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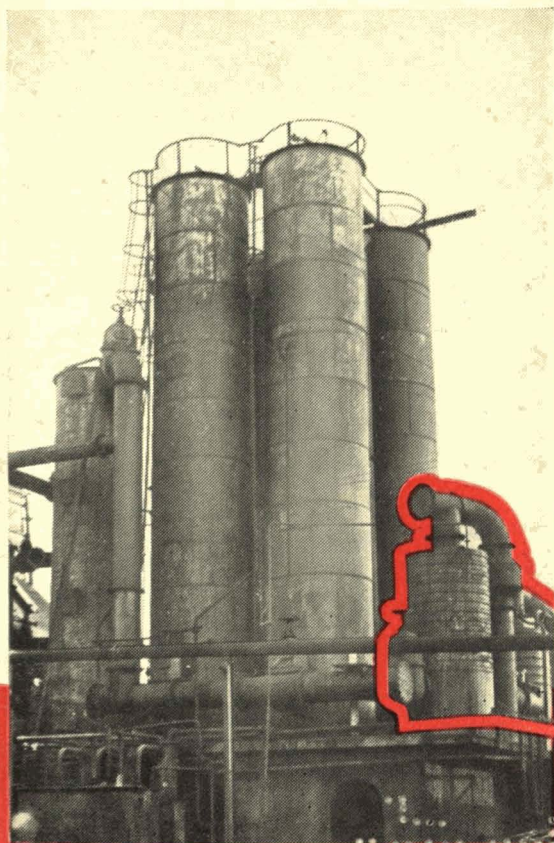
# THE Chemical Age

VOL. LXXIII

22 OCTOBER 1955

No. 1893

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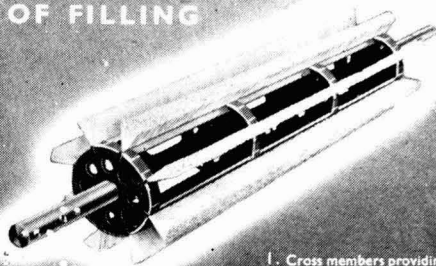
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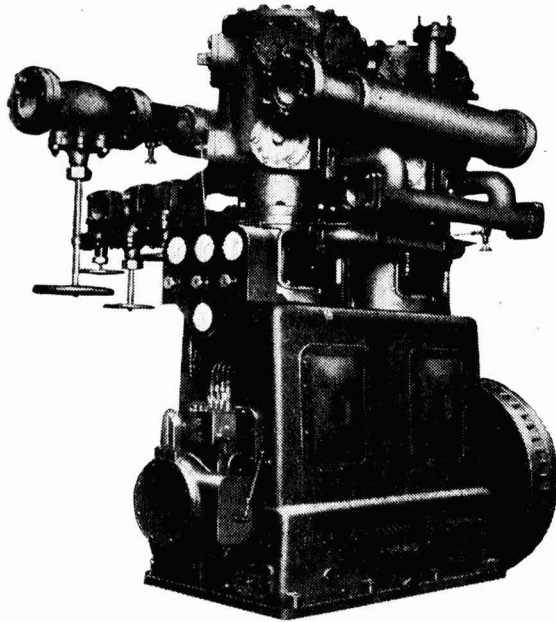
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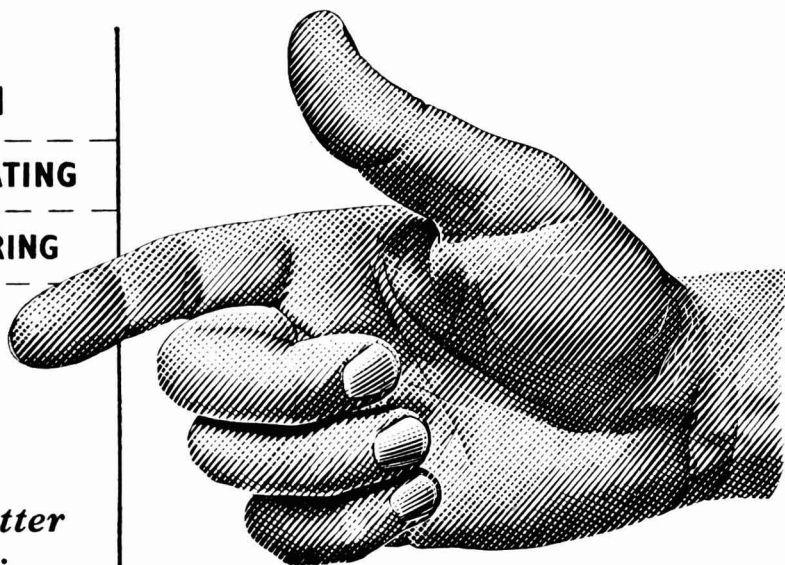
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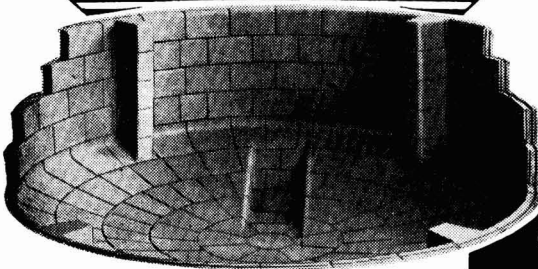
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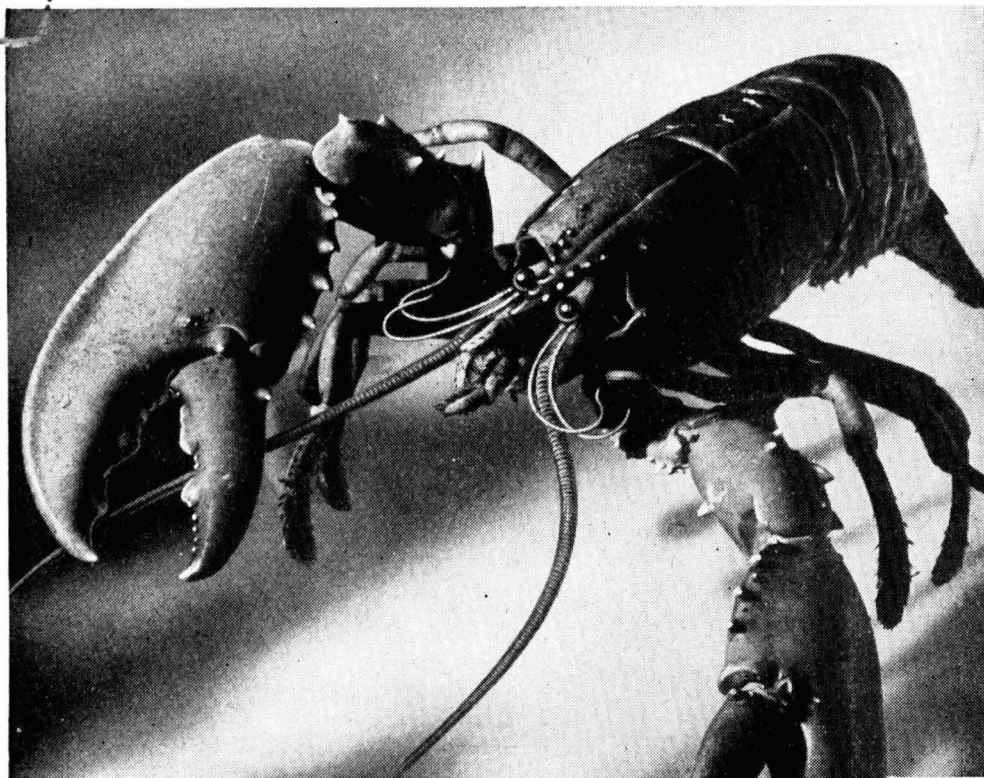
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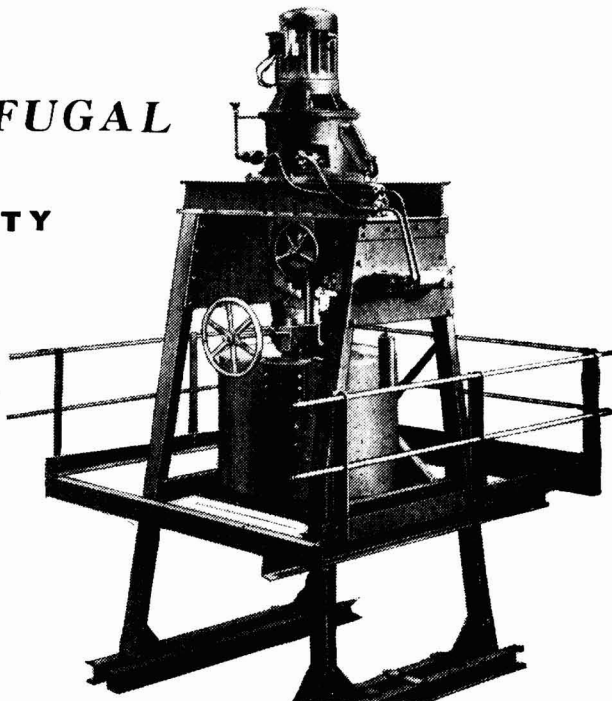
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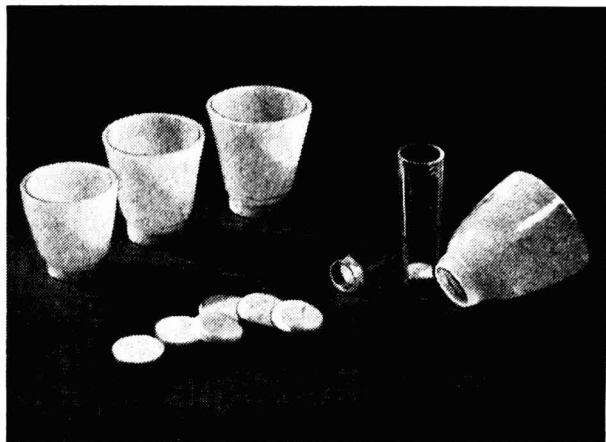
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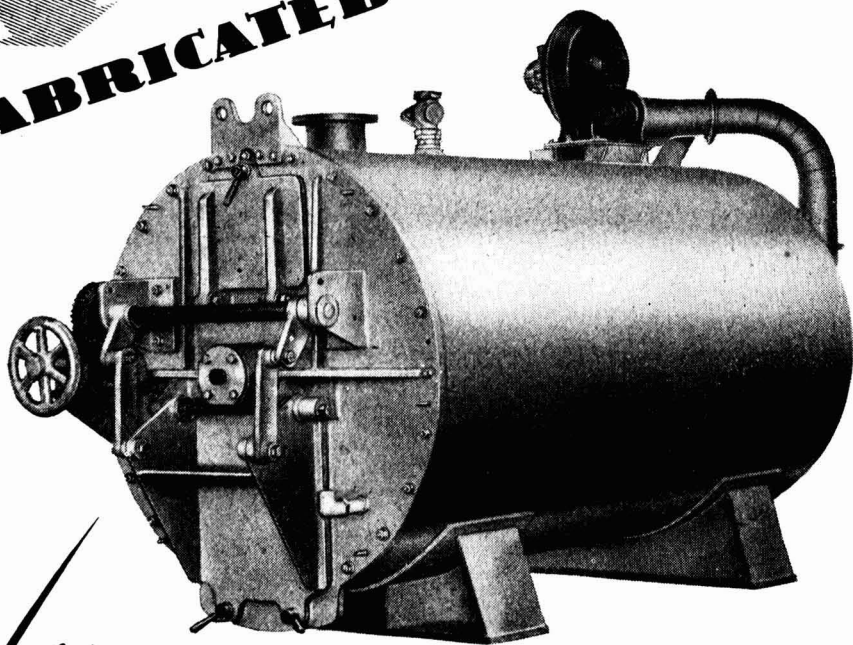
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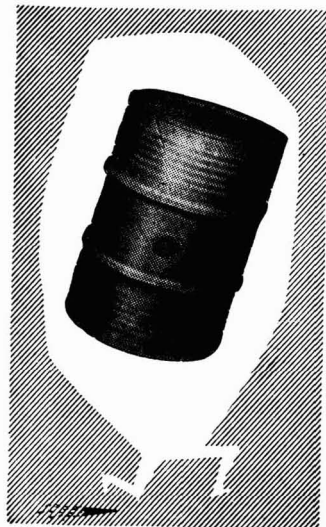
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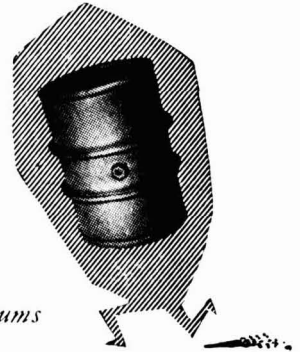


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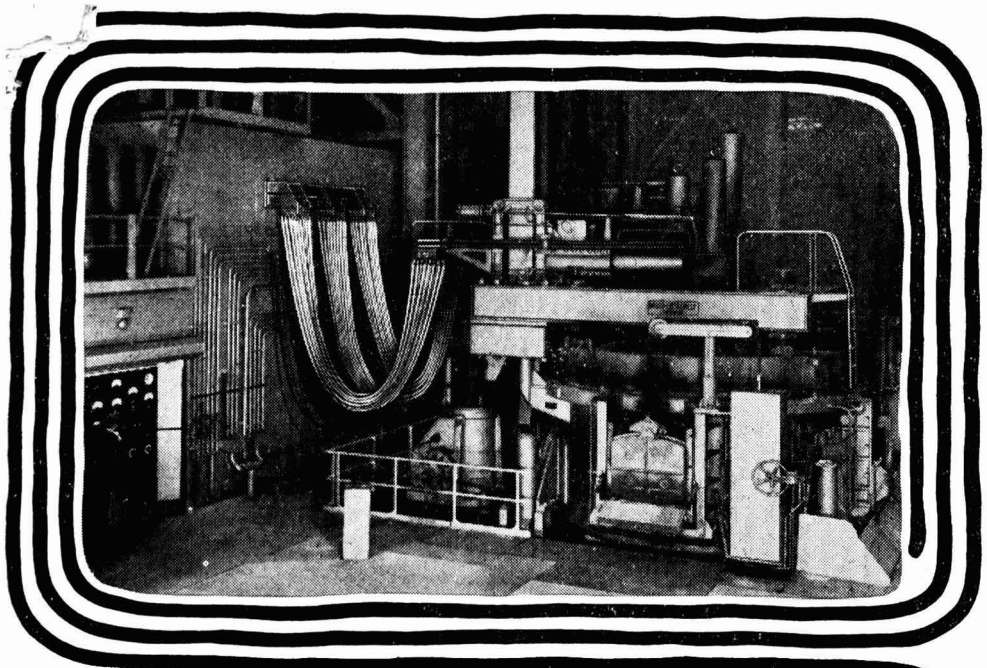
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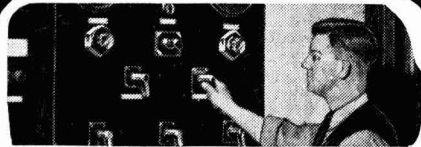


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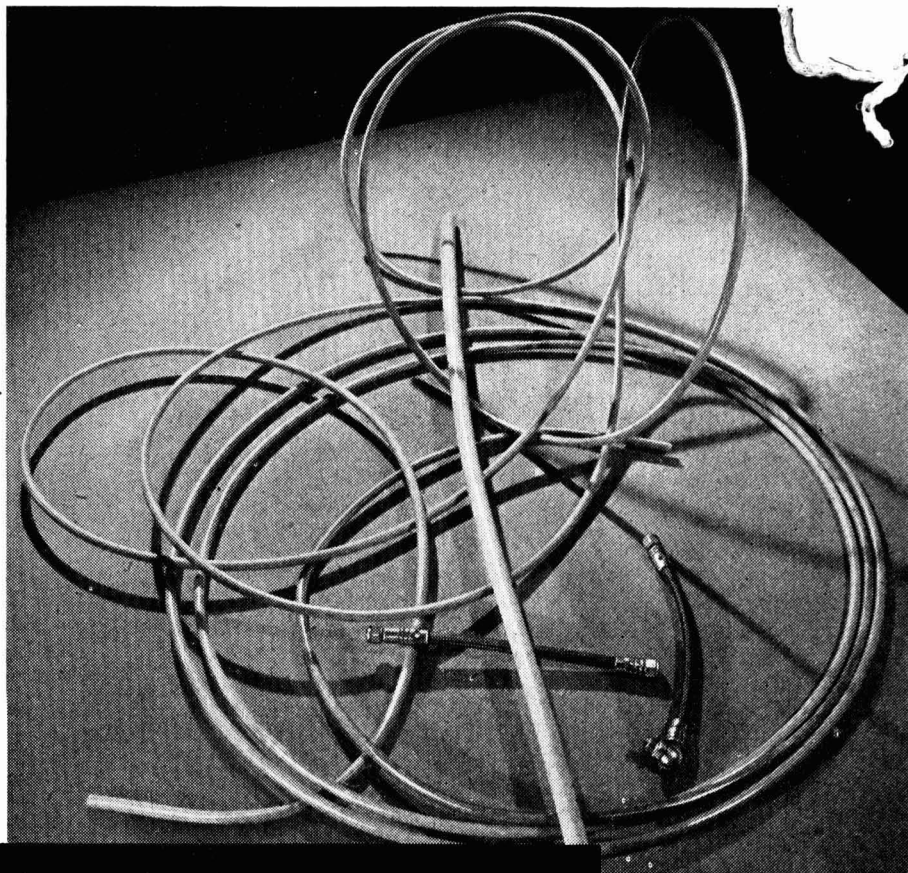
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Number 1893

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*The Weekly Journal of Chemical Engineering and Industrial Chemistry*

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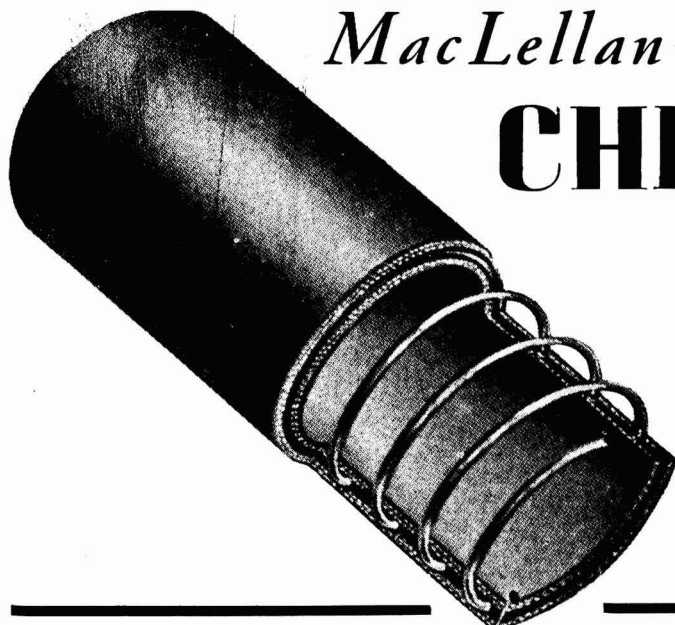
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# Automation

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**A**UTOMATION has far more novelty as a word than as an idea. The word is attributed to a Ford Motor Company vice-president in 1940, but automatic devices that rejected out-size or under-size units in production flowlines were hardly unknown at that time. Unfortunately, the development of a new word has led to considerable misunderstanding.

