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# THE Chemical Age

VOL. LXXIII

3 SEPTEMBER 1955

No. 1886

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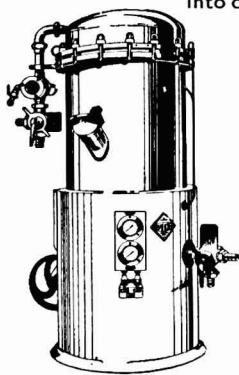
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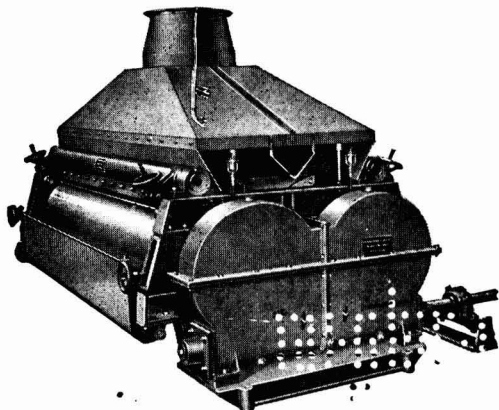


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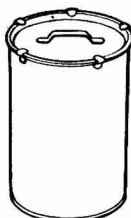
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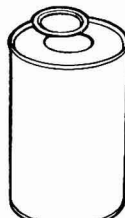
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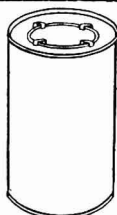
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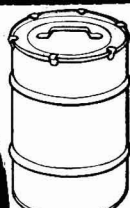
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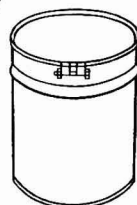
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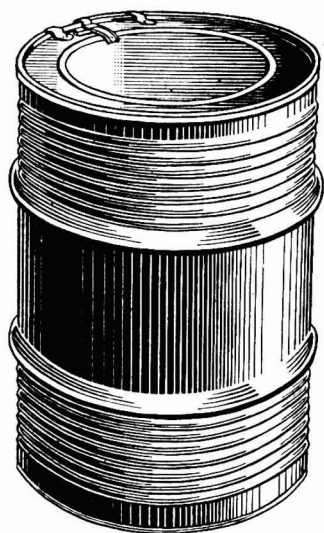


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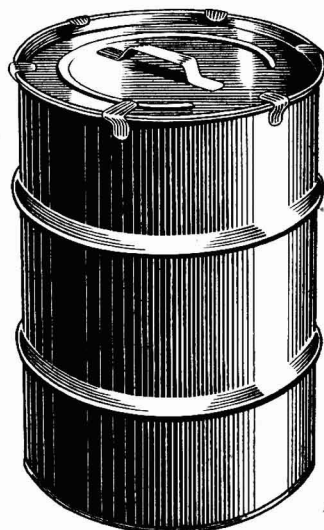
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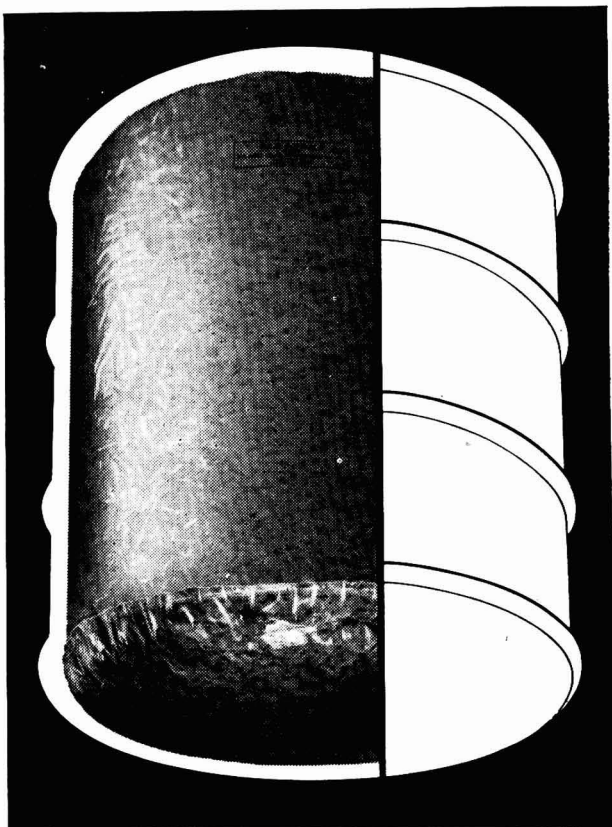
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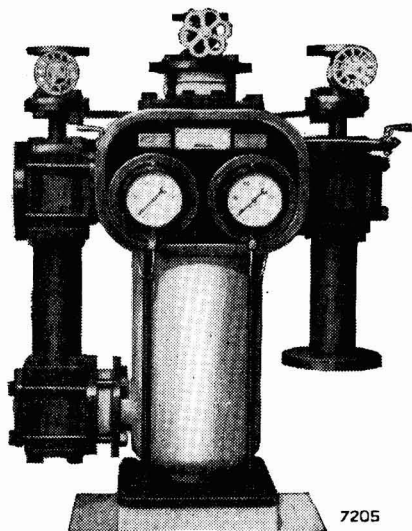
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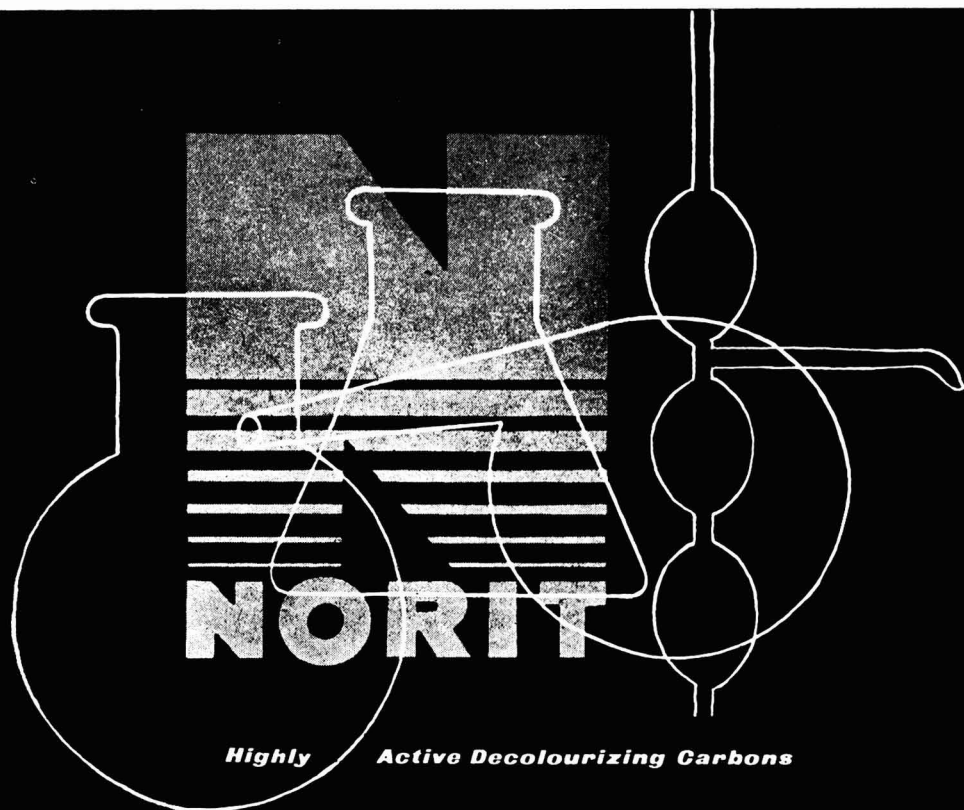
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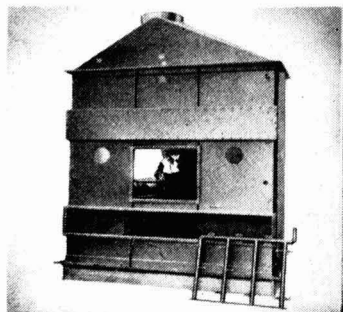
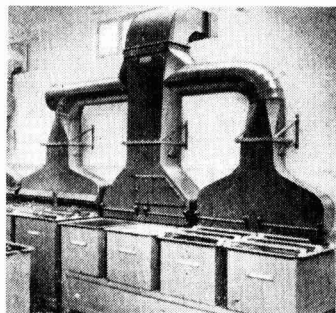
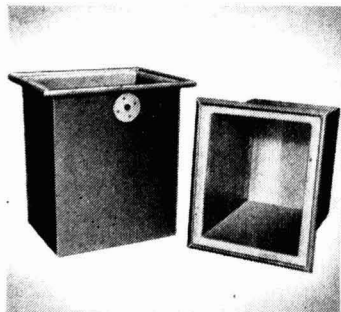
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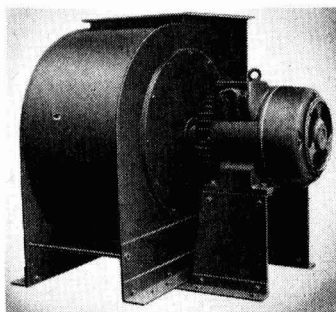
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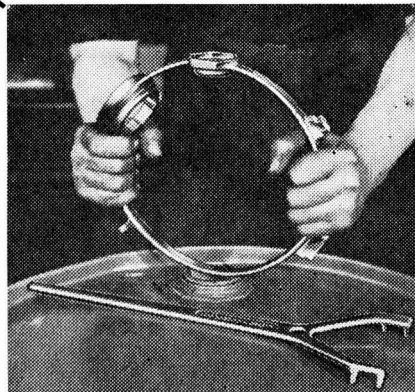


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Volume LXXIII

Number 1886

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# The Chemical Age

*Established 1919*

*The Weekly Journal of Chemical Engineering and Industrial Chemistry*

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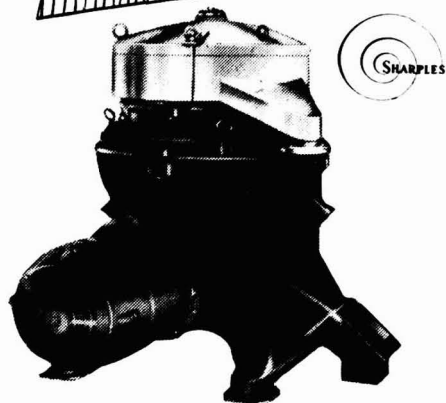
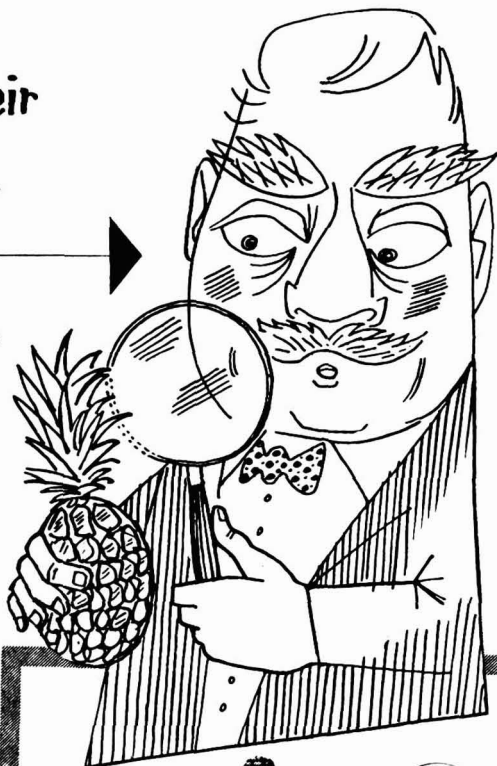
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## The British Association

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**T**HIS week the British Association for the Advancement of Science began the fifth of its annual meetings to be held at Bristol. Today Bristol is a teeming and prosperous industrial city, yet one that has huge open tracts of downland within a mile of its centre—a green middle as well as a green belt—and residential areas that are only here and there grimly describable as ‘factory-dormitories.’ Bristol, too, is now a university city, the university college status of her graceful Gothic-towered university having at last passed off. Few cities were more destructively blitzed during the war, and the scientists gathering there this week will have seen a remarkable display of persistent wounds and angry scars. ‘Virtue and Industry’ is Bristol’s civic motto, and this long-term exposure of blitzed sites would seem to be regarded as a monumental virtue.

Here and there substantial rebuilding projects, obviously long planned, are now in progress, and eventually Bristol may be able to claim that more than any other city she utilised the chance of war-time destruction to bring about a major reshaping. Patience and endurance are West Country characteristics.

Bristol might well have been a venue for the ‘British Ass’ more often. It has been the place of many scientific careers and contributions. Davy and Ramsay passed earlier stages of their careers there. Tyndall and Travers were Bristol men of

science. Today Professor Powell and his students frequently project cosmic research balloons from the university’s playing fields. So much, in a fractional nutshell, for the city where this major scientific meeting is now in progress.

Normally the ‘place’ might be named and left at that, but Bristol, as one of our six leading cities, is peculiarly unknown, a city that many people have visited most frequently yet also one that many others have never seen at all. No error is greater than supposing Bristol to be the mongrel product of tobacco and chocolate, prominent in her mixture of industry though these two particular branches may be.

Sir Robert Robinson, this year’s BA President, is an eminent chemist indeed. His Presidential Address was as discursive in theme and topic as Bristol’s industry is diverse in type and product. Perhaps the time has finally departed when BA presidents can achieve more than scattered commentary upon the swiftly moving flood of modern science; when the flow was no more than a stream or river, these annual addresses could dwell more vividly upon a few decisive points or trends. Sir Robert’s theme and title was ‘Science and the Scientist’ and by insisting upon distinction between the two he has made a practical and simple contribution to one of the modern problems of muddled thought. Science is not a form of religion, nor is it an ideology. ‘There is no such thing as the voice of

science . . . there is no such thing as British, or German, or Russian, or Jewish science. . . . Titles such as "Science and Religion" tend to confuse the simple issue which relates to scientists and not to science.' Aptly enough, Sir Robert reminded us that science is 'simply the record, enshrined in the literature, of the system of knowledge and of the conceptions correlating parts of that system. It is fundamental that such knowledge cannot be based upon dogma or authority of any kind, nor on any intuition or revelation. . . .'

The distinction between science and scientists was stated by implication and it can perhaps be regretted that Sir Robert did not insist upon this point more directly. 'The brotherhood of scientists is a reality. It is fortunately not unique; there is a similar fraternity among sportsmen, musicians, chess players, and other categories of enthusiasts, not encumbered by the so-called ideologies.'

It seems clear that Sir Robert deplors attempts to use 'Science' as the *motif* of pressure-groups seeking to influence national or international policies or trends in public opinion.

That he is right in insisting that 'Science' has no voice, that 'Science' cannot be set up as some over-riding authority or court of pronouncement, will not be denied. There is some danger, however, that the establishment of this point will suggest that scientists themselves should concern themselves much less with national thought and national actions. His theme may be interpreted—though no doubt wrongly—as an appeal for retreat into the academic-Ivory Towers. Yet he himself, in brief reference to nuclear energy, asks whether the relay of nuclear explosions in atomic bombs is controlled with 100 or with 99.9 per cent certainty, whether every possibility of setting fire to elements lighter than uranium has been excluded. 'Do we really know enough about nuclear reactions to be sure there is no loophole? Has every conceivable case been considered? . . . it is desirable that the inner circle of advisers to Governments should not only be right but be "seen to be right." This can only be secured by a relaxation

of secrecy on the scientific aspects of nuclear energy developments and by some form of international consultation before novel and greatly increased releases of energy are attempted.' The scientist as a citizen cannot avoid a sense of extra responsibility if, by his knowledge or through his training to think objectively, he suspects an existence of risks of which his fellow citizens, without that knowledge or training, are blissfully unaware. Scientists cannot be hermits in this age of 'Science.'

Elsewhere Sir Robert seems to oversimplify this dilemma of scientific duty. 'It still (*i.e., in peacetime*) seems that as citizens we should do all in our power to strengthen the hands of our leaders, in whom we have placed our trust. . . . This offers no solace to the scientist who feels that political leaders may be misusing or under-using the powers or potentialities of modern science. Some of our contemporary novelists and dramatists have been able to present this problem of twentieth century scientists in broader and deeper perspective.

There is one other personal problem of the scientist to which Sir Robert has drawn most timely attention. 'One of the troubles of the modern life of scientists is that we are all too busy and that only a fraction of our available time and energy can be spent in practising our real vocation. Please forgive a personal reference—it is not really very boastful. I am conscious of a certain talent for tapping a test-tube but it is a long time since I was able to indulge in this bent to much purpose. Lately I have had to be content to encourage others to perform this simple operation. . . .'

There, indeed, is a cry from the heart, and at the same time it may well represent a wound in the heart of science. Distinction and success in scientific work all too quickly and commonly bring distance from laboratories, with secretaries crowding out laboratory assistants and appointment diaries pushing out laboratory notebooks. This was not so when scientists had thin facilities and even thinner funds. Now '*we are all too busy*.' Are great men of science in other countries also kept too busy?



## Notes & Comments

### *Adding Amino-Acids to Foods*

**F**ORTIFYING animal foods with methionine is already sizeable if not big business in the US. Poultry foods and pig foods provide a major market for this relatively new industrial synthetic; and dog foods seem likely to provide an extension. The nutritional argument is, of course, that some protein foods are deficient in essential amino-acids, and the addition of such an acid greatly enhances the value of these foods. For humans the argument is much stronger if lysine rather than methionine is the prospective additive, for cereal-based diets are known to be deficient in lysine when the proteins break down in the body into their various amino-acids. Lysine can be produced by an industrial synthesis; indeed, Du Pont has already operated a pilot-scale plant. However, lysine costs about \$12 a pound whereas synthetic methionine is between \$2 and \$3 a pound. Enriching bread with lysine would add 2 cents to the price of a loaf. Nevertheless, lysine-fortified biscuits are being produced by one US company.

### *Thorough Testing Ensured*

**T**HE official view in US is that there is no national need for amino-acid enrichment of human diets in peacetime. This view would seem to foreshadow a difficult future for producers of synthetic amino-acids; for even if they foster demand, food enrichment on a large scale would require changes in US food laws. A much more positive official outlook is needed if such changes are to be obtained. But American citizens are probably the best fed people in the world; their diet may be costly but their wages are equivalently high, and it is far from a protein-deficient diet. It is surely in the less fortunate countries, the truly subsistence-diet communities, that amino-acid enrichment is needed. In those areas, however, those who could afford to pay for the cost of amino-acid additions could just as readily pay for better food. At the present stage of social progress, chickens and pigs and domestic pets

in America are likely to continue to be the recipients of extra amino-acid rations. This may not prove a bad thing, for what is undeniably a major nutritional development will have a long-term 'tried-out-on-the-dog' period of test.

### *Ladies in Laboratories*

**T**HE current number of the *Journal of the Royal Institute of Chemistry* (1955, **79**, 413) contains a survey, based upon information from RIC members, of the feminine position in chemistry. The economic information reveals that pay is far from equal. In the under-25 age groupings disparity is small, but the earning power of male chemists would seem to advance with age much more attractively than that of women chemists. For the 41-45 age-group the average female salary is £800-£940 (1955) compared with an average for men (1953) of £1,360-£1,540, a disparity of more than a third. Disparity of reward seems to vary considerably with the type of work undertaken. The disparity is high in industry, but not nearly as high in government service, local authority service, university posts, or, of course, in teaching. The point can be made that disparity is smallest in those fields of chemical employment where the rate of pay for men is also low.

### *Restricted Progress*

**I**T is not surprising that women's rewards as chemists in industry should be such marked examples of 'unequal pay.' It is not as easy for women to be promoted from initial routine-type responsibilities; it is obviously difficult for their skill to be developed as works chemists with daily contacts with a predominantly male works staff. Feminists may resent these observations, but we would hasten to excuse ourselves from controversial debate—we are not laying down rules or making generalisations, but simply summarising life as it is and the average viewpoints that are held. Save in exceptional cases, the woman

chemist in industry is likely to remain much nearer to the starting post than the male chemist with equivalent skill.

### Could be Misleading

THE figures in the RIC survey could be very misleadingly used. Only members of the Institute were involved, and the total—188—is a small sample. It is not a random sample. Obviously many women chemists have decided that membership of the Institute is not particularly advantageous to them—for example, only 16 of the 188 are employed as teachers in schools, which implies that the extra status of RIC membership is not considered to possess any scholastic usefulness. But 79 of the 188 were employed in industry, roughly 40 per cent. A random sample survey of women chemists would surely show a much smaller proportion.

### The Marriage Risk

THE marriage risk is a serious disability for women chemists' hopes of progress and high reward. The RIC survey indicates that the loss by marriage is about 14 per cent. Firms are naturally nervous of losing women chemists within a few years of initial employment, at the very time when their value, through training and experience, should be highest. The married woman who continues to work still presents a risk from the employer's point of view—even where children do not bring discontinuity of service, the husband may be moved in his work to some distant area. These risks count more heavily against the woman chemist than, say, the woman secretary or office 'manager' for replacement at fairly short notice is much more difficult.

### Mr. Punch, 1846 & 1955

LAST week's (24 August) issue of *Punch* should not have been missed by any agricultural chemist for its picture of two courting rustic inhabitants sitting on a gate beneath a moon and the delightful words below: 'What say us gets married come next organo-phosphorus spraying?' A far cry from 1846 when part of a poem published by *Punch* ran

as follows: 'But chemistry now into tillage we lugs,

'And we drenches the earth with a parcel of drugs,

'All we poisons, I hope, is the slugs.'

However, the modern Mr. Punch, still expressing the traditional Englishman's outlook, is probably being slightly cynical in changing the farming calendar from harvest terminology to dates for chemical spraying.

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### Saskatchewan's Potash

THE Potash Company of America is using deep-freeze methods in their operations to make the first cut in Saskatchewan's potash fields. They are sinking a shaft at Patience Lake, near Saskatoon, which will have circular walls of solid ice, necessary to prevent loose sedimentary strata from shifting against underground mine structures.

The company is expected to be the first to reach commercially into the province's potash basin, the largest known source in North America, and possibly in the world. Estimates have placed its reserves as high as 100,000,000 tons.

The construction of the shaft will cost \$3,000,000, and the Potash Co. intends spending another \$10,000,000 on a refinery. Another company working in the basin is Palmer Oil Development of Calgary who are sinking 29 refrigeration pipes to below the 3,000-foot level. The bulk of all potash produced is pre-destined for the US.

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### Polythene Plant

WHEN Union Carbide's new polythene plant opens at Grangemouth, Scotland (see *THE CHEMICAL AGE*, 1955, **73**, 232) it will bring the company's total annual production to 290,000,000 lb. a year, it is estimated.

In the US Union Carbide is already producing polythene at its plants at Seadrift and Texas City, Texas, and South Charleston, West Virginia. Another plant, at Torrance, California, is scheduled to start production next year, while another, at Montreal, should be completed early in 1957.

The Scottish plant will be the first polythene plant built by Union Carbide in Europe, and will cost upwards of \$12,000,000. It will be operated by Gemec Chemicals Company, a subsidiary of Union Carbide.

# IUPAC Elects Officers

## Four New Members in Analytical Section

THE Analytical Section of the International Union of Pure and Applied Chemistry has elected four new members to its section committee. These are Mr. Samuel E. Q. Ashley of General Electric Company (Louisville, Kentucky, US), Dr. Ronald Belcher of the University of Birmingham (England), Prof. Gerold Schwarzenbach of the University of Zurich (Switzerland), and Dr. Frederick D. Tuemmler of the Shell Development Company (Emeryville, California, US); these memberships are for a term of four years, except that of Mr. Ashley which is a two-year term.

The election results were declared after examination of a letter ballot on the section members at the meeting of the section committee at Zurich on 21 and 27 July, during the XVIIIth Conference of the IUPAC held at the Swiss Federal Institute of Technology. During the same meeting, Dr. Tuemmler was elected secretary of the section by the section committee, a post to be held until 1959. He succeeded Mr. Ashley who held the office since 1949. In its meeting on 21 July, the section committee expressed by a vote of thanks, its great indebtedness, to Mr. Ashley for all the work which he has done on behalf of the section.

### Executive Committee

The president of the section, Prof. I. M. Kolthoff of the University of Minnesota (Minneapolis, US), the vice president, Mr. R. Clark Chirnside of the General Electric Company (Wembley, England), and the secretary form the Executive Committee of the Section. The remaining four members of the Analytical Section committee are: Prof. G. Duyckaerts of the University of Liège; Prof. C. J. van Nieuwenburg of the Technische Hoogeschool (Delft, Netherlands), Prof. Lars Gunnar Sillén of the Royal Institute of Technology (Stockholm, Sweden) and Prof. Dr. Michael K. Zacherl of the Tierärztlichen Hochschule (Vienna, Austria). The terms for these six members expire in 1957.

The members whose term expired this year are Prof. Fritz Feigl of Rio de Janeiro (Brazil), Dr. J. I. Hoffman of the US National Bureau of Standards (Washington,

DC), and Prof. Dr. P. E. Wenger of L'Ecole de Chimie de l'Université (Geneva, Switzerland). Prof. Wenger served as vice president of the Union from 1951 to 1955 and was one of the leaders in the reorganization of the Analytical Section in the period since 1948.

In connection with the 1956 International Analytical Congress at Lisbon being held under the patronage of the analytical section of the Union, it was decided that all papers submitted should be new or novel contributions; review papers would be discouraged. In the interest of securing papers at as high a level of scientific interest as possible, the national adhering bodies of the Union have been requested to screen the papers submitted from their respective countries.

### The Lisbon Congress

The Lisbon Analytical Congress, the XVth Congress of the IUPAC, is being arranged by an organising committee of chemists in Portugal, of which Prof. Dr. Pierre A. Laurent, of the Instituto Superior Técnico, Avenida Rovisco Pais, is secretary-general. The congress will be divided into the following sections: (1) microchemical methods, (2) biological methods, (3) electrical methods, (4) optical methods, (5) radiochemical methods, (6) organic complexes, (9) general, and (10) standardisation of methods and miscellaneous applications. Persons interested in having further information regarding the Congress should write to Prof. Laurent at the above address.

All the commissions of the analytical section have been very active during the past year, two of them reporting to the Union on pending publications. The commission on analytical reactions, headed by Prof. Jan Gillis (Riuksuniversiteit Gent, Belgium) reported that the monograph on colorimetry of inorganic compounds prepared by Prof. C. Duval (National Centre of Scientific Research, Paris, France) has just been published under the patronage of the Analytical Section.

The commission on equilibrium data, headed by Prof. L. G. Sillén (Royal Institute of Technology-Stockholm, Sweden) has

collected a great number of published equilibrium data. To date, Prof. J. Bjerrum (University of Copenhagen, Denmark) has prepared a complete set of tables of stability constants of inorganic complexes and chelate compounds (of the order of a few thousand), covering literature up to 1953. After some further editing and making the data complete to the end of 1955 by Profs. Schwarzenbach and Sillén, these very valuable tables will be published in 1956, by the Chemical Society of London under sponsorship of the IUPAC.

This Commission is also engaged in making a critical compilation, with representative diagrams, of the solubility of hydroxides, hydrous oxides, slightly soluble sulphates, metal sulphides, and silver halides.

The commission on electrochemical data, headed by Dr. Roger G. Bates (US National Bureau of Standards, Washington D.C., US), is compiling selected electrochemical data of analytical importance, specifically of oxidation-reduction potentials at various ionic strengths in several electrolytes; data for 52 of the elements is complete and work on the remainder will begin in the autumn.

#### Collection Being Compiled

A systematic collection of selected values of polarographic properties is being compiled; a standard data form has been adopted for the uniform presentation of data (half-wave potential, diffusion current), experimental conditions (solvent, pH, maximum suppressor, type of microelectrode), reference and explanatory remarks. A critical evaluation has been completed of the accuracy and limitations of the several methods by which dissociation constants have been obtained. Since the solvent medium plays a fundamental part in acid-base dissociation, the constants are being arranged according to solvent; some 80 original articles have been reviewed and constants for 50 compounds collected.

The commission on optical data, headed by Prof. G. Duychaerts (University of Liège, Belgium) is engaged in the preparation of a critical compilation of numerical data on absorption spectra and extinction coefficients of complexes used in analytical chemistry; some two hundred compounds have been covered to date. The Commission will also assist in the coordination of information on molecular spectroscopy (infrared) of analytical interest.

The commission on microchemical techniques under the guidance of Prof. Dr. Michael K. Zacherl (Tierärztlichen Hochschule-Vienna, Austria) has completed a survey of microchemical techniques in some 25 different countries to ascertain profitable subjects for standardisation. Work is now starting on the preparation of international standards of microchemical apparatus and listing of preferred notations (units) of measurement with special reference to micro-techniques.

In a joint meeting of the analytical and of the physical-chemical sections, overlapping of functions and co-operation between Commissions was discussed. Plans were laid for the basis of co-operation between the commission on electrochemical data in the analytical section which will co-operate with the commission on electrochemistry of the physical-chemical section. A new commission on molecular spectroscopy in the section of physical chemistry is contemplated, but the commission on optical data will remain charged with the collection and co-ordination of information of analytical value.

At present, there are 54 members in the analytical section of the union, including the section committee and its commissions, representing 16 adhering countries; Austria, Belgium, Czechoslovakia, Denmark, England, Finland, France, India, Italy, the Netherlands, North Ireland, Spain, Sweden, Switzerland, the United States of America, and West Germany.

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#### Power-Gas Reorganisation

THE Power-Gas Corp. Ltd. of Stockton-on-Tees, founded in 1901, now has subsidiaries in Hull, Johannesburg, Melbourne, Paris, Montreal and Calcutta, as well as offices in London and Bombay.

In order to improve service and to increase efficiency of the growing growing internal organisation, five main product groups are to have specialised divisions: Blast Furnace, General Contracts, Gas Plant, Chemical Plant, and Works.

The chiefs of the new divisions are: Works—Mr. T. K. Hargreaves; General Contracts—Mr. C. Ingman; Gas Plant—Mr. T. H. Riley; Chemical Plant—Mr. P. M. K. Embling; Blast Furnace—Mr. D. R. Brown. (See also p. 487 of this issue.)

# Chemical Exports for Month of July

## Recovery after End of Dock Strike

**EXPORTS** of chemicals for July generally showed substantial increases over those for June. This can be accounted for by the end, on 3 July, of the six-weeks' dock strike. Nevertheless, figures are generally lower than those for July 1954.

Australia is still the biggest buyer of British chemicals, importing £1,509,512 worth of goods, with India second with £1,009,095. Exports to Turkey have doubled in the last year, while those to Hong Kong have decreased by more than half.

Aluminium oxide and ammonium nitrate figures, which fell almost to zero during June, were back to normal for July. Among general organic chemicals, sulphonamides again showed substantial increase over the previous month. Figures for plastics materials, although much higher than those for June, were down compared with the May figures.

There seems to have been a fairly substantial increase in exports of coal tar and cresylic acid since last year. The total for all coal tar products has also increased in the same period. On the other hand, synthetic dyestuffs have decreased in value since last year.

### EXPORTS : PRINCIPAL COMMODITIES

	July 1955	June 1955	July 1954
Acids, inorganic (cwt.)	12,735	8,200	15,600
Copper sulphate (tons)	1,683	1,240	2,598
Sodium hydroxide (cwt.)	203,847	255,097	195,463
Sodium carbonate (cwt.)	226,209	154,878	472,608
Aluminium oxide (tons)	2,116	1	1,518
Aluminium sulphate (tons)	1,756	1,324	2,329
Ammonia (cwt.)	7,303	3,279	10,913
Bismuth compounds (lb.)	22,567	16,196	34,810
Bleaching powder (cwt.)	15,252	20,128	33,269
Hydrosulphite (cwt.)	8,515	5,433	7,993
Calcium compounds, inorganic (cwt.)	29,418	17,921	32,314
Lead compounds, inorganic (cwt.)	3,752	3,260	6,308
Magnesium compounds (tons)	711	1,727	1,463
Nickel salts (cwt.)	8,856	6,008	4,924
Potassium compounds (cwt.)	4,103	4,607	2,667
Acids, organic & derivatives (value in £s)	£81,243	£39,922	£74,733
Ethyl, methyl, etc., alcohols (value in £s)	£178,494	£53,809	£148,740
Acetone (cwt.)	23,698	4,784	15,824
Citric acid (cwt.)	2,570	1,785	3,295
Sulphonamides, unprep. (lb.)	96,449	46,102	43,564
Dyestuffs intermediates (cwt.)	4,333	3,381	5,921

Total for elements & compounds in £s £3,905,802 £2,535,057 £4,440,054

Coal tar (tons)	25,723	7,458	10,048
Cresylic acid (gal.)	353,401	139,264	114,517
Cresote oil (gal.)	2,064,163	1,855,228	2,817,126

Total for tar products £492,251 £267,717 £334,141

Indigo, synthetic (cwt.)	1,402	1,308	4,272
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Total for synthetic dyestuffs (cwt.) 16,788 9,720 23,504

Total for paints, pigments & tannins in £s £1,621,815 £1,036,419 £1,609,876

Total for medicinal & pharmaceutical products in £s £2,716,553 £1,960,815 £2.93 .271

Essential oils (lb.) :			
Natural	18,042	16,343	52,237
Synthetic	96,301	81,334	41,451
Flavouring essences (value in £s)	85,140	£81,334	£104,500

Total for essential oils, perfumes, etc. (in £s) £1,855,994 £1,960,815 £1,964,019

Ammonium nitrate (tons)	524	8	876
Ammonium sulphate (tons)	20,106	11,664	52,330

### VALUE OF EXPORTS IN £ : PRINCIPAL BUYERS OF CHEMICALS

	July 1955	June 1955	July 1954
Australia	1,509,512	774,132	1,992,794
India	1,009,095	593,178	1,118,296
Canada	830,747	370,118	518,363
South Africa	812,673	681,144	1,045,639
Netherlands	787,724	514,947	759,969
United States	752,435	309,251	520,089
Eire	638,874	629,397	560,786
New Zealand	587,931	294,804	755,638
Italy	572,306	477,450	400,637
Sweden	549,026	343,745	494,350
Egypt	518,113	138,218	264,498
France	513,059	434,324	451,452
Argentina	463,617	119,134	371,387
Western Germany	435,066	396,781	366,230
Nigeria	425,020	259,051	338,642
Belgium	395,141	309,200	392,999
Denmark	360,594	232,119	334,712
Gold Coast	335,657	62,532	342,240
Pakistan	323,817	673,265	350,499
Norway	288,836	181,097	306,397
Singapore	274,662	152,703	352,958
Trinidad	265,163	47,059	140,962
Malaya	261,621	116,903	274,704
Finland	255,951	160,059	174,921
Switzerland	206,805	182,739	207,298
Turkey	200,352	13,203	104,089
Hong Kong	195,302	102,392	441,521

Total value of chemical exports 18,276,022 11,840,098 18,873,478



Total for all fertilisers in £s ..	£435,335	£234,900	£1,000,743
Total for plastics materials (cwt.)..	132,521	95,415	129,769
Disinfectants, etc. (cwt.)	11,791	7,323	21,662
Insecticides & fungicides (cwt.) ..	39,787	18,330	32,620
Rodenticides & weed-killers (cwt.) ..	3,824	2,548	6,997
Lead tetra-ethyl (gal.)	469,022	328,869	361,693

## Automatic Control

### Joint Conference to be Held in October

A JOINT conference on automatic control in the process industries is being sponsored by The Institution of Chemical Engineers, 56 Victoria Street, London S.W.1, and The Society of Instrument Technology, 184 Sherwood Park Road, Mitcham, Surrey, and will take place on 4 October, at Caxton Hall, Westminster, London S.W.1.

The timetable will be as follows:—

9.30 a.m. Registration.

#### Morning Session

9.45 a.m. Introduction by John A. Oriel, President, The Institution of Chemical Engineers.

10.00 a.m. Fundamentals of automatic process control, by R. S. Medlock.

10.20 a.m. The dynamics of process plant, by J. McMillan.

11.00 a.m. Automatic process control and chemical engineering, B. W. Balls and A. H. Isaac.

11.20 a.m. Discussion.

12.45 p.m. Lunch.

#### Afternoon Session

2.00 p.m. Automatic control in the steel industry, by B. O. Smith.

2.15 p.m. Automatic control of batch processes, by W. A. Goldstein.

2.30 p.m. The temperature control of large storage tanks, by W. A. J. Preece.

2.45 p.m. Automatic control in the pulp and paper industry, by N. C. Underwood.

3.00 p.m. The economics of process control, by S. W. J. Wallis.

3.40 p.m. The development of modern control techniques and the pattern of future developments, by A. J. Young.

4.00 p.m. Discussion.

5.00 p.m. Résumé of the conference by A. J. Young, President. The

Society of Instrument Technology, and Sir Harold Hartley, Past President, The Institution of Chemical Engineers.

5.15 p.m. End of conference.

The registration fee will be 10s. for members of either sponsoring body, 20s. for non-members.

Advance copies of the papers will be sent to all those registering. Persons not attending may obtain copies of the papers by paying the appropriate registration fee.

## Chemical Hygiene Fellowship

THE uncovering and defining of possible hazards in the handling of newly available chemicals is being carried out by a fellowship on chemical hygiene at the Mellon Institute, Pittsburgh, Pa. This fellowship, set up by the Union Carbide and Carbon Corp. of New York, has made preliminary studies of some 70 materials that may have economic value. Detailed studies were carried out on 15 compounds which will reach the public and on another eight that will be contacted only by industrial workers.

A rubber foam which is resistant to the spread of flame has been produced by the rubber fellowship at the Mellon Institute, which is supported by the Firestone Tire and Rubber Co., Akron, Ohio. The most suitable material was found to be a neoprene type foam rubber. Current efforts are being directed towards achieving fire resistance in natural rubber and GR-S type foams.

## Indian Synthetic Oil Project

THE committee formed by the Indian Government to consider a proposed synthetic oil project met in New Delhi recently under the chairmanship of Dr. J. C. Ghosh, a member of the planning commission. They considered points given by three companies—M. W. Kellogg of New York, Lurgi of Frankfurt, and Heinrich Koppers of Essen—who have agreed to prepare plans for a synthetic oil plant in India. The reports are to be submitted in October.

The committee also considered details concerning end-products and what types of coal should be used. Earlier this year the Indian Government had decided that a synthetic oil plant using low grade coal should be established with a capacity of 300,000 tons of oil a year.

# Research on Optical Cements

## Investigations to Find Ideal Material

**M**ODERN optical instruments are usually equipped with a considerable number of lenses, in order that the images presented may be as nearly perfect as possible. The number of air-glass surfaces is therefore fairly large, but every time light passes through a glass surface from the air a certain proportion of that light is lost, the average loss per glass surface being from 4 to 5 per cent. The aggregate loss from a number of surfaces is large enough to bring about a drastic reduction in the efficiency of high precision instruments.

One of the most effective methods of eliminating or reducing the loss of light from air-glass surfaces is by cementing some of the lenses together. This solution has the further advantage of preventing surfaces from being contaminated by dust and dirt. Moreover, certain types of optical glass need permanent protection from the atmosphere and so require to be cemented.

An optical cement suitable for the exacting requirements of modern instruments must possess so many desirable properties that the number of materials likely to be suitable for this purpose is extremely small.

### Ideal Properties

A list of the properties of an ideal optical cement has been compiled by the Optical Shop of the Naval Gun Factory, Washington, DC. The requirements are set out as follows:

1. Substantially colourless and neutral in light absorption.
2. Clear and non-scattering.
3. Refractive index between 1.51 and 1.58, preferably within the limits of 1.52 to 1.54.
4. Chemically neutral to glass; i.e., no leaching or other destructive effects on glass surfaces.
5. Good adhesion to glass, with sufficient flexibility and mechanical properties such that adhesion and clarity are unaffected by indefinite storage at any temperature between  $-60^{\circ}\text{F}$  and  $+160^{\circ}\text{F}$ . At  $160^{\circ}\text{F}$  the cement must be capable of withstanding a strain of up to 5 oz. per sq. in. of cemented surface.
6. If the cement is to be polymerised

between the lens elements, it should be capable of polymerising with a minimum amount of shrinkage and, if possible, at room temperature. The use of higher temperatures should be avoided.

7. Sufficiently stable to ship and store for approximately a month before use; should also be capable of being shipped ready for use or at least in such a form that the user will have a minimum number of simple operations to perform before applying it.

8. Good ageing characteristics, so that on indefinite ageing or storage within the required temperature range, it does not lose its adherence to glass or become yellow. This property should also include resistance to moderate amounts of ultraviolet light.

9. The cement should be fungistatic, preferably fungicidal.

10. It should be substantially non-toxic.

11. The materials should permit separation of optics where necessary with low breakage hazard. This requirement includes ease of removal of cement from the glass.

12. No effect on the optical properties of component elements; e.g., straining or surface distortion.

13. The cement should be sufficiently fluid at  $250^{\circ}\text{F}$  to permit cementing.

At present there is no known cement which fulfils all these requirements, so that it is necessary to compromise by using the best available materials for specific applications.

The classical material for optical cements is Canada balsam, which has been used for many years and is still employed for numerous applications. During the second world war, however, it became apparent that Canada balsam could not withstand the extreme temperature variations to which aircraft instruments are subjected. It becomes too brittle at low temperatures and too fluid at high temperatures and is susceptible to 'thermal shock'. An aeroplane descending from stratospheric cold to tropical heat might be subjected to a temperature variation of  $150^{\circ}\text{F}$  in a matter of minutes. A cement capable of standing up to such conditions had therefore to be found. There are various materials which can withstand extremes of temperature, but their application presents certain difficulties.

On both sides of the Atlantic much effort has been devoted to research on optical cements. Both thermosetting and thermoplastic materials have been employed as cements, but severe limitations in their applications have been encountered. If thermosetting materials are used, it becomes difficult to effect any readjustment of the components once the cement has been processed. In the thermoplastic field, one of the difficulties is to find a substance which has the right properties within the temperature limits.

Ever since its formation in 1918, the British Scientific Instrument Research Association has been interested in the development of optical cements. It has investigated the behaviour of many possible materials under the conditions obtaining in optical contacts, and some of the cements developed have proved entirely suitable for particular applications. One synthetic cement in particular was favourably received by many optical firms and its behaviour in completed instruments has been given an extended trial.

#### American Work Reported

American work on optical cements is the subject of a report by Donald E. Field, of the Naval Research Laboratory, Washington, DC, a copy of which has been received by the Technical Information and Documents Unit of the Department of Scientific and Industrial Research (Reference: PB11273). It describes the development of an improved optical cement based on cellulose caprate. For several years the US Navy has used cellulose caprate cement for all airborne optical instruments. It has been established that this material will meet all but three of the requirements laid down by the Naval Gun Factory. The refractive index is 1.4734, however, which is too low, while the material is not fluid enough to permit cementing at 250° F. A further limitation is that it is not fungistatic.

The object of the investigation was to develop an optical cement capable of meeting all thirteen requirements, specified by the Naval Gun Factory, either by modifying cellulose caprate or by finding a new material. Both possibilities were simultaneously explored.

The thermosetting resins examined included various Epon and Araldite resins and also several synthesised resins of this class. These were glycidyl ethers formed by the

condensation of epichlorohydrin and polyhydric alcohols, usually phenols, in the presence of a base. They are vulcanised without evolution of volatile matter and with low shrinkage by a variety of compounds to form thermosetting resins of excellent adhesive properties and high solvent resistance.

Among the vulcanising or curing agents tried were aliphatic amines and acids, acid anhydrides, Friedel-Craft metal halides, phosphoric acid and its mono-esters, and phosphorus halides. The most satisfactory were the aliphatic diamines, which cure rapidly at relatively low temperatures and have a substantial working life after mixing. The best formulations do not meet requirements 11, and were not tested for requirements 1 and 9, but proved satisfactory in all other respects. Their refractive index varies with the formulation from 1.55 to 1.60 and adhesion to glass is particularly good.

The following formulations are recommended:

Composition	Formulations (parts/wt.)		
	No. 1	No. 2	No. 3
Epon RN-34 (Shell) . . . .	100	—	—
Epon 828 (Shell) . . . .	—	—	100
Araldite 101 (Aero Research Ltd.) . . . .	—	100	—
Allyl Glycidyl Ether . . . .	10	10	—
2, 4-Diamino-2-methylpentane	10	10	10

Early work with thermoplastic mixtures consisting of a thermoplastic substance plus one or more naturally occurring resins and a liquid or solid plasticiser (or both) proved unsuccessful. It was therefore concluded that cellulose caprate could only be modified by chemical reaction. It was believed that the refractive index could be raised to 1.52 or higher and the melting point lowered, besides improving weather resistance and adhesion, by the following methods:

1. Further esterification of the free hydroxyl in the cellulose caprate polymer with aromatic, substituted and dibasic acids.
2. Introduction of functional groups of high refractivity.
3. Hydrolysis and re-esterification of cellulose caprate in order to obtain the desired number and kind of groups.

Considerable research conducted in these directions failed to produce a modified cellulose caprate cement or a new cellulose ester that more nearly met the specifications of an ideal cement. The investigators therefore reverted to the original idea of a

thermoplastic mixture. It was believed that if the plasticiser content were kept below 25 per cent, the melting point could be lowered without causing cold flow at 160° F. Since refractive index is an additive property, the addition of a plasticiser with a high refractive index would raise the refractive index of the cellulose caprate. A fungicidal plasticiser would help to make the cement fungicidal. Other advantageous qualities could also be derived from a suitable plasticiser.

The primary plasticiser finally selected was Dow Resin 276-V2, a polymerised product derived from alpha-methyl styrene. Its unique properties include water-white colour; ready solubility; good water resistance; lack of acidity; and stability to heat, light and ageing. The plasticised cellulose caprate has good weathering characteristics, but a slight incompatibility of the plasticiser was perceptible in the form of a slight haziness in the cement in stick form. The cemented optics were clear, however, and the transmission was not decreased.

Since the compatibility of a plasticiser with a resin is a function of its polarity, molecular size and structural configuration, slightly incompatible plasticisers can often be made compatible through the use of mutual solvents or other plasticisers. The search for a secondary plasticiser yielded Santiciser 1-H, N-cyclo-hexyl para-toluene-sulphonamide. This is a white solid plasticiser with good heat and light stability and high compatibility with cellulose caprate. The recommended proportions are one part secondary to three or four parts primary plasticiser and 20 parts cellulose caprate. This formulation results in a cement that is sparklingly clear.

#### Refractive Index Raised

The plasticised cellulose caprate does not meet requirements three or nine, but the refractive index has been raised from 1.473 to 1.493 and the resistance to fungus increased. Requirements 13 and five are satisfied, except that the cementing temperature is less than 250° F without having cold flow at 160° F. The cement meets all other requirements, as does cellulose caprate; in addition, it has less colour and fewer foreign particles, can be made in large quantities, and imparts less strain to the cemented elements during cooling and setting.

It is hoped that the improved cellulose

caprate cement will be used in place of Canada balsam in surface-borne optical instruments and for co-indent prism assembly.

### Emulsion Stability

A FREQUENTLY overlooked factor contributing to emulsion instability is the presence of polyvalent metallic ions such as calcium, magnesium, iron and copper. Emulsions made with anionic emulsifying agents are particularly susceptible to the presence of metallic ions as also are cationic quaternary compounds.

Even the softest waters contain a certain amount of metallic ion in solution. Distilled water can be used for some applications but this is obviously expensive and in many cases impracticable.

Ethylenediamine tetraacetic acid and its sodium salts will act as chelating and sequestering agents, effectively removing metallic ions from solution.

Among other manufacturers of EDTA are Glyco Products Co. Inc., Empire State Building, New York 1, New York, who market their product under the trade name 'Tetrine'. They claim that this product will not react with soaps to form precipitates or curds or with quaternaries to destroy or lessen their efficiency. Chelating agents of this type make the use of distilled water unnecessary, they say.

### Australian Sulphuric Acid

DURING the first three months of 1955 the Australian sulphuric acid industry produced a total of 217,475 tons. Of this 158,056 tons were produced by the chamber process and 59,419 tons by the contact process. The sources used were as follows (units being long tons and the acid being 100 per cent):—

from brimstone ...	146,621
from pyrite ...	43,476
from zinc concentrates ...	24,555
from spent oxide ...	2,823

#### Raw materials used:—

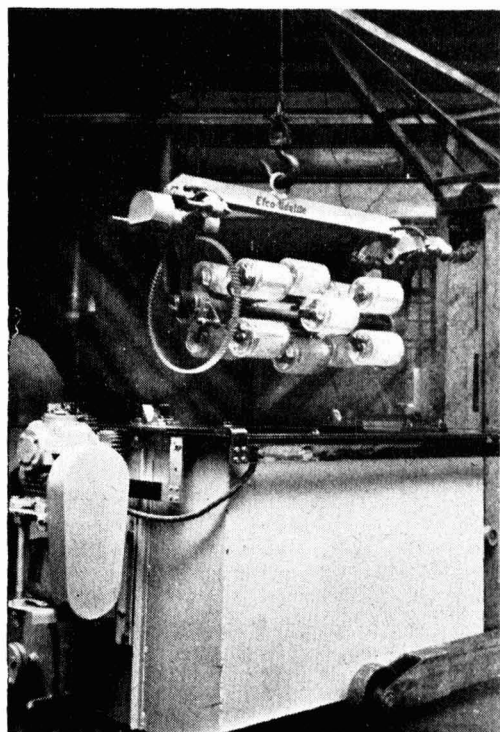
brimstone ...	46,679
pyrite ...	35,324
zinc concentrate ...	29,743
spent oxide ...	3,148

## Plating by Cluster Barrel

### Developed for Simultaneous Processes

**I**N the manufacture of small metal component parts such as rivets, screws, etc., the plating industry and engineering works have often felt the need of some form of fully immersed plating barrel suitable for a variety of processes in which small batches of different types of articles can be plated at the same time. To meet this need the Electro Chemical Engineering Co. Ltd. have developed the Efco-Udylite Perspex cluster barrels.

A cluster barrel—as the new device is termed—consists of twelve containers fitted on to a central shaft by insulated spring clamps. The main shaft and spring clamp carry the current to the containers by cable to two horns on the main structure. The cluster barrels are made in Perspex with stainless steel cathode contact plates and bayonet type lugs. All lids are interchangeable as are the barrel assemblies, so that additional containers can be used to avoid delay during loading and unloading.



*Efco-Udylite Cluster Barrel*

The Perspex construction is unique in that the barrels can be taken through hot alkali cleaner, water rinse, acid dip and acid or alkali plating processes without any intermediate transfer of work being necessary. The external dimensions of the containers are 5 in. in diameter and  $7\frac{1}{8}$  in. long and each will hold approximately  $4\frac{1}{2}$  lb. of 2 BA nuts.

The current drawn on various solutions varies according to conditions. In a recent test with 50 lb. in 10 barrels the current drawn was 380-410 amps at 15 volts for bright nickel. An idler pinion between the existing drive pinion and the Perspex ring gear enables the barrel at all times to be fully immersed in the plating solution.

## I.C.I. at Copenhagen

### Exhibit at British Trade Fair

**T**EN of I.C.I.'s 12 manufacturing divisions are exhibiting at the British Trade Fair which will be held in Copenhagen from 29 September to 16 October.

The display of the Alkali Division will illustrate the Alfloc water treatment service. Included in this is Alfloc sodium aluminate—a coagulant for use in (a) clarification and filtration of water supplies, (b) paper sizing, particularly for high pH papers. Alfloc briquettes—balanced chemical mixtures for the treatment of boiler feed water to prevent scale, corrosion and carry-over are also shown.

The Billingham Division display will feature a wide variety of chemicals including solvents, resin forming materials, plasticiser intermediates, antioxidants, fungicides and bactericides, moisture control agents, fire proofing materials and a range of alkylamines.

The new Alcian dyestuffs, which will be shown as part of the Dyestuffs Division's display, are a development from Monastral Fast Blue, which was discovered by I.C.I.

Metal degreasing by trichloroethylene will be shown by the display of the General Chemicals Division. The use of Arcton products for refrigeration will also be shown.

Alkathene tube and end products, nylon and Diakon thermoplastic moulding powders and Mouldrite thermosetting powders will be exhibited by the Plastics Division. Articles made from Perspex acrylic sheet will also be shown. The finished products are of Danish and British manufacture.



# De-Salting Saline Waters

## A Survey of Methods Available

**A**MONG the problems presented by rising living standards and industrial expansion is that of providing adequate supplies of fresh water to meet the world's ever-growing needs. In desert areas such as North Africa there are highly saline ground waters, which cannot be used for vegetable culture and must be distilled at great expense for household use. Supplies of freshened water are needed in areas along the Red Sea; in parts of Italy, Spain, Portugal and the Near East; in Eastern Pakistan, Australia, many parts of Latin America, and in most arid small islands such as the Canary Islands or Mallorca.

The growing shortage of fresh water is by no means confined to arid regions. In the United States the outlook is viewed with such concern that Congress authorised the expenditure of up to \$10,000,000 over 13 years on the development of practicable low-cost means of producing from sea water, or from other saline waters, water of a quality suitable for agricultural, industrial and municipal use.

An initial appropriation of \$125,000 was made in the fiscal year 1953 to start the programme and appropriations of \$400,000 were authorised for each of the years 1954 and 1955. Almost every aspect of demineralisation is being investigated, mainly by development contracts, and reports are made to the Secretary of the Interior. So far a bibliography and three annual reports have been produced.

### Infiltration in UK

Even in Great Britain, in spite of its rainfall, authorities in some areas find themselves short of supplies and have to seek them elsewhere. For instance, sea water is infiltrating into fresh water wells in the Thames Estuary and it is becoming more and more difficult to suggest other sources that do not involve expensive long-distance pumping. In Holland the underground water level is falling and the water is becoming brackish.

Talks on the possibilities of various methods of de-salting brackish water have been going on for some time under the auspices of OEEC and have led to proposals

for international co-operation in research. Two schemes have so far been put into operation and others are under consideration. In addition, much research is being undertaken in individual OEEC countries under government auspices and by commercial firms.

Various processes for de-salting saline waters are under investigation, among the most promising being electrodialysis, ion exchange, vapour compression distillation, solar distillation, critical pressures devices, osmotic processes, solvent extraction separation by freezing, and the use of ultrasonics.

### Electrodialysis Developments

The principle of electrodialysis has been known for many years, but commercial exploitation awaited suitable membrane and engineering techniques, which have only recently been developed. The method depends briefly on the fact that certain plastic membranes pass only cations and others only anions. When salts are dissolved in water they break up into equal quantities of cations and anions, which move in opposite directions in an electrical field.

In vapour compression distillation, salt water is evaporated at atmospheric pressure and the vapour is compressed to raise the pressure of the steam to about 3 lb. per sq. in. and the temperature correspondingly to about 222° F. The compressed steam is returned to the heating side of the evaporator tubes to heat more of the brine from which the original vapour was formed. Since the brine in the evaporator boils at 213° F a temperature differential of about 9° F exists between the compressed steam and the boiling brine, and this permits a transfer back to the brine. Nearly all the latent heat of the compressed steam is used in maintaining evaporation of the brine solution, and condensation of the compressed steam occurs directly in the steam chest forming the distillate product. Thus no separate condenser or cooling water is required. This process has been intensively developed since about 1940. At present one lb. of fuel oil will evaporate nearly 250 lb. of water in a clean vapour compression unit.



The beneficial effects of turbulence or agitation upon heat transfer have been recognised for many years. Early experience with a new type of evaporator developed by Dr. Hickman in the United States, indicated that when an extreme degree of agitation was provided, the rate of heat transfer exceeded previously measured quantities by a large amount. An experimental unit operated for 315 hours on Boston harbour water. In this equipment sea water was allowed to flow by pressure differential through a screen type filter, an electrical resistance heater and a flow meter into a preliminary degassing chamber above the still, where most of the dissolved air was removed. The non-condensable gases, together with a little steam, were removed from the degasser to the still by gravity and the residue and distillate were removed from the still by a duplex diaphragm pump.

#### Operating Data

The operating data indicated overall heat transfer coefficients in the range of 3,000-3,500 B.Th.U./hr./sq. ft./° F. When the machine was opened at the conclusion of the run substantially no mineral scale was present. The chloride content of the distillate was checked periodically and was consistently found to be less than 3 ppm. It has been reported that the preliminary results indicate the possibility of producing fresh water from sea water at about one-quarter the cost of distillation by the most economical process at present in operation.

The extraction of fresh water from brackish water or sea water by the use of solar energy is attractive because no fuel and little mechanical power are required. On the other hand, a solar still covers a relatively large area and investment costs are high.

The only device which in the past has produced really practical results uses the 'glass house effect'. A recent report by the Government General of Algeria, Hydraulics and Land Settlement Service (1), describes an industrial installation of a type which has been in service in Chile since 1872, producing up to 22 cubic metres of drinking water per day with a working area of 4,400 square metres. The device consists essentially of a flat reservoir containing brackish water, hermetically sealed by a transparent cover which is usually glass. The short wave-length radiant energy which

crosses the transparent top is largely absorbed by the water and the blackened base. These give out longer wave-length radiation (infra-red), which cannot cross the transparent top and is thus taken up, raising the temperature of the water and the steam saturating the interior of the still.

The glass cover acts as a cold surface on which the water condenses. The condensed water glides the entire length of the inclined transparent covers to a collecting channel. This device has been systematically studied and high yields per unit area have been obtained.

It is hoped that up to 10 litres per day per square metre may be obtained from a tilted type of solar still now being studied at New York University, which is claimed to be simpler and cheaper to construct. The possibility of reducing investment costs by using inexpensive transparent and durable plastics in place of glass and framing is also being explored.

An American worker has concluded that if efficient, durable equipment could be developed and could be manufactured by mass production techniques, it is reasonable to expect that solar distilled water could be produced in some localities for less than \$1.00 per 1,000 gallons.

At atmospheric pressure it requires 970 B.Th.U. to convert a lb. of water into steam. On the other hand, very little energy is needed to convert this amount of water to steam when the water is in its critical state. For pure water the critical values are in the region of 3,200 lb./sq. in. and 705° F. Below the critical point pure water exists in two phases, namely, liquid and vapour. Above the critical point only one phase can be distinguished.

#### Vaporisation Problems

The advantage of extracting fresh water from sea water in the 'supercritical state' lies in the possibility that the conversion could be accomplished under conditions where the latent heat of vaporisation is very small. With efficient heat exchange the net energy requirements for the process might not be very great. The problems to be solved at these high pressures and temperatures are corrosion, scale formation, and the behaviour of saline water which is different from that of pure water.

The development of membranes and procedures for demineralisation of saline water

by reverse-osmosis methods is being undertaken for the US Saline Water Conversion Programme under several contracts. It has been found that purification by this method is possible, but the flow rates so far obtained are low and further research and development are necessary before costs can be reliably estimated. The best membrane so far discovered is cellulose acetate, which removed about 90 per cent of the salt from sea water in one pass. The highest reduction so far achieved is 99.5 per cent.

Exploratory research has also been conducted on the applicability of a solvent process to the demineralisation of sea water. Based on laboratory data, it is concluded that solvent extraction is theoretically feasible. A method which has been selected for study involves liquid-liquid extraction with phase separation at atmospheric pressure and between temperatures of 30° and 80° C. Many solvents show a large change in solubility for water at different temperatures within this range.

The first stage in the process involves extraction of the saline water with an organic solvent. This could be carried out efficiently with a continuous counter-current extractor consisting of a tall column having a means of mixing the two liquid phases as they passed through it. The products leaving the column would be an aqueous phase of concentrated brine and a solvent phase containing a large percentage of water.

#### Recovery from Solvent Phase

The second step is to recover pure water from the solvent phase. If the temperature of the extract were changed to one at which the water had a lower solubility in the solvent, the extract would separate into a water phase and a solvent phase. The water phase would be separated as product water and the solvent phase recycled to the extraction column. To carry out the water separation step the extract would be passed through a heat exchanger to change its temperature and then to a phase separation tank, where the layers would separate by gravity and be withdrawn. Both the product water and the concentrated brine would probably contain small amounts of solvent, which could be removed by extraction with an insoluble solvent or by passing the streams over activated carbon.

Methods of freezing water into an ice-water slush, ice sheets and fine crystals have

also been proposed. In the United States the cost has been estimated at \$400 per acre-foot. Natural freezing might possibly be used in some localities and would reduce this figure considerably. Since the latent heat of water in crystallisation is about one-seventh that in vaporisation, separation by freezing would appear to be economical in energy requirements. It is found in practice, however, that recovery is beset by difficulties.

#### OEEC Report

At the University of Florida exploratory research is being conducted into the use of ultrasonics for demineralisation of saline waters. It has been demonstrated that fluids containing insoluble impurities can be separated by the use of ultrasonic vibrations and that various degrees of separation of concentration exist in columns of solutions when these columns are subjected to suitable vibrations. Though the method may prove too costly or impracticable, it is regarded as meriting exploratory investigation.

A group of experts on the problem of desalting of brackish water drew up a technical report for presentation to the OEEC working party set up in 1952. Waters of 1,000, 5,000 and 20,000 parts per 1,000,000 of chloride were considered. After studying the experts' report on the various processes, the working party was able to recommend some four methods for co-operative development by countries of the OEEC, the selection being based on both technical and economic considerations and also on the practicability of organising projects for research.

Electrodialysis was regarded as particularly promising. The General Technical Department of TNO (The Netherlands' equivalent of DSIR) has been engaged for some years on development work, which is well advanced. From the results obtained it appeared possible to obtain de-salted water at a total cost of approximately 50s. per 100 cu. m., this figure being based on a reduction of salt content from 1,000 mg. Cl per litre to 300 mg. Cl per litre, with the use of a current density of 2.5 ma/sq. cm. This is equivalent to an energy consumption of approximately 0.5 kWh/cu. m. For the desalting of sea water to 300 mg. Cl per litre an energy consumption of 7 kWh/cu. m. was regarded as probable. A considerable part of these total costs arises from the periodical substitution of the membranes, which depends on their durability (2).

The Dutch recently offered to carry out development work on electrodialysis in co-operation with other countries showing an interest. Great Britain has joined the Netherlands, South Africa, Australia and Algeria (representing France) in paying for this work. The problems to be solved are mainly those of bringing up the process from small to large pilot scale. All the co-operating countries will share in the new knowledge and in any patents that may be taken out in the future. Results which the previous Dutch work produced will also be shared between them. Manufacturing rights in any large scale process will be available to British industry on reasonable terms.

### Scale & Foam Prevention

In Britain an Admiralty team has been working on scale and foam prevention in methods of distillation. Various methods are available for preventing scale, such as the control of pH by ferric chloride, additions to the feed water, the use of sequestering or chelating agents, and internal or external stabilisation beds. A product developed by a British firm has proved very successful for foam prevention. Outstanding results have been achieved in the Navy, but the Admiralty has been working exclusively with sea water. DSIR has given £5,000 to pay for an extension of the research programme to cover other waters. A Dutch scientist is joining the Admiralty team.

Still in the exploratory stage are two other processes which the French have put forward as possibilities for co-operative research. These are certain aspects of ion-exchange and of solar distillation, which may be suitable for use in very hot, dry areas.

### Algerian Research

For the salt removed by ion-exchange a corresponding amount of regenerating chemical must be supplied. Demineralisation by ion-exchange thus becomes less economical as the saline concentration increases. Most of the research would be carried out through the Materials Laboratory of the Service de la Colonisation et de l'Hydraulique of the Government of Algeria.

Last year workers in Europe and North America were visited by Mr. Davis S. Jenkins, Director of the US Saline Water Conversion Programme, Professor Everett D. Howe, of the University of California, and Dr. George W. Murphy, of the State Uni-

versity of New York. They concluded that much remains to be done before low-cost water in large quantities becomes a reality and that research and development under the US programme should be co-ordinated more frequently on a technical basis with work in other countries (3).

### REFERENCES

- (1) Demineralisation of Brackish Waters by Solar Distillation, Research Carried out by the Hydraulics and Land Settlement Service (SCH), April 1955.
- (2) Wiechers, S. G. & van Hoek, C., *Research*, 1953, 6, 192.
- (3) Third Annual Report of the Secretary of the Interior on Saline Water Conversion, January 1955.

## Nitroparaffins

### First Large-Scale Production

**W**HAT is believed to be the world's first large-scale plant for the production of nitroparaffins has been constructed at Sterlington, La, US.

The present unit is only the first stage of a long range project by the Commercial Solvents Corporation. The four nitroparaffins which will be produced are: nitromethane, nitroethane, 1-nitropropane and 2-nitropropane. From these CSC laboratories have already produced more than 2,000 derivatives, among which are 2-amino-2-methyl-1-propanol, tris (hydroxymethyl) amino-methane, hydroxylammonium acid sulphate, and the Alkaterges.

Nitroparaffins are produced by the vapour phase nitration of propane gas at high temperatures. The heart of the process is the nitrator and the multiple-acid-spray-type nitrator, an original design by CSC engineers, proved to have important advantages over other designs.

Control of the whole plant is centralised, using some of the latest developments in instrumentation. The control panel contains over 100 miniature recorders and controllers, and is supplemented by a console type multi-point temperature installation and a data reduction system. This latter notes any deviation from the normal and records it, at the same time giving an alarm signal.

Sterlington was a logical choice for the plant as CSC are already producing nitric acid on this site. Other favourable factors are: good supplies of water, power and gas, good transportation and adequate labour supply.

Actual construction was by Ford, Bacon and Davis to designs by CSC engineers.

## Safety Instruments & Clothing

*On Show at the Industrial Health & Safety Centre*

A SECTION of the Industrial Health & Safety Centre, Horseferry Road, London S.W.1, is devoted to instruments used to indicate the comfort, health or safety of conditions in places of work.

Comfort depends to a very large extent on ventilation, using the term in its widest sense to indicate the rate of air movement. Other important factors are air temperature, humidity, the effect of radiant heat, and the toxicity of the atmosphere.

Various forms of hygrometer are shown. They all work on the same principle of indicating wet and dry bulb temperatures; the relative humidity can then be found (as a percentage) from a previously prepared table. The exhibits also include several types of katathermometers. These instruments measure the cooling power of the environment and can be used as anemometers for measuring air velocities by determining indirectly the speed at which air flows past the bulb.

Another type of instrument on view is an Owen's jet dust counter, manufactured by C. F. Casella & Co. Ltd., which is an apparatus for collecting dust suspended in an atmosphere, so that the particles can be examined and counted under a microscope. A sample of the air to be tested is drawn by a pump with a capacity of 50 cc. through a cylinder lined with damp blotting paper to a slot through which it passes, impinging at a high velocity on a microscope cover-glass to which the solid particles adhere. From the data so obtained the number of particles in a given volume of air is calculated.

### Poisonous Atmospheres

It is sometimes necessary to enter and work in confined spaces where there may be a poisonous atmosphere. More than 200 cases of gassing, including about 20 fatal ones, are reported every year. It is therefore very desirable that before any work is done in stills, tanks, etc., the atmosphere should be tested before entry is permitted. Instruments shown at the Centre indicate when the natural ventilation has been effective in producing safe conditions; equally important, they enable periodical checks to be made to ensure that the atmosphere remains safe.



***Thermofoil heat reflecting clothing gives high degree of protection against radiant heat***

The Poole Explosimeter is designed for immediate testing of inflammable atmospheres. For testing in enclosed spaces, the instrument is taken near the entrance of the enclosed space and a long sampling tube is introduced. Operation of an aspirator bulb draws some of the vapour into the instrument where it flows past an electrically heated filament. There are two of these filaments in the set, each of which forms part of a Wheatstone bridge circuit. The combustion of the inflammable vapour around one of the filaments causes the bridge to go out of balance. The amount of out-of-balance is shown on a central dial, which is calibrated to measure the percentages of the lower explosive limit of the atmosphere inside the enclosed chamber or tank.

Another type of explosimeter on view is manufactured by the Mine Safety Appliances Co. for testing the concentration of inflammable gases and vapours in the atmosphere.

The McLuckie gas detector, manufactured by J. H. Naylor Ltd., is used for measuring the percentages of inflammable gases present in the atmosphere.

## Industrial Safety

A lamp by J. Towers Ltd. indicates the presence of low concentrations of halogen vapours by the coloration of a flame burning on a copper element.

Many tests for toxic gases in the atmosphere depend upon the change in colour of chemical indicators. The degree of coloration indicates the concentration. The Lovibond comparator, manufactured by Tintometer Ltd., is designed to interpret the colours obtained in such tests.

### Carbon Monoxide

A simple and rapid means of detecting and estimating traces of carbon monoxide is afforded by an apparatus manufactured by Combustion Instruments. The method uses a 'CO-test' tube containing silica gel impregnated with a palladium compound, which turns to a dark brown when traces of CO come into contact with it. The column can be calibrated to indicate concentrations by the length of the stain.

There are also examples of gas leak indicators made by Short & Mason Ltd. The action of these instruments is based on the physical law relating to the diffusion of gases. A small chamber covered by a porous plate is connected to a pressure gauge. If the plate is exposed to an atmosphere containing a gas of lower density than air, an increased pressure is set up in the chamber because the lighter gas passes through the porous plate more rapidly than the air inside diffuses outwards. Conversely, the pressure in the chamber is reduced by exposure to a gas heavier than air. The differences of pressures are registered on the gauge.

This instrument can be used for detecting the presence of any gas such as coal gas, marsh gas, hydrogen, carbon dioxide, the density of which differs considerably from that of the air. When used for detecting coal gas, it requires to be specially calibrated against known mixtures of the gas with air.

Of particular interest, having regard to the growing use of radioactive isotopes in both production and research, is a display of equipment for detecting the presence of radioactive contamination on skin, clothing, benches, floors, and in the atmosphere.

A portable dose rate meter (Ministry of Supply Type 1043) is used for measurement of X or Gamma radiation intensity. A thin window at the front may be uncovered to admit Beta radiation for qualitative estimation. This instrument is battery operated. It consists of an ionisation chamber, which delivers a current proportional to the radiation intensity, and an electrometer valve circuit 25  $\mu$ A indicating meter.

Instruments are required which can be worn by individuals to indicate the total dose received either from a specified operation or to test for normal working over a period of a few days, so that a check can be made to ensure that the individual does not exceed the tolerance dose. A quartz fibre dosimeter of the 'fountain pen' type has been selected as an example of this type of personal monitor. It consists of an ionisation chamber with a quartz fibre movement and an optical system and graticule for magnifying and viewing the small movements of the fibre. These movements are proportional to the dose received. By choosing the size of ionisation chamber, fibre diameter, and length and capacity of the unit, the range can be varied to suit requirements.

### Radioactive Materials

To measure atmospheric contamination by radioactive materials, air is drawn through a filter paper by a modified domestic vacuum cleaner. The air flow is measured by means of an anemometer mounted on the body of the instrument. When the required volume has been sampled the filter paper is removed and the radioactivity of any material collected is measured by means of a Geiger counter or other suitable apparatus.

If hospitals could have a correct history and diagnosis of cases of gassing sent from chemical works, appropriate treatment could be started without delay. A system has therefore been devised whereby casualties have suitable labels or cards sent with them to hospital, setting out details of the first-aid treatment they have received and suggesting further treatment that might be appropriate. This system was devised by the Association of British Chemical Manufacturers and is described in the Association's publication, 'A System of Labels for Gassing Casualties'.

Among other exhibits is an 'Eve Riley' resuscitating apparatus made by Siebe, Gorman & Co. Ltd. Its object is to promote



respiration by mechanical means, the main feature being that when the head of the patient is downwards, the weight of the abdominal organs prises up the diaphragm, dispelling air from the lungs. The rate of tilting can be controlled by a mercury gauge.

A comprehensive selection of respirators is displayed. On the one hand it is shown how a silk stocking provides economical protection against skin irritant dusts such as pitch or lime. At the other extreme is a self-contained breathing apparatus by Siebe, Gorman & Co. Between these two extremes are breathing apparatuses approved under the Chemical Works Regulations for low concentrations of certain gases, manufactured by J. E. Baxter & Co. Ltd.; a canister type respirator by Siebe, Gorman & Co., and a range of short distance breathing apparatuses by Siebe, Gorman & Co. and Safety Products Ltd.

It is explained that the efficiency of a respirator depends on the following factors.

(1) Construction: (a) a medium which combines high filtering properties with low resistance to breathing; and (b) accuracy of fit—the edges should fit closely to the face.

(2) Maintenance: (a) Removal of the medium as soon as resistance to breath is noticeable; (b) periodical cleaning and disinfecting of the face piece. The sponge type of medium can be washed and re-used.

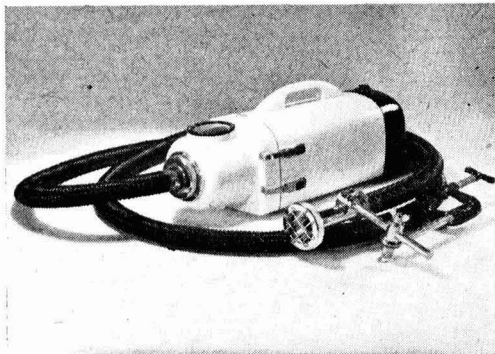
To guard against the risk of communicable disease, each worker should have his own respirator and exchange should not be permitted.

The wide range of protective clothing now available is illustrated by an imposing array of models, each differently clad. One is wearing a combined apron and bib of a PVC fabric, which is highly resistant to acid and grease, retaining this property even



***An essential feature of a mask is stability no matter what position operator is in***

## ***Industrial Safety***



***An instrument for measuring atmospheric contamination by radioactive materials***

when splashed with oil up to a temperature of 50° C. The same fabric is used for the accompanying gaiter, spats and detachable sleeves, the latter being provided with elastic at each end for fastening. This outfit was made by Wallach Bros. Ltd.

Another PVC suit, by Plysu Products Ltd., comprises jacket, trousers and hood with a visor which affords maximum protection, especially against corrosive liquids and sprays. All seams are welded and there are no eyelets.

A Terylene overall manufactured by Wear-Well Overalls Ltd. is acid-resisting and hard wearing. Its close weave gives high resistance to dust and dirt penetration. The material is easily laundered and does not shrink or stretch.

Acid-resistant clothing made by George Angus & Co. Ltd. is also shown. It comprises a bib-type rubber apron of medium weight for use in a variety of occupations where there is a risk of acid splashing. The overall trousers are made of PVC covered fabric and are provided with supporting straps.

Also of interest to chemical workers is a two-piece overall and hood, made by the RFD Co. Ltd., which is suitable for work with oils and greases, acids, and other types of chemicals. This outfit is very light, the total weight being only 2 lb. 3 oz. A loose-fitting jacket allows circulation of air.

Many types of industrial safety gloves and gauntlets are also on view. Gloves manufactured for hand protection in industry do



## Industrial Safety

not always meet the requirements of particular processes. Alterations and improvements can, however, be effected by the makers or by the users themselves. A special display is devoted to gloves which, while suitable for most processes, have been improved for use in more arduous work.

## Occupational Diseases

### Beney Report Published

THE present system of prescribing specific occupational diseases against which employees are insured for cash benefits under the Industrial Injuries Insurance Scheme should not be changed, say the Committee under the chairmanship of Mr. F. W. Beney, Q.C., in their Report (Cmd. 9548, obtainable from HM Stationery Office or through any bookseller, price 1s. 3d.).

The committee was appointed by the Minister of Pensions and National Insurance, Mr. Osbert Peake, in May 1953 to review the diseases provisions of the Industrial Injuries Act. The Report is being considered by the Minister.

At present a disease may be prescribed by the Minister if he is satisfied that it ought to be treated as a risk of an occupation and not as a risk common to everyone, and that the attribution of particular cases to the nature of the employment will normally be possible with reasonable certainty. The Committee conclude that it would not be practicable to extend insurance cover to everyone who could show he was suffering from a disease which was probably of occupational origin, because in the present state of medical knowledge many of the claims could not be decided on any reasoned basis.

The Committee assert their conviction that the assiduous pursuit of research into occupational health hazards is essential to the effective working of the system of prescription, and they emphasise the importance of using statistical techniques for this purpose. They recommend that the Industrial Injuries Advisory Council be made responsible for keeping under constant review the schedule of prescribed diseases, and for suggesting to the Minister diseases which might be prescribed and research or investigations bearing on prescription which might usefully be

carried out; and that to enable the Council to discharge these responsibilities effectively a small body of highly qualified specialist staff should be put at their disposal.

Three members of the Committee, Mr. C. R. Dale, Sir William Lawther and Sir Alfred Roberts, have signed a minority report. They do not accept the conclusions reached by the majority on the impracticability of making more comprehensive cover available against diseases under the Industrial Injuries scheme. But they express full agreement with the majority conclusions about occupational health research.

## Du Pont Safety Record

LAST year in the US 57 Du Pont employees suffered disabling injuries while on the job. This amounts to 0.33 injuries per million man hours, as against the Manufacturing Chemists Association's safety programme figure of 3.27. This is an improvement over Du Pont's 1953 figures and is the lowest value yet recorded.

It is frequently said that the new worker is an unsafe worker, but this is not necessarily so says J. Sharp Queener, Du Pont's safety director. As an example he cites the case of the Seaford, Del., nylon plant which started operations in 1939 and worked until 1945 without an injury. Mr. Queener also disposes of the argument that it is difficult for a small group to have a good safety record. Du Pont is a big company with many little plants, all of which have good records.

When asked how much safety costs the company Mr. Queener replied that he did not know. 'I suppose individual plants have figures on direct costs such as for safety equipment; compensation figures are available, as are other figures. But we have no total. Management has become so sold on the benefits of a safety programme that it has never asked for a total.'

The number of people killed in UK industrial accidents in July was 105, of whom five were employed in the chemical industry and one in metal extracting and refining. No deaths were reported from industrial diseases during July. There were six cases of lead poisoning, 10 of skin cancer, and 23 of chrome ulceration. No cases of aniline poisoning were reported.

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# HOME

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## Foster Wheeler Ltd. Get Iraq Contract

Foster Wheeler Ltd., the British subsidiary of Foster Wheeler Corp. of the US, has received an order from the Iraq Government to build a lubricating oil refinery in Baghdad at a cost of \$10,000,000.

## Spectrometric Solvents

A questionnaire is being distributed by the Photoelectric Spectrometry Group with the purpose of finding out the demand for solvents for spectroscopic purposes, with particular attention to the purity required at specified minimum wave-lengths and the quantities used. Copies can be obtained from the assistant honorary secretary, K. A. Macdonald, 56 Arbury Road, Cambridge.

## Industrial Disputes

The number of working days lost as the result of industrial disputes in the chemical industry during the period January to June 1955 was 5,000 as against less than 500 for the corresponding period last year.

## Increasing Gas Sales

Gas sales in the year ended 31 March, 1955, were  $4\frac{1}{2}$  per cent higher than in the previous year. The increase was especially marked in industrial sales which rose by 9 per cent. Domestic sales were 2 per cent higher, with commercial and other sales rising to over 6 per cent. Indications for the April/June quarter show a further increase of about 4 per cent over the corresponding period last year.

## Second Welding Meeting

The second meeting in the series, Increasing Productivity by the use of Welding, which the British Welding Research Association is arranging in various centres throughout the country (see THE CHEMICAL AGE, 1955, 73, 386), will be held in the Demonstration Theatre, Electricity House, Bristol, on 4 and 5 October.

## Society for Analytical Chemistry Meeting

An ordinary meeting of the Midlands section of the Society for Analytical Chemistry will be held at 7 p.m. on Tuesday, 13 September, at the University, Edgbaston, Birmingham 15. The following papers will be presented and discussed: 'The Use of the Mass Spectrometer in Analysis' by Dr. J. C. Robb, and 'Micro-wave Spectroscopy' by Dr. J. Sheridan.

## The Fifth Emsley Lecture

The fifth of the Emsley lectures, a series inaugurated by the Textile Institute to commemorate the memory of John Emsley, J.P., first fellow of the Institute and president from 1922 to 1926, will be given by Mr. J. R. Whinfield, C.B.E., M.A., F.R.I.C., F.T.I.(Hon.), of I.C.I. Ltd., Terylene Council, Harrogate, at the Institute headquarters on Friday, 14 October. The lecture will be 'Textiles and the Inventive Spirit'.

## Employment Figures

At the end of June a total of 513,200 people were employed in the chemical and allied industries, says the August edition of the *Ministry of Labour Gazette*. This is an increase of 13,200 over the figure for June last year. During the four weeks ending 29 June, 4,971 vacancies in the chemical industry were filled through labour exchanges, leaving 8,514 vacancies still unfilled.

## Glass-Blowing Course

A course in glass-blowing will be held at Loughborough College of Further Education, beginning on 5 September. It has been arranged chiefly for science teachers, so that they can make and repair their own apparatus and save time and money. The course will consist of one lesson a week for a year.

## Thyodene Price Increase

Rising production costs have forced Purkis, Williams Ltd., of London, to increase the price of Thyodene Indicator from 7s. 6d. per 100 gm. bottle to 9s. per bottle (post free). This is the first price increase since Thyodene was introduced in 1952.

## To Share Same Name

Two members firms of the British Oxygen group, the Quasi-Arc Co., of Bilston, Staffs, and Fusarc Ltd., of Gateshead, Durham, will trade under the name of Quasi-Arc Ltd. from 1 October.

## New Address

Toplis, Simpson and Company, instrument manufacturers, formerly of Harrow, Middlesex, have moved to Maple Cross Industrial Estate, Denham Way, Rickmansworth, Herts. The telephone number is Rickmansworth 5369 and the telegraphic address MOYmeter, Rickmansworth.

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# OVERSEAS

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## Balm Proprietary

Balm Proprietary, the company in which I.C.I. (Australia & New Zealand) has a controlling interest, will spend £A1,500,000 on new plant at Clayton, Victoria.

## First Canadian Methyl Isobutyl Ketone

The Canadian Chemical Co. is now producing methyl isobutyl ketone at its Edmonton, Alberta, petro-chemical plant for the first time in Canada.

## Union Carbide Form Nuclear Division

Union Carbide & Carbon Corp. has formed a new division, Union Carbide Nuclear Co., to integrate the corporation's activities in the field of atomic energy. Its objects will be to carry out research and development in the industrial applications of atomic energy.

## Reformer Contract

A contract to build a catalytic reformer for producing high octane gasoline at Sarnia, Ontario, has been awarded to the Fluor Corp. by Imperial Oil. The unit will have a daily capacity of 13,500 barrels when completed.

## Shell-Canadian Eagle Venture

Shell and Canadian Eagle Oil will jointly finance a new refinery to be built at Havana, Cuba. Scheduled to be in operation by November next year, the plant will bring the total investment in Cuba of the Shell and the Canadian Eagle groups to \$20,000,000.

## Seeks Bids to Build Helium Plant

Acting Secretary of the US Interior, Mr. Clarence A. Davis, has announced that the Bureau of Mines will call for bids for constructing a \$6,000,000 helium plant at Exell, Tex., to increase output of this lightweight, non-flammable gas by approximately 50 per cent.

## Chilean Nitrate

Sales of nitrate in Chile during 1953-54 totalled 1,477,500 tons, an increase of 1 per cent. The industry's profits are reported to be US\$13,389,627, of which the Chilean Government received US\$3,347,407. A pending government agreement with nitrate producers is expected to permit producers to compete more favourably with the synthetic product and to allow them more capital investment for improvement and expansion.

## Australian Paint Factory

A £1,500,000 paint factory capable of producing 700,000 gallons of alkyd and other synthetic resins and 1,100,000 gallons of varnishes a year was recently opened at Sunshine, near Melbourne.

## Processing Methane Gas

An Italian company has acquired land in the Ravenna district to build a factory for processing methane gas into synthetic rubber and fertilisers. When completed in about three years it is estimated that the factory will use 400,000,000 cubic metres of methane gas to produce 3,000 tons of synthetic rubber and 35,000 tons of fertilisers a year.

## Phosphate Mine Damaged

The phosphate mines operated in Morocco by the Office Cherifien des Phosphates in which the Moroccan State holds all shares were damaged in the recent disorders. French reports say that surface installations over 100 acres were swept by fire. Production which was at the rate of 15,000 tons daily has ceased.

## Potash Plan Abandoned

The Norsk Hydro and the Dutch Mekog factories announce that they have abandoned their joint plan to build a factory in Norway to produce potash from sea water.

## Imperial Oil Form Chemical Section

Imperial Oil Ltd., of Canada, has announced the formation of a chemical products department to handle the manufacture and sales of petro-chemicals. The department will consist of a sales division and a technical division.

## Timber Treatment

A new company, Natal Creosoting (Pty.) Ltd., Pietermaritzburg, is to creosote timber felled over a wide area of Natal and Zululand, using pentachlorophenol and zinc naphthenate for this purpose. The new plant is up to date and American methods of treatment are used.

## Copper Sulphate in the US

The Bureau of Mines reports that production of copper sulphate in the US in June decreased by 6 per cent from May, during which month exports at 2,399 tons were the lowest since December, 1954.

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## • PERSONAL •

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DR. GEORGE PORTER has been appointed to the newly established chair of physical chemistry in the University of Sheffield. Dr. Porter, who studied at Leeds and Cambridge, has made many contributions to the field of flash photolysis and kinetic spectroscopy. He was appointed demonstrator in physical chemistry at Cambridge in 1949 and assistant director of research in 1953. In 1954 he joined the British Rayon Research Association as assistant director and was associated with the opening of the new laboratories on 11 May (see *THE CHEMICAL AGE*, 1955, 72, 1137).

MR. WALTER GRAINGER, M.INST.F., and MR. JOHN MAYER, B.Sc., A.M.I.MECH.E., have been appointed joint managing directors of International Combustion (Holdings) Ltd., as from Monday, August 22. Both have been with International Combustion Ltd. for over 30 years.

MR. A. E. S. GOURLAY has been appointed technical sales representative in Scotland for the Sheepbridge Group of companies. Mr. Gourlay has been a director and the general manager of Clews Petersen, one of the Sheepbridge companies, for the past 16 years.

MR. D. W. MANSELL, the vice-president of Brush Aboe Inc., New York, is to take over the sales managership of National Gas & Oil Engine Co. He will also become a director of National Oil Engines (Export). He takes up both appointments this month.

MR. KENNETH G. HOLDEN has joined the board of Geigy Holdings.

Londen Aluminium Co. has two new directors. They are MR. SAMUEL R. HOGG and MAJOR CECIL R. DIBBEN.

MR. R. H. GREENLY, a director of Thos. Hedley & Co., has been appointed managing director of Procter & Gamble de Venezuela, an associate company. The appointment takes effect from 1 January next year. Mr. Greenly joined Thos. Hedley in 1934.

MR. JOHN P. HOLMES, vice-president of Celanese Corp. of America, has been elected to the board of directors. Mr. Holmes joined the company's yarn sales staff in Charlotte, N.C., in 1927. He was made a vice-president in 1948 and has recently been in charge of

merchandising activities of the textile division.

MR. KENNETH RUSH, a vice-president of Union Carbide & Carbon Corp., has been appointed president of the corporation's new atomic energy division, Union Carbide Nuclear Co. Other appointments announced are: MR. LYMAN A. BLISS, MR. CLARK E. CENTER, and MR. OSCAR F. HOLMGREN as vice-presidents. Mr. Rush is in charge of all Union Carbide activities outside the US, and he will combine this work with his new appointment.

MR. P. M. K. EMBLING, B.Sc. (ENG), head of the newly formed Chemical Plant Division of The Power-Gas Corporation (see p. 470), was educated at King's School, Worcester, and while training in various departments of Ashmore, Benson, Pease & Co. and The Power-Gas Corporation Ltd. took an Honours Degree in engineering as an external student of London University. He was concerned during the war years with



**P. M. K. Embling**

the installation and operation of a number of process plants in factories operating under the auspices of the Ministry of Aircraft Production. At the end of the war he went out to India as technical representative to develop the company's business there. After his return from India his activities were chiefly in the technical sales field with special reference to plants for the production and purification of synthesis gases. He was appointed Technical Sales Manager for the company in 1952 and Manager of the Chemical Plant Division in 1955.

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### Wills

MR. JOHN HARRIS WRENTMORE, of Calverley Hotel, Tunbridge Wells, Kent, a director of Vitamins Limited left £34,437 net (duty paid £8,321).

## Epichlorohydrin Plant

SHELL Petroleum are building a plant at Pernis near Rotterdam to manufacture epichlorohydrin. At present, this chemical can only be obtained from the US, and this plant will be the first of its kind in Europe. Production is expected to start in September 1956.

Epichlorohydrin is one of the two key ingredients in Epikote resins, the other being di-phenylol propane which is already manufactured at the Stanlow chemical plant in Cheshire.

As the result of special study by the Shell Development Company in California, a technique known as 'hot chlorination,' in which chlorine is substituted for one of the hydrogen atoms in propylene, has been evolved and this process will be used at Pernis. The allyl chloride so produced can be further processed to either glycerol or epichlorohydrin.

Apart from its use in the manufacture of epoxide resins, epichlorohydrin is finding ever increasing application in chemical synthesis. It is already established as an intermediate in the manufacture of surface active agents, ion exchange resins and pharmaceuticals, and it is often employed as a stabiliser for chlorinated hydrocarbon insecticides.

## Bradford Engineering Lectures

THE Bradford Further Education Sub-Committee, in conjunction with the Yorkshire Council for Further Education, is arranging a course of lectures on Chemical Engineering in Industrial Processes at the Bradford Technical College. The course will consist of six lectures to be held on Wednesdays starting 2 November to 7 December. The fee is 30s. and application forms are now available from the Principal of Bradford Technical College.

The lectures in order of sequence will be: Process Design by C. Toyne, B.Sc.(Tech.), A.M.C.T., A.M.I.Chem.E., of I.C.I.'s Dyestuffs Division; Chemical Engineering in Medium-sized Dyestuffs Intermediate Works by T. Harrington, B.Sc., Ph.D., F.R.I.C., of Hickson & Welch Ltd.; Chemical Engineering in the Coal Tar Industry by G. H. Thompson, M.Sc., A.M.Inst.F., of the Coal Tar Research Association; Chemical Engineering Problems in Dyestuffs Manufac-

ture by J. H. F. Hallett, B.Sc., A.C.G.I., A.M.I.Chem.E., of I.C.I.'s Dyestuffs Division; Effluent Disposal Problems in the Chemical & Allied Industries by M. Lovett, B.Sc., F.R.I.C., F.Inst.S.P., of the Yorkshire Ouse River Board; and Heat Conversion in Chemical Engineering by E. Woollatt, B.Sc., A.R.I.C., M.I.Chem.E., of Lever Brothers.

## Manchester Lecture Series

POST-ADVANCED lectures in chemistry to be given in the Manchester area during the 1955-56 session which begins this month are described in a booklet published by the Manchester and District Advisory Council for Further Education, of Deansgate, Manchester 3.

One series is on Molecular Orbital Theory and its Applications in Organic Chemistry starting on 29 September. It consists of 12 lectures by C. E. Scaman, Ph.D., A.R.I.C. On 19 October H. Suschitzky, Ph.D., A.R.I.C., begins a course of 20 lectures on Technical German for Graduate Chemists; and starting 12 January there is a course of eight lectures on Adsorption of Gas by Solids by K. S. W. Sing, B.Sc., Ph.D., A.R.I.C. All will be given at the Royal Technical College, Salford, and the fee for each course is one guinea.

Two courses of lectures on Recent Advances in Physical Chemistry, and a course of 10 lectures on Protein Chemistry will be given at the University of Manchester beginning in October.

## US Refinery Explosion

Damage to the Standard Oil Co.'s Whiting, Indiana, refinery which burst into flames following an explosion last Sunday is estimated at \$100,000,000. Firemen diverted escaping petrol through the town's sewers into Lake Michigan, and evacuated 1,000 families. Two people were killed; one, a refinery foreman, died of a heart attack.

## Next Week's Events

TUESDAY 6 SEPTEMBER

### Institute of Metal Finishing

Birmingham: The James Watt Memorial Institute, 6.30 p.m. Chairman's Address by L. Mable.



## COMPANY MEETING

# Benn Brothers Limited

### Record Turnover but Costs Rise Steeply

THE fifty-ninth annual meeting of Benn Brothers Ltd. (proprietors of THE CHEMICAL AGE) was held on 30 August at Bouverie House, Fleet Street, London E.C.4. Mr. Glanvill Benn, chairman, presided and, in the course of his speech, said:—

For the first time in ten years the gross profit has fallen below the £100,000 mark. The net profit, after tax, is only £2,122 down. In other words the results for the financial year 1954-55 strikingly illustrate Lord Mackintosh's dictum that the Government is the largest sleeping partner in any business undertaking to-day.

Turnover was again the largest in the history of the company, but costs rose even more steeply than in any year since the war. These increased costs were swollen by the restoration of two of our most important journals to pre-war size—most expensive operations but, in the opinion of your directors, necessary for the benefit of readers and advertisers at once, and of our shareholders in the longer run.

Week by week, month by month, year by year, the Benn journals, year books and directories are published. From time to time notable records are made, as for instance the world-record-breaking issue of *The Hardware Trade Journal* of 25 March, mentioned in the Report. Two of our long-established annual publications—*The Electrical Trades Directory* and *Electricity Undertakings of the World*—are now meeting a considerably widened demand in all countries, thanks largely to the great expansion and re-styling of their unique information which has been effected in the light of the needs of this vastly extending world industry.

#### 75th Anniversary

The paper which my grandfather, Sir John Williams Benn, started in 1880 (and so founded this business) celebrated its 75th birthday in July, immediately after the end of the year now under review. You would not expect me to wait until this time next year before drawing your attention to that very notable birthday, so admirably recorded by Mr. Richard Woolley, editor of

*The Cabinet Maker*, in the issue of 2 July and in the special publication, 'Furniture and Furnishings 1880-1955'.

A trade-journal publisher must take a much longer than one-year view. Costs are, to some extent, under our own control, and increased costs must be faced from time to time as matters of development policy.

#### Dependent on Goodwill

For revenue, on the other hand, we are entirely dependent on the goodwill of our customers. Are we producing the journals and books they require? Do advertisements in our journals and directories help to sell their products and services? Judged by these, the only real tests, we may look back on the past year with pride, as more readers and more advertisers paid for our publications than ever before. There are now, by the way, fully paid subscribers to the Benn journals in 115 countries throughout the world.

These bumper revenues reflected, of course, the general prosperity of British industry during the past year—prosperity that may have been partly the illusion of inflation. The Chancellor of the Exchequer certainly took that view and began to apply his now famous 'squeeze'. The future results of Mr. Butler's dis-inflation policy remain to be seen, but the trading community may wonder why Government expenditure has not yet been treated in the same way.

Economic historians contend that the Geddes Axe of the post first world war period was too drastic, but future historians will record that post second world war Chancellors have been too lenient. The announcement that a cut of 10 per cent in Government expenditure in all its forms, except possibly vital defence developments, had been ordered for the year 1956, would be the best possible tonic to British industry and commerce, would ensure world confidence in the £ sterling, and, incidentally, would release for productive work many much-needed men and women from their present long-standing occupations as petty obstructionists.

With a family business in which the origi-



nal owners or their successors have never sold their interest, the shares tend to be held tightly by relatively few. In the case of Benn Brothers Ltd., the death two years ago of a large family shareholder had a happy sequel in that it enabled many members of the staff to acquire shares from the executors, thus adding considerably to the numbers of our employee-shareholders who were introduced a good many years ago by my father, Sir Ernest Benn. To my mind this arrangement is the ideal solution to the problem of profit sharing.

Each year I refer to the directors' and shareholders' debt to the staff, and each year your debt and ours increases. It was a particular pleasure to me to be able, last Christmas, to announce to the staff the introduction of our new pension and life insurance scheme. Each individual can now look forward to a calculable retirement allowance.

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### **Emulsifying Systems**

THE M. W. KELLOGG Company announces development of a series of perhalogenated, monobasic carboxyl acids which will produce efficient emulsifying systems under the most corrosive, high temperature conditions. According to Kellogg, these acids will meet the growing need for newer types of surface active agents that can be used efficiently with strong acids and oxidants.

Derived from chlorotrifluoroethylene, these KEL-F acids undergo reactions involving the carboxyl group. Metallic salts, esters, acid halides, alcohols, amides, nitriles and ketones have been prepared from them.

The new surface active agents are characterised by high thermal stability up to 450° F; excellent resistance to strong acids and oxidants; selective reactivity