an end point and the other to a selected point in advance of the end point, the difference being adjustable to a minimum of minus 0.5 pH. Provision is made for either automatic or manual control and the accuracy of the end point may be controlled to within ± 0.07 pH units.



This electrical viscometer has been designed by Dobbie McInnes Ltd. to give a continuous indication of viscosity during a manufacturing process

A COMPARATIVELY small vacuum condenser pump with a water vapour capacity of about 15 lb. per hour has been developed by EDWARDS HIGH VACUUM LTD. This pump can be used for evacuating high vapour pressure systems without exceeding the vapour pumping capacity of the air ballast rotary pump. The condenser takes the bulk of the vapour pumping load, and it is thus possible to handle high evaporation rates without increasing the size of the rotary pump beyond economic limits. A special



A printed circuit connector made by Electro Methods Ltd. Moulded in Melamine this connector has a maximum of 22 ways

problem met with in condenser-pumped systems is the measurement of true vapour pressures. This is generally impossible because of condensation in the cold gauge. Edwards have developed gauges kept at the right temperature by internal electrical heating.

A new Edwards high vacuum valve of the butterfly type has been designed. This type of valve has never hitherto been successfully applied for real high vacuum duty because of the difficulty of maintaining satisfactory sealing around the whole periphery of the plates, particularly at the pivot point. The new Edwards valve is believed to overcome these difficulties.

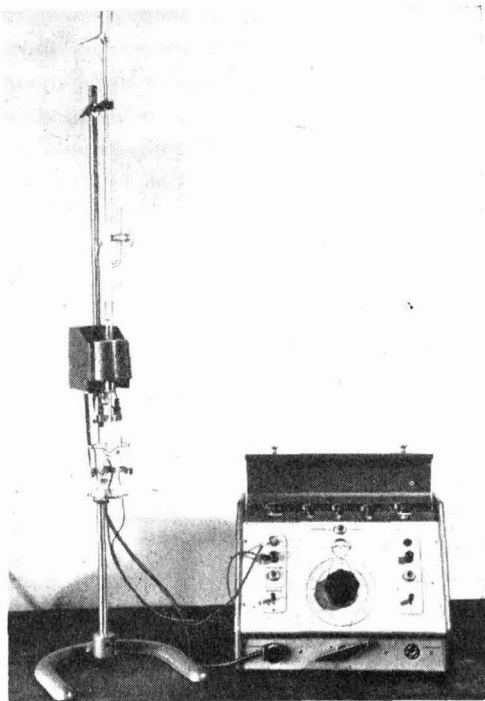
CLOSE temperature control thermostats are manufactured by ELECTRO METHODS LTD. A new range of cartridge thermostats has been developed which will maintain temperatures to within $\pm 0.1^\circ\text{C}$. They are claimed to be vibration proof and to have long term stability. Suitable applications are in the plastics industry for the temperature control of platens etc. Another development is a new type of contact thermometer for very close temperature control. These thermometers will withstand very heavy shocks and are primarily designed for crystal oven control and temperature reference devices. Also new is a design of crystal oven using these thermometers.

THE EIL automatic titrimeter made by ELECTRONIC INSTRUMENTS LTD. will carry out

a volumetric titration automatically and to an accuracy claimed to be comparable with manual operation. Provision is made for two titration units to be used independently and both volumetric and coulometric systems are available.

Among instruments embodying the EIL Vibron principle is an industrial vibrating condenser pH meter, which is claimed to have virtually no zero drift. Other instruments using this principle are high impedance electrometers for general laboratory use and for nuclear research.

A RANGE of scintillation counters designed to meet all requirements for this type of instrument in the fields of medicine, spectrum analysis, research and industry, is made by EKCO ELECTRONICS LTD. Type N559A is a fully shielded counter for relatively low-activity counting. It incorporates an amplifier which provides positive-going pulses suitable for operating all normal ratemeters, and scalars which include a discriminator circuit. An improved version of the type N550 scintillation counter has been developed. This is designed for the gamma assay of

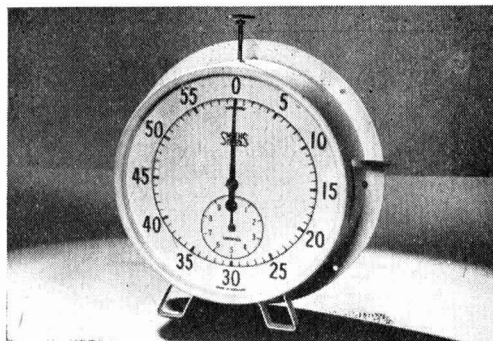


The EIL automatic titrimeter with volumetric unit made by Electronic Instruments Ltd.

of radioactive materials of extremely low activity in either liquid or powder form. Provision is made for either a cylindrical crystal and annular sample container or a well-type crystal and test tube.

Also manufactured by Ekco are double channel and single-channel thickness gauges. The former uses a vibrating reed method of signal amplification and combines ease of servicing together with very low zero drift.

A SECONDS timer which has been designed to meet the demand for an instrument with a larger dial size has been produced by ENGLISH CLOCK SYSTEMS, a branch of the clock and watch division of S. SMITH & SONS (ENGLAND) LTD. The timer has a robust metal case and is operated in a similar manner to a stop watch. It is started by depressing the side lever. To stop the timing process it is only necessary to return the side lever to its original position. The larger dial (eight inches) indicates seconds from 0-60 with a bold subsidiary dial showing 0-10 minutes. Both hands return to zero when the plunger at the top of the case is pressed down. This action also winds the timer automatically in readiness for the next operation.

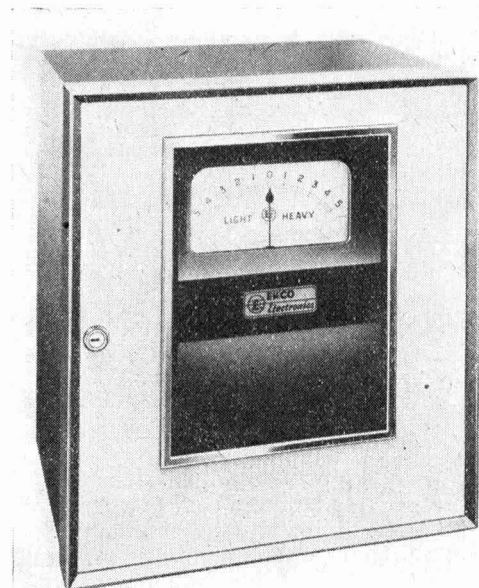


English Clock Systems have produced this eight inch seconds timer for the exact timing of many industrial processes

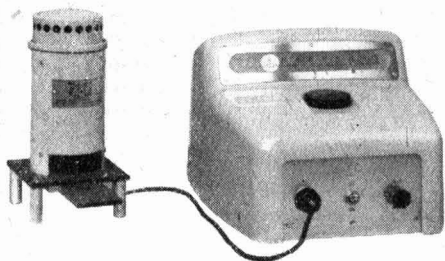
DETERMINATION of the size frequency curves of powders within the sub-sieve range can be carried out with the photo-extinction sedimentometer made by EVANS ELECTRO-SELENIUM LTD. Five simultaneous analyses are possible (or six if the use of a reference cell is dispensed with). A powder reflectometer which operates with the standard EEL galvanometer is designed for the rapid determination of the optical characteristics of powders. The instrument may be used for the rapid determination of the mean particle size of black powders and it is of value in the controlling of the production of finely defined graphite molybdenum disulphide and similar materials. It also offers a rapid means of determination of the optical properties of pigments and other powders.

Designed for the evaluation of optical whitening agents with ultra-violet light is the fluorescent light meter. The sample of material is dyed with the optical whitening agent and, after washing and drying, is placed over the opening at the top of the instrument, where it receives light from a mercury lamp, the fluorescent light passing through an OY18 filter on to a barrier layer photo-cell. The current generated is measured on a built-in galvanometer.

THE Flexicon method of jointing glassware, developed by W. G. FLAIG & SONS LTD. is claimed to provide an economical alternative to the familiar methods of interchangeable ground joints, corks, rubber bungs, rubber tubing, etc. The joint consists of an unground socket of a normal 1 in 10 taper together with a cone which is a specially designed glass moulding fitted with two heat



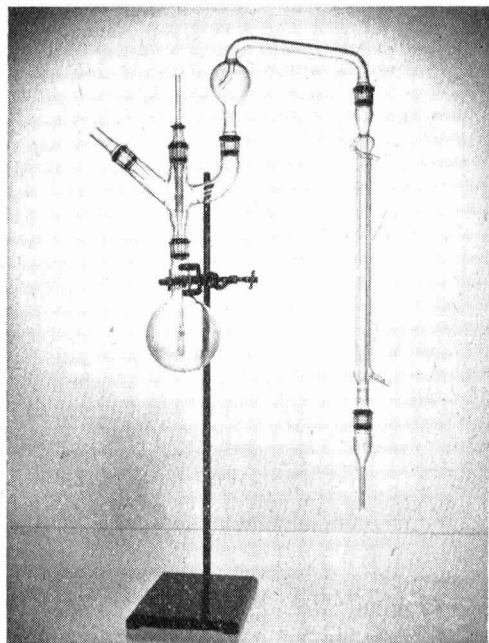
Double channel thickness gauge type N562 made by Ekco Electronics Ltd.



Powder Reflectometer together with standard EEL Galvanometer made by Evans Electro selenium Ltd.

and chemically resistant flexible rings forming a cone shaped fitting with a 1 in 10 taper. Sizes are similar to BS 572 ground joints. When the cone and socket are fitted together the seal is made by the ring at the narrow end, and the second ring acts as a stabilizer. Fluon barriers may be fitted between the ring and the flange at the narrow end if required.

Flexicon rings are made from silicone rubber which retains its physical properties at high temperatures.



Apparatus assembled using the Flexicon method of jointing developed by W. G. Flaig & Sons Ltd.

EXAMPLES of the latest trends in the design of control panels are shown by the range of graphic panels made by FOXBORO-YOXALL LTD. The panel illustrated was made to the order of the Lummus Company and was recently shipped to Saudi Arabia for installation in the Arabian American Oil Company's refinery there. It is 47½ ft. long by 7½ ft. high and was designed to control a fluid catalyst hydroformer and its auxiliary plant including feed preparation and charge heater, reactor and regeneration and distillation and refractionation sections. The layout of the plant is depicted graphically on the panel by suitably coloured cut out symbols and 'D' section lines so that the position in the process of any instrument can be seen at a glance.

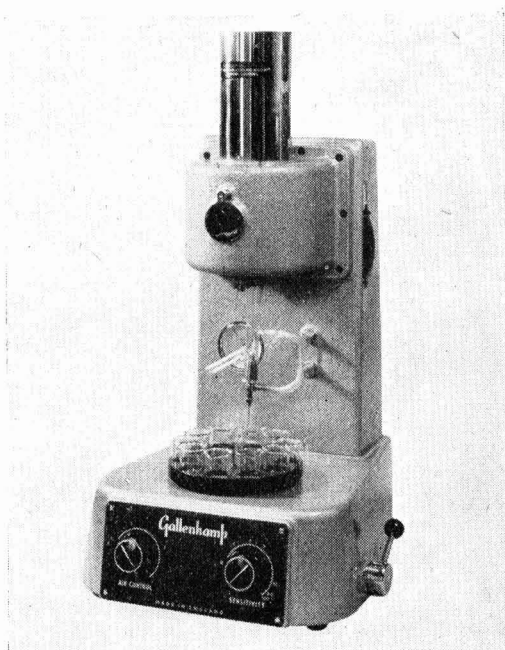
Apart from the plant connections, more than 45,000 ft. of wiring and 3,000 ft. of copper tubing were needed to link the principal instruments, numbering more than 140. In addition to the controlling, indicating and recording functions there are comprehensive automatic alarms systems for each section and an overall plant shut down alarm.

UNIQUE features are incorporated in the flame photometer made by GALLENKAMP & Co. LTD. it is claimed. Steady and reproducible atomization of samples is obtained with a stainless steel atomizer which fits into a glass burner tube. The air/gas mixture containing the atomized sample burns inside a water-cooled combustion chamber. The transparent burner allows observation of the process and the whole system is easily dismantled for cleaning. Emission from the flame passes first through a water filled cell which absorbs unwanted infra-red radiation and then through a suitable colour filter, and finally falls into an infra-red sensitive photocell. The filters are mounted in a four position turret and either gelatin or interference filters are available. The output from the photocell is connected to a reflecting galvanometer for which a sensitivity control is provided. A 10 position rotating lifting table which holds 5 ml beakers is used for manipulating the samples. Each beaker in turn can be correctly positioned and on lifting the table the sample is immediately drawn up into the atomizer.

THE Mono Oxygen Recorder made by JAMES GORDON & Co. LTD. is a recent

development in the range of Mono Gas analysis recorders made by this company. These instruments record the outlet gases from furnaces and are intended as aids to efficient furnace operation. A sample of the gas to be analysed is measured in a volumeter and at the same time a quantity of reaction gas, usually hydrogen is measured in another volumeter. The two quantities are passed together through an electric furnace where the oxygen combines with the hydrogen to form water which is condensed. The remaining gas is measured in a measuring bell which operates the pen lever mechanism. The percentage of oxygen is recorded on a chart. The quantity of hydrogen used is small, ranging from 1.5 to three litres per hour.

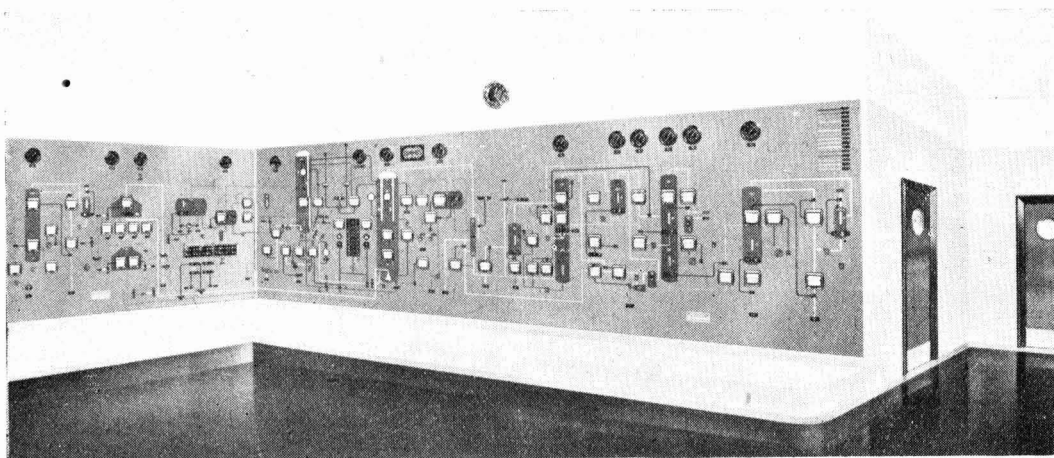
ANALYSES of mixtures of liquids of low to medium molecular weight vaporizing between 20 and 250°C at atmospheric pressure can be made with an accuracy equal to that of the mass spectrometer, it is claimed by GRIFFIN & GEORGE LTD., using vapour phase partition chromatography. The mixture to be analysed is vaporized and swept by a gas through a packed column. Each component leaves the column at a different time, the more volatile ones travelling the faster. They pass over a hot wire, affecting its resistance and these changes appear on a recorder as peaks. The peak positions identify the components, and their magnitudes are a measure of the amounts present. The method has been



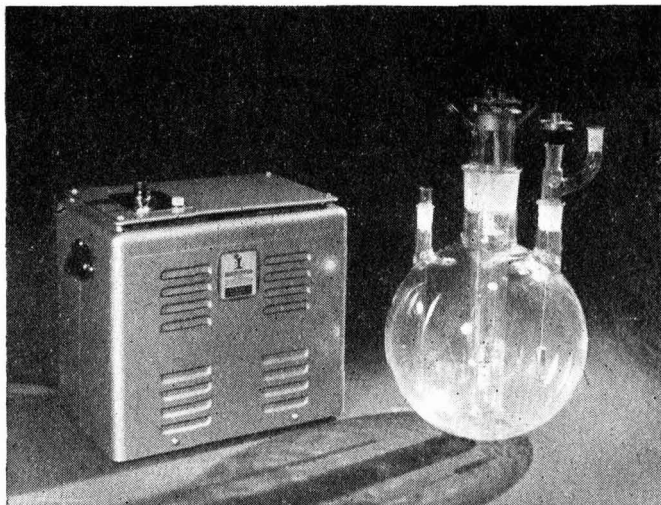
The Gallenkamp flame photometer showing the 10 position rotating lifting table

found to work equally well with gas mixtures.

A PHOTOCHEMICAL reactor for laboratory or small scale production work is made by HANOVIA LAMPS. This consists of a 10 litre glass reaction flask with three sockets.



A modern graphic panel constructed by Foxboro-Yoxall Ltd. The layout of the plant being controlled is depicted graphically on the panel by coloured cut-out symbols and 'D' section lines



Photochemical reactor with control unit made by Hanovia Lamps

The centre socket holds a heat resistant glass tube fitted with a water cooling jacket. A Hanovia S.500 medium pressure mercury vapour arc lamp in quartz is suspended in the centre tube to give radiation in the body of the reagent fluid or vapour. Among the wavelengths emitted are 2,695Å, 2970Å, 3,130Å and 3,660Å. A low pressure U-shaped mercury vapour quartz discharge tube can be used in the centre tube if short ultra-violet wavelengths are required. (2,537Å). The equipment is also suitable as a batch fluid sterilizer depending on the optical density of the fluid to short ultra-violet wavelengths below 3,000Å.

INSTRUMENTS for the measurement and control of atomic processes are manufactured by **ISOTOPE DEVELOPMENTS LTD.** Reductions in the cost of new industrial equipment have been made by the use of standard sub-assemblies. This also facilitates servicing under industrial conditions.

A highly sensitive detection unit for measuring small changes in gamma radiation has been produced. This principle is being developed for the continuous measurement of the density of liquids and various slurries and suspensions.

AN all glass stirrer which does away with mercury seals has been produced by **JENCONS (SCIENTIFIC) LTD.** Rods and bearings fit to a close tolerance and leakage is claimed to be less than 0.05 mm. Hg per minute at 760 mm. Hg pressure difference. A variety of stirrers are available including link stirrers and PTFE paddles.

Jencon's manufacture under licence a mercury diffusion pump of the all-glass, two stage pattern. This is claimed to produce an ultimate pressure of better than 10^{-6} mm. Hg. This instrument is available with either gas or electric heated boiler.

DURING the last 12 months **JAMES A. JOBLING & Co. LTD.** have introduced a range of semi-micro apparatus designed primarily for use in technical colleges and schools. This range, of which a special catalogue is available, has been designed with the idea of enabling practical course students to carry out a wide range of preparations with only a small financial outlay.

Also introduced during the last 12 months is a range of separating funnels, volumetric flasks and cylinders all of which have stoppers which are fully interchangeable, and made to the sizes laid down in the **BSS.**

Pyrex brand glassware has been chosen as the standard material for both experimental and production work on anti-polio-myelitis and in recent months, when larger vessels have been required for actual production of the vaccine a large number of special culture vessels including some with capacities of up to 50 litre have been produced and supplied in quantity.

A DEPTH and thickness gauge made by **KELVIN HUGHES** enables the dimensions of solids to be measured from one face only. The reference unit of the depth gauge consists of a column filled with liquid in which are immersed two crystals, one transmitting

and one receiving. The time for a pulse of ultrasonic energy to pass from one crystal to the other in the liquid is known and the distance between the crystals can be altered to increase or decrease this travel time. The point of transmission and reception gives a trace on a cathode ray tube and provides an accurate time base. When the thickness of a metal is measured, the distance between the face on which the probes rest and the opposite face is directly proportional to the peak traces on the cathode ray tube. If traces from the reference unit are superimposed on the trace set up by the metal being measured the thickness of the metal can be read instantly. The measurement obtained is independent of current supply variation, and any faults developing in the equipment are normally shown up immediately.

ADDITIONS have been made to the Commander range of instruments made by GEORGE KENT LTD. Three of the new types, the KUP, KUX and KUS, are simple extensions based on the KU mercurial flow meter; while in the fourth, the KP, up to three Bourdon tubes for pressure measurement are substituted for the mercurial U-tube. The fifth type, KT, includes mercury in steel primary elements for recording temperature; and the sixth, the KR series, uses a mercury U-tube or bellows unit for the remote reception of flow values from a primary measuring and pneumatic-transmission device.

The KUP series covers the flow recorder with one or two pressure recordings added. For the measurement of level, specific gravity, etc., the KUX series is available. The KT series consists of temperature recorders with mercury in steel primary elements for the measurements of temperatures within the range -37 to $+600^{\circ}\text{C}$. These circular chart recorders are available as single points, two point or three point instruments; and to the single and two point instruments one of the Kent Mark 20 range of control mechanisms may be added.

THE Super-Minor centrifuge made by MEASURING & SCIENTIFIC EQUIPMENT LTD. is intended primarily for the small centrifuge user for whom 50 ml maximum tube size is sufficient, but who wishes to spin a greater number of tubes or requires consistently high centrifugal force whatever the loading conditions. A feature of the Super-Minor is that the multiplicity of heads usually associated with the general purpose

centrifuge has been replaced by two universal heads, one of the swing out type and one of the angle type. It is claimed that these heads will spin at speeds up to 4,500 rpm whatever the loading conditions. Also manufactured by MSE is the Superspeed 20 centrifuge which has a maximum capacity of 400 ml and a maximum speed of 20,000 rpm. It is supplied complete with built-in refrigeration equipment.

Specimen sections of about 300-400 Å thickness suitable for electron microscopy can be obtained with the C & P Ultra-Microtome made by MSE. This microtome uses a glass knife and the object to be sectioned is advanced by means of controlled thermal expansion of an electrically heated section of the object arm. Sections obtained with this microtome are claimed to be better than those obtained by other means.

SEVERAL analytical instruments are made by MERVYN INSTRUMENTS, including a heavy water analyser, a square wave polarograph, and a spectrometer. A feature of the heavy water analyser, which is derived from the Mervyn NPL grating spectrometer, is that it uses a ratio recording system. The special compensation system allows a high degree of accuracy, and it is suitable for both high and low concentrations of heavy water.

The square wave polarograph is claimed to be the most advanced instrument of its kind available at the present time. Its maximum sensitivity is $2 \times 10^6 \text{M}$. It is of particular use in the food industry where metal ions of concentrations of a few parts per million are important.

A new region of the spectrum for infrared analysis has been opened up by the Mervyn NPL infra-red spectrometer, it is claimed. This region, lying between 1 and 4μ , has largely been ignored by users of prism instruments.

THE latest developments in electron optical techniques are said to be incorporated in the Type EM6 electron microscope made by METROPOLITAN-VICKERS ELECTRICAL CO. LTD. The electron optical system consists of a 100kV electron gun fitted with removal cathode and adjustable anode plate. The output of this gun is collimated by a two-stage condenser lens which gives control over the illuminating beam between wide limits. Either a normal beam for transmission microscopy or a beam tilted to the

requisite angle for reflection microscopy can be provided. A wide viewing window allows several people to see the image at one time, and a telescope is provided for focusing purposes.

Metropolitan-Vickers also manufacture a vapour phase chromatograph based on the principle of gas-liquid partition chromatography. It is designed both for routine analytical applications and for research work, and can be fitted for either manual or automatic admission of gas samples. The detector is a katharometer, comprising two thermal conductivity cells placed in the inlet and outlet lines of the column. The individual components of the sample appear as distinct peaks in the trace.

AMONG apparatus developed by THE MORGAN CRUCIBLE CO. is the Crusilite MI 28 laboratory furnace which uses silicon carbide resistor tubes as heating elements. These tubes may be run in air up to 1550°C. The resistance is concentrated in a central spiral zone by a helical split. MI 28 is an insulating brick (thermal conductivity 10^{-3} cgsu) which will withstand 1540°C. It may be cut and drilled with normal hand tools.

A NEW model of their electrolytic polisher has been designed by NASH & THOMPSON LTD. It consists of a cabinet containing a power pack which supplies a fully smoothed DC voltage to a pair of clip type electrode holders mounted in a polythene cap and attached to the cabinet by means of a flexible cable. Electrolyte and washing water beakers are mounted side by side on magnetic stirrers and the moulding containing the electrodes forms a cap for each of the beakers in turn. Speedy interchange of electrodes and electrolytes is possible when a variety of different metals have to be polished.

An electronic colloid osmometer was developed by Dr. R. S. Rowe of Birmingham University for the accurate measurement of osmotic pressures in aqueous colloidal solutions. The principle of operation is to measure very accurately the movement of a thin metal diaphragm brought about by the osmotic pressure of the fluid under test. Nash & Thompson have produced a plating thickness meter from an original design of the British Non-Ferrous Metals Research Association. The principle of operation is to measure the thermo-emf generated at the interface between the coat-

ing and base metal. This emf varies with the depth of interface and can be used to indicate coating thickness by reference to a calibration curve obtained from known samples.

A TANTALUM electrolytic capacitor series has been developed by THE PLESSEY CO. LTD. Known as the Castanet series, they span the range 50 mF 70v DC to 750 mF 3v DC and being small in size promise to be particularly useful for transistor and other specialized low voltage circuits. Other products made by this company include a magnetic store drum, a single crystal memory cell and a selection of ferrite components for microwave, magnetostrictive and digital storage applications. The single crystal memory cell comprises a crystal of barium titanate with suitable electrodes and gives electric displacement-field loops with squareness ratios of the order of 90 per cent.

A NEW pH meter having several extra features is being made by W. G. PYE & CO. LTD. There are two ranges, 0-10 pH and 4-14 pH, and the scale length is 11 inches. Manual temperature compensation over the range 0-100°C is incorporated as well as full automatic temperature compensation to permit standardization at one temperature and pH measurement at any other temperature. A wide range of buffer control enables a variety of electrode assemblies to be used, and measurements may be made on earthed or non-earthed solutions.

Designed as an accessory to the Pye range of mains operated pH meters is the automatic titrator and delivery unit. Basically it consists of an electronically operated two-speed burette tap controlled by a pH meter or some other device for indicating the end point of a titration.

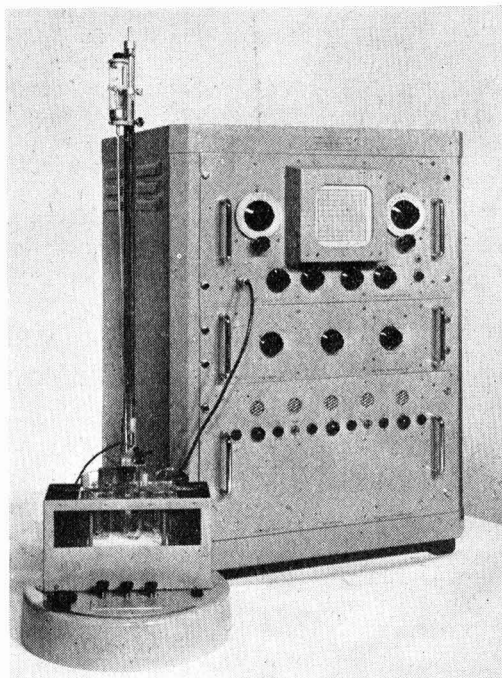
For continuous operation, remote control pH measuring and recording equipment is available. The indicating scale length is eight inches and remote operation is possible as the control unit may be mounted alongside the electrode assembly, the pH transmitter being situated elsewhere. The equipment provides a complete installation and is normally offered with a recorder.

A MOISTURE meter with a range of from complete dryness to 100 per cent water has been designed by SHAW ELECTRONICS. Known as the Wide Range Super, this instrument works at a higher frequency than other commercial moisture meters and gives a direct indication of moisture content on a

dial. It is claimed to give accurate results on many materials on which previous moisture meters would not operate. This brings the range of meters manufactured by Shaw Electronics up to 24.

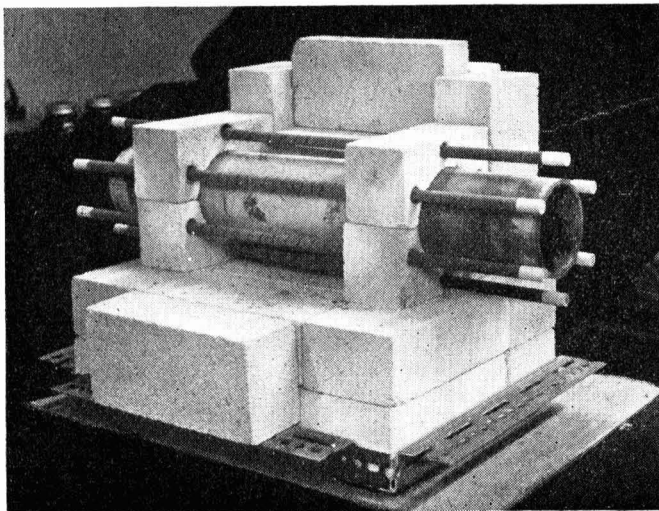
A GAS-LIQUID partition chromatograph for the analysis of mixtures has been designed by SHELL RESEARCH LTD. for research work necessitating a wide range of operating conditions and the least possible diversion of effort to the apparatus itself. The instrument comprises one recorder unit which may be connected as required to one or two column-furnace units maintained in a stand-by condition. A forced convection air bath maintains a uniform and constant column temperature in the range between ambient and at least 300°C, and allows very rapid changes from one level to another. The thermal conductivity cell is constructed entirely of refractory materials and is demountable for replacement of filaments; yet it is leak free under high vacuum conditions and capable of operation at temperatures up to at least 300°C. The response of the thermal conductivity cell is registered in the usual way by means of a potentiometric recorder and there are facilities for monitoring the operating conditions with adequate precision.

IMPROVEMENTS to the cathode ray polarograph have been made by SOUTHERN INSTRUMENTS LTD. A circuit has been introduced to give improved synchronization of the cathode ray tube time base to the mercury drop, together with a finer pitch to



Cathode ray polarograph designed by Southern Instruments Ltd.

the sensitivity control. The voltage and current calibration grid is printed directly on the face of the tube, thus eliminating parallax errors. Other features of the equipment are built-in derivative operation, provision for direct photography of the cathode ray trace, and an all-in-one mercury electrode stand. This stand embodies the



This Crusilite MI 28 furnace made by the Morgan Crucible Co. may be run in air up to 1550°C

thermostatically-controlled tank, a cell holder enabling the simultaneous de-gassing of three cells to be carried out, the mercury reservoir, and mechanical means of raising and lowering the electrodes in the solution under test. The cathode ray system is fundamentally similar to that employed in conventional polarography, except that the polarogram is produced every seven seconds, corresponding to the life of one mercury drop, as against several minutes with conventional polarographs. At present there is a lack of published papers dealing with the cathode ray polarograph, but the instrument can be used to produce the polarogram of any substance which is reducible at the dropping mercury electrode.

A RADIOACTIVE static eliminator has been produced by STANTON INSTRUMENTS LTD. to remove static charges which are a frequent source of error in precision weighing, and a problem made more acute by the increasing use in analytical chemistry of silica, borosilicate glasses and plastics. The Stanton eliminator is designed for permanent fixing to the balance case and is supplied in a mount which provides automatic protection for the operator when loading the balance. The isotopes used emit only beta rays which do not penetrate the balance case.

The new range of balances made by Stanton includes free swinging and aperiodic models as well as models with partial and full weight loading to 200 g. The cases are dustproof, finished in hard, scratch-resistant cellulose enamel. Other improvements include, better lighting and projection systems, unobstructed access to the pans, together with clearer readings. Optical heat filters are fitted as standard to the lamp unit.

THE Lovibond Schofield Tintometer was introduced by THE TINTOMETER LTD. in 1930 and this instrument enabled the subtractive visual Lovibond colour measuring system to be linked to the colorimetric convention of the Commission Internationale de l'Eclairage. Instead of using the three Lovibond primaries red, yellow and blue together, only two at a time are used, and any colour may be matched by suitable combinations provided the relative luminance of the sample and matching field can be adjusted to equality in some way. A redesigned model has been produced which retains the merits of the original system but

is simpler mechanically, cannot get out of adjustment, uses one lamp only to illuminate both fields of view, and works at a higher level of illumination. The tintometer used is the standard BDH model containing 81 Lovibond permanent glass cover slides covering the range 0.1 to 18.0 Lovibond units in each of the three primary colours. This instrument has many applications in the printing, paint, dyeing, cosmetic and other colour using industries where the visual significance of small colour differences is important, rather than differences in spectral characteristics.

THE automatic fraction collector made by J. W. TOWERS & CO. LTD. is designed to collect the effluent from ion exchange and chromatographic columns. It consists of a turn-table carrying a circular anodized aluminium rack for 100 collecting tubes arranged in a spiral formation. Any size of test tube from $\frac{1}{2}$ inch to one inch may be handled by using interchangeable racks. The turn-table is driven from one tube position to the next by means of a motor controlled by a relay system, which is operated by a siphon on a balance arm carrying a mercury switch. The siphon can be supplied in any capacity from one to 50 ml. The repeatability of the fraction is of the order of ± 2 per cent for one ml. fractions and less for larger fractions. Practically the whole of the mechanism is enclosed in a box forming the base of the instrument, the top of which is a white vitreous enamelled tray. The relays are hermetically sealed and completely protected from corrosion.

An automatic model of the countercurrent apparatus is being manufactured by Towers. This consists of a robot coupled to one or more stands carrying the required number of all-glass countercurrent tubes. The tipping mechanism for transferring top-phase liquid is hydraulically operated, thus providing an extremely smooth transfer action. After each tipping operation the automatic dispenser adds an accurately measured portion of top-phase to the first tube, and the last tube either discharges its top-phase into an automatically operated fraction collector or returns it to the first tube for recycling.

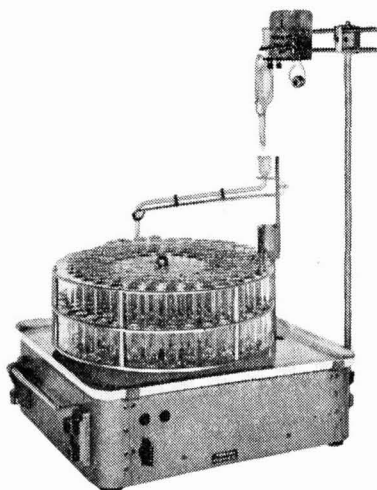
IN the latest vacuum oven manufactured by TOWNSON & MERCER LTD. cast aluminium doors with armourplate windows are fitted at both ends, thus improving

visibility within the oven. This change is also convenient in certain operations. Heating is effected by 18 heaters wound with heavy Nichrome tape. They are clamped on to the outside of the heavy aluminium tube which forms the body of the oven, and glass wool insulation fills the space between the cover and the heaters. Thermostatic regulation is performed by a standardized Invar rod operating a micro-switch. This can be adjusted by a coin slot on the front which is not so easily disturbed as an ordinary knob.

Apart from the vacuum ovens, Townson & Mercer also manufacture a range of normal even temperature ovens both with and without fans. Experimental work has shown that air, which has a low specific heat, cannot be used to give heat. Heat must be supplied by radiation since if a sensible amount of heat is given up by circulated air its temperature drop is excessive. Accordingly these ovens are heated directly by 24 windings clamped over the internal oven by aluminium bands.

EMULSIFICATION for industry is the theme of ULTRASONICS LTD. The principle of the Minisonic emulsifier is that a vibrating blade, producing vibrations inaudible to the human ear, causes continuous cavitation in the liquid being emulsified. Very high pressures are released locally and immediately made to work in the surrounding liquid without the loss of energy usually caused by transfer from one medium to another. The Minisonic is a self contained unit. The continuous phase of an emulsion is introduced into the outer funnel and recirculated via the vibrating element while the disperse phase is taken up from the inner funnel at regulated speed. The progress of emulsification can be observed throughout the transparent pvc hose and the finished emulsion is discharged by the same hose. Pre-mixed emulsions can be processed by using the outer funnel without the inner one. No limit has yet been found for the viscosity of the emulsion being processed.

AN instrument suitable for thickness measurement or flaw detection in the region 0.02 to 0.05 inch is made by the ULTRASONOSCOPE CO. (LONDON) LTD. The technique used is one in which an electrical step function is imposed on a barium titanate disc. A square wave of stress is generated and the leading edge of this is utilized as



Automatic fraction collector made by J. W. Towers & Co. Ltd.

a step function, the trailing edge being arranged to occur after all echoes of interest have returned.

THE SP.700 Recording Spectrophotometer made by UNICAM INSTRUMENTS LTD. is a development of the SP.500 Quartz Spectrophotometer, and is available either as a manually operated instrument, or with facilities for the automatic recording of transmission or optical density against wave-number by a double beam method. The frequency is indicated by marks on the record at equally spaced wave-number intervals. The light sources are a hydrogen lamp with quartz envelope, and a tungsten lamp. The radiation passes twice through the monochromator, and is chopped at 100 c/s between the passes, giving high stability and ensuring that very little scattered light is detected. The dispersing element is a 30° quartz prism. The sample is contained in a glass or silica sample cell with path length between 1 mm and 100 mm, cells of the latter length being intended for gases. The detector used in the ultra-violet and the blue is a photomultiplier with ultra-violet transmitting envelope, together with a fluorescent converter for the shorter wave-lengths down to 200 m μ . A lead sulphide photoconductive cell is used in the red out to 2.8 μ . Provision is made for a lead selenide cell to cover the 3 μ region, in this

case the usual tungsten lamp is replaced by one with an infra-red transmitting window. The signal from the detectors is amplified and converted to DC by a homodyne detector. Transmission and optical density are measured by a null balance system having several ranges, balance being indicated on a meter.

The Unicam SP.900 Flame Photometer consists of a burner (for propane or acetylene), fed with an air supply (conveniently derived from compressed air bottles), in which the sample material has been finely dispersed by means of a concentric jet atomizer. Light from the burner, which shows a high degree of stability, is passed through a silica prism monochromator of high light-gathering power to a detector via a 100 c/s chopper. The detector output is amplified and synchronously rectified, and the resulting signal displayed as a direct reading of emission line intensity on a spot galvanometer having an open scale and high speed of response. An alternative signal outlet suitable for operating certain standard types of recorder is also provided.

Berk's Record Year

SALES of F. W. Berk & Co. Ltd., of London, were a record in 1955. This was announced by the chairman, Mr. A. D. Berk who said that all recent ventures undertaken by the company were expanding satisfactorily. For the year ended 31 December 1955 the company's sales were up by five per cent on 1954. The profit of the group before charging taxation was £359,806 compared with £374,761 for 1954.

The net profit for the year was £185,561 compared with £183,704 for 1954. The directors recommend the payment of a final dividend of 4½d per share on the ordinary capital as increased on 14 October 1955 to £1,280,000. On the capital prior to this increase, the final recommended dividend of 4½d, together with the interim dividend of 1½d, paid on 14 October 1955, will make a total of 6d per share for the year 1955.

On 1 July 1955 the company transferred the operations of subsidiary companies, through which it operated, to the parent company, which resulted in increased efficiency in administration. The companies concerned were William Bailey & Son

(Wolverhampton Ltd.), Drayton Chemicals Ltd., Fullers Earth Development Co. Ltd. (formerly Baynards Fullers Earth Co. Ltd.), Jackson Bros. (Lancashire) Ltd., Powder Metallurgy Ltd., Schori Metallising Process Ltd., Tenovus Ltd., and Wood Chemicals Ltd.

ABPI Annual Meeting

THE annual general meeting of the Association of British Pharmaceutical Industry was held at the Cora Hotel, London WC1, on 25 April, when the following were elected to the council:—Mr. W. N. Boorne (Evans, Gadd & Co. Ltd.), Mr. R. C. Feather (Meggeson & Co. Ltd.), Mr. E. J. Fleetwood (Howards of Ilford Ltd.), Mr. N. E. Forster (Hall Forster & Co. Ltd.), Mr. H. C. H. Graves (Vitamins Ltd.), and Mr. G. S. Woolley (James Woolley Sons & Co. Ltd.).

Col. S. Watson, D.S.O., M.C., B.Sc., who recently retired from his position as managing director of James Woolley Sons & Co. Ltd., was elected an honorary member of the association.

A record number of 437 representatives of member firms and guests attended the annual dinner at the Savoy Hotel in the evening. Mr. C. M. Hill, president of the association, proposed the toast of 'Our Guests' and Mr. Robert Turton, Minister of Health, responded.

From Small Beginnings

IN 1937 a Mr. Hugh Miller took over the control of a small plumbing business in Glasgow from his two partners, a Mr. Shaw and a Mr. Petrie. He had ideas of making pipe fittings, and he began by employing five workers. To-day Mr. Hugh Miller is head of two companies, Shaw Petrie Ltd., and Clyde Tube Forgings Ltd., employing 1,200; and which have associate companies in Canada and the US. This week Shaw Petrie Ltd./Clyde Tube Forgings have been celebrating their 21st anniversary. The principal guest was Lord Bilsland.

Clyde Tube Forgings Ltd., which manufactures warehouse and supply standard lines of tube fittings for petroleum installations, chemical plants and power stations, is the only company in Britain making pipe fittings up to a diameter of 24 in. in a complete range.

The Physical Society Exhibition

Standard Expected To Be Highest Ever

THE 40th Physical Society Exhibition will be held on Monday 14 May till Thursday 17 May in the Old and New Halls of the Royal Horticultural Society, Westminster, London SW1. The hours of opening are:—Monday, 10.30 a.m. to 8 p.m. (Fellows and Press only 10.30 a.m. to 2 p.m.); Tuesday and Wednesday, 10 a.m. to 8 p.m.; Thursday 10 a.m. to 5 p.m.

The exhibition will be opened on Monday 14 May at 11 a.m. for Press and Fellows by Sir John Cockcroft, K.C.B., K.B.E., F.R.S., Director, AERE, Harwell.

In addition to the exhibition a programme of discourses and demonstrations has been arranged as follows:—

Monday 14 May at 6.15 p.m.: 'Recent Developments in Light Sources' by H. G. Jenkins (Research Laboratories of the General Electric Co. Ltd.).

Tuesday 15 May at 6.15 p.m.: 'The Production of Images of Chemical Molecules' by Professor H. Lipson, F.R.S. (Faculty of Technology, University of Manchester).

Wednesday 16 May at 6.15 p.m.: 'Colour Television: Considerations which have led to Recent Trends' by G. G. Gouriet (Research Laboratories of The British Broadcasting Corporation).

Altogether there are 131 exhibitors this year, including instruments manufacturers, research organizations, Government Departments and universities. The following is a list of the exhibitors:—

	Stand No.
Admiralty Research Establishment	110
Advance Components Ltd.	57
Airmec Ltd.	42
Armament Research & Development Establishment (MoS)	5
Associated Iliffe Press	122
Baird & Tatlock (London) Ltd.	111
Baker, C., of Holborn	66
Baldwin Instrument Co. Ltd.	90
Barr & Stroud Ltd.	17
Beck, R. & J., Ltd.	65
Bellingham & Stanley Ltd.	51
Birmingham University	78
Blackie & Son Ltd. (Publishers)	124
British Iron & Steel Research Association	7
British Physical Laboratories	96
British Scientific Instrument Research Association	114
British Telecommunications Research Ltd.	45
British Thomson-Houston Co. Ltd.	24
BSA Group Research Centre	29
Butterworths Scientific Publications	123
Cambridge Instrument Co. Ltd.	82
Cardiff University College	79
Cawkell, A. E., electronic engineers	48
Chapman & Hall Ltd.	129
Cinema-Television Ltd.	84
CNS Instruments Ltd.	50
Cooke, Troughton & Simms Ltd.	63
Cossor Instruments Ltd.	69
Crystal Structures Ltd.	9
Dawe Instruments Ltd.	75
Decca Radar Ltd.	14
Department of Scientific & Industrial Research	15
Distillers Co. Ltd.	40
Dobbie McInnes Ltd.	56
Doran Instrument Co. Ltd.	83
Dynatron Radio Ltd.	81
Edison Swan Electric Co. Ltd.	94
Edwards High Vacuum Co. Ltd.	109
Edwards High Vacuum Ltd. (Publishing & Bookselling Department)	127
Ekco Electronics Ltd.	18
Electro Methods Ltd.	37
Electronic Instruments Ltd.	59
Elliot Brothers (London) Ltd.	104
EMI Electronics Ltd.	10
English Electric Valve Co. Ltd.	25
Ericsson Telephones Ltd.	86
Evans Electro selenium Ltd.	49
Explosives Research & Development Establishment (MoS)	3
Farol Research Engineers Ltd.	8
Ferranti Ltd.	28
Fortiphone Ltd.	35
Furzehill Laboratories Ltd.	95
Gallenkamp, A., & Co. Ltd.	76
General Electric Co. Ltd.	11
Glass Developments Ltd (see Ultrasonoscope Co. (London) Ltd.)	53
Griffin & George Ltd.	52
Guy's Hospital Medical School	116
Hanovia Lamps Division of Engelhard Industries Ltd.	117
Hatfield Instruments Ltd.	43
Hilger & Watts Ltd.	105
Iliffe (see Associated Iliffe Press)	122
Infra-Red Development Co. Ltd.	34
Institute of Physics	119
Isotope Developments Ltd.	92
Kelvin & Hughes Ltd.	100
Labgear (Cambridge) Ltd.	31
Lewis, H. K., & Co. Ltd.	131
Locarte Company, The	107

	Stand No.		Stand No.
Macdonald & Co. (Publishers) Ltd.	120	Unicam Instruments Ltd.	13
Macmillan & Co. Ltd.	130	United Kingdom Atomic Energy Authority	16
Marconi Instruments Ltd.	26	United Trade Press Ltd.	128
Megatron Ltd.	71	University of Birmingham (see Birmingham University)	78
Mervyn Instruments	93	University College, Cardiff (see Cardiff University College)	79
Methuen & Co. Ltd. (Publishers)	121	University of London (see Middlesex Hospital Medical School)	115
Metropolitan-Vickers Electrical Co. Ltd.	106	University of Reading (see Reading University)	20
Middlesex Hospital Medical School	115	Vinten, W., Ltd.	61
Ministry of Supply (see under separate establishments)		Watson, W., & Sons Ltd.	85
Morgan Crucible Co. Ltd.	27	Wayne Kerr Laboratories Ltd.	30
Muirhead & Co. Ltd.	73	Weapons Research (Defence) Branch (MoS)	1
Mullard Ltd.	108	Westminster Hospital	118
Murex Ltd.	77	Wray (Optical Works) Ltd.	98
Nagard Ltd.	67		
Nash & Thompson Ltd.	74		
National Coal Board	55		
National Research Development Corp.	64		
Oertling, L., Ltd.	101		
Optical Works Ltd.	91		
Oxford University Press	126		
Panax Equipment Ltd.	39		
Phillips Electrical Ltd.	113		
Physical Society Colour Group	21		
Pitman, Sir Isaac, & Sons Ltd.	125		
Plessey Co. Ltd.	32		
Post Office Engineering Department	102		
Prior, W. R., & Co. Ltd.	62		
Pye, W. G., & Co. Ltd.	12		
Radar Research Establishment (MoS)	4		
Reading University	20		
Royal Aircraft Establishment (MoS)	2		
Salford Electrical Instruments Ltd.	68		
Sanders, W. H. (Electronics) Ltd.	54		
Saunders-Roe Ltd.	33		
Science Museum	60		
Servomex Controls Ltd.	38		
'Shell' Research Ltd.	70		
Siemens Brothers Group Research Laboratories	22		
Signals Research & Development Establishment (MoS)	6		
Solartron Electronic Group Ltd.	36		
Solus-Schall Ltd.	19		
Southern Instruments Ltd.	99		
Standard Telephones & Cables Ltd.	23		
Stanley, W. F., & Co. Ltd.	47		
Stanton Instruments Ltd.	103		
Sullivan, H. W., Ltd.	87		
Sunvic Controls Ltd.	44		
Taylor, Taylor & Hobson Ltd.	80		
Techne (Cambridge) Ltd.	112		
Telegraph Construction & Maintenance Co. Ltd.	97		
Thermal Syndicate Ltd.	46		
Thompson, J. Langham, Ltd.	58		
Tinsley, H., & Co. Ltd.	72		
Tintometer Ltd.	41		
Townson & Mercer Ltd.	89		
Twentieth Century Electronics Ltd.	88		
Ultrasonoscope Co. (London) Ltd., Glass Developments Ltd.	53		

New Visqueen Film

A NEW and improved type of Visqueen film has been introduced by British Visqueen Ltd. The company claims it is more transparent, has higher tear strength, and improved mechanical properties. These improvements result from important changes in production methods made in recent months.

Tear strength has been increased by some 40 per cent as indicated by the Elmendorf tear test. Other mechanical properties, such as tensile strength and percentage elongation at break, have also been improved in the new film. The price for Visqueen film remains the same.

Firestone to Make Styrene

The Firestone Tyre & Rubber Co. plans to build a 75,000-ton capacity plant for the manufacture of styrene at its 1,000 acre petrochemical manufacturing site near Orange, Texas. The plant is expected to be in operation early in 1958, and will be located adjacent to the company's recently announced 40,000-ton capacity butadiene plant. According to the chairman of the company, Firestone will be the first rubber company to produce the principal raw materials for the manufacture of synthetic rubber.

Record Pharmaceutical Exports

Last year Britain's pharmaceutical exports were a record at £35,900,000, compared with £32,000,000 in 1954.

Confectioners' Glucose

Talk to BFMIRA Research Panel

ATALK on 'The Manufacture of Confectioners' Glucose' was given by Mr. A. P. Buchanan, a director of the Albion Sugar Co. Ltd., at a recent meeting of the Bakers Prepared Materials Research Panel of the British Food Manufacturing Industries Research Association.

The manufacture of liquid glucose was based on the breakdown of starch under conditions of acidity, temperature and pressure, said Mr. Buchanan. It was possible to vary the composition of the product by adjusting the conditions and length of the conversion period.

The water white glucose widely used in the confectionery and allied industries was usually prepared from maize or potato starch by hydrolysis for 10 minutes in an autoclave, the product consisting mainly of dextrin, maltose and dextrose.

After the dilute glucose had been discharged from the autoclave and neutralized, it was filtered and collected. The crude glucose liquor was purified by three successive treatments with activated carbon under controlled pH conditions in order to remove the flocculated impurities consisting of oil, protein and fibre.

The liquid was filtered after each treatment and the concentration of the clear liquor was carried out in two stages.

The purity of the glucose depended on the efficiency of the refining process, but an important factor was the purity of the starch. The starch manufactured in Britain was mainly from imported maize which, after steeping, was subjected to a 'wet milling' process.

The efficient running of a starch plant was directed towards the maximum recovery of solids, both starch and by-products, and the finished starch should not contain more than 0.3 per cent of protein. Modern developments included the use of centrifuges for purifying and a continuous conversion system for producing glucose of consistently high quality.

BIF, 1957

The 1957 BIF will be held at Castle Bromwich, Birmingham, from 6 to 17 May. All the facilities for staging it on a large scale exist at Castle Bromwich and space will be available for exhibitors from the London section of the fair.

Instrument Show

TRADE delegates from India, Pakistan and Russia were early visitors to the second international instrument show which opened at Denison House, Vauxhall Bridge Road, London SW1, on 7 May. The show, organized by B & K Laboratories Ltd., London SE1, remains open until the 18th.

Of the 46 firms with stands at the show, American and Continental predominate. One of the most impressive displays is a complete nuclear-magnetic-resonance form of spectroscopy which is stated to enable scientists to identify and investigate various materials in a completely non-destructive manner.

The other 229 instruments exhibited have a varied application in the wide fields of industry and research.

Lederle Antibiotic Plant

WORK began on 3 May on a £700,000 antibiotic plant at Gosport, Hampshire. Speaking at the ground-breaking ceremony, Mr. K. C. Towe, president of the American Cyanamid Co., said that the plant would be Cyanamid's first major plant in Europe for the production of a large range of Lederle pharmaceutical and veterinary products.

The Lederle Division of Cyanamid Products Ltd. which has been operating in Britain since 1947 will finance the construction of the plant which is being undertaken by CAS (Industrial Developments) Ltd. When completed in about 15 months, the plant will employ a staff of 300.

Muriate of Potash

IT IS stated by Potash Ltd., St. James's Square, London SW1, that a new feature of the potash fertilizer trade next season will be their regular marketing of a free-flowing high-grade muriate of potash (60 per cent K₂O) adapted for straight use. The product, known as 'Pink Potash', will be packed in six-ply red-striped paper bags—1 cwt. net weight—for convenience in handling. This particular form of muriate of potash is said to be suitable for direct application both in cases where farmers prefer to use straight fertilizers and as a potash supplement to potash-deficient soils.

HOME

Change of Address

The Applied High Frequency Induction Heating Division of Wild-Barfield Electric Furnaces Ltd. will move from Cricklewood on 28 May to the company's main works at Elecfurn Works, Otterspool Way, Watford By-Pass, Watford, Herts.

New Midlands Representatives

Megator Pumps & Compressors Ltd. has appointed two representatives to cover its reorganized midlands sales area. They are Mr. B. Briggs, of Halifax, who will cover the new south Yorkshire area of the midlands, and Mr. Alan Billingham, of Sheffield, who will deal with the new east midlands area.

Production Exhibition

The Production Exhibition and Conference will be held at Olympia, London, from 23 to 31 May 1956. Among the papers to be read at the conference will be 'Investing in Better Utilization of Resources' by Bertram White, B.Sc., F.R.S.C., managing director, A. Boake Roberts Ltd.

New Address for Resin Sales

New address of the resin sales department of British Industrial Plastics Ltd. is Popes Lane, Oldbury near Birmingham. Tel.: BROadwell 2061.

Royal Society Lecture

A lecture on 'Research in the Plastics Division of ICI Ltd.' will be given by Dr. J. C. Swallow in the Royal Society's apartments, Burlington House, London W1, at 4.30 p.m. on 17 May 1956.

Perkin Exhibition

An exhibition marking the centenary of Perkin's discovery of mauveine opened at the Science Museum, South Kensington, on Tuesday, 8 May. The exhibition will be open for a month, from 10 a.m. to 6 p.m. on weekdays and from 2.30 p.m. to 6 p.m. on Sundays. Admission is free.

Overseas Agents' Conference

Agents from Egypt, East Africa, South America, Scandinavia and other European countries attended the annual conference of overseas agents of Houseman & Thompson Ltd., water treatment specialists, at the May Fair Hotel, London, from 8 to 11 May. The conference included demonstrations of the latest developments in the firm's products.

Borax Proposal to Change Name

On 24 May Borax Consolidated will hold an extraordinary meeting to consider a proposal to change the company's name to Borax (Holdings).

Planning New Factory

W. Openshaw Ltd., chemical engineers, of Cheadle Hulme, Manchester, are planning to build a factory at Baguley, Manchester.

Fibres Division Area Offices

The Fibres Division of ICI Ltd. has opened offices at 122/124 Granby Street, Leicester (tel: Granby 1301), and at 109/110 Royal Exchange, Manchester. Tel.: Deansgate 7454/5.

BOC Plan Two Tonnage Oxygen Plants

The British Oxygen Co. announces that as part of the Steel Company of Wales project it is to build two tonnage oxygen plants at Port Talbot. The plants, the first of which should be operating by the end of this year, will have a combined output of 300 tons of oxygen daily. The oxygen produced will be sold to the Steel Company of Wales, principally for use in the new Bessemer steel plant. It will also be used in the existing open-hearth furnaces, a method of employing oxygen which the Steel Co. has patented.

Society of Cosmetic Chemists

The annual general meeting of the Society of Cosmetic Chemists of Great Britain will be held on 25 May at the Bonnington Hotel, Southampton Row, London WC2, at 7 p.m. Following the formal business, Mr. R. T. Dobson will present a paper, 'Development of a New Product.'

Iron & Steel Prices Up

The Iron & Steel Board announces increases in the maximum prices of most iron and steel products, which have the overall effect of raising the average level of prices for these products in the UK by five per cent, as from 7 May. Compared with the first half of 1955, costs of imported materials have risen by the following approximate amounts:—iron ore, 11s a ton; scrap, £7 10s a ton; pig iron, £5 a ton; and semi-finished steel, £6 a ton.

OVERSEAS

Petroleum Chemicals in France

The manufacture of petroleum chemicals at the Naphtachimie plant near Lavera Refinery, Marseilles, is to be expanded. Lavera Refinery is British Petroleum Co.'s French associate, Societe Francaise des Petroles BP, which has a shareholding in Naphtachimie plant. Naphtachimie was commissioned in early 1953 for the production of a range of petroleum chemicals derived from a naphtha feedstock. Main products are ethylene and propylene, which are processed into solvents and anti-freeze liquid. The plant is to be converted to use either a light naphtha or gasoline feedstock, and the capacity is to be increased—ethylene from 10,000 tons a year to 18,000 tons, and propylene from 9,000 tons to 18,000 tons.

Finnish Pulp Exports

Finland's exports of mechanical wood pulp last year totalled 182,841 metric tons, 10,000 tons less than in 1954. Leading buyers were the UK (90,158 tons); France (31,403 tons); the US (19,551 tons); and Argentina (13,123 tons). Chemical pulp exports totalled 1,128,841 tons, of which sulphite pulp accounted for 682,016 tons. The three principal buyers were the UK, France, and the US.

Kuwait Production Figures

Production of crude oil at Kuwait, where the British Petroleum Co. has a 50 per cent interest, totalled 14,043,452 tons for the period 1 January to 31 March this year.

British Titan In Joint SA Venture

British Titan Products Co. Ltd. of York, in conjunction with African Explosives & Chemical Industries Ltd. of Johannesburg, are to form a joint company in South Africa at Umbogintwini, 17 miles from Durban. The plant will be for the manufacture of titanium dioxide pigments, and will reach the production stage by the end of 1958.

Norwegian Atomic Expansion

The capacity of the atomic reactor at Kjeller, near Oslo, is to be expanded from 350 kW to 800 kW. The expansion, which will be done without rebuilding the reactor, will involve changes in the heating system and in the secondary refrigerator system.

Turkey's Second Oil Refinery

A \$10,000,000 oil refinery is to be built with American capital at Izmit on the Sea of Marmora, south of Istanbul, Turkey. Oil refining equipment costing \$7,500,000 will be imported from the US. The remaining \$2,500,000 will be spent on building and labour. This will be Turkey's second refinery. The first, at Batman in south east Turkey, has an annual output of about 300,000 tons.

Man-Made Displacing Natural Rubber

Addressing a meeting of the Commonwealth Club in San Francisco recently, Mr. William Richardson, president of the B.F. Goodrich Co., said that crude rubber had lost its tonnage leadership to man-made rubber in the US economy. So far as can be seen ahead, he added, tree rubber will be the minority material.

Swiss Aid Norway's Aluminium Scheme

The aluminium plant to be built at Mosjoen in Northern Norway will be completed by 1958. The plant, which will cost £7,500,000, will be two-thirds financed by the Norwegian engineering concern, Elektrokemisk A/S, and one-third by the Swiss company, Aluminium Industrie A/G. The annual output of the plant will be 20,000 tons. In 1945, Norway's aluminium output was down to 4,600 tons a year.

US Chemical Co. in Argentine Project

The Argentine Ministry of Finance has announced that a US chemical company, in conjunction with Serum Quimica Argentina SRL of Buenos Aires, will establish a plant, at a cost of \$150,000, to produce isotonic solutions, hypertonic glucose solutions and similar products for medicinal and surgical use.

Du Pont Licence For Glyco Products

E.I. du Pont de Nemours & Co. Inc. has licensed Glyco Products Co. Inc., of New York, to manufacture and sell dimethyl hydantoin, monomethylol dimethyl hydantoin and dimethyl hydantoin formaldehyde resin. Commercial quantities are now available for shipment.

Sasol's Difficulties

Regular Output Not Yet Achieved

THE South African Coal, Oil & Gas Corporation (Sasol) produced its first petrol from coal last August and towards the end of the year a few deliveries of petrol were made to pumps in Sasolburg and Parys. In 1951 it was estimated that the Sasol project would cost £18,000,000 and would be in full swing by 1954. The cost has now gone to £40,000,000 and Sasol has not yet succeeded in producing a regular output of petrol.

Fires, plant modifications and mechanical defects are among the setbacks that the scheme has suffered. Absence of production last year is believed to have increased Sasol's cash requirements by about £5,000,000, and it is said that for every day without production £10,000 is lost.

In 1954, the Minister of Economic Affairs emphasized that in coming to Parliament for an additional £6,000,000 to bring the total to £32,700,000, he was anticipating all contingencies. He hoped that it would be the last time he would have to ask Parliament for more money. Yet, more recently, the new Minister has had to ask for an extra £7,300,000.

Sasol hopes to produce 55,000,000 gallons of petrol a year, a sixth of the country's demand. Of this figure, 15,000,000 gallons will be sold in special Sasol pumps, and the remaining 40,000,000 gallons will go to the oil companies to mix with their imported petrol. The petrol in the Sasol pumps will be sold at 1d less than the other types of petrol, but Sasol pumps will only be erected on the Rand and in the area surrounding Sasolburg, although the plant is a national effort.

Chemical production will have to provide

one third of Sasol's revenue, and it may be difficult to build up this market. The chairman of Sasol has said that a chemical establishment is one of the most difficult to start and keep running smoothly.

Imperial Smelting's Make SO_3

STABILIZED sulphur trioxide is now being manufactured in sample quantities by Imperial Smelting Corp. Ltd. Commercial production is expected to start in 1957. This material is the gamma form of sulphur trioxide and has the following physical properties:—

Melting point	16.8°C
Boiling point	44.8°C
d_4^{20}	1.922

It can be stored indefinitely, in the absence of moisture, without polymerization to the alpha and beta forms. Should its temperature fall below 17°C it can be remelted without the use of high temperatures and pressures.

Stabilized sulphur trioxide can be used with advantage to replace oleum, sulphuric acid or chlorosulphonic acid as a sulphonating agent and its use reduces the size of plant needed, increases the capacity of existing plant, and eliminates the waste acid disposal problem encountered with other sulphonating agents.

About a year ago (see THE CHEMICAL AGE, 1955, 72, 949) Hardman & Holden announced that they were going to build a plant for the production of stabilized sulphur trioxide in agreement with the Allied Chemical & Dye Corp. of America. Their product, Manox 'Sulfan', is now available and is being taken in up to half ton lots by customers. It is supplied in glass ampoules for laboratory work, and mild steel drums for commercial operations.

Manufacturers' Agents for:

Importers of Produce from:

CHINA

M. D. EWART AND CO. LTD.

15 DEVONSHIRE ROW, BISHOPSGATE, LONDON, E.C.2.

Telephone: Bishopsgate 4333 (10 lines) Telex: London 8466 Telegrams and Cables: "Jasmine London"

PERSONAL

The following officers were appointed at the annual general meeting of the London Section of the Oil & Colour Chemists' Association on 24 April:—*chairman*, MR. H. A. NEWNHAM; *hon. secretary*, MR. H. C. WORS-DALL; *hon. treasurer*, DR. S. R. W. MARTIN; *hon. publications secretary*, MR. J. A. L. HAWKEY; *hon. auditor*, MR. W. H. CAMP-BELL; *committee members* MR. J. R. FISK, MR. M. R. MILLS, and MR. A. PASS.

MR. ROLAND MACNAB, F.P.S., head of the veterinary department of A. J. White Ltd., of Brixton, London, specialists in nitrofurans products, has just returned after a two-months' overseas tour which covered Egypt, East and Central Africa, India and Pakistan. Mr. Macnab's visit to India coincided with the Indian Government's preparations for a plan for expanding the poultry industry which will call for the use of effective and economical products such as the nitrofurans for disease prevention in poultry.

MR. P. WHEELER has resigned from the board of Gas Purification & Chemical Co., but remains chairman of the subsidiary company, Gas Purification. MR. E. G. IRWIN has been co-opted a director of the parent company to succeed Mr. Wheeler.

MR. J. B. FENWICK, senior northern technical representative, British Filters Ltd., is in Mansfield General Hospital suffering from serious injuries following an accident while on manoeuvres with the Territorial Army. The company stated last week that he is 'making reasonable progress'. MR. H. G. ARMISTEAD, the company's north western representative, is covering Mr. Fenwick's territory.

May & Baker Ltd., Dagenham, Essex, have announced three new appointments. MR. F. J. PAXON, B.Sc., A.R.C.S., F.R.I.C., M.I. Chem. E., who joined the company in 1925, and was until recently deputy director of production, has been appointed director of production in succession to the late MR. R. W. E. STICKINGS, O.B.E. MR. E. V. THOMAS, M.P.S., general manager of

Pharmaceutical Specialities (May & Baker) Ltd., since 1942, is the new associate director of sales of May & Baker Ltd. MR. W. A. STEWART, M.P.S., the general sales manager of Pharmaceutical Specialities (May & Baker) Ltd., has been appointed the general manager.

MR. P. BERNARD H. CUFF has been appointed a director of Solartron Electronic Business Machines Ltd. A former chairman of the East Midlands Branch of the Purchasing Officers' Association, Mr. Cuff joined the staff of The Solartron Electronic Group Ltd. as group controller of purchasing and stores in August 1955.

MR. A. WEBB has been appointed chief buyer of Albright & Wilson Ltd. following the death of MR. C. H. BRENNAN in April. Mr. Webb's successor as manager, Central Traffic Department, is MR. D. R. THOMAS.

MR. J. H. NICHOLAS, M.A., has been appointed head of DSIR's bituminous materials section of the road research laboratory with the rank of senior principal scientific officer. He succeeds DR. R. S. MILLARD who has been appointed head of the laboratory's newly formed Colonial section. Mr. Nicholas was educated at Port Talbot Secondary School and at Jesus College, Oxford. He joined the bituminous materials section of the laboratory in 1941 and engaged in research on tar and bitumens. Since 1951 he has served as secretary of the road tar research committee.

At the annual general meeting of the British Laboratory Ware Association Ltd. on 17 April the following were elected:—*chairman*: MR. N. MCKINNON WOOD, managing director, Griffin & George Ltd.; *vice chairman*: MR. T. H. HOPPER, Middleton & Co. Ltd.; *treasurer*: MR. A. TATMAN, Townson & Mercer Ltd.; *members of council*: MR. J. E. C. BAILEY, Baird & Tatlock (London) Ltd.; MR. W. H. NICOLSON, W. B. Nicolson (Scientific Instruments) Ltd.; MR. R. MACINNES, Scientific Supplies Co. Ltd.; MR. J. S. TOWERS, of J. W. Towers & Co. Ltd.; MR. E. W. PEARMAN, Charles

[continued on page 1096]

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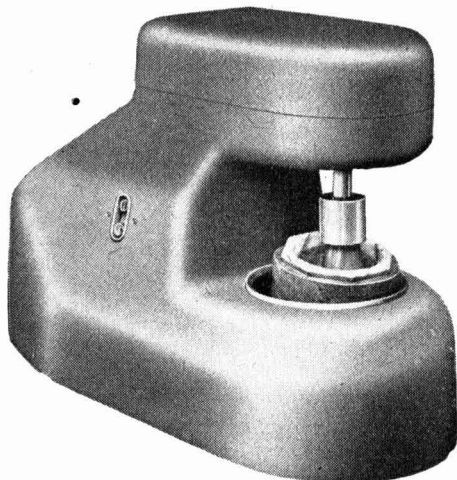
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The machine is of a neat, compact, and pleasing design, occupying bench space of approximately 24½ in. by 10½ in., with an overall height of 18 in.

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The Driving Mechanism of the Machine is totally enclosed and quiet in operation.

The Mortar (in either agate or alternative materials) has a spherical bowl 3½ in. diameter by 1 in. deep and is accommodated in a fully cushioned carrier. The Pestle has a 2 in. diameter head, correctly formed to suit the radius of the Mortar Bowl.

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Telephone : LEEDS 20655

Telegrams : ALEXSON, LEEDS II

Personal

continued from page 1094

Hearson & Co. Ltd.; MR. T. A. DRYDEN, T. Dryden Ltd.; MR. J. G. MALPASS, W. Finlayson; and MR. W. H. ADAMS, secretary, BLWA. MR. R. W. PARKER, of A. Gallenkamp & Co. Ltd., was re-elected convener of the technical committee, and MR. C. A. MERRY, Griffin & George Ltd.; MR. S. J. KENNEDY, Baird & Tatlock (London) Ltd.; MR. D. ALLAN, Townson & Mercer Ltd.; MR. D. E. L. PRICE, Charles Hearson & Co. Ltd.; and MR. A. W. BARKLA, J. W. Towers & Co. Ltd., were also re-elected.

SIR HARRY JEPHCOTT, M.Sc., F.P.S., chairman and managing director of Glaxo Laboratories Ltd., and PROFESSOR H. A. BETHE, professor of physics, Cornell University, are to receive honorary D.Sc. degrees at the Degree Congregation of Birmingham University on 30 June.

At the annual general meeting of the Aluminium Development Association on 20 April THE HON. GEOFFREY CUNLIFFE, deputy chairman and joint managing director of The British Aluminium Co. Ltd., was elected president of the association in succession to DR. H. W. CLARKE. MR. SPENCE SANDERS, of Almin Ltd., was elected vice-president and MR. J. H. MAYES, of the Northern Aluminium Co. Ltd., was appointed chairman of the executive committee in succession to MR. HAROLD GOODWIN.

DR. H. BLOEMGARTEN, who has been a managing director of the Royal Dutch/Shell Group of oil companies since 1948, is to retire, at his own wish, at the end of June. It will, however, be proposed at the annual general meeting of the Royal Dutch Petroleum Co. on 30 May that he be offered a seat on the board of directors of that company. MR. L. E. J. BROUWER has been nominated to fill the vacancy caused by Dr. Bloemgarten's retirement.

MR. ALBERT SCHARWACHTER of the Arizona Chemical Co. was re-elected president and MR. RICHARD J. SPITZ of Newport Industries Inc., was elected vice-president of the Pulp Chemicals Association at its second annual meeting on 18 April in New York. Mr. Scharwachter and MR. E. J. CALLETON, of the National Southern Products Corp., were elected chairman and vice-chairman, respectively, of the Tall Oil Division of the

Association. MR. LEE A. RADEKER, Champion Paper & Fibre Co., and MR. E. M. GODAT, Crossett Chemical Co., were elected to similar positions in the Sulphate Terpentine Division.

The appointment of MR. JOHN G. THOM as sales manager for Northern Ireland is announced by British Oxygen Gases Ltd. Mr. Thom, aged 49, has been with the company for 35 years. He is an associate member of both the Institute of Welding and the West of Scotland Engineers' Association.

MR. C. S. WINDEBANK, managing director of Esso Research Ltd. (see p. 1068 this issue) is a graduate of London University (1931) and of Massachusetts Institute of Technology (1937). He is a member of the Institution of Chemical Engineers and a fellow and member of council of the Institute of Petroleum. Mr. Windebank joined Esso in 1937, and has served in a variety of technical appointments dealing with the refining and use of petroleum products. When Esso Development Co. Ltd. started operations in 1947 Mr. Windebank was manager of the laboratories. In 1949 he became managing director—a position he continues to hold under the company's new name of Esso Research Ltd.

MR. THOMAS POWELL has been appointed managing director of British Acheson Electrodes Ltd. in succession to MR. W. B. H. GALLWEY, who was recently appointed chairman of the company. Mr. Powell, who is 47, is divisional managing director of British Electro Metallurgical Company (a division of Union Carbide) and also a director of Union Carbide.

MR. W. LINDSAY BURNS has given up his post as managing director of Henry Balfour & Co. Ltd., of Leven, after 27 years' service. During this time, he has seen the company develop into one of the most important and enterprising chemical engineering concerns in Britain. He is succeeded by MR. LINDSAY BURNS, Junr., and MR. I. M. O. HUTCHISON, who will be joint managing directors. Mr. Burns remains as chairman and will act in a consulting capacity.

MR. E. G. FAIRBURN, managing director of the Chemical & Insulating Co. Ltd., Darlington, has been elected president of the Tees-side & South-West Durham Chamber of Commerce.

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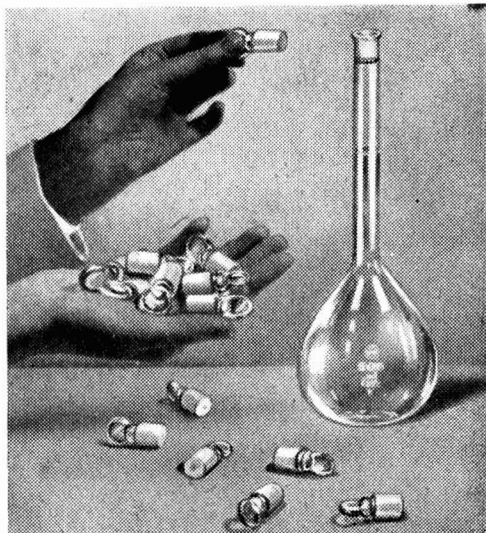
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Law & Company News

Commercial Intelligence

Satisfaction

LEDA CHEMICALS LTD., London W.—Satisfaction 10 April, of mortgage registered 13 December 1954.

Changes of Name

BRITISH INDUSTRIAL SOLVENTS (KENFIG) LTD., manufacturers of acetic acid and other chemicals etc., Devonshire House, Mayfair Place, London W1, changed to Distafeed Ltd. on 20 March 1956.

ASPRO LTD., 71/76a Buckingham Avenue, Slough, Bucks, to Aspro-Nicholas Ltd., on 3 April 1956.

A. & G. NICHOLAS LTD., exporters, importers etc., 71/76a Buckingham Avenue, Slough, Bucks, to Nicholas Products Laboratories Ltd., on 3 April 1956.

NICHOLAS PRODUCTS LABORATORIES LTD., manufacturing chemists etc., 71/76a Buckingham Avenue, Slough, Bucks, to A. & G. Nicholas Ltd., on 3 April 1956.

Company News

Babcock & Wilcox Ltd.

The profits of the group, subject to UK taxation, but after setting aside £1,780,282 for depreciation, totalled £4,629,498. After providing for UK tax and making other necessary adjustments, the balance standing to the credit of the consolidated profit and loss account is £2,213,748. The preference dividends, less tax, required £54,713, and the directors have recommended that a final dividend of eight per cent, less tax, be paid on the ordinary stock, making a total of 15 per cent for the year.

British Chrome & Chemicals (Holdings) Ltd.

In his report at the annual general meeting of the company at Stockton-on-Tees recently, Mr. E. Fitzwalter Wright, the chairman, said that following the explosion at the Glasgow works after which production virtually ceased, it had been impossible to bridge the gap in production, although in other plants every effort was made to do so. In order to keep faith with customers, the company had to import chromium chemicals

at prices in excess of the prices to customers. Yet in spite of this, the company's output of chrome chemicals in 1955 was slightly in excess of that in 1954. The gross trading profit, before depreciation, is down from £562,780 to £514,082; net profit down from £241,243 to £234,283. The final dividend recommended on the ordinary stocks is 6½ per cent.

British Oxygen Co. Ltd.

The consolidated profit at £4,277,152, after charging depreciation of £2,015,484, includes the profits of the subsidiary companies for 12 months and the profit of the parent company industrial, medical and chemical activities in the UK for nine months to 30 September, 1955. Profits in 1954, adjusted to corresponding periods would have been £4,168,369. After allowing for tax and outside interests there is a net profit attributable to the parent company of £1,764,673. In his review of overseas subsidiaries, Mr. J. S. Hutchison, the chairman, said development in Australia had continued favourably, and in Africa, despite strong competition, Oxygen & Acetylene (Pty.) Ltd. had again experienced a favourable sales expansion. In New Zealand and Canada progress had continued, as it had in Egypt and Pakistan. Although the main operations of the chemical division of the company are concerned with melamine and polyvinyl acetate, the division was making a growing contribution to profits.

Manchester Oil Refinery (Holdings)

Group profit of the company before taxation at £163,720 compares with £174,349. After providing for taxation, other than profits tax arising from the distribution of preference and ordinary dividends, and after deducting the profit attributable to outside shareholders, the net profit of £82,879 compares with £112,447 in the previous year. The directors recommend the payment of a final ordinary dividend of 8½ per cent, less tax, which with the interim dividend of 4 per cent, less tax, makes a total distribution for the year of 12½ per cent, less tax.

Degussa

Net profits for the year 1954/55 of Degussa of Frankfurt/Main, Germany, amounted to DM 7,209,620.97. During the

[continued on page 1100]

Platinum Laboratory Apparatus

Our comprehensive standard range of Platinum apparatus has been compiled to assist users in selecting what is most suited to their needs. In cases where a catalogued specification fails to meet requirements, we will gladly manufacture in accordance with customer's own designs.



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The compounds of the precious metals are finding increasing use in science and industry. Our laboratories are equipped to prepare any known compound for which a workable method of preparation exists.

Booklet giving formulae and properties of compounds available on request.

Company News

continued from page 1098

year the company increased the number of its employees by 560, and by September 1955 the total labour force was 7,292. Industrial demand for the company's precious metals rose by 20 per cent over the previous year, while the demand for oxidizing and bleaching agents also increased. The sodium metal plant's capacity was fully utilized, and the output of cyanides, pharmaceutical materials and methanol derivatives was maintained at a high level. The company proposes to pay a dividend of 9 per cent.

Cooper McDougall & Robertson

Group profit of Cooper McDougall & Robertson, chemical manufacturers, dropped from £485,247 to £333,542. This is attributed by the chairman, Sir William Cooper, to smaller income from exports and to a rise in costs. Group net current assets amount to £1,373,564, against £1,358,094 last year, and net assets to £2,921,941, compared with £2,925,509. Dividend is 10 per cent.

The Texas Co.

Consolidated net income of The Texas Co. and its subsidiaries for the first quarter of 1956, after all charges, was \$69,958,343, or \$2.55 per share, Mr. J. S. Leach, chairman of the board, announced at the recent annual meeting of stockholders. These earnings compare with \$56,021,212, or \$2.04 per share for the first quarter of last year. First quarter earnings include dividends received from domestic and foreign non-subsidiaries totalling \$25,554,578 after deduction of applicable income taxes.

Next Week's Events

WEDNESDAY 16 MAY

SCI (Corrosion Group)

Sunbury-on-Thames: Works visit to the research station of the British Petroleum Co. Ltd., beginning at 2.30 p.m. Train leaves Waterloo Station at 1.42 p.m.

THURSDAY 17 MAY

The Royal Society

London: The Society's Rooms, Burlington House, Piccadilly W1, 4.30 p.m. 'Research in the Plastics Division of ICI Ltd.' by Dr. J. C. Swallow, B.Sc., Ph.D., A.M.I.Chem.E., M.R.I.

Market Reports

LONDON.—There has been a steady outlet for the majority of the routine industrial chemicals with a good movement against contracts, particularly for the textile and plastics industries. The shipping demand is reasonably good covering a wide range of products. The decline in non-ferrous metal values is reflected in the prices of the chemical compounds, and copper sulphate is reported to be lower at £107 15s a ton. Elsewhere prices are firm and the higher freight costs have yet to be absorbed. There has been a satisfactory export demand for cresylic acid and there is no lack of buying demand for most of the other coal-tar products.

MANCHESTER.—On the whole, steady trading conditions have been reported on the Manchester chemical market during the past week from the point of view of the flow of delivery specifications against contracts especially for the wide range of soda products. Replacement buying is coming forward reasonably well. A fair number of fresh home and export enquiries are being dealt with. Prices generally are on a steady to firm basis, the outstanding exception again being sulphate of copper which has declined by a further £3 a ton. A fair movement of supplies of fertilizer materials is reported, and a steady call for most of the light and heavy tar products.

GLASGOW.—The Scottish heavy chemical market during the past week has continued fairly active and business has been well maintained covering most sections of the industry. Some prices are still showing a slight upward tendency due, as reported last week, to the increase in freight charges. On the agricultural side the demand has again shown improvement. The export market continues favourably.

Fixed Capital Expenditure

Total capital expenditure by the chemical and allied industries in 1955 was £94,000,000, 13 per cent more than in 1954. Compared with 1954, eight per cent more was spent on plant, machinery and vehicles, and 36 per cent more was spent on building. Total fixed capital expenditure in the last quarter of 1955 was 54 per cent more than in the corresponding quarter of 1954.



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required, with experience in Animal Testing, using rats, chicks, and poultry, for Vitamin Testing and Nutritional Research Work.

This is interesting work covering a fairly wide field and the person appointed will be responsible for the Company's Biological Testing Station. It will be an advantage if the applicant can act in an advisory capacity on animal feeding.

Applicants should have a good degree, preferably a research degree. Apply, in writing, giving full particulars of age, education and experience, to the

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Principal Scientific Officer £1,270-£1,680 p.a.

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At the present the rates for women are slightly lower. Contributory Superannuation Scheme. Married officers now living outside the Establishment's transport area will be eligible for housing on one of the Authority's estates; alternatively assistance towards legal expenses incurred in house purchase will be payable.

Requests for application forms by **POSTCARD** to the Senior Recruitment Officer at the above address not later than May 16th, 1956. Quote reference B.154/38.

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The posts are divided between following main groups and subjects (a) Mathematical and Physical Sciences, (b) Chemistry and Metallurgy, (c) Biological Sciences, (d) Engineering subjects and (e) Miscellaneous (including e.g. Geology, Library and Technical Information Services).

AGE LIMITS: For Experimental Officers, at least 26 and under 31 on 31st December, 1956; for Assistant Experimental Officers at least 18 and under 28 on 31st December, 1956. Extension for regular service in H.M. Forces. Candidates aged 31 or over with specialised experience for Experimental Officer posts may be admitted.

Candidates must have at least one of a number of specified qualifications. Examples are Higher School Certificate, General Certificate of Education, Scottish Leaving Certificate, Scottish Universities Preliminary Examination, Northern Ireland Senior Certificate (all in appropriate subjects and at appropriate levels), Higher National Certificate, University degree. Candidates taking their examinations in 1956 may be admitted. Candidates without such qualifications may be admitted exceptionally on evidence of suitable experience. In general a higher standard of qualification will be looked for in the older candidates than in the younger ones.

SALARY (London):—

Experimental Officer £838-£1,008 (men); £742-£914 (women)

Assistant Experimental Officer. £342 (at age 18) to £736 (men), £664 (women). Starting pay up to £611 (men) or £567 (women) at 26 or over. Somewhat lower outside London. Promotion prospects. Women's scales being improved under equal pay scheme.

Further particulars, for which you are advised to make early application, from Civil Service Commission, Scientific Branch, 30, Old Burlington Street, London, W.1. quoting No. 894-95/56.

PLASTICS DEVELOPMENT ENGINEERS required for expanding Technological Department. Good prospects for men of practical turn of mind with good engineering training. Previous experience of reinforced or thermoplastics desirable. Good pension scheme. Apply giving details and approximate salary required to **PERSONNEL MANAGER, T.I. (GROUP SERVICES) LIMITED, ROCKY LANE, ASTON, BIRMINGHAM, 6.**

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10 Fraser horiz. **RETORTS**, 3 ft. by 3 ft. by 6 ft. Fitted swing door.

Broadbent 48 in. **HYDRO EXTRACTOR MONITOR**, vulcanite lined. Monitor 55 in. dia. by 20 in. deep with 3½ in. dia. side discharge. Two oval bottom discharge parts 12 in. by 6 in. 3 point suspension. Motorised 400/3/50.

Recessed plate **FILTER PRESS** by Edwards & Jones, for cakes 23 in. by 24 in. by 1½ in. Top centre feed 4 in. dia. Ribbed type plates each with bottom drain. Hand screw-closing.

FILTER PRESS by Johnson. 49 C.I. recessed plates 36 in. sq. by 1½ in. pyramid surface. Cake size 34 in. sq. by 1 in. Centre feed. Hand ratchet closing.

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(Unused Stock, **RUSTY**) ¾" over chequer 8 in. by 4 in., 6 in. by 3 in., 6 in. by 2.5 in.

100 Tons available.

Minimum, 2-ton Lots.

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Unused Stock, Rusty
1½ in. by 1½ in. by 8 ft.
Large quantity available.

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VESSELS of all shapes and sizes, jacketed or unjacketed—with stainless steel mixing gear to requirements; also stainless steel storage tanks and vacuum vessels.

"MORWARD" "U"-shaped **TROUGH MIXERS**—up to 2 tons in stainless steel, with agitators, scroll or paddle type, jacketed or unjacketed.

Stainless Steel TROUGHS, TANKS and CYLINDERS made to requirements.

These items can also be fabricated in mild steel.

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100g., 150g., and 200g., new in mild steel, for 100 lb. p.s.i. w.p.—with or without mixing gear.

3 cwt. **TROUGH MIXERS** by **CHALMERS** and **GARDNER**—stainless steel lined troughs.

50g., 75g. and 100 g. heavy duty **MIXERS** by **FALLOWS** and **BATES**. Agitators driven through bevel gears from fast and loose pulley.

200g. cast-iron **JACKETED MIXING VESSEL** with nickel-chrome impellor type agitator driven through bevel gears from fast and loose pulley.

BROADBENT HYDRO EXTRACTORS

21" **EQUAL TO NEW**, galvanized baskets, electrically driven through centrifugal clutch or belt driven Safety inter-locks.

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Selection of new **MONO** and second-hand Pumps in stock—2 in. to 5 in.

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MONEL METAL JACKETED PAN—45 in. by 19 in. deep.

STAINLESS STEEL JACKETED MIXERS—39 in. by 32 in. and 40 in. by 24 in.

STAINLESS STEEL PANS—2 ft. 6 in. by 2 ft. 4 in. (Two). 850 and 625 gallon **GLASS-LINED CYLINDRICAL ENCLOSED TANKS.**

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20 & 30 gallon Electrically heated **PANS**, also Welded, Cast-iron and Copper **JACKETED PANS, MIXERS, PUMPS, STILLS, HYDROS, CONDENSERS**, etc.

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STEEL PLATE STORAGE TANKS for sale, 25 ft. 9 in. long by 5 ft. diameter with gauge glass level indicator, control valves and internal perforated pipe. Pipe connection 2 in., 4 in. and 6 in. Similar Tank 21 ft. 9 in. long by 7 ft. diameter. **F. J. EDWARDS LTD., 359, EUSTON ROAD LONDON, N.W.1. EUSTON 4681.**

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STAINLESS STEEL 200 and 100 gallon Stirring Vats. Water Jacketed.
CHANGE-CAN or Pony Mixer 25 gallons. A.C. Motor.
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MORTON 2-speed 20 gallon 'Z' Blade Tilting Mixer.
WILKINSON Ointment Mill.
VERTICAL Sterilizer 18" × 36".
REVOLVING DRUM 6' dia. × 2' 4".
 100 gallon **HORIZONTAL PASTE MIXER**.
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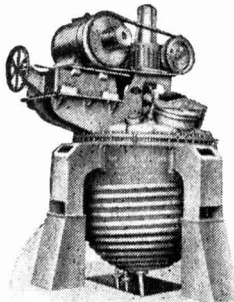
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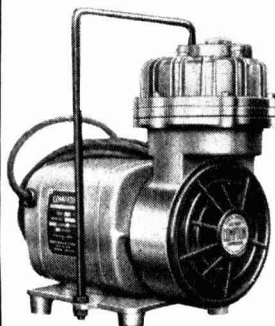
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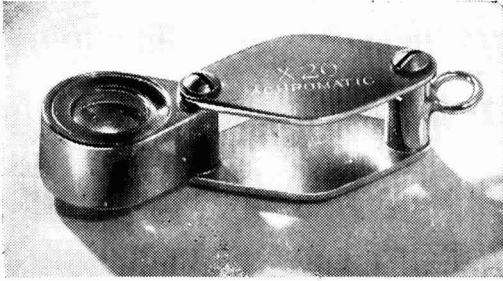
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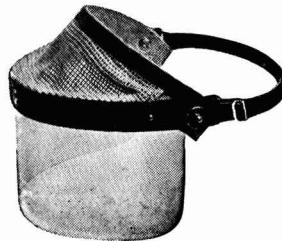
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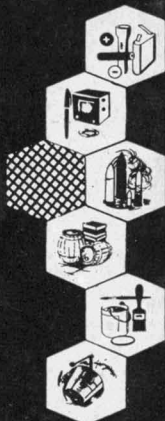
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