Automation is simply the extension or continued development of industrial principles that began not even in this century but in the last. It is the coining of a word that has brought illusion—in fact there is nothing new and certainly no date-line between a past without automation and a present suddenly blessed by it.

It has been said that automation is a contraction of 'automisation'. If so, this new and ugly word has at least the merit of substituting for an uglier, stillborn word. However, an appropriate phrase for all that is covered by automation had always existed in 'automatic control', and the time will come, if it has not done so already, when the folly of creating one loose word to serve for two precise ones will be fully realised.

However, when a word has become fashionable, resistance and resentment are almost as futile as similar reactions to the latest shape of feminine headgear. Automation is here. For certain politicians, popular journalists, and radio-cum-TV debaters, the fashion has added a welcome new subject to their short list of topics. Perhaps like most fashions, this one, too, will pass. Alternatively, as time

clarifies verbal turbidity, automation may acquire a precise and limited definition and those who then use the word will know what they and other people mean by it.

It is fortunate that some trades union leaders have shown excellent sense in their reactions to widespread talk about automation. Thus Mr. Bob Edwards, M.P., general secretary of the Chemical Workers' Union, in an article in *The Chemical Worker* (July, 1955) said: 'Automation, however, is an old story as far as the chemical industry is concerned. In recent years many of our larger chemical establishments have been revolutionised by new technical processes which have turned chemical process workers into meter readers, and while these new technical processes have lightened the toll of our members they have not reduced their responsibilities. . . . But how far can this realism and good sense percolate downwards in the union movements if there is more and more talk and news about revolutionising industry by automation? What is the inevitable reaction of a works staff of, say, 150 to 200 men when automation is the local topic? It took some 20 years for time and motion study to become willingly accepted by workers as 'work study'. All that was so beneficially implied in the analysis of unit labour operations was painfully delayed because it started on the wrong foot, in both manner and verbal description.

The pace of wartime necessity and the opportunities of post-war reconstruction have together reshaped

the technical potentialities of automatic control. Much the same generalisation could be applied to most other aspects of industrial activity, but electronics and instrumentation have made particularly striking progress since 1939; equally striking progress has been possible, therefore, for automatic process control. There is perhaps a third contributory factor, the fairly new realisation that quality control is a sub-branch of statistical science.

The coming-together of these influences at much the same time has undoubtedly acted as a hormone injection upon the respectable and quite elderly subject of automatic control. However, the extent to which automatic controls can be applied to chemical processes is almost temperamentally variable. Many such processes are 'naturals' for automatic control—production continuity, the movement of gases or liquids, the dynamics of chemical reactions, these are ideal conditional bases for control by instruments with dial-pointers. On the other hand, many processes are sensitively dependent upon operational conditions, sometimes even to the point of hazard, should variation of temperature or pressure occur, and often in such cases it is difficult to decide whether the causes of efficiency and safety are best served by human conscientiousness plus simple instruments or by more complex instruments that ring action bells when abnormality is measured. No one need be labelled a technological diehard for failing to place 100 per cent trust in a machine or assembly of instruments whose innermost workings can be understood (and adjusted) only by a few specialised technicians! In this context the opinion of a septuagenarian gardener on modern gardening 'machines' is not completely irrelevant—he dismisses with contempt those which can only be described as labour-saving, but he welcomes full-heartedly those which are more aptly described as labour-aiding. One of the finest examples of automatic control in industry is the safety-valve on a steam-boiler (though it is somewhat less effective when the end of the lever-arm is used as a coat-hook by the stoker, a passing comment from experience and one not wholly irrelevant in an increasing instrumental world!).

These elementary remarks at mation will by this stage have enthusiasts who visualise large in productivity per man-hour as a result of instrument-controlled processes. However, irritants are not always futile and there are circumstances when they can be physiologically beneficial. It is a reasonable assumption to say that most industrial chemical processes are large-scale chemical reactions or interactions. For many years one of the major difficulties of control in the industry has centred on the time-lag between sample-taking and the receipt of analytical results by plant managers; continuous processing is often posthumously controlled by works laboratories, with Monday's poor performance blissfully unknown until Wednesday's inquest. There has been much less progress towards reducing this time-lag problem than in developing instruments that can continuously measure specific 'properties' in material passing along a production flowline; such progress that has been made has usually involved loss of analytical accuracy. How far this loss of accuracy matters depends upon the purity requirements of the final product. Indeed, a point can be reached when specification standards for chemicals are lowered for the sake of utilising the economic benefits of automatic control—current examples of this trend may be found in the fertiliser industry.

These points are not raised to crab the theme of automation, but they may serve as a timely reminder that the primary consideration in many chemical processes is chemical, with engineering and materials, handling considerations in a secondary place. Although automatic control is especially compatible with most chemical flowlines, the expansion of past developments will encounter a rising number of limitations, and it may well become something of a danger if processes or products achieve preference simply because they are more suited to automatic control. These are hazards that must be safeguarded by clear thinking. The use of man-hours per £1,000 of product-value in the chemical industry is already commendably low; striving for greater economy in this direction must not diminish quality or flexibility of product.

# Notes & Comments

## Chemistry for Carriers

**T**HE men who transport chemical products may not know quite so much about the fundamental properties of chemicals as do the men who make them or use them, but when it comes to safety, the tank truck driver or his employer certainly is as vitally concerned as anyone.' This opening sentence taken from a recent news report in *Chemical & Engineering News* (1955, 33, 3978) puts across a point of universal importance. The steady increase in tank transportation of liquid chemicals which have hazards of inflammability, rapid expansion through high volatility, or toxicity, has an obvious relevance. We have little information about British practice in training tank-lorry drivers or other drivers who are in daily charge of chemicals on the road, but the recent experiment in America of holding a three-days' training school for them seems well worth comment. The sponsoring organisation was National Tank Truck Carriers Inc.; the initiative for tackling this problem was taken, therefore, by the transport industry rather than by the chemical industry.

## Exceptional Interest Shown

**T**HIS first school or course was run as a pilot experiment; whether similar efforts were to become annual or regular arrangements depended upon the opening response. There seems small doubt now that this response was even keener than any that had been anticipated. An expected attendance of 60 turned out to be more than 100. Questions after lectures were fired by the dozen. Nor was the provision of information a one-way process. Discussions revealed some common inadequacies in tanker truck equipment, e.g., the performance of flexible hoses used, which led to the formation of a joint committee of hose manufacturers and tanker truck carriers to investigate the problem. Some tanker transport contractors are reported to have shown that their safety practice was ahead of the standard set

by chemical manufacturers! It was 'abundantly clear' that most contractors and drivers have adopted a far from casual attitude towards their chemical responsibilities, that in fact many of them had been asking for information that should have been supplied without request. Indeed, the deduction can be drawn from the US report that it is the chemical industry rather than the transport organisation that has been casual in tackling this special aspect of chemical handling safety.

## British Needs

**I**N this country there is as yet a smaller proportional use made of road tankers; nor is specialised goods transport operation as much in the hands of contractors. Organising general education courses for transport personnel would probably be more difficult for the general level of education among drivers is undoubtedly much lower in the UK. Nevertheless, the miscellaneous chemicals that must be carried by outside agencies, notably, of course, by British Road Services, can be assumed to present chemical risks—to what extent is safety in this sense taken for granted? There is certainly some argument for taking a leaf from the American book; for conference and free discussion seem to have been unexpectedly useful, and it is axiomatic that good safety practice is better based upon knowledge than upon arbitrary instruction.

## Hospitality

**H**OSPITALITY may scarcely seem a scientific topic, but we are reminded that it plays a part in progress by the 1955 Report of the Society for Visiting Scientists Ltd. SVS is an exceedingly honorary and voluntary organisation which copes with the human and material requirements of scientists who visit us for conferences and other interchanges of views. Candidly, we were shocked to find that the report bore considerable resemblance to the parochial charity reports that emerge annually in small towns. To say this is

not to belittle the efforts of SVS. On the contrary, attention should be forcibly drawn to the paucity of assistance that this organisation seems to receive. More financial help from industry has been strenuously sought, but the Society has reluctantly assumed that its budget cannot be helped by any extension of industrial support. The one 'bright spot' in the current position is that the British Council has supplemented its grant of £2,000 per annum with a further sum of £1,500; but this still does not restore the wartime level of British Council help when, of course, each £ was able to provide more hospitality.

### Slavery

THE amount of work that has been done by eminent scientists in appealing for funds on behalf of SVS has amounted to clerical slavery. It has produced a meagre harvest. This may to some extent be due to the academic bias of the society which would seem to be mainly concerned with visits of 'pure' scientists. Yet should this be otherwise? The visits of eminent 'applied' scientists are usually well looked after. SVS is most necessarily trying to fill a gap, and more recognition of this fact by industry would not be out of place. Surely everything that can be done to encourage scientific conference in Britain should be done—we cannot afford to become a second-rate or third-rate contact centre. This Society has been formed to promote international discussions *here*; and when overseas scientists come to this country, their opportunity to make contacts with science and scientists is widened. The economic plight of Britain is not so grave that charity appeals and cheese-paring should be associated with these useful purposes.

### Floral Fortitude?

HAS one of the oldest of domestic chemical challenges found an answer? A brief news report in *Industrial & Engineering Chemistry* (1955, 47 [9], 7A) certainly suggests that an effective preservative for cut flowers has been developed by a research chemist of the University of Denver. There are, of course, various 'dodges'—aspirin, a

penny in the water, sugar, and so on—but most of these methods are old or young wives' tales; put to objective test, they do not prolong cut flower life consistently. The chance factor of bacterial decay at the cut end of the stem is probably the most decisive influence for the length of most flowers' vase-life, but this development is promoted by other conditions. It seems that any hopeful flower preservative must control the pH of the vase water, must act as a respiration inhibitor, and must provide nutrient material to supplement the food reserve in the cut flower and stem. A chemical preparation with these properties has emerged from two years of research; what it contains is not revealed in the article referred to, but experiments showing that its use doubles the life of cut flowers have apparently taken place. It is being marketed—paradoxically enough to enlarge our faith in the commercial vision of the 1950s—by a florists' association! We could certainly make good use of fuller information on this subject; a genuinely effective preserving tablet for cut flowers would speedily build up big business across British counters. Flowers in the house in winter-time are costly indulgences that few housewives resist. Indeed, it was once observed that sales of cut flowers fell much less than other luxuries during periods of depression. If this US development is sound, it can cross the Atlantic with an abundance of success and homage.

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### Triplex Safety Glass Co. Ltd.

Profits of Triplex Safety Glass Co. this year are a record, and the directors have recommended a dividend of 2s. 6d. per stock unit, or 25 per cent on the issued ordinary capital. The amount of the ordinary dividend the company proposes to pay is £111,392. Sir Graham Cunningham, the chairman and managing director, presiding at the annual meeting said: At our Kings Norton works we are starting a large extension for storage alone which will cost between £200,000 and £250,000, and at Triplex (Northern) we are proposing to spend £300,000. We are not, however, contemplating any additional expense at Quickfit & Quartz at Stone, Staffs.

# Chemical Engineering Advisory Service

## ABCM Chairman Announces Decision at AGM

**P**RESENTING the 39th annual report at the annual general meeting of the Association of British Chemical Manufacturers which took place on 13 October, Mr. W. J. Worboys, retiring chairman of the ABCM, announced that it had been decided not to set up any central form of chemical engineering research organisation. Instead a Chemical Engineering Research and Advisory Committee was being formed and this would include a liaison member nominated by the British Chemical Plant Manufacturers' Association. The committee will not compete with existing consultants but it will advise member firms on a confidential basis.

In part, Mr. Worboys's address was as follows:—

The holding of provincial meetings last autumn was a new idea and I think we can look back on them now as having been most worthwhile. They revealed the fact that the association's publications and other information sent out from London, very often failed to reach those levels in the firms where they could be used to advantage. They also disclosed considerable ignorance among the representatives from the actual factories and provincial offices of the member firms, of the services provided by the association. Changes have since been made in the methods of distributing our documents and I hope they now reach the people who can make most use of them.

### Groups Have Not Met

The group structure has been in existence since the association was formed in 1916; it was reviewed in 1937 when the number of groups was reduced from 12 to 7 in an attempt to secure a more workable arrangement. In spite of this the fact remains that with the main exceptions of Groups B and D, where there is a live community of interest—particularly the Key Industry Duty and the Dyestuffs Act—the majority of the groups have not met for many years, nor does there appear to be any likelihood of their becoming more active in the future.

This is due, I think, to two main causes. There are many trade associations in the chemical industry, some affiliated to the

ABCM and some not, and some even operating from this office, which deal effectively with most sections of the industry where there are active product problems to handle. We have also developed an effective system of what may be called technical or functional committees such, for example, as those relating to safety and transport, which deal with problems affecting all sections of our industry. Various methods of activating the dormant groups were considered by the Council Sub-Committee set up to study the problem, but the conclusion was finally reached that the best method of improving the working of the association would be to abolish the groups and set up a regional organisation in its place. The experience at the provincial meetings and the successful work being done by the Area Productivity Committees both indicated that a regional organisation offered good prospects of success.

### Regional Committees

Council has, therefore, decided to set up for a trial period of two years a regional system based on the same regions as operate for the Area Productivity Committees. The new Regional Committees will, it is hoped, be instrumental in developing co-operation and mutual help among the chemical firms in their regions to the benefit of the industry as a whole, and in stimulating the use in the various works and offices of member firms of the numerous services provided by the association. These committees will be free to discuss any subjects consistent with the objects for which the Association was established and to make recommendations to the Council. The chairmen will be invited to attend all meetings of Council and report on the activities in their regions, thus maintaining close contact between the regions and the association's headquarters.

It is the intention that the members of affiliated associations who have works in the regions will be invited to participate in any general meetings or activities organised by the Regional Committees.

There was a strong feeling in many quarters that it would be advisable to abolish



the groups now in order to give the new regional organisation a better chance of success, but after careful consideration, Council decided that instead of taking this step now, the wiser course would be to suspend the action of the groups for the time being.

It is also proposed that the committees of the association be divided into two categories, namely:—

(a) Council Committees dealing mainly with policy and general problems which are the primary concern of Council.

The chairman of a Council Committee will normally be a member of Council, but if he is not, he will attend *ex-officio*.

There will be committees in this category dealing with subjects such as finance, productivity, public relations and information exchange, as well as a Dyestuffs Committee to provide for the activities of Group D, and a Tariff Committee under which the KID problems of the fine chemical industry will be handled as well as broader tariff matters.

(b) Technical or Functional Committees of which the chairmen will not necessarily be members of Council but will be invited to attend Council meetings to present their reports when such attendance seems desirable. The existing committees dealing, *inter alia*, with traffic, trade effluents, works safety, marking of containers, fuel efficiency and instrumentation will be in this category.

#### Allotted Task

I want specially to mention the proposed new council committee on productivity. The present steering committee has now completed its allotted task of stimulating the industry in the application, where appropriate, of the recommendations of the Heavy Chemicals Productivity Team Report, and will be dissolved. A new Council Productivity Committee will be set up to continue the work on productivity and to co-ordinate this with the activities of the Work Study Advisory Committee which will report to it instead of direct to Council as at present. The representatives of the Association of Chemical and Allied Employers and the Trade Unions will be invited to serve as liaison members of the Productivity Committee in order to maintain continuity and to preserve the present excellent co-operation.

The steering committee has operated through the six area committees, these areas

being the same as the regions now proposed for the regional organisation.

These Area Productivity Committees, in which the Trade Unions are represented will continue to function as at present, reporting to the new Productivity Committee.

For the time being the Area Productivity Committees will operate in parallel with the new Regional Committees, but their ultimate amalgamation will be considered after the latter have proved their effectiveness.

You will all no doubt have been awaiting with interest the outcome of the discussions which have been taking place between this Association and the British Chemical Plant Manufacturers on chemical engineering research and the recommendations of the Cremer Report. After full analysis and consideration of the problem, the representatives of the two associations came to the conclusion that they could not recommend the setting up at the present time of any central form of chemical engineering research organisation. In the analysis leading to this conclusion your representatives felt that the main requirements of our industry in this matter were that:—

(a) Published chemical engineering knowledge and data should be readily available in as compact a form as possible.

(b) Fundamental work on the basic factors controlling operations which are or are likely to be widely used in chemical processes should be encouraged.

(c) There should be available in this country the means by which chemical manufacturers and chemical plant manufacturers, irrespective of their size, can arrange for research to be done on specific chemical engineering problems arising in connection with the development of new or improved chemical processes and plant, e.g. an institution in which experimental work could be sponsored and paid for by the party requiring it to be done.

(d) There should be available means by which those producers of chemicals or chemical plant who do not possess chemical engineering research facilities or the appropriate technical staff can be assisted in their appreciation of the advantages to be gained from the application of existing chemical engineering knowledge and given advice on how to solve their chemical engineering problems.

The type of research referred to in (b)

can be and is being done in the universities. The type referred to in (c) requires fairly close contact between the researchers, plant designers, plant operators and those who will ultimately sell the product of the plant. It is being done now on a not unsubstantial scale by larger firms, by some of the nationalised undertakings and by a number of research associations. Your representatives formed the opinion that immediate support for a centralised research establishment would not be sufficient and that of highest priority was the need for setting up an advisory service to stimulate a proper appreciation of the economic advantages of applying chemical engineering knowledge and a research committee to study the chemical engineering requirements of our industry and, in cases where gaps in knowledge were established, to propose steps by which appropriate research might be carried out.

Council have accordingly decided to set up a Chemical Engineering Research and Advisory Committee, which will include a liaison member nominated by the British Chemical Plant Manufacturers' Association. The committee will be served by a full-time executive officer.

Broadly, the functions of the committee will be to consider the chemical engineering requirements of the British chemical industry and to recommend from time to time steps which might be taken to extend chemical engineering knowledge; it will also endeavour to ensure within member firms the appreciation of the benefits that can accrue from the application of chemical engineering knowledge. Consideration is now being given to the personnel of this committee, to which Council will delegate the detailed planning of the advisory service and the task of finding a suitable executive officer.

#### Advisory Service

The advisory service, which will not, of course, compete with existing consultants, would have the following objectives:—

(i) to advise member firms on a confidential basis where they can obtain information and assistance necessary for the solution of their problems;

(ii) to stimulate and facilitate the interchange among members of non-confidential data;

(iii) to help in the collection and publication of available information;

(iv) to undertake such extra activities

which in its opinion are likely to increase the appreciation of member firms of the advantages to be gained from a more intensive application of chemical engineering knowledge.

The work of the committee and the advisory service will doubtless disclose the need for some addition to the present national facilities for research in this field and the committee will be empowered to submit proposals to Council as to the steps that might be taken, whether by sponsored research or otherwise, to fill the gaps that have become apparent in chemical engineering knowledge.

#### British Industries Fair

The next item on which I wish to comment is the proposed chemical section at the British Industries Fair, 1956. I would remind you that Council have already decided, and the BIF authorities have accepted, that there will be a chemical section at the BIF not more frequently than every other year. The immediate objective, strongly endorsed by Council, is then to stage in 1956 a representative exhibit worthy of our great industry by filling the National Hall at Olympia, where an area of some 32,000 sq. ft. is available.

This will combine the advantages of a specialist chemical exhibition which many firms favour, with all the benefits which accrue from the world-wide publicity of the BIF organisation. The prestige component of such an exhibition is undoubtedly high—higher indeed than any short-term commercial advantage—and, if adequately supported, the exhibition cannot fail to enhance the status of our industry in the eyes of the world and our overseas customers, who are conscious of the revival of the German chemical industry as displayed, for example, at recent Hanover Fairs.

The response to the association's appeal has to date been less than was expected. We have, however, secured the support and participation of over 50 firms for a total exhibiting area of some 25,000 sq. ft. This is sufficient to justify our going ahead with the project, and in the next month or two we may hope to persuade others to join in and help to fill the rest of the National Hall at Olympia.

We will also develop more fully the proposed 'shop window' section. I realise that member firms haven't always got a new product or new development which can be

the feature for a BIF stand, and I realise also that the cost and trouble of manning a stand can be greater than the cost of the stand. The 'shop window' section, which could include an inquiry desk staffed by the association and a couple of offices for the use of exhibiting members, could, therefore, be a real help to members, enabling them to be in the exhibition with their names before potential buyers.

Consideration is also being given to holding a technical conference during the 1956 BIF in rooms adjacent to the National Hall. The Steering Committee and the Area Productivity Committee have, as the report shows, made good progress during the year. The Work Study Advisory Committee has published the first two booklets in the series of 'Notes on Work Study'. These booklets have had a good press and have met with an appreciative reception from member firms. The Work Study Advisory Committee is now planning further booklets. A questionnaire was sent out a month ago to all members to ascertain their views as to the priority to be given to the various aspects of Work Study. The replies have been most helpful and will be used in planning the new booklets.

The Association of Chemical & Allied Employers has accepted Council's invitation to nominate two representatives to serve on this Committee; this ensures effective liaison which is especially desirable when dealing with aspects of work study in which the Association of Chemical & Allied Employers is particularly concerned, such as job evaluation and incentives.

Our various committees have been actively continuing their good work on behalf of the industry, and I would particularly commend the Safety Committee, the Traffic Committee and the Marking of Containers Committee.

## The Annual Dinner . . . .

**A**FTER welcoming the guests at the annual dinner which was held on Wednesday evening, 12 October, Mr. Worboys further explained the association's plans for reorganisation and for the setting up of the Chemical Research and Advisory Committee. Mr. Worboys said:—

Our industry continues great, one of our country's biggest; it is still expanding its frontiers—still growing, indeed, at about twice the rate of British manufacturing in-

dustry as a whole. But some other British industries have been growing faster and we must run faster still if we are to keep our place.

Marking of containers is a subject which has now assumed international importance, as witness the discussions at the International Labour Organisation meetings at Geneva in February. In this field we are working closely with our American colleagues in the Manufacturing Chemists' Association, and a few of them are coming over next week for discussions with us and the ILO officials, in an attempt to get agreement on the many and complicated problems involved.

The normal tenure of office for a chairman of the ABCM is two years and I have now reached the end of mine. They have been busy years and I think during them the association has continued to expand its field of endeavour. Whatever progress we have made has been due to the support we have had from our members and the great help we have received from the personnel of all our committees. Our area productivity meetings have done much to foster that spirit of co-operation and mutual help which must be the basis of every effective trade association, and I desire to thank all concerned for the part they have played in this. Particularly would I thank the staff who have borne the heat and burden of the day. Although the staff has increased, our activities have grown faster and I know that the staff has always been kept very busy.

I have enjoyed my two years in the chair, thanks to the loyal co-operation and support I have had at all times from my colleagues on the Council. We have had many vigorous debates, but throughout all of them, the ardent desire of everyone to advance the prestige and value of the association has been abundantly apparent. I feel sure that my successor will receive the same full measure of support in the many arduous tasks which lie ahead of him.

I would like to talk to you for a few minutes about our association and the part it plays in our industry. There is still much misunderstanding of trade associations in the public mind; they are thought by many to be principally concerned with price fixing and other restrictive practices. In fact, the

great majority of trade associations have nothing to do with the fixing of prices or other forms of commercial activity—and this certainly applies most positively to the ABCM.

The objects of our Association are:—

(1) the promotion of co-operation between chemical manufacturers.

(2) to deal with all questions likely to promote our industrial efficiency; and

(3) to act as a co-ordinating body in dealing with Government Departments.

In the 39 years of its existence your association has done a good job in meeting these objectives. And this time last year, you will remember, we were part-way through a series of provincial meetings called for the purpose of frank discussion to see whether the services provided by the association could in any way be improved so as to make the association still more useful to our industry. From these meetings a number of suggestions for improvement in our association's services emerged and have been put into operation.

If you think of the objects of our Association and the services it provides, you will agree that it is these services which are growing and becoming more technical (I use the word 'technical' in a very wide sense) which are the common interest of our members rather than matters concerning a particular group of products.

### To Promote Co-operation

We are, therefore, proceeding to set up six regional committees initially for a trial period of two years. The regional committees will be asked to stimulate in the regions the use of the various services provided by the association; to promote co-operation and mutual help between member firms and, indeed, to consider and discuss any subjects they like which are consistent with the association's articles and to make recommendations thereon to Council.

Our association is very much a 'mutual aid' body: for many of its activities, what is taken out bears a close relation to what is put in. This is likely to be even truer in the future than in the past. As I said last year, I believe that there is a considerable amount of non-confidential information that could be exchanged between member firms and that such exchange could speed up the rate of growth of our companies and

of our industry. But we must develop suitable mechanisms for this exchange. I believe that the new Regional Committees can contribute much to this and at the same time bring forward new ideas for increasing the effectiveness of our association.

### Cremer Report

Not unnaturally, chemical engineering research is an important subject for chemical manufacturers to think about, and ever since the publication some four years ago of the Cremer Committee's Report, with its emphasising of the varied and insistent research needs in chemical engineering, this subject has been under serious consideration by your association jointly with the British Chemical Plant Manufacturers' Association. While it would have been relatively easy to decide to set up a chemical engineering research association of the normal DSIR type, it was felt that this would not necessarily meet the real requirements of our industry. These requirements were thought to be:—

(1) The adequate dissemination and the full use of existing chemical engineering information;

(2) the proper appreciation throughout the industry of the economic advantages of applying chemical engineering knowledge and, of course,

(3) appropriate facilities for both fundamental and applied research.

I would like to emphasise that it would be wrong to assume that overall the competitive strength, or the rate of growth, of the British chemical industry is being badly affected by the lack of chemical engineering knowledge, but nevertheless the position does vary from firm to firm and, therefore, we have felt that any new organisation set up to deal with chemical engineering research should include the possibility of giving advice to member firms. Such an advisory service, in addition to helping members and increasing their appreciation of the benefits of applying chemical engineering knowledge in their factories, would also bring to light gaps in chemical engineering knowledge. For the short term, at any rate, the closing of such gaps in knowledge might be dealt with by sponsoring research in appropriate universities or already existing research associations or institutions.

The ABCM Council has accordingly

decided to set up a Chemical Engineering Research and Advisory Committee, which will include a liaison member nominated by the British Chemical Plant Manufacturers' Association. This committee will have a full-time executive officer and will, in addition to organising the advisory service I have just mentioned—which will, of course, not compete with existing consultants—try to stimulate and facilitate the interchange of non-confidential information between member firms and will also help in the collection and publication of available information. It will also consider broadly the chemical engineering requirements of the British chemical industry and recommend, from time to time, steps which might be taken to extend our knowledge.

### Sponsored Research

Your Council feels that in a few years this committee should establish whether or not some addition to our existing national facilities for chemical engineering research is required and, if required, recommend its form. Without anticipating their findings, it is not perhaps improper for me to say that there might be attraction in establishing a suitable, sponsored research institute which would enable firms to 'hire' research facilities for the study of their problems, either instead of having their own research department or in extension of their own research facilities.

We should not let the importance of the technical problems before us cloud our eyes to the commercial problems which too are important. We are not the only nation making chemicals, and competition in world markets, already strong, is likely to intensify. Not only must we make good chemicals cheaply, but we must also present them to our customers attractively and with good advocacy and we must distribute them cheaply and efficiently too.

There are as many detailed but important points to be thought about on the commercial side of our business as there are on the technical side—and we are, I feel, not always as good on these commercial matters as we should be. This is perhaps not surprising: technical advice has been rapid and absorbing: we have enjoyed something approaching sellers' market conditions for one and a half decades and many of our younger executives have never known the real icy blasts of fierce competition in

overseas markets. Approximately 30 per cent of our chemical industry's production is exported: this we must maintain. Indeed, we would like to increase it.

I do most strongly believe that in the world of today we cannot leave it to the customer to find out that we have a good chemical industry in Britain. We must tell him! And the co-ordinated chemical section in the National Hall at Olympia at the 1956 British Industries Fair—a prestige exhibition if you like—should provide excellent background, and cheaply, for our own salesmen's selling efforts.

I have been disappointed at the support members have so far promised for the 1956 Exhibition: we have enough support to go on, but I would have liked much more, for there is much that is novel and worthwhile in our plan. Surely our industry of all industries should be better at looking forward adventurously than at looking back over our shoulders conservatively.

### Mr. Butler

Welcoming Mr. Butler, Mr. Worboys concluded:

'There is one thing on which we are not in conflict with the Chancellor of the Exchequer of today, namely the setting and phrasing of our national target—the doubling of the standard of living in 25 years. In this we are undoubtedly his allies and, further, we believe the target to be a thoroughly practical one. We hope, however, that concentration on this very material target will not make us forget other important but less material things, and we hope too that you, Sir, will be able to solve that most vexed question of our present times, the giving of incentives to companies and individuals for enterprise and hard work, without adding dangerously to inflationary consumption at home—for man continues to be, we sadly know, both basically selfish and basically lazy.'

Replying, Mr. Butler said that British chemical manufacturers, by reducing Britain's dependence on overseas supplies and by their export trade, were helping to strengthen the gold and dollar reserves of the whole sterling area. He wanted those present to know that Her Majesty's Government appreciated their work. Their success was due to patient research and often to the erection of costly and expensive plants,



plants which had to be seen to be believed.

In the modern world change was a condition of growth and for Britain it was a condition of survival at our present standard of living—let alone at a standard twice as high.

Congratulating the industry on its success story, Mr. Butler said that he was sure that greater achievements lay ahead. It had created, or helped to create, entirely new industries. Mr. Worboys had said that the industry was growing twice as fast as all manufacturing industries taken together. But what he would like to commend them for was that their productivity had gone up by half, compared with a fifth for all manufacturing.

The demand for factories and machinery was very high and this, on top of booming personal consumption, had brought total home demand to the point where the national economy was now overstrained. We were suffering from the disease of over prosperity. Unfortunately, exports had not kept pace with the increase in imports. Provisional figures showed that in the first nine months of the year exports were higher than a year earlier by 6 per cent, but the value of imports was higher by 15 per cent. From 1948-1954 incomes rose 50 per cent while output rose only 20 per cent. As a country we could not tolerate such a situation. The only solution was higher productivity, competitive prices and greater exports.

### Cutting Costs Essential

The cutting of costs of production—and hence of prices—was the most realistic appeal he could make. The prices of chemicals affected the prices of many other export industries and if the chemical manufacturers could cut costs they could help over a wide field.

'The wholesale cost of your output has on average, I believe, risen less in recent years than in manufacturing generally. Therefore I have to congratulate you not only on increased productivity but also on maintaining competitive prices. You are a glory to Britain, a source of inspiration, but perhaps you can do even better.'

In conclusion, the Chancellor said that Britain was at the parting of the ways. If she was to win through great inventiveness must be shown and she must go all out to win. So far as the chemical industry was concerned three things were needed to set

an example to the manufacturing industries of the country. These were technical efficiency, imagination and salesmanship.

The British chemical industry was so vigorous and versatile that it was impossible to define it. This was not only one of the marks of greatness, but also a reminder that there was scarcely any aspect of national prosperity where it was not at work. Still greater achievements were within its reach and the whole nation looked forward to sharing in them.

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### By Air to Edwards

HELICOPTERS are being used by Edwards High Vacuum Ltd. to transport overseas visitors from London Airport to their factory at Crawley New Town, 30 miles away.

On Tuesday, 18 October, a party from the Commissariat à l'Energie Atomique of France, including Professor Debeisse, the Director of the Centre d'Etudes Nucleaire, arrived at London Airport and were taken immediately to Crawley, arriving in time for talks before luncheon. Valuable time was saved in this way, say the company.

The flight was arranged by Helicopter Services Ltd. who selected a suitable land-place close to the Edwards' offices. The visitors went straight from the helicopter to the conference room and the visit differed little in convenience from a car journey, save in the all-important matters of time and freedom from traffic jams.

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### Russians Visit I.C.I.

THE POSSIBLE uses of Terylene in Russia were discussed at Harrogate on 7 October, at a meeting between Dr. A. Caress, chairman of the I.C.I.'s Terylene Council, members of the techno-commercial department and three members of the Russian delegation which has recently visited this country (see *THE CHEMICAL AGE*, 1955, 73, 772).

The visitors were shown the new laboratories and exhibition rooms and showed particular interest in the industrial applications of Terylene, especially its use for fishing nets, ropes and papermakers' felts.

Members of the same delegation also visited I.C.I. paints division at Slough where they showed particular interest in automatic control methods such as are used in the varnish kettles, filling and labelling departments.

## Instrumentation

### Courses at Northampton Polytechnic

REALISING the need for highly trained technicians, the scientific instrument industry of this country approached the Ministry of Education with the request that a national college should be set up for the instrument making industries. The Northampton Polytechnic had for many years run courses on instrument technology and it was decided to incorporate this subject in the work of the National College of Horology, which was founded at The Northampton Polytechnic, St. John Street, London E.C.1. in 1946.

The joint college became known as The National College of Horology & Instrument Technology.

Part of the extensions to The Northampton Polytechnic, which have recently been completed, have consisted of new workshops and laboratories for the instrument engineering department.

'We are the first college in this country to make a full study of instrumentation', said Mr. C. J. Charnley, who is head of the college. 'Other colleges are now following our example and many of them have come to us for advice'. In the laboratories of the college many models have been set up on which students can learn the fundamentals of automatic process control. As the college develops another section which will include a computer will be opened, where students will be able to study automation.

Among courses available at the college may be mentioned a one year post-graduate course in instrument technology. The first term of the course consists of fundamental work, while in the second and third term a choice of subjects may be taken, depending on the student's or his employer's requirements. In certain cases students are accepted for work on special problems, usually specified by a sponsoring firm.

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### US Chemical Storage Terminal

THE chemical division of Celanese Corp. of America has opened a chemical storage terminal at Newark, New Jersey, as the eastern distribution centre for a wide range of liquid and dry chemicals. One of the largest facilities of its kind, it is a modern push-button terminal which has initial

capacities of 4,000,000 gallons of liquid chemicals, 1,000,000 pounds of dry products and, in addition, a substantial drumming capacity.

Mr. R. W. Kix Miller, vice-president and general manager of the chemical division, says it will provide the company with an accelerated and efficient system for the distribution of chemicals in the expanding eastern market.

'Celanese-produced chemicals ranging from solvents such as acetone and alcohols to intermediates like formaldehyde and acetic acid,' Mr. Kix Miller said, 'arrive at Newark by ocean tanker and railroad tank car. Stored in 27 tanks and two warehouses these materials can be distributed to customers by water, rail or land in either drum, tank car, tank truck, carload or barge quantities.

One of the features of the terminal is an 840,000-gallon formalin storage tank fabricated from a special type aluminium. This is the fourth largest aluminium tank in the world, and the largest ever fabricated from the particular alloy. A second 840,000-gallon tank for the storage of methanol is made of carbon steel. Other tanks are made of stainless steel and carbon steel, some of which are resin lined for quality protection.

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### Q.V.F. Forming German Subsidiary

Plans for capturing from Germany a large share of the chemical plant and glass pipeline market are announced by Sir Graham Cunningham, chairman of Q.V.F. Ltd., of Stone, Staffs, a member of the Triplex group of companies. Sir Graham, who recently returned from Germany, announced that a subsidiary of Q.V.F. is being formed there.

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### Mechanical Handling

A preview of a new film 'Mechanical Handling on Show' was given on Friday, 14 October. This film is a pictorial record of recent Mechanical Handling Exhibitions, and is presented by *Mechanical Handling*, the journal which organises the exhibitions. The film is available on request, free of charge, from *Mechanical Handling*. The next Mechanical Handling Exhibition and Convention will be held at Earls Court from 9 to 19 May next year.

**SOCIETY FOR ANALYTICAL CHEMISTRY****Meeting of Midland Section**

**T**HE first meeting of the new session of the Midlands Section of the Society for Analytical Chemistry was held on Tuesday, 13 September, in the Chemistry Department of the University of Birmingham, Edgbaston. The chairman, Mr. J. R. Leech, JP, said that two papers were to be read, 'The Use of the Mass Spectrometer in Analysis' by Dr. J. C. Robb (Birmingham University) and 'Microwave Spectroscopy' by Dr. J. Sheridan (Birmingham University).

Dr. Sheridan introduced his paper by saying that in spite of its general title, there would only be sufficient time to outline the electronic techniques which make microwave spectroscopy entirely different from optical spectroscopy, and to discuss briefly the scope and limitations of the method as a means of chemical analysis.

Microwaves are radio waves of very short length, roughly from one mm. to one metre. Their absorption by electrically dipolar substances in the gaseous state at low pressures is a form of spectroscopy in which, on account of the electronic methods used, extremely high resolving powers are readily available. Since the microwave spectra of different compounds can be in no significant way coincident on account of the great sensitivity of the spectra to molecular shape, the resolving power provides, in principle, a powerful means of identifying, and separately estimating, the components of mixtures. The study of spectra of gases in the region of very short radio waves began in 1946, and in this early period the apparatus was taken directly from short wave radar. Sufficient progress has now been made for the method to be a useful supplement to existing procedures for chemical and isotopic analysis.

**Monochromatic Radiation**

The radiation is obtained from an oscillator, and hence is monochromatic, but the oscillator can be 'tuned' so that a range of frequencies is scanned. No dispersion instrument is needed. The radiation is controlled and directed inside rectangular metal tubes (wave guides), and in a long length of such a tube it traverses the gas to be studied, the pressure of which is roughly  $10^{-2}$  mm.

The radiation reaching the far end of the absorption cell is detected at a silicon-tungsten crystal diode, and the detected signals are then handled in conventional amplifier circuits. Absorptions by the gas appear as vertical displacements of an oscilloscope trace which is swept horizontally in step with the frequency range swept by the radiation.

The frequencies absorbed can be measured with great accuracy, approaching one part in a million, by essentially conventional electronic methods, comparison ultimately being made with standard broadcast frequencies. The spectrum of a substance can thus be tabulated and reproduced in a highly precise manner.

**Stark Effect Modulation**

Spectrometers with Stark effect modulation are now used by most investigators, since these instruments are not only very sensitive but also the most versatile. The principle of such spectrometers is that, when an electrical field is applied to the gas under investigation, the splittings of the spectral lines (the Stark effect) are resolvable from the ordinary spectrum.

Previously most workers have operated at wavelengths from 15 to six mm. (20,000 to 50,000 Mc/sec.) where sensitivity is greatest, but measurements are now being made over a much larger range of frequencies. Thus, although the lowering of the short wavelength limit of radio techniques will always challenge the experimentalist, recent advances have led to the measurement of molecular absorptions at wavelengths as short as 0.77 mm. This has made possible the microwave study of certain important light molecules which do not absorb in the previously accessible region.

Also notable among experimental advances are the development of spectrometers, operating at temperatures of up to  $1,000^{\circ}\text{C}$ , for the study of the many simple molecules, e.g. the alkali halides, which have sufficient vapour pressure only under such conditions, and the design of instruments for the study of highly corrosive substances, e.g. interhalogen compounds, and

of unstable molecules, e.g. hydrogen peroxide.

The spectra are nearly always the pure rotational spectra of electrically dipolar molecules, the absorbed radiation merely causing the molecules to spin more rapidly. As such, the spectra are intimately related to the moments of inertia of the molecule and hence to its structure, and it is extremely improbable that two substances should have microwave spectra so similar that one could be confused with the other. This arises essentially from the ability to resolve the absorption lines and to characterise their frequencies with high accuracy.

### Isotopic Analysis

Successful application has been made in the case of isotopic analysis, where the small changes in mass accompanying isotopic replacements in molecules show up, in many cases, as gross changes in their microwave spectra. It is also possible to determine the location of the new atomic mass in the molecule. For example, it is possible to estimate  $^{15}\text{N}$  in admixture with  $^{14}\text{N}$  by conversion to ammonia and comparing intensities of appropriate microwave absorptions of  $^{15}\text{NH}_3$  and  $^{14}\text{NH}_3$ .

Greater difficulties attend the estimation of mixtures of chemically different substances, as these can differ in ways which are impossible for isotopic molecules. Thus, they can differ in their ease of adsorption on the inner surfaces of the spectrometer, and so cause the gas present to differ in composition from that of the overall sample. Furthermore, the width of a given adsorption line, and hence its peak intensity, depends on the nature of any foreign molecules present, as well as on their number. For instance, if a line is first measured in pure ammonia and half the ammonia molecules are then replaced by argon molecules, the peak intensity of the line does not fall to half its former value; the loss is chiefly in width.

Care must therefore be exercised to retain constant widths of lines or to measure total rather than peak absorptions. Troubles such as these can doubtless be overcome by the evolution of careful procedures for individual cases in which something is known of the substances which are present. In this way it appears certain that the highly specific nature of microwave spectra will find application to special analytical problems.

In the second paper, Dr. Reeb gave a brief account of the working of a mass spectrometer, followed by a consideration of a number of typical applications to the solution of analytical problems. The major use, namely that involving the analysis of gaseous samples, was discussed in some detail, and a number of more recent developments also considered.

Although the principles of mass spectrometry have been used for forty years, it is only within the last twenty years that it has been possible to apply the method to the analysis of mixtures of volatile compounds. The impetus responsible for the development of the method came largely from the petroleum industry in which it was necessary to obtain quick, accurate analysis of hydrocarbon mixtures.

The principle upon which the instrument operates is simple, molecules for analysis being allowed to flow into a highly evacuated space and there collide with electrons of pre-determined energy. One result of such collisions is the production of positive ions. Further, the electron energies are such as to produce decomposition of the molecule, so that, for example, with methane a number of ions are formed:—



These ions are then accelerated through an electric field such that a beam is defined in which all the ions have the same kinetic energy. By passing this beam into a magnetic field the ions can be deflected, the ions of lower mass being deflected more than those of higher mass. Thus it is possible, by adjusting the intensity of the magnetic field, to deflect ions of any selected mass through a definite angle so that only ions of that mass can be collected on a metal plate after passing through a system of slits in order to define the collected beam.

### Standard Conditions

If the instrument is operated under the standard conditions, the relative intensities of the various ions present from a pure component remain constant and the absolute intensities are proportional to the pressure of the component. Methane, for instance, gives peaks corresponding to ions of mass 16, 15, 14, 13, and 12, the major peak being that at mass 16. For methane, the ratio 15 peak height/16 peak height, 14 peak height/16 peak height, and so on, are constant for a particular instrument and

as a result are a kind of 'finger print' for the presence of methane. Similarly, for ethane ions of mass 30, 29, 28, 27, 26, 25, 24, 15, 14, 13, 12, are observed so that for a mixture of methane and ethane, the peak at mass 30 indicates the amount of ethane present while that at mass 16, indicates the amount of methane present.

This approach to the computation can be used to cover a wide range of mixtures and it is found that an accuracy of about 0.4 per cent can be achieved in a multi-component hydrocarbon mixture containing up to  $C_5$  hydrocarbons. Volatile organic acids, alcohols, etc., can be similarly treated with an accuracy of about one per cent or better and the analysis can be carried out on a sample of about 0.5 ml. of gas at STP of which about one per cent is consumed in the analysis.

Recently it has been demonstrated that by the use of special techniques a mass spectrometer analysis of oils and waxes can be carried out in which it is possible to determine, for example, the molecular weight distribution for normal and *isoparaffins* in materials containing molecules with carbon numbers up to 60 or so. This opens up new fields in the study of heavy oils and waxes.

#### Inorganic Analysis

Another application lies in the use for inorganic analysis, although the field is very much restricted by the small number of volatile inorganic compounds. However, it is for certain purposes desirable to examine elements for their isotope distribution and for this the mass spectrometer has proved most useful. The main problem in this connection is that of producing positive ions from the element in question. This has been achieved in a variety of ways, for example by converting the element into a compound which is sufficiently volatile at reasonable temperatures. In the case of lead, for instance, this could be prepared as lead iodide which can be vaporised from a suitable container inside the mass spectrometer. Other elements can be made to evaporate from heated filaments as ions, for example lithium and the rare earths. Once the positive ions are produced, the subsequent determination of the isotope abundance ratio is not difficult.

The speed with which analyses can be performed makes the method most suitable for plant control and plant monitoring, especi-

ally in cases where hydrocarbon analysis is required and there are now available a number of such machines which can give a visual continuity record of the performance of such a plant. It is likely that further advances in this direction will be forthcoming.

Although the present applications of this analytical method are many and varied, the potentialities of the mass spectrometer have by no means yet been exhausted.

At this point the meeting was opened for questions to be put to the two lecturers, and for general discussion. One inquiry concerned the possible use of the mass spectrometer for the analysis of waxes to which silicones had been added. Dr. Robb thought that the analysis was possible, in principle at least, if a sufficiently high temperature could be obtained.

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### Challenge to Engineers

PRESIDENT of Atlas Powder Company, Ralph K. Gottshall, challenged chemical engineers to take the initiative in learning to deal effectively with people to increase their chances of becoming top executives.

'If I were to pick up any one phase of my transition from the laboratory to top management as being crucial, I would say it was learning to deal effectively with people . . .,' said Mr. Gottshall, before the National Meeting of the American Institute of Chemical Engineers at Lake Placid, NY.

'Understanding human drives and motivations, and finding out how to lead people with a baton instead of a bat,' is a real and key challenge for engineers who wish to develop into good managers.

Referring to a recent survey, he said that while 45 per cent of the major executives questioned had science and engineering training, less than 10 per cent of them had moved directly in their job from an engineering or research spot. The rest had worked in sales, production, finance or general management, where they learned how to deal effectively with people, before entering high management ranks.

Evidence that engineers are meeting this challenge is found in Mr. Gottshall's own career and in the fact that one-third of the personnel now at the management level in the US have had considerable engineering education and experience.



## Epoxy Resins

### Shell and Bakelite Outline Uses

**M**ANY insecticidal and fungicidal sprays, weedkillers and similar agricultural chemicals possess the disadvantage of being very strong paint removers. This factor is one which has tended to be accepted as inevitable, though it is difficult to prevent damage to protective paints on spray equipment and towing vehicles, etc., through spillage or wind-blown spray. By the time of the evening wash-down, contaminated equipment has usually suffered considerable damage on its painted surfaces. Sometimes the paint is completely stripped off.

The recent introduction of Shell 'Epikote' resins, which impart good chemical resistance to coatings in which they are used, has prompted a paint manufacturer to carry out tests on his Epikote resin based enamels with a number of widely used agricultural chemicals.

The enamels used were Brymod AC enamels, applied to test pieces over an AC primer. The following results are claimed:

| Type of spray, etc                     | Period of total immersion | Result                               |
|--|---------------------------|--------------------------------------|
| Vaporising Oil<br>Weed-killer          | 3½ months                 | Unaffected.                          |
| PCP Miscible Oil                       | 3½ months                 | Only slightly softened.              |
| Tar Oil Winter Wash                    | 1 month                   | Unaffected.                          |
| Sodium Arsenite<br>Potato haulm killer | 3½ months                 | Unaffected.                          |
| 24-D/245 T Esters<br>Brush killer      | 2½ months                 | Only slightly softened.              |
| 24-D Amine Salt<br>Weed-killer         | 2½ months                 | Unaffected.                          |
| MCPA Potassium Salt<br>Weed-killer     | 2½ months                 | Unaffected.                          |
| Dinoseb Ammonium<br>Salt               | 1 month                   | Yellowed and very slightly softened. |
| DD Soil Fumigant                       | 14 days                   | Unaffected.                          |

The manufacturers suggest that these results give remarkable proof of the suitability of their Epikote resin based enamels for protection of equipment subject to the effects of these chemicals. They believe that even where the resistance is only of 14 days' duration, this period is one of constant and complete immersion. It is unlikely that splashes of fluid, which would presumably be cleaned off at the end of a day's work, would affect the enamel after only a few hours' contact.

Applications of Bakelite resin R.18774 are discussed in a series of leaflets published by the manufacturers, Bakelite Ltd. This is a liquid epoxy resin which when used with various hardeners produces materials which

are suitable for potting and impregnating electrical components, as a metal bonding adhesive and for the production of large castings.

Potting materials for electrical components are produced by using the resin with hardeners Q.18884 and Q.18905. Fillers can be used and they are recommended with Q.18905 to give increased thermal conductivity and a decreased coefficient of expansion. The addition of fillers is also claimed to reduce the overall shrinkage during hardening and to minimise the exothermic temperature rise.

Hardener Q.18964 will produce a cold setting resin which is suitable for bonding metals, polyester-glass fabric laminates, phenolic laminates and mouldings, glass, porcelain and wood. Hardener Q.18905 may also be used in combination with R.18774 to give a material which is suitable for producing large castings. The most satisfactory method for making such castings, say Bakelite, is to use a two-stage process in which a pre-cast core containing a high proportion of coarse filler is faced to a thickness of approximately ¼ in. with a material containing roughly equal parts of resin and finely ground fillers.

## West German Potash Output

A REPORT in *The Financial Times*, 11 October, states that the West German potash output this year is estimated at more than 1,700,000 tons, an increase of four per cent over last year. In 1954 the increase was 25 per cent when potash output rose by 296,000 tons to 1,650,000 tons.

Exports this year will probably reach 700,000 tons—against 643,000 tons last year—which is over 50 per cent more than the export figure for the whole of Germany in 1938. The industry has invested heavily in flotation plant, transport equipment, and mechanisation of packaging in recent years and is about to embark on large-scale marketing of complex fertilisers.

## Water Board

I.C.I. and Dorman Long have agreed to bear loan charges for the Tees Valley Water Board, thus enabling the board to go ahead with further development, costing £2,250,000, which will save three years in time and increase supplies by 2,000,000 gallons a day.

# Society of Leather Trades' Chemists

## Papers Presented at Annual Conference

THE Annual General Meeting and Conference of the Society of Leather Trades' Chemists was held on Friday and Saturday, 23 and 24 September, at the University, Leeds. The president, Dr. R. G. Mitton was in the chair.

Elections were held, and as a result Dr. L. Goldman becomes vice-president and Mr. H. Lee, Mr. J. S. Mudd and Dr. T. White become members of the council. The Donald Burton Prize for 1955 was awarded to Mr. S. R. Evelyn of the Leather Industries Research Institute, South Africa, for his publications on wattle tanning.

In his presidential address Dr. Mitton reviewed the activities of the society, and afterwards a series of papers were read and discussed.

Dr. H. Booth spoke on 'The Atmospheric Oxidation of Alkali Sulphide Solutions and their Effects on the Unhairing and Dewooling of Skins'.

Alkali sulphide solutions, he said, are oxidised by air by two different mechanisms:—

(a) In less alkaline solutions (NaHS or  $\text{Am}_2\text{S}$ ) with limited oxygen supply—poly-sulphide formation.

(b) With good aeration or more alkaline solutions, a reaction catalysed by iron.

Reaction (a) is slow, complete oxidation taking a few days or weeks.

Reaction (b) can be extremely rapid in alkaline solution with good aeration or on a surface where access of air is easy, complete oxidation taking less than a day.

### Ultimate Products

The ultimate products of both are normally thiosulphate, but with reaction (b) in alkaline solution  $\frac{1}{2}$  of the sulphide can be oxidised to sulphite if there is a restricted supply of oxygen.

The reaction is catalysed by the reduction of ferric sulphide, which on oxidation gives ferric sulphide and sulphite or thio-sulphate. Ferric sulphide is the ferric salt of a complex anion ( $\text{FeS}_3$ ). Green colloidal solutions of an intense colour are formed by this anion with ferrous iron, and insoluble derivatives are formed with Ca, Ba and Mg. The catalytic activity of the iron depends

on the proportion present at any given time as ferrous or ferric sulphide and the particle size. The proportion present as the various complexes is without catalytic activity.

With drum or paddle liming processes where the liquor is aerated, or with painting processes, where the grain of the skin receives a restricted supply of oxygen, conditions are favourable for the iron in the skin to oxidise sulphide to sulphite. As sulphite reacts with lime to form caustic soda, dangerously high alkalinities may be produced at the skin surface. When this happens drawing of the surface may occur, or the grain may be softened so that abrasive damage takes place subsequently, producing in sheepskins the defects of dull grain or leopard grain.

### Joint Paper

A joint paper entitled 'Electron Microscope Studies of the Process in Leather Manufacture' was presented by D. Burton and R. Reed.

Electronmicrographs of the unsalted hide show well-defined fibrils, clear striations and a large amount of amorphous material, which may possibly be a mucoid protein complex. On liming with a lime liquor containing 0.1 per cent sodium sulphide, the fibrils swell and the striations become less clear. Cigar-shaped segments coated with granular material of unknown composition appear and some small fibrils. There is some dispersion of the amorphous material. After deliming, the fibrils are less swollen, well defined and matted together with much amorphous material. There are no segments or small fibrils.

After bating, the fibrils are less rigid, the striations are possibly more clearly defined and there is more amorphous matter, which now contains dense particles. After pickling, there is more swelling and the fibrils are more rigid. The striations are more clearly defined and there are substantial amounts of amorphous material. After chrome tanning, there is much less swelling than at any previous stage. The striations are bead-like instead of being bands as previously. The significant feature is the contraction of the

fibrils to give a compact structure showing little amorphous material.

The effects of wet heat on four kinds of leather have been determined by means of a series of electronmicrographs in order to ascertain the significance of the shrinkage temperature. The chrome calf disintegrated at, or below, 80-85°C but the shrinkage temperature was 95°C. Sumach tanned calf showed large dense amorphous deposits, which are probably fixed tanning matter. The effects of wet heat begin to be visible at 59.5°C although the shrinkage temperature is 75-76°C. The semi-chrome E.I. kip was more resistant to wet heat than the sample of full chrome calf and the vegetable tanning material was affected before the fibrils. A chrome re-tanned hide did not withstand wet heat as well as the semi-chrome leather.

### Soluble Constituents

'Collagen and the More Soluble Constituents of Skins' were discussed by J. H. Bowes.

The chief protein constituent of skin is collagen, he said, but experiments on extraction with dilute acid and alkaline solutions indicate the presence of a number of different protein fractions differing in solubility. He described briefly the methods used for the determination of the amino acid composition and terminal amino groups of such protein fractions.

The composition of ox hide collagen has been redetermined by the method of Moore and Stein, and he pointed out some slight differences from previous analyses. He drew attention to the peculiarities of the amino acid composition of collagen. No terminal amino groups are detected in the original collagen, but after relatively mild treatments a number became available for reaction.

A collagenous protein has been extracted from calf skin with citrate buffer—the procollagen of Orekhovitch—and some of its properties were described by the speaker. The amino acid composition of the extracted protein is essentially the same as that of the ox-hide collagen, but certain small differences suggest that the ox-hide collagen is associated with a protein relatively rich in tyrosine, histidine, leucine and amide-nitrogen and containing little or no hydroxyproline.

Further experiments on the extraction of

calf skin with citrate buffer, dilute acetic acid, and alkali indicate the presence of one or possibly two non-collagenous protein constituents associated with collagen.

Mr. Bowes also discussed the significance of the various soluble protein fractions.

Ion exchange resins are of interest to the leather chemist in three distinct fields said K. W. Pepper in a paper entitled 'Ion Exchange Resins and Their Applications in Leather Chemistry.' These are: (a) processes carried out on the works scale, (b) techniques used in routine chemical analysis, and (c) research on proteins and tanning materials.

On the industrial scale, he said, ion exchange processes are economically most attractive either for the replacement or removal of ionic impurities occurring in small amounts in water or an organic non-electrolyte or for the recovery and concentration of precious metals from large amounts of unwanted material. The removal of common metals and other ionic contaminants from waste liquors or trade effluents can be achieved by ion exchange but such processes have so far not been adopted because the operating costs outweigh the value of the material removed.

### Ion Exchange

The leather chemist is familiar with the use of ion exchange in the determination of salts in tan liquors and there are many other useful applications in analytical chemistry, e.g., the preparation of sodium hydroxide free from carbon dioxide; the concentration of trace amounts of ions prior to estimation by conventional methods and particularly the removal of interfering ions in the estimation of sulphate, phosphate, etc.

In recent years, ion exchange chromatography has proved to be one of the most powerful techniques available to the research worker for the separation of complex mixtures of ions into individual constituents. Amino acid separations on ion exchange columns are now routine operations in protein research. Exchange techniques have been used to estimate the amounts of positively and negatively charged complex ion in chrome liquors, and to determine the stability constants of complexes. In applications of this type, however, careful precautions must be taken to avoid the risk that the equilibrium existing in the solution may be disturbed by the exchange reaction.

# Combating Atmospheric Pollution

## Introduction of Holmes-Schneible Multi-Wash

AT a time when atmospheric pollution is receiving wide publicity in this country, the introduction by W. C. Holmes & Co. Ltd., of Huddersfield, of the Holmes-Schneible Multi-Wash System is timely. But while this system, which is extensively used in the U.S. may answer a multitude of problems, the manufacturers want to avoid its application to those problems which are technically more within the province of other dust cleaning equipment made by the company.

To avoid this the company will place at the disposal of customers laboratory facilities designed for the examination of dust, fumes, etc., as well as pilot plants for trials on the site. Colour films showing each type of unit in operation are also available.

Details of the standard Holmes-Schneible Multi-Wash Collector Type HC have just been received. This system is used where the highest possible efficiency is demanded for dust extraction where a large percentage of the dust falls in the sub-micron size range. It consists of a cylindrical tower fabricated of any type of metal sheet, plate or coated steel, depending on the nature of the dust and fumes to be collected, and the liquid to be used as the washing medium.

### Impingement Stages

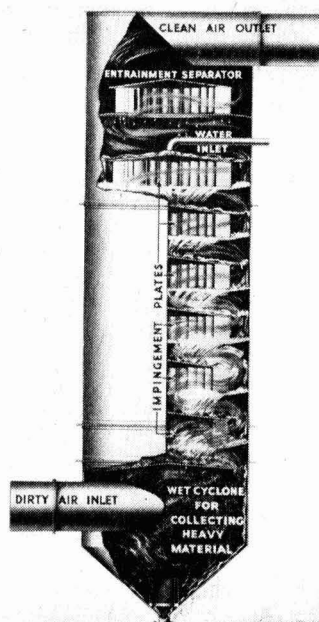
Inside the cylindrical tower are six and one-half impingement stages, each comprising a horizontal disc from which curved vanes or baffles are suspended. Each impingement stage rests on a shelf, and an entrainment separator, similar in construction to the vaneless impingement stage, is placed above these units, forming a seventh tier. The tower terminates in a cone at the bottom.

Dust, odour, or fume laden air enters the collector tangentially through a duct or ducts just above the cone and below the lowest (vaneless) impingement plate. The spiral motion which results is then maintained by the curved vanes encountered by the rising air at each impingement stage. The cone-shaped bottom serving as a wet cyclone, collects the heavier particles as soon as they enter the tower.

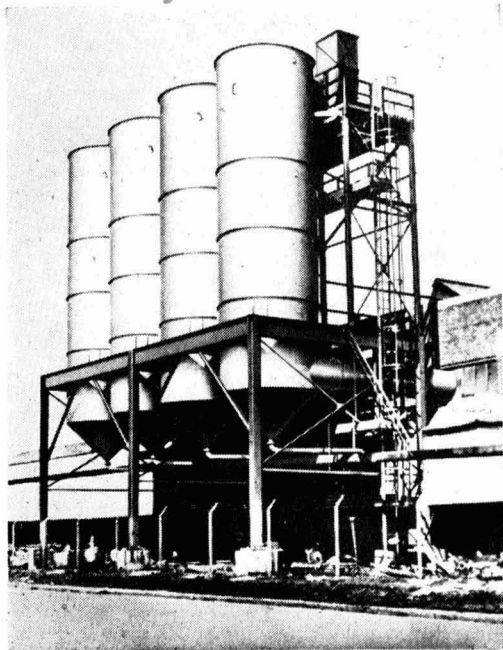
The washing agent, usually water, is intro-

duced at no head pressure above the centre of the top impingement plate, gravity causing the water to flow against the upward flow of the rotating air current. As the rotating motion of the rising air creates a similar motion in the descending water, the resultant violent whirling agitation forces the liquid off the edges of each disc and shelf in a finely divided heavy water curtain, through which the air must pass. The combination of water curtain, spray and impingement cone envelopes the particles or dust rising with the air and carries them down into the cone and out of the collector.

The air having been 'scrubbed' by the turbulent action in passing under and over the six sets of shelves and discs between the vanes of the implement plates, passes through the entrainment separator at the top of the tower above the water inlet. There it is freed of excess moisture which drips into the top impingement plate where it joins the incoming liquid.



*The Holmes-Schneible Multi-Wash Collector*



*A typical instalment*

Two other systems operate identically with Type HC. They are the Multi-Wash Collector Type IC and the Multi-Wash Collector Type JC. The efficiency of Type IC is the same as Type HC, except where the gas or air to be cleaned contains an excess of fine material down in the sub-micron range. It can be converted to Type HC by adding a section containing two additional impingement stages.

Type JC is used where high efficiency is not so essential, or when a large proportion of the dust is above the sub-micron range. It can be converted into either a HC or JC type. All three systems are made in complete range of sizes from 1,000 cfm. to 40,000 cfm.

The Holmes-Schneible Multi-Wash Collectors have proved successful and safe where there is a danger of explosion due to inflammable liquid or solid particulate matter to be collected, and where the carrier gas itself has been inflammable. Many installations of the system are operating where the gaseous contaminant in the air stream is removed through chemical reaction with the recirculated liquid. For example, hydrogen sulphide, sulphur dioxide, hydrochloric acid vapours will react readily with an alkaline solution.

## Borax Converting Mine

THE Pacific Coast Borax Co., a division of Borax Consolidated, Ltd., is starting work to convert its present system of mining at Boron, California, to open-cast and to construct new concentrating and refining plants.

Recent developments in technique and equipment now make possible the recovery of virtually the entire ore-body at the Boron mine by open-cast methods. Increased demand since the war and the likelihood of still larger demands in the future make this project economical.

As the character of ore recovered by open-cast methods will be different from that hitherto obtained by more selective methods a substantial change in process had to be developed. The new concentrating and refining plants at Boron will handle economically all grades and varieties of ore and will produce borate concentrates required for export and the principal forms of refined borax.

The Wilmington refinery, 125 miles from Boron, which produces refined borax, will continue to produce boric acid, special compounds and the 20-Mule-Team package products. The new facilities will cost about \$18,000,000 and are expected to be in operation by the middle of 1957.

## Wages Increases

PRINCIPAL changes in rates of wages reported in the chemical industry in August were: 2d. an hour increase for workpeople employed in continuous night work in the manufacture of chemical fertilisers. The new rates came into effect on or after 21 July and minimum time rates after change for men, 21 and over, London—3s. 11½d., other districts—class 1 firms 3s. 10½d.; class 2 firms 2s. 3d.

Rates in the heavy chemicals industry and in the chemical manufacturing side of the plastics industry for nightworkers on continuous duties were also increased by 2d. Minimum time rates now are: London—3s. 11½d., other districts 3s. 10½d.

## Du Pont Paint Factory

The Du Pont Co. of Canada is to manufacture a full range of automotive paints at Ajax, Ontario. The factory is designed to be readily extended in two directions, and will be completed by 30 November.



# Geneva Conference on Olive Oil

## United Nations Considers Need for Control in the Industry

**I**NTERNATIONAL measures to meet special difficulties which exist or are expected to arise concerning olive oil were considered at a conference of governments which was convened at Geneva on 3 October and was expected to last about three weeks. The need for international action had been considered by the Interim-Co-ordinating Committee for international commodity arrangements because of the extreme variability of olive oil production from year to year, and its pronounced effects on consumption, international trade, prices, total value of the olive crop and export earnings.

The Conference had before it a draft agreement prepared by the Food and Agriculture Organisation of the UN which will serve as basis for the discussion at the Conference and aims at ensuring fair competition among countries producing and exporting olive oil and at guaranteeing to consumers delivery of a commodity that conforms to specification of the contract concluded. It also looks to reducing disadvantages due to fluctuations of supplies on market without hindering long-term changes in demand and productivity. The draft provides for maintenance of fair labour standards and classification of olive oil as well as world wide publicity to promote olive oil consumption.

### Olive Oil Council

The draft also envisaged the creation of an Olive Oil Council to draw up global balance sheets of supplies and requirements on the basis of which it would make such recommendations as it deems advisable to governments parties to the agreement.

Olive oil production is located principally in the Mediterranean region (Spain, Italy, French North Africa, Portugal and Greece) and operation of national marketing schemes does not appear to have been uniformly efficient in all countries. It was suggested that international action is necessary for the solution of these problems because a withdrawal of excess supplies will only be effective in preventing unremunerative prices in glut years and excessive prices in poor crop years if all major producers act in concert. International action is also required because

it is in the interest of producing countries to make joint and co-operative arrangements for use of any international facilities obtained for financing stocks.

Opening the Conference, Mr. Adrian Pelt, Director of the European Office of the UN, said: Both the Economic and Social Council and the General Assembly of the United Nations have stressed the universal character of international trade problems as well as the importance of international trade as an essential means for achieving the economic goals set out in the charter of the United Nations.

For some time the problems of the olive oil industry have been under consideration by the various organs of the Food and Agriculture Organisation of the United Nations. As a result of these deliberations the director-general of FAO requested the secretary-general of the United Nations to convene this conference.

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## Northampton Polytechnic

**PART-TIME** courses in many branches of pure and applied chemistry are available at the Northampton Polytechnic, St. John Street, London E.C.1. According to Dr. J. E. Garside, the head of the department of chemistry, this polytechnic, which is supported largely by the London County Council, has a very important part to play in the chemical industry of this country.

The laboratories of the department are very well equipped. 'Our great lack is space', says Dr. Garside. Plans are, however, under way for the addition of two further floors to part of the building, which should increase available space considerably.

As well as courses in general chemistry suitable for the National Certificate and A.R.I.C. it is possible to study more specialised subjects such as corrosion science, fuel technology, metal finishing and electrodeposition, chemical plant operation, glass technology and clay technology.

The Polytechnic also arranges evening lectures in which speakers drawn from a variety of colleges and research organisations discuss various important topics. Three such courses are at present being held.

## British Sulphate of Copper

### Association Holds 31st AGM

THE 31st annual general meeting of the British Sulphate of Copper Association Ltd. was held at the Association's offices at 1 Great Cumberland Place, London W.1, on 18 October, the chairman, Mr. J. D. McKechnie, presiding.

The chairman, in opening the meeting, said: 'During the past year the principal matter of importance to our trade was the rise in the price of copper. Prices for sulphate of copper did not rise to the same extent but were nevertheless too high to encourage the use of our product and had a detrimental effect on our sales. We were also badly handicapped by the price of copper being higher in the UK than abroad, which resulted in local manufacturers in certain of our export markets being able to maintain lower prices.

'Sulphate of copper is a very cut trade and the high price we have had to pay for raw materials, together with other rising manufacturing costs, has priced us out of several export markets during the past two years.

### Volume of Exports Falls

'Although there was a decrease of nearly 7,000 tons in our exports, the total value remained about the same—just under £3,000,000, of which £600,000 was for dollar markets. Home trade was slightly down, and our total deliveries in all markets were about 7,500 tons lower than last year.

'We have intensified our efforts to increase the use of sulphate of copper for the control of bilharzia, aquatic weeds, liver fluke, and copper deficiency in soil; also sulphate of copper has been successful in helping to control black pod disease of cocoa in West Africa.

'With reference to the outlook for the present season, it depends not only on whether we can obtain our raw materials at competitive prices compared to other producing countries, but also on whether our other manufacturing costs can be kept down. If not, there is no doubt that our export trade, which has already fallen by about £1,500,000 sterling in two years, will continue to suffer.

'In conclusion, I should like to express my appreciation to the members of the Management Committee for their support and co-operation during the past year. Also,

it gives me great pleasure on behalf of you all to express thanks to the general manager and his staff for their hard work and loyal service to the Association.'

## Iberian Markets

PROSPERITY and the pro-British attitude of the Portuguese were two things that impressed Mr. Edward Gurr, founder of Edward Gurr Ltd., Laboratory Chemists, who has just made a business tour of France, Spain, Portugal, Gibraltar, Switzerland and Italy.

'Many British manufacturers take the Portuguese market for granted,' said Mr. Gurr. 'They believe that they can continue to go their own leisurely way, taking about eight months to a year for delivery, whereas German and other competitors deliver the equivalent goods, often at lower prices, within a matter of a few weeks.'

Mr. Gurr said that there is a strong preference for British goods in Portugal. He feels, however, that unless some British manufacturers improve their delivery times, much business will be lost to Germany, the US, etc.

According to Mr. Gurr it is quite easy to export small quantities of chemicals and allied products to Spain; large quantities, however, can only be exported by a complicated process of exchange, because many chemical and pharmaceutical products are now manufactured in Spain. Import licences are, however, granted fairly freely for scientific instruments, laboratory and medical equipment, and Mr. Gurr believes that Spain should offer a good market for British manufacturers in this field.

### Nichols Chemical Co. Expansion

An expansion of its sulphuric acid plant at Valleyfield has been announced by The Nichols Chemical Co. Ltd. Capacity has been stepped up over 60 per cent in order to supply increased industrial requirements in eastern Ontario and Quebec. Construction has already begun and is scheduled for completion by February, 1956. Nichols' announcement is the second in recent weeks dealing with major developments of the company. Earlier it revealed plans to build a new plant at Thorold, Ontario, to manufacture liquid aluminium sulphate.

# Dow Polystyrene For Britain

## Joint Company Commences Production in Wales

AT two large receptions at the May Fair Hotel, London, it was announced this week that Styron brand polystyrene was now being produced in Britain. A new plant at Barry, Glamorgan, has begun operation only 10 months after construction began. It is said to have a rated capacity of between 6,000 and 7,000 tons per year.

The factory, which is on the 92 acre site of British Resin Products Ltd. and British Geon Ltd., is owned by Distrene Ltd., Devonshire House, London W.1. This company is jointly owned by The Distillers Co. Ltd. and the Dow Chemical Company of Midland, Michigan. 'Styron' is the registered trade name of Dow and it is under this name that the polystyrene will be sold in the UK; elsewhere it will be sold as 'Distrene'. British Resin Products, another subsidiary of The Distillers Company, will act as sole selling agents for Distrene Ltd.

The new Styron factory is said to be the most modern polystyrene plant in the world; so up-to-date in fact that members of the press who attended the first reception at the May Fair (on 17 October) were told that the firm did not consider it advisable to arrange for an official opening. It is said to employ all the latest ideas in efficiency and production technique.

### Grangemouth Monomer

The styrene monomer for polymerisation will be drawn from the new Grangemouth plant belonging to Forth Chemicals Ltd. This company is owned by British Petroleum Chemicals Ltd. (two-thirds) and Monsanto Chemicals Ltd. (one-third). British Petroleum Chemicals, in turn, is jointly owned by the British Petroleum Co. Ltd. and The Distillers Co.

Forth Chemicals began producing styrene monomer in 1953 but production is now being more than doubled and this expansion work is to be completed by early 1956. Up until comparatively recently the bulk of this material was imported from Canada, the US and Germany, but a recently imposed Key Industry Duty of 33½ per cent appears to be aimed at excluding the Germans and Americans from the market.

In 1954 production of polystyrene in this country amounted to approximately 22,000 tons. Of this 14,000 tons were consumed in Britain and 8,000 tons were exported. At the moment, with production increases expected, output is around the 22,000 tons per year mark so it is unlikely that there will be need for further imports from Canada, Germany or the US. The Key Industry Duty, which was re-introduced on 19 August for a period of six months, has certainly made it difficult for either the US or Germany.

The principal Canadian producer of styrene is Dow Chemical of Canada Ltd. In the US, Carbide & Carbon Chemical Co., Dow Chemical Co., Koppers Co. and Monsanto are the manufacturers. In Germany two firms are producing at the moment, Badische Anilin & Soda-Fabrik AG and Chemische Werke Hüls. In the UK, however, the sole manufacturer is Forth Chemicals Ltd.

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## Obituary

MR. CECIL TURNBULL, a director of Hercules Powder Co. Ltd., died suddenly on 12 October, from a heart attack. He was 53. Mr. Turnbull joined the Hercules organisation as a technical salesman attached to the company's offices in Holland. From that time until the Second World War, he travelled principally in Britain. During the war years he was asked to undertake specialised managerial work in the munitions industry, for which work the company released him. On returning to Hercules, Mr. Turnbull played an active part with Mr. C. H. B. RUTTEMAN in setting up the British company, Hercules Powder Co. Ltd. in 1944. In 1951 he was appointed a director of this company. In recent years, Mr. Turnbull had been mainly responsible for the company's interests in cellulose products, and he was closely associated with the establishment of British manufacturing facilities for cellulose acetate at Lancaster. He was also concerned with arrangements for the British manufacture of Hercules insecticides. Mr. Turnbull leaves a widow and five children. His home was at Northwood, Middlesex.

# F. W. Berk & Company Ltd.

## Increasing Capital to £1,480,000

AT an extraordinary general meeting of F. W. Berk & Co. Ltd., approval was given by shareholders to a resolution that the capital of the company be increased to £1,480,000 by the creation of 1,920,000 additional ordinary shares of 5s each ranking as to dividend according to the terms of issue thereof and in all other respects *pari passu* with the existing ordinary shares in the capital of the company. The company is making a 'rights' issue of three new ordinary 5s. shares for every five held at a price of 6s. 3d. Dealings in the new shares began on Monday, 17 October.

The Berk company was founded in 1870 by the brothers Frederick and Robert Berk, and has been under the management of the Berk family ever since. With one exception, all the present directors are members of the family, and they are all whole-time working directors. The company does not pay directors' fees. In 1949 the capital was reorganised and the company was made public, the whole of the preference capital and a proportion of the ordinary capital being offered for sale.

The board of the company has consistently followed a policy of keeping the issued capital in line with the capital employed in the business. In 1950 a scrip issue of 50 per cent was made, followed in 1951 by a second scrip issue of 100 per cent and an issue for cash of 800,000 shares (1 for 3 held) at 5s. 3d. In April 1955 a third scrip issue was made of 100 per cent, the nominal value of the shares being written up from 2s. 6d. to 5s. The present issue is of 1,920,000 5s. shares and when this is made the capital of the company will be: 200,000  $4\frac{1}{2}$  per cent cumulative preference shares of £1 (£200,000) and 5,120,000 ordinary shares of 5s. (£1,280,000), making a total of £1,480,000.

Berk's products are used in a wide range of industries. Sulphuric and hydrochloric acids, sodium and magnesium salts are among the basic products and the company is also one of the largest manufacturers in the UK of mercurial salts. These are used in agriculture (for seed dressing and fungicides), in medicines and as a constituent of anti-fouling paint. Other specialities are

the manufacture of metal powders of tin, copper, zinc, brass and solder, a proportion of which are used in the company's Schori metallising process, a method of protection against corrosion used by many industrial concerns. Although engaged primarily in the heavy chemical business, the group also makes fine chemicals, the production of which is expanding.

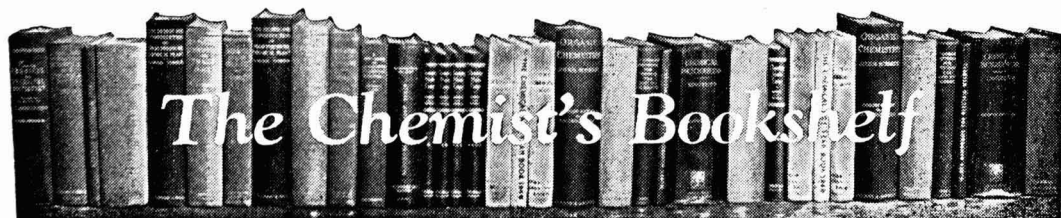
The reason for the new issue which will produce a net sum of about £570,000 is to finance expansion and development. In order to increase the production of fine chemicals a new factory has been bought at Sandridge, Herts, and plans are advanced for equipping this plant. This year Abbey Chemicals Ltd. was formed in conjunction with Hoyt Metal Co., of GB Ltd., to manufacture bentone and lead chemicals at Berk's Stratford, London, factory. The new company, in which F. W. Berk has a 48 per cent interest, is being expanded. The bentone plant is being constructed and the lead chemicals plant will begin soon. Other schemes are also planned.

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## CIL to Adopt Original Name

SALES of all divisions of Canadian Industries (1954) Ltd. rose in the first nine months of this year over the corresponding period last year, it was reported at a special meeting of shareholders. The meeting ratified the directors' plan to apply for supplementary letters patent to revert to the name Canadian Industries Ltd. The right to use this name and the trademark CIL was allotted to the present company in the division last year of the original Canadian Industries Ltd. between CIL 54 and Du Pont Securities of Canada Ltd. The adoption of the original name is expected to be made by the end of this year.

It was also announced at the meeting that the company expected to start operating its new \$9,000,000 anhydrous ammonia plant, now being built on part of the large industrial-site area acquired at Millhaven, near Kingston, by the middle of next year. On another part of this property is the company's \$22,000,000 Terylene plant.



## The Chemist's Bookshelf

**AN INTRODUCTION TO CHEMISTRY.** By Howard L. Ritter. John Wiley & Sons Inc., New York; Chapman & Hall Ltd., London, 1955. Pp. v+649. 52s.

Here is an excellent introduction to chemistry for the beginner. Part I, constituting 130 pages, is devoted to an examination in non-mathematical terms of the nature of matter. The nature of physical science is first discussed and then the molecular theory of matter. The kinetic theory of gases and solutions is particularly well outlined in this treatment, but the atomic theory and the structure of atoms could profitably have been allotted more space.

Part II dealing with the principles of chemical reaction necessarily introduces some mathematical concepts, but these have been well handled, and students who have a dislike of mathematics will not be upset in any way by this section. In this part of the book a very thorough understanding of chemistry is built up, and a delightful atmosphere of exploration is maintained throughout. The sections on the reaction of ions in solution and the periodic classification of the elements are particularly noteworthy in this respect. Even if the remaining part of the book—the descriptive chemistry of the elements—were not up to standard, this section on principles would make this book worthy of recommendation.

The coverage of the text in this last section is wide. It opens with the inorganic chemistry of the non-metals and moves on to the fields of organic chemistry, colloid chemistry and biochemistry. Finally, metals are dealt with, and the book closes with a discussion of radioactivity. The two chapters on metals are in the reviewer's opinion inadequate, but the author maintains that the details of metal chemistry belong to a course of inorganic chemistry rather than to a general introduction to chemistry.

However that may be, the chapter on metallurgy is well planned and the general tone of the descriptive chemistry, which places unusual but welcome emphasis on the

relationships in the periodic table and on simpler aspects of interatomic geometry, is excellent. The book is well presented and neatly bound, but the price is too high for the type of student to whom it would be most useful.—T. S. WEST.

**PHYSICAL CHEMISTRY & METAL EXTRACTION.** By D. W. Hopkins, J. Garnet Miller Ltd., London, 1954. Pp. 232. 30s.

This book deals with the thermodynamics, kinetics, and other physicochemical aspects of metallurgical processes. The first third of it consists of a survey of classical thermodynamics, along fairly conventional lines. Then follow chapters on roasting, reduction and oxidation, and slags, which go thoroughly into the general physicochemical theory of these subjects (mainly thermodynamics), and are illustrated by a selection of numerical examples. The book ends with chapters on the iron blast furnace and zinc distillation.

There are up-to-date and thorough compilations of the available data on free energy changes in metallurgical reactions. These are mostly presented in the form of well-planned graphs, from which the feasibility of a given reaction under a given set of conditions can be determined in a few moments. These graphs, and the many references with which each chapter ends, are among the book's valuable features. It is, however, too short for the amount of material it covers, the explanations being often so concise that they are difficult for anyone not already familiar with the subject to follow.

It would, perhaps, have been better to have omitted the long thermodynamic introduction, which contains no material not more adequately covered in the standard works on thermodynamics, and to have expanded the remaining chapters considerably. There are some errors, mostly typographical, in the symbolism and equations. On the whole, though, this book can be recommended for its excellent critical insight into so many chemical operations.—H. G. HEAL.



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# HOME

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## Factory Extension

S. H. Johnson & Co. Ltd., chemical engineers and manufacturers of filter presses and pumps, Carpenters Road, London E.15, have had plans prepared for the erection of a new extension to their premises at Lett Road, London E.15.

## Billingham to Expand

Although I.C.I.'s Billingham site has often been described as 'almost full', further expansion is planned. This was announced by Dr. S. W. Saunders, B.Sc., Ph.D., division technical joint managing director, at a recent presentation of long-service awards. 'We are going to put up some more new plants, but obviously Billingham can't expand in the way it has expanded in the past', he said.

## Calcium Para Amino Salicylate

Under Indian SRO 2001 (Customs Notification No. 150), of 17 September Notification No. 85 is rescinded. The effect of this is that calcium para amino salicylate again becomes liable to the full import duty payable under tariff item 28A, i.e. 50 per cent *ad valorem* (standard) or 40 per cent *ad valorem* (United Kingdom).

## Housing for I.C.I. Workers

The Wilton factory of I.C.I. is expected to double in size within the next five or six years and the company is meeting the local authorities of Redcar, Eston and Guisborough in informal talks about housing requirements. I.C.I. expects to increase its labour strength at Wilton by about 1,000 a year.

## Automatic Control Conference

In last week's issue we gave a further report of the joint conference on 'Automatic Control in the Process Industries' which was held on 4 October at Church House, London, and which was sponsored by the Society of Instrument Technology and the Institution of Chemical Engineers. We failed to mention, however, that copies of the papers can be obtained from the Institution, 56 Victoria Street, London S.W.1. The price is 10s. to members of either sponsoring body and £1 to non-members. This was the first conference on this important subject to be held in the UK and very great interest was shown in the papers.

## The Queen to Open New Colleges

Her Majesty The Queen is inaugurating the new Colleges of Technology, Commerce and Art at Gosta Green when she visits Birmingham on Thursday, 3 November.

## Scottish Firm's Golden Jubilee

Associated Metal Works Ltd., of 30 St. Andrew's Square, Glasgow, is celebrating its 50th anniversary this month. The company was one of the pioneers in the manufacture of stainless steel equipment in Scotland 20 years ago, and they specialise in the designing of equipment and plant for the chemical and allied industries. The firm was founded in 1905 by the late Mr. Max H. Cina, a sheet metal worker, who was born in Lodz, Poland.

## Professor Heyrovsky to Visit Britain

Professor J. Heyrovsky, of the Polarographic Institute of the Czechoslovak Academy of Science, is to visit Britain in November at the invitation of The Polarographic Society. His first engagement will be to deliver the Presidential Address to the Society on 16 November at the Royal Institution in Albermarle Street, London, followed by a lecture on recent advances in polarography.

## The Fertiliser Society

At the general meeting of The Fertiliser Society to be held on Thursday, 10 November, at 2.30 p.m., in the lecture hall of the Royal Society of Arts, John Adam Street, Adelphi, London, W.C.2, Dr. R. Stewart, B.Sc., will present a paper entitled 'Compound Fertiliser Formulation', to be followed by a discussion.

## New Address

The British Laboratory Ware Association Ltd has changed its address to 6/7 Queen Street, London E.C.4. Tel.: CITY 1197.

## Hercules Reforming Plant

The Power-Gas Corporation Ltd. report the receipt of an order from Laporte Chemicals Ltd. for a Hercules reforming plant to produce high purity hydrogen. The plant will consist of a reforming furnace followed by three stages of CO conversion and CO<sub>2</sub> removal with methanation and a Wiggins gasholder.

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# • OVERSEAS •

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## Chemical Combine Next

Biggest investment of Hungary's next Five-Year Plan, due to commence next year, will be the Tiszamenti Chemical Combine which is to process natural gas piped from Rumania on a 700-acre site beside the River Tisza.

## Uranium Contribution

Mr. D. A. V. Fischer, the South African delegate, told the United Nations Economic Committee that South Africa's uranium industry may eventually contribute about \$150,000,000 a year to the country's national income.

## Major Rutile Producer

Australia is now producing the bulk of the world output of rutile, the mineral used in the production of the strategic metal titanium. This was disclosed by production estimates by the Australian Bureau of Mineral Resources, which put world production of rutile last year at 52,000 tons, and Australia's quota of this at 44,000 tons. In Melbourne, the chairman of Zircon Rutile Ltd., Mr. Wallace Smith, told shareholders that the industry in Australia could almost double its production in five years.

## US Firm Buys Mine

The Vanadium Corp. of America has bought the Baharti manganese mine near Fort Rosebery, Rhodesia, but the terms of the purchase have not been released. A subsidiary company, formed to work the mine, has been registered in Salisbury. The quality of the manganese deposits at Fort Rosebery which are mined on the surface and transported by truck across the Congo Pedicle to the rail head at Mufulira, are known to be impressive.

## Sulphuric Acid Plant

A new sulphuric acid plant with an ultimate capacity of 100 tons a day is now in production at Fort Saskatchewan, Alberta, 17 miles east of Edmonton. The plant uses about 25 tons of sulphur daily from the Jumping Pound gas field of Shell Oil Co., about 20 miles west of Calgary. One of the plant's most important customers is the nearby nickel-ore processing plant at Sharritt-Gordon Mines Ltd., which is using about 25 tons of acid a day in its leaching process with an option to buy 25 tons more.

## First Petroleum Sulphonates

Canada's first petroleum sulphonates and synthetic sulphonates will be produced at a new chemical plant now being equipped by the Surpass Petro-Chemicals Ltd., of Scarborough, Ontario, a subsidiary of Montgary Explorations Ltd. The sulphonates will come into production early in 1956 and the output will go primarily into the petroleum lubricating field as necessary components of additional agents.

## Israel Oil Rated 30.5

Oil recently found at the Heletz strike, in Israel, is considered 'as good as that in Kuwait, and better than that in Egypt', according to Mr. H. S. Tschopp, the Swiss chief geologist of the Israel Lapidoth Co. The API rating of the oil, 30.5, means that the proportion of petrol it contains—suitable for cars—is slightly higher than the average.

## \$5,000,000 Sodium Chlorate Plant

Electric Reduction Co. of Canada Ltd. will build a \$5,000,000 sodium chlorate plant in North Vancouver, to be completed by 1957. Sodium chlorate, mainly used in weed control and metal treatment, is now used in production of chlorine dioxide for bleaching pulp. Electric Reduction has operated a plant in Buckingham, Que., since 1898.

## Molybdenum Decreases

Domestic production and shipments of molybdenum concentrates in July in the US were 44 and 25 per cent, respectively, lower than in June 1955, according to the Bureau of Mines, US Department of the Interior. Consumption of molybdenum concentrates decreased 9 per cent during the month.

## Australian Customs Changes

The Australian Department of Trade & Customs announces that the Minister has made, amended or cancelled by-laws and until further notice malonic and oxalic acid combined will be admitted duty free. Turpentine substitutes will be charged duty at the rate of  $\frac{1}{4}$ d. a gallon, while aminacrine hydrochloride has been removed from the provisions of by-law entry under tariff item 285b(1) and is now classifiable under the substantive tariff item at  $17\frac{1}{2}$  per cent *ad valorem*.

# PERSONAL

At the recent annual general meeting of The Association of British Chemical Manufacturers the following officers were elected:

—*president*: SIR GRAHAM HAYMAN (The Distillers Co. Ltd.); *vice-presidents*: DR. F. H. CARR, C.B.E., D.Sc. (Boots Pure Drug Co.), DR. E. V. EVANS, O.B.E. (North Thames Gas Board), SIR HARRY JEPHCOTT, M.Sc., Ph.C. (Glaxo Laboratories Ltd.), MR. C. F. MERRIAM, M.C. (BX Plastics Ltd.), MR. L. P. O'BRIEN (Laporte Chemicals Ltd.), DR. W. J. WORBOYS, B.Sc., D.Phil. (Imperial Chemical Industries Ltd.); *chairman*: MR. G. F. WILLIAMS (The British Drug Houses Ltd.); *vice-chairman*: MR. B. HICKSON, M.Sc., F.R.I.C. (Hickson & Welch Ltd.); *hon. treasurer*: MR. J. L. HARVEY, M.B.E. (Laporte Chemicals Ltd.); *elected members*: MR. I. V. L. FERGUSON (Evans Medical Supplies Ltd.), MR. E. M. FRASER, C.B.E. (Imperial Chemical Industries Ltd.), DR. W. H. GARRETT, M.B.E., B.Sc., Ph.D., J.P. (Monsanto Chemicals Ltd.), MR. J. C. HANBURY, M.A., B.Pharm., F.P.S., F.R.I.C. (Alien & Hanburys Ltd.), DR. W. G. HISCOCK, B.Sc., Ph.D., F.R.I.C., F.I.I.A. (Imperial Smelting Corp. Ltd.), MR. L. G. MATTHEWS (Burdoughs Wellcome Ltd.), MR. F. G. PENTECOST (A. Boake, Roberts & Co. Ltd.), MR. H. V. POTTER (Bakelite Ltd.), DR. W. D. SCOTT, B.Sc., Ph.D., F.R.I.C., A.R.C.S. (Monsanto Chemicals Ltd.), MR. E. STEIN (The Distillers Co. Ltd.); *co-opted members*: MR. D. J. BIRD, M.B.E. (Fisons Ltd.), MR. E. LE Q. HERBERT, B.Sc., F.R.I.C., M.I.Chem.E., F.Inst.P. (Shell Chemicals Ltd.), MR. F. S. POOLE (Peter Spence & Sons Ltd.); *hon. vice-presidents*: MR. C. E. CAREY, B.Sc. (South Eastern Gas Board), MR. N. N. HOLDEN (Hardman & Holden Ltd.), LORD MCGOWAN, K.B.E.; *director & secretary*: MR. J. DAVIDSON PRATT, C.B.E. M.A., B.Sc., M.I.Chem.E., F.R.I.C.; *manager*: MR. A. J. HOLDEN, B.Sc., F.R.I.C.

DR. F. C. TOY, director of research for 12 years at the Shirley Institute of the British Cotton Industry Research Association, has resigned. He will be succeeded in January by DR. D. W. HILL, Ph.D., D.Sc., the present deputy director of research.

Three of Britain's foremost agricultural

scientists, DR. W. S. GORDON, Ph.D., DR. J. DUCKWORTH, D.Sc., B.Sc., and DR. S. K. KON, Ph.D., D.Sc., attended the first international conference on the use of antibiotics in agriculture which ended in Washington on Friday, 21 October. The three scientists will later visit the Lederle Laboratories in New York. Dr. Gordon, who is director of the ARC Field Station, Compton, Berks, will stay in the US for a few days to visit other research establishments. Dr. Duckworth, head of the Department of Applied Chemistry at the Rowett Research Institute in Aberdeen, will visit the West Indies before returning.

The Mond Nickel Fellowships Committee announces the following awards for 1955: MR. D. H. BUTLER (The Phosphor Bronze Co. Ltd.) to study the production of copper and its alloys in the United Kingdom, on the continent of Europe and in America; MR. R. W. N. DRON (Rhoanglo Mine Services Ltd.) to study the organisation of research and its relation to production in extraction metallurgy in the United Kingdom and North America; MR. W. F. DUNCAN (the British Aluminium Co. Ltd.) to study the design, layout and operation of continuous strip mills; MR. R. H. HANNAFORD (the British Iron and Steel Research Association) to study organisation and practice in the ferrous foundry industry in the United Kingdom, Europe and the United States; and MR. R. J. HARBORD (John Lysaght's Scunthorpe Steelworks Ltd.) to study the development of continuous casting in the non-ferrous industry.

MR. GEORGE R. HEMBROUGH has been elected a technical director of C. M. Keyworth & Co. Ltd., of Barnfield, Leek, Staffs, a wholly owned subsidiary of Croda Ltd., Goole, Yorks. Mr. Hembrough was formerly chief chemist of Croda Ltd.

MR. SHELDON V. CLARKE has been appointed manager of the general purchasing department of Union Carbide & Carbon Corp. He succeeds MR. H. V. HUFFARD who is retiring after 40 years of service with the Corporation. Mr. Clarke, a graduate of Lehigh University, joined the Union Carbide organisation in 1920. He served as

construction engineer in the construction and design department of Linde Air Products Company and later held the same position in Carbide & Carbon Chemicals Company.

MR. W. K. G. ALLEN, M.I.Mar.E., A.M.I.N.A., has been elected president of the British Engineers' Association. Mr. Allen is chairman and joint managing director of W. H. Allen, Sons & Co. Ltd. MR. E. W. THOMPSON, M.A., J.P., chairman and a managing director of John Thompson Ltd, was elected vice-president. The retiring president, MR. H. S. 'DICK' BROOM, M.B.E., B.Sc., M.I.Mech.E., joint managing director of Broom & Wade Ltd., was elected honorary treasurer.

At the recent Cliftonville conference of the Purchasing Officers' Association, MR. H. W. KING was elected president of the Association for 1955/56. Mr. King (Eburite Corrugated Containers Ltd.) as National hon. secretary, played a vital part in the Association's reorganisation eleven years ago when it was at a low ebb and its membership was fewer than 500. Since, he has held every major office in the Association, whose membership is now nearly 4,000. Other elections:—*Executive vice-president*: MR. R. J. MITCHELL (The Morgan Crucible Co. Ltd.); *vice-presidents* (UK): MR. J. FERGUSON (Chloride Batteries Ltd.), MR. F. KAY (Forestral Land, Timber & Railways Co. Ltd.), MR. H. D. LEATHER (I.C.I. Ltd., Alkali Division), MR. O. A. PALLETT (The British Thomson-Houston Co. Ltd.), MR. C. L. WRIGHT (The Westinghouse Brake & Signal Co. Ltd.); *chairman of the National Council*: MR. H. C. EXELL (The North Thames Gas Board); *vice-chairman*: MR. C. F. HUEBNER (The British Oxygen Co. Ltd.); *hon. treasurer*: MR. R. E. G. GILLIS (Goodyear Tyre & Rubber Co. (G.B.) Ltd.).

MR. WILLFRED W. LUFKIN, Jr., for the past three years president of Wellington Sears Co. will join Celanese Corp. of America on 1 November, as a vice-president and as president of its foreign trading subsidiaries. Mr. Lufkin will have his headquarters in the Celanese office at 180 Madison Avenue, New York City, but will travel extensively throughout Europe, South America and the Far East.

## Will

DR. RONALD CUTHILL, M.Sc., Ph.D., F.R.I.C., who held a senior chemistry appointment at Stoke-on-Trent Technical Institute, and a former principal of Keighley Technical College, previously of Dewsbury Technical College, and earlier head of the chemistry department at Burnley Municipal College and Bolton Municipal College, left £4,762 (£4,730 net).

## Scots Oil Refiners Expand

BUCHANAN & Co. Ltd., oil refiners, Renfrew, Scotland, have started work on an extension for manufacturing a high-grade mineral oil and a by-product, petroleum sulphonate. It is planned that work will be completed by the end of the year.

The firm has done a considerable amount of research work on the development of lubricants which is their main field, and in which they cover virtually the entire range. Current work is aimed at extending still further the scope and coverage of the plant, and about 80 per cent of the output of the new products will be exported.

The company produces a range of some 500 products graded from the lightest oils used in carpet weaving to the heaviest greases. Other products include concrete mould oils, and batching oils used in the jute industry to prevent breaking of strands during processing.

The latest work undertaken involved broadening the range of lubricants and the launching of production of copper naphthenate for use as an anti-rot material in the textile, timber, netmaking and rope industries.

## Seaweed Processing Factory

Alginate Industries Ltd. are to build a new seaweed processing factory at Spanish, North Uist, to supplement the work they are already doing in South Uist. The company, one of the leaders of seaweed industry activity in Scotland, asked the Inverness-shire Planning Committee to provide premises for lease, but failed to secure support. They are now asking that the committee give all other support, and that they will provide the necessary premises themselves. This the committee has agreed to do.

# Publications & Announcements

THE Benjamin Electric Co. Ltd., of London, have published in pamphlet form advanced information about a new dust proof fluorescent lighting fitting they will be marketing. The fitting has internal wiring, and gear and contacts are effectively sealed off so that no dust can penetrate between the heavy brass lampholders and the lamp. Access to the interior of the unit—except by authorised persons—has purposely been made difficult in the design.

\* \* \*

LATEST edition of the 'CIBA Review' (No. 111) contains an account of modern trends in printing, dyeing and finishing. The increasing need for a brightening agent applicable to Terylene and Dacron has led CIBA to develop Uvitex U which they claim produces clear whites of good fastness to washing and chlorine on polyester fibres. The use of Uvitex U is not restricted to polyester fibres say the makers. It may be applied as a brightener to nearly all natural and synthetic fibres. Contrary to their behaviour on cotton and silk certain basic dyes exhibit very good fastness on acrylic fibres say CIBA. This property has led to the development of the Deorlene range of dyestuffs. At present seven dyes are available in this range, all of which are claimed to produce bright shades and to have very good fastness properties both as regards processing and the finished article. CIBA have produced a colour film which illustrates the nature and method of applying Cibalan dyes.

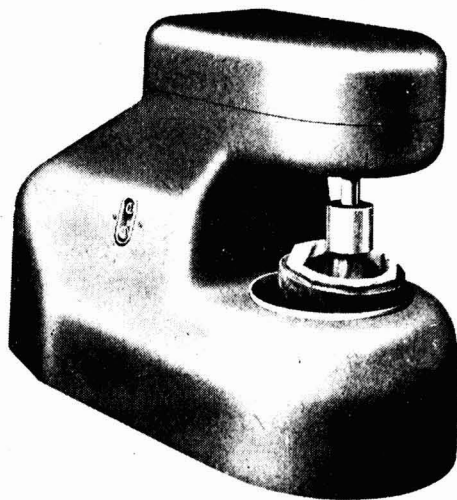
\* \* \*

A TOTAL of 40 different balances are described in a catalogue produced by Stanton Instruments Ltd., 119 Oxford Street, London W.1, and entitled 'Stanton Precision Balances'. Stanton's claim to be the first people in the world to use synthetic sapphire (Corundum) as standard practice in the manufacture of balances. This material has near diamond hardness which virtually eliminates surface wear. Tests have revealed indentation free surfaces after four to five million weighings. Sapphire planes are standard on nearly all balances listed in the present catalogue. Although the emphasis is on the more specialised and highly accurate balance, the needs of the college and works laboratories have not been forgotten. Typical of

the inexpensive range is the model C.26 which will weigh up to 200 g. with a sensitivity of 0.1 mg. Among the more specialised balances may be mentioned the model MC.1, a micro-balance which has a capacity of 20 g. and a sensitivity of 0.001 g.

\* \* \*

AN entirely new electrically driven pestle and mortar grinder for the fine grinding of samples is announced by Herbert Alexander & Co. Ltd., of Leeds. The outstanding feature of the machine, claim the manufacturers, is its rapid and efficient action. Driven by a totally enclosed fractional HP motor and worm reduction unit, both pestle and mortar rotate in opposite directions, the pestle at 96 RPM and the mortar at 31 RPM. The mortar is fitted into a hardwood holder which rests freely on the sponge rubber bed of the carrier, and thereby assumes an inclination to the horizontal plane under the pestle giving even grinding pressure by concentrating the sample under the pestle. The centre line of the pestle, being offset to that of the mortar, is also instantly retractable for withdrawal of the ground sample. In the standard machine both pestle and mortar are of polished agate, but alternative materials can be supplied.



*The Alexander pestle and mortar grinder*



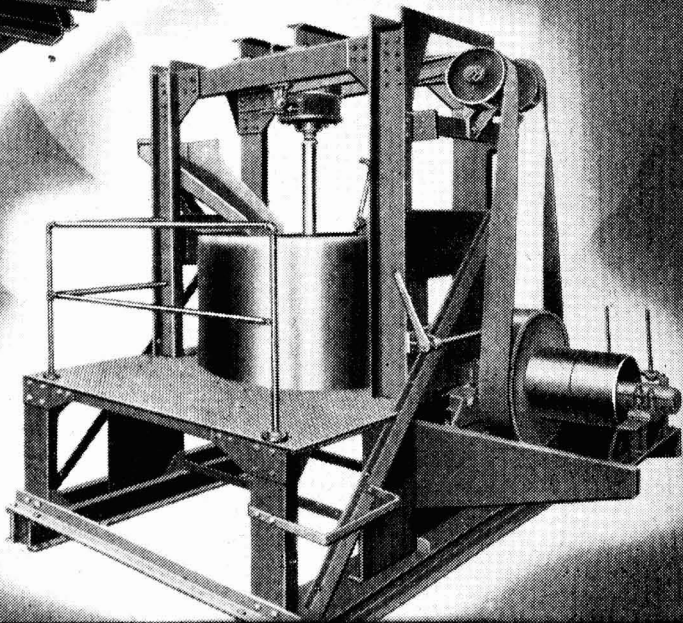
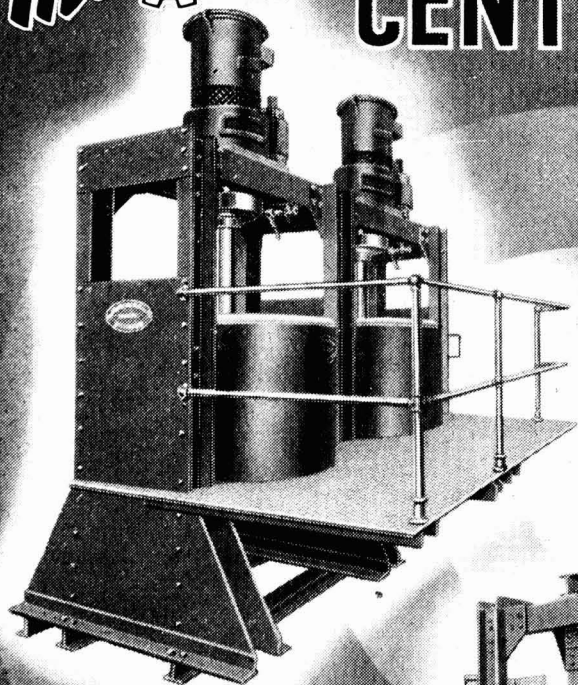


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Self-contained, electrically or belt  
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Baskets arranged for bottom discharge.  
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Baskets and casings of non-corrosive  
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Structures to suit any requirement  
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## Next Week's Events

### MONDAY 24 OCTOBER

#### The Chemical Society

Birmingham: The Chemistry Department, The University, 4.30 p.m. Centenary Lecture 'The Photosynthetic Carbon Cycle' by Professor M. Calvin, Ph.D.

### TUESDAY 25 OCTOBER

#### SCI (Yorkshire)

Leeds: Chemistry Lecture Theatre, The University, 6.30 p.m. 'The Chemistry of Petrol Refining' by S. F. Birch, Ph.D., D.I.C., A.R.C.S.

#### Society for Analytical Chemistry

Nottingham: East Midlands Gas Board's Showrooms, 7 p.m. A lecture-demonstration 'Ring-Oven Technique' by Dr. H. Weisz.

### WEDNESDAY 26 OCTOBER

#### The Institute of Fuel

Liverpool: Liverpool Engineering Society's Rooms, Dale Street, Liverpool, 6 p.m. 'Some Factors Governing the Welfare of Steam Boilers & Other Pressure Plant' by F. Shapley.

#### British Association of Chemists

London: The Wellcome Institute, 183 Euston Road, N.W.1, 7 p.m. 'Sewerage & Sewerage Purification' by E. H. Vick, M.I.C.E., F.I.P.H.E., M.I.S.P.

#### SCI (Food Group)

London: Rooms of the Chemical Society, Burlington House, Piccadilly, W.1, 6.30 p.m. 'Nutritional Requirements & Food Fortification' by T. Moore, D.Sc., V. H. Booth, Ph.D., and P. N. Williams, M.Sc., F.R.I.C.

### THURSDAY 27 OCTOBER

#### The Institute of Fuel

Birmingham: James Watt Institute, Great Charles Street, 6 p.m. 'The Impact of Refractory Materials on the Efficient Use of Fuel' by Dr. A. T. Green.

Nottingham: Gas Showrooms Lecture Theatre, 6.15 p.m. Open forum to discuss 'Mineral Matter in Coal'.

#### RIC (Manchester)

Manchester: Gas Showrooms, Town Hall, 12 a.m. to 8 p.m. The Dalton Exhibition on Chemistry & Agriculture.

#### The Chemical Society

Bristol: Chemistry Department, The University, 5.15 p.m. 'Some Properties of Aqueous Hydrogen Fluoride Solutions' by R. P. Bell, M.A., F.R.S.

#### Royal Institute of Chemistry

Brighton: Technical College, 6.30 p.m. 'Antibiotics—Past, Present & Future' by A. L. Bacharach, M.A., F.R.I.C.

### FRIDAY 28 OCTOBER

#### Royal Institute of Chemistry

Manchester: Town Hall, 7 p.m. The Ninth Dalton Lecture 'Chemistry & Crop Nutrition' by Sir William Ogg, M.A., Ph.D., LL.D.

#### The Chemical Society

Aberdeen: Marischal College, 7.30 p.m. 'Electron Transfer Reactions' by Professor C. E. H. Bawn, Ph.D., F.R.S.

Dublin: Trinity College, 7.45 p.m. 'Phenylation' by Professor D. H. Hey, D.Sc., F.R.I.C., F.R.S.

#### The Textile Institute

Droitwich: Worcestershire Brine Baths Hotel, 7.30 p.m. Kidderminster branch annual dinner.

#### Institute of Metal Finishing

Sheffield: Grand Hotel, 6.30 p.m. 'Obtaining Maximum Output of Decorative Chromium Plating for Minimum Cost' by E. A. Ollard, A.R.C.S., F.R.I.C., F.I.M.

#### SCI (Fine Chemicals Group)

London: Devonshire House, Piccadilly, W.1, 6.30 p.m. to 9.30 p.m. Conversazione by courtesy of The Distillers Co. Ltd.

### SATURDAY 29 OCTOBER

#### Institution of Chemical Engineers

Manchester: Reynolds Hall, College of Technology, 3 p.m. 'Review of Processes for the Production of Hydrogen' by A. T. Grisenthwaite, B.Sc., A.C.G.F.C., M.I.Chem.E.

#### Nuclear Engineering Course

A course in nuclear engineering will be sponsored this year for the first time at Glasgow University. The course has been devised to equip the practising engineer with an insight into the problems which may be expected to arise when nuclear fission is used as a source of heat to drive electrical generating plants. It will form part of the normal B.Sc. degree course as one of the additional subjects. Suitably qualified engineers already in the industry will be admitted to the course.

# KARBATE

## HEAT EXCHANGERS SERIES 310

Now available as a complete unit with steel shell and "Karbate" impervious Graphite tube bundle and domes.

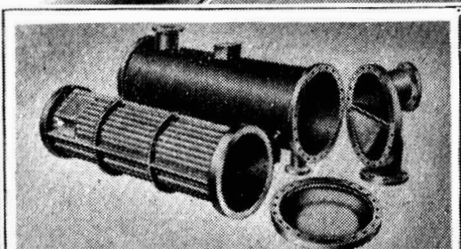
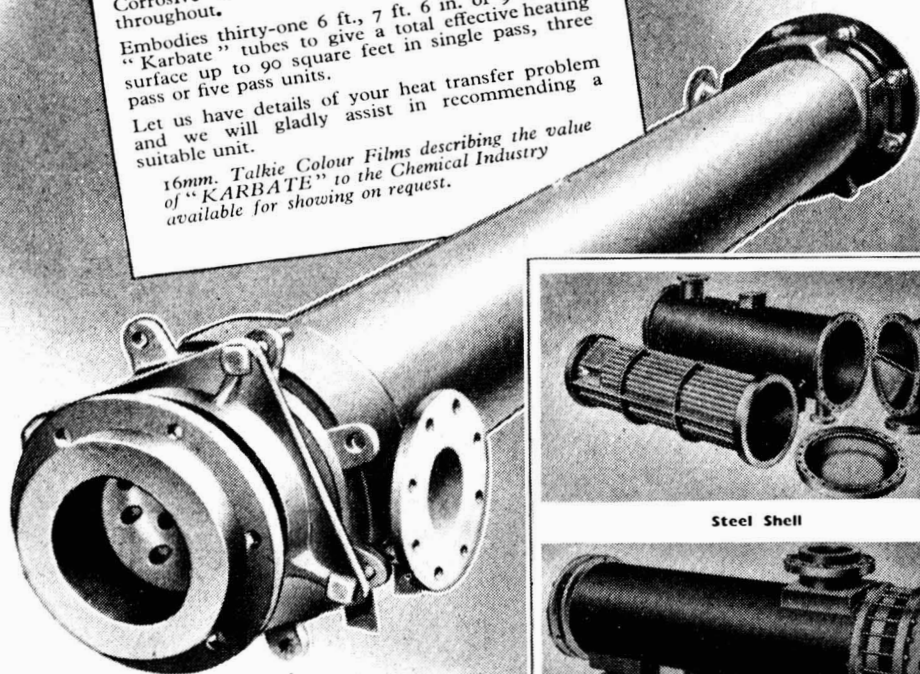
Corrosive fluids in contact with "Karbate" throughout.

Embodies thirty-one 6 ft., 7 ft. 6 in. or 9 ft. long "Karbate" tubes to give a total effective heating surface up to 90 square feet in single pass, three pass or five pass units.

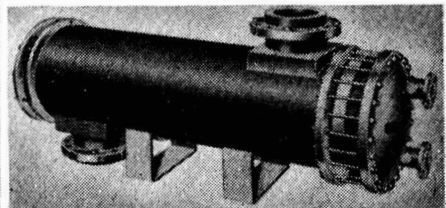
Let us have details of your heat transfer problem and we will gladly assist in recommending a suitable unit.

16mm. Talkie Colour Films describing the value of "KARBATE" to the Chemical Industry available for showing on request.

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BRITAIN'S LARGEST MANUFACTURERS OF GRAPHITE ELECTRODES & ANODES

# Law & Company News

## Commercial Intelligence

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

### Mortgages & Charges

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

CHEMIGRAPH LTD., London E.C., engineers, designers, etc.—14 September, £500 charge to Hirex Finance Ltd.; charged on certain contract moneys.

GEORGE SMITH & CO. (PAINTS) LTD., Bury, Lancashire.—20 September, charge, to Barclays Bank Ltd, securing all moneys due or to become due to the bank; charged on plot of land at Lower Woodhill Road, Ekton, Bury, and any rent charged, etc. \*— 28 November, 1954.

PLASTIC METALLISING LTD. (formerly Caps & Crackers Ltd.), London W.—21 September, £2,500 debenture, to J. T. W. Oxbury, London; general charge. \*Nil. 31 December, 1954.

VISUAL EFFICIENCY, London W.C., manufacturers of soap preparations, etc. 20 September, by order on terms, £6,500 (not ex.) mortgage to Lloyds Bank Ltd.; charged on company's interest in leasehold premises known as Victoria Laboratories, Victoria Villas, Richmond, Surrey. \*Nil. 28 December, 1954.

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### Satisfactions

BRITISH CELANESE LTD., London W.—Satisfaction, 22 September of debenture stock registered on 2 October, 1943, and 8 November, 1944, to the extent of £10,210.

HOLDFAST PAINT & ENAMEL CO. LTD., Norwich.—Satisfaction, 19 September, of debenture registered 29 September, 1953.

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## New Registrations

### Aynsome Laboratories Ltd.

Private company (555,750.) Capital £10,000 in £1 shares. To carry on the business of analytical and consulting chemists,

advisers and specialists in food and agriculture and in chemical research work, etc. Subscribers (each with one share): Herbert H. Ward and Alan H. Ward. Solicitors: C. G. Metson & Co., Cereal House, Mark Lane, London E.C.3.

### Petroleum Waxes Ltd.

Private company (555,803.) Capital £100 in £1 shares. To carry on the business of general merchants, and in particular to deal in oils, waxes, chemicals, drugs, medicines, pharmaceutical supplies, materials and products, dyestuffs, paints and other raw materials, etc. Directors: Peter G. Simonis and Douglas J. W. Dryburgh, directors of Industrial Raw Materials Corporation, Ltd, Reg. office: 2 Raymond Buildings, Grays Inn, London W.C.1.

### Fertilisers & Chemicals Ltd.

Fertilisers & Chemicals Ltd., particulars filed 10 October, 1955, pursuant to Section 407 of the Companies Act 1948. Capital: £6,500,000 Registered in Israel on 5 July, 1946, to carry on business of producers and manufacturers of and dealers in natural and synthetic fertilisers, chemicals and chemical derivatives, etc. British address: 52 Pall Mall, London S.W.1. Directors: Abraham Akavia and Simiha Ambache, both of Haifa, Israel. Zvi Ben-Shahar, Post Nahala, Israel; Joseph Blumenfeld, Paris, and others.

### Dales Chemicals Ltd.

Private company (555,753.) Capital £1,000 in £1 shares. To carry on the business of manufacturers of and dealers in all kinds of metals (including precious metals), minerals, ores and alloys and residues and chemicals, etc. Solicitors: Hyman Stone & Co., 64 Fargate, Sheffield 11.

### Rowen & Chadwick (Heywood) Ltd.

Private company (555,771.) Capital £2,000 in £1 shares. To carry on the business of pharmaceutical products manufacturers and manufacturers, merchants, factors, importers, exporters, processors and agents for the sale and distribution of and dealers in chemicals, etc. Permanent directors: John P. Rowen, Mrs. Evelyn Rowen, Kenneth Chadwick, Mrs. Marion Chadwick, Richard H. Pomfret, Mrs. Margaret Wright, Casimir Kochanski, Reginald S. Strutt, Jack Greenwood and

[continued on page 16]

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Sales Offices :

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**MANCHESTER:** 144-146 Deansgate. Tel: Deansgate 6451.

**BIRMINGHAM:** Clarence Chambers, 39 Corporation Street, 2. Tel: Midland 6954.

**GLASGOW:** 28 St. Enoch Square, C.1. Tel: Glasgow Central 9561.

**BELFAST:** 35-37 Boyne Square. Tel: Belfast 20081.

**DUBLIN:** 53 Middle Abbey Street. Tel: Dublin 45775.

★ Overseas enquiries should be directed to local Shell Companies.



## New Registrations

*continued from page 914*

Cecil Wilkinson. Secretary: Cecil Wilkinson. Reg. office: 1a Church Street, Heywood.

### I.B.F. (Great Britain) Ltd.

Private company (555,488.) Capital £10,000. To carry on the business of importers, exporters and manufacturers of and dealers in insecticides, bactericides and fungicides and chemicals of all kinds, etc. Directors: Ronald A. L. Thornton and Gerald Brown. Solicitors: Blakeney & Marsden Popple, 33 Gt. James Street, London S.W.1.

### Cannon Hygienic Products Ltd.

Private company (555,351.) Capital £2,000. To acquire the business of a manufacturer and supplier of disinfectants, etc., now carried on by Stanley O. Kennon at Rydal Works, Lancaster Road, Torrisholme, Morecambe, as 'Cannon'. Directors: Stanley O. Kennon and John Kitchen. Reg. office: Rydal Works, 300 Lancaster Road, Torrisholme, Morecambe, Lancs.

### Barr-Hamilton Ltd.

Private company. (554,547.) Capital £5,000. To carry on the business of importers and exporters of and dealers in home, foreign and colonial goods and produce of all kinds, particularly chemicals, chemical formulations, etc. Directors: Basil F. W. Barr-Hamilton and Diana Barr-Hamilton. Solicitors: Mawby Barrie & Letts, 62/4 Moorgate, London E.C.2.

## Company News

### Greeff-Chemicals Holdings Ltd.

The directors of Greeff-Chemicals Holdings have declared an interim dividend of 5 per cent, less tax, in respect of the year ending 31 December, 1955, payable on 1 November 1955. The increase in the interim ordinary dividend reduces the disparity between the interim and the final dividends. This increase should not be taken as necessarily implying a larger total distribution for 1955 than that for 1954.

### Thos. W. Ward Ltd.

At the annual general meeting to be held on Friday, 25 November, 1955, the directors will recommend a final dividend of 11½ per cent, less tax, on the ordinary share capital of the company, making, with the interim dividend of 3¼ per cent, less tax, already

paid, 15 per cent, less tax, for the year ended 30 June, 1955.

### Increase of Capital

CHROME ALLOYING CO. LTD., Manufacturers of corrosion and acid resisting alloys, etc., 18 Maddox Street, London W.1, increased by £24,900, in £1 ordinary shares, beyond the registered capital of £100.

## Market Reports

LONDON.—A steady home demand continues for the general run of industrial chemicals with good deliveries against contracts and a fair inquiry for replacement business. The export of chemicals is keeping up to a satisfactory level and supplies for shipment are reported to be easier. Prices for the most part are unchanged though some of the soda compounds are firmer and the undertone throughout is very steady. Among the coal tar products pitch is in steady demand and the call for tar acids is fully maintained. Pyridine is easier on a reduced demand, current quotations showing a drop of 2s. 6d. per gallon.

MANCHESTER.—Fresh inquiry and actual replacement business in heavy chemicals on the Manchester market during the past week have been on a fair scale and values generally are on a firm basis, the outstanding exception being the sharp decline in sulphate of copper in sympathy with the metal. Contract deliveries of a wide range of products are being called for steadily from the leading industrial outlets, with a fair movement of supplies to the cotton and allied trades. In the fertiliser section, basic slag and the compounds and the concentrated fertilisers seem to be the most active. With a few exceptions the light and heavy tar products are going steadily into consumption.

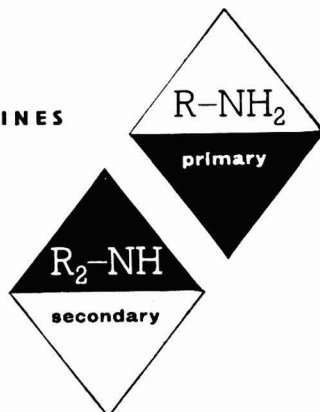
GLASGOW.—The Scottish heavy chemical market continued to show improvement during the past week, and business has been well maintained. The bulk of orders received have been for prompt despatch. Deliveries against contracts, however, are being taken up regularly. Copper derivatives have again shown a further reduction, but otherwise prices generally have remained firm. The export market continues satisfactory with an increase in inquiries received.

HIGH MOLECULAR WEIGHT ALIPHATIC AMINES

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AND AMINE ACETATES

armacs



The Chemical Division of Armour & Co. Ltd. have detailed technical information on applying their ARMEENS and ARMACS in many industries. We may have a ready-to-use formula to fit your case.

ARMEENS are a range of primary aliphatic amines  $RNH_2$  or secondary aliphatic amines  $R_2NH$  in which R represents pure or mixed fatty acid radicals. *Armeens* are strongly cationic and water repellent, and dissolve in oils and most solvents. They are substantive to metals, pigments, fibres, paper, glass, masonry, stones, plants, synthetic resins, etc. They are capable of additive and other chemical reactions.

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

**ANALYTICAL CHEMISTS**, required by the **POWER-GAS CORPORATION LTD., STOCKTON-ON-TEES**. Applicants should be below 35 years of age and have had experience in Inorganic Analysis and preferably be of H.N.C. Standard. Permanent and pensionable positions. Salary according to qualifications and experience. Application forms from Staff Personnel Department at the above address.

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have vacancies for:

- (1) **Senior Design Structural Draughtsmen**—experience in the design of bunkers, steel frame buildings, light structures, etc.
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Good working conditions, 5-day week, 3 weeks' holiday, pension scheme and luncheon vouchers. Commencing salary depending on experience, age, etc.

Write full personal details:

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**GRADUATES** in **MECHANICAL** and **CHEMICAL ENGINEERING** required for progressive positions in the Research, Design and Production Divisions of **THE POWER-GAS CORPORATION LIMITED**. Training given to men without previous industrial experience. Apply to:—**STAFF PERSONNEL MANAGER, PARK-FIELD WORKS, STOCKTON-ON-TEES.**

**WANTED**, capable **ORGANIC CHEMIST** or **ENGINEER** with five years' selling experience, for important technical custom-sales position. Apply by letter with curriculum vitae. **BOX No. C.A. 3432, THE CHEMICAL AGE, 154, FLEET STREET, LONDON, E.C.4.**

### GOVERNMENT OF UGANDA

A vacancy exists for a  
**GOVERNMENT CHEMIST IN UGANDA.**

**QUALIFICATIONS**—F.R.I.C. (Branch E Food and Drugs), B.Sc. (Chemistry), 1st or 2nd Class Honours Degree, three years' experience of analytical work in applied chemistry.

**DUTIES**—Routine chemical estimations and investigations, teaching of African staff; care and accounting for Government Stores and giving expert advice in Court. Duties may also entail travelling.

**TERMS OF APPOINTMENT**—On pensionable terms or on contract for a tour of 30-36 months with emoluments in the scale £852-£1,620 plus a temporary non-pensionable allowance of 10 per cent with a maximum of £162 per annum. For contract appointment, a gratuity of 13½ per cent of total emoluments, excluding allowances, is payable on satisfactory completion of contract. Outfit allowance of £30 if initial salary is below £882. Free return passages for officer, wife and children. Furnished quarters at low rental. Income tax at local rates. Apply in writing to the

**DIRECTOR OF RECRUITMENT,**  
**COLONIAL OFFICE,**

**GREAT SMITH STREET, LONDON, S.W.1,**  
giving briefly age, qualifications and experience. Mention the reference number (BCD117/9-012).

### IMPERIAL CHEMICAL INDUSTRIES, LIMITED

(Billingham Division)

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#### GRADUATE CHEMISTS

**S**INCE its foundation in 1919, Billingham Division has attracted chemists of outstanding quality who have built up a factory second to none in the chemical manufacturing world. Today it produces about 2 million tons of products annually, all vital to the nation's economy. A large and comprehensive research organisation plays an important role in the constant search for improvements in existing techniques and the development of new processes. There are interesting appointments and excellent opportunities for advancement for graduates with qualifications in all branches of chemistry.

**Billingham Division would welcome applications from Chemists who feel able to contribute to its further expansion and who seek an active and varied chemical career.**

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For most appointments a good Honours Degree is necessary unless the experience which has been gained by a candidate is of a responsible and varied nature.

Appointments are permanent and pensionable, and excellent starting salaries are offered. A profit-sharing scheme is in operation.

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

**THE STAFF MANAGER, IMPERIAL CHEMICAL INDUSTRIES, LIMITED**  
(Billingham Division),  
**BILLINGHAM, CO. DURHAM,**  
quoting Reference L3.

**BRITISH CELANESE, LIMITED**, require Women Technical Assistants having a University Degree for their Information Department at Head Office. A good knowledge of Chemistry or a knowledge of textile and other machinery is essential. Applicants should be able to read French and German. Five-day week. Pension scheme. Please reply to the **PERSONNEL MANAGER, BRITISH CELANESE, LIMITED, 22-23, HANOVER SQUARE, W.1**, quoting Ref. 1136.

**GRADUATE CHEMISTS**, aged 23 to 25 years, National Service completed, required for investigational work in rubber, resins, waxes and allied fields. Experience in these subjects is not required. The posts will call for practical ability and should appeal to those interested in Applied Chemistry. Superannuation and bonus schemes in operation. Apply to **MANAGING DIRECTOR, EVODE LIMITED, STAFFORD**.

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

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

**GILLED STEEL STEAM TUBING** 3 in. o.d. 2,000 ft. available.  
**"FYNA" SWING HAMMER MILL & CYCLONE.**  
 Coltman 7 ft. by 3 ft. **VERTICAL CROSS-TUBE STEAM BOILER**—340 lb. evaporation, 80 lb. pressure.  
**HAYWARD TYLER STEAM PUMP**—1,800 g.p.h.  
 Worthington Ditto—180 g.p.h.  
**STANDARD GWYNNE PORTABLE PETROL-DRIVEN FIRE PUMP.**

**A. H. KIMMINS & SONS LTD.,  
 LYNTHURST ROAD,  
 WORTHING.**

**MORTON, SON AND WARD, LIMITED,**  
 offer  
**HYDRO EXTRACTORS**

**36** in. and 21 in., by **BROADBENT**, equal to **NEW**, belt driven through centrifugal clutch, safety interlock. Steel galvanised baskets.

**48** in. by **BROADBENT**, all-electric underdriven, pit type, 3-point suspension, steel galvanised basket. With starter.

#### MIXERS

**NEW "MORWARD" "U"-shaped VESSELS** made to requirements in stainless steel or mild steel. Jacketed or unjacketed, with or without mixing gear.

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

**50 100g. Heavy Duty MIXERS** by **FALLOWS** and **BATES**. Agitators driven through bevel gears from fast and loose pulley.

#### JACKETED PANS

**NEW** 100g., 150g. and 200g. in mild steel, for 100 lb. w.p., with or without mixing gear.

**SECOND-HAND PANS, MIXERS, etc.**, available from stock—all in good condition.

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A selection of new **MONO** and other second-hand **PUMPS** in stock, 2 in. to 5 in.

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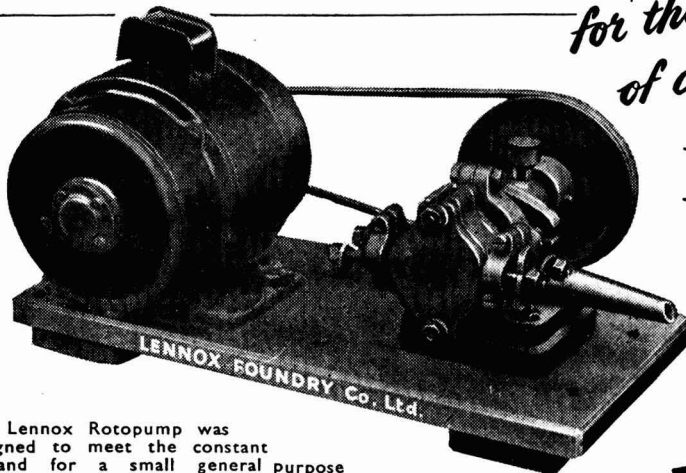
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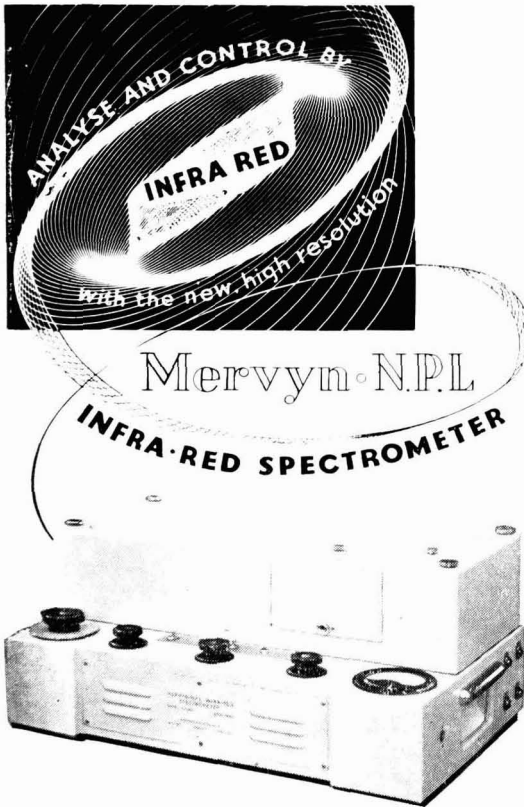
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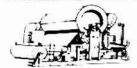
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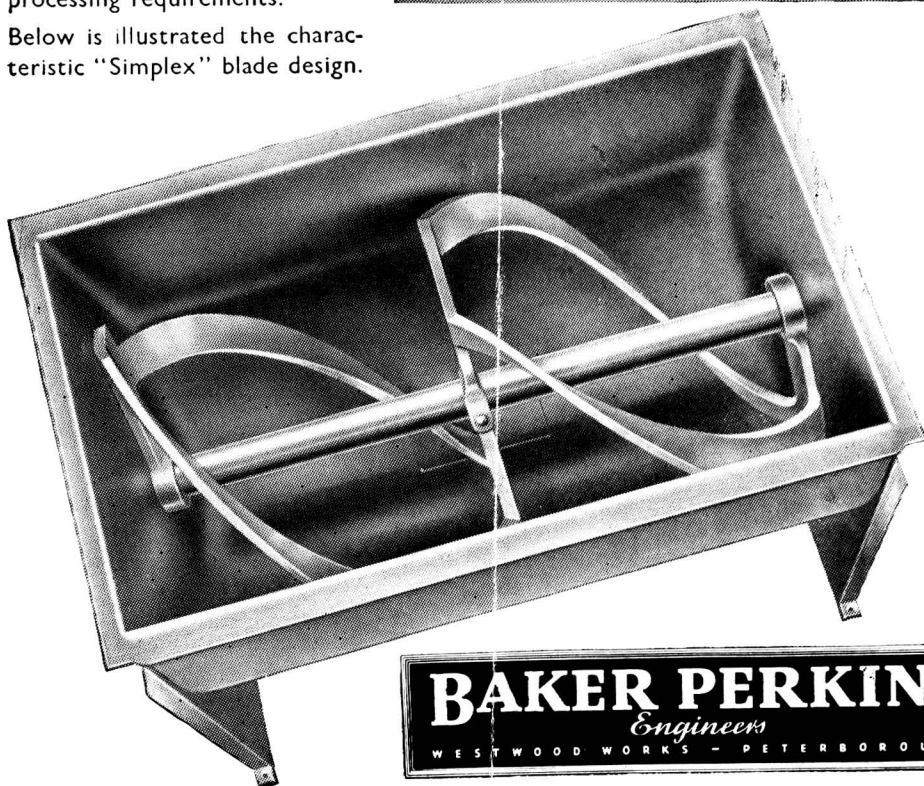
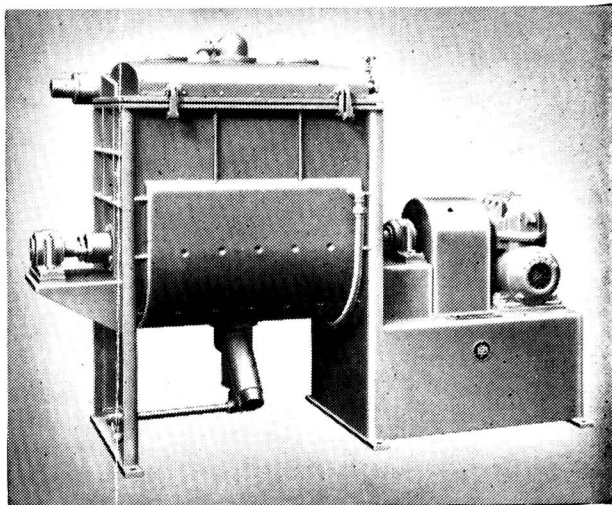
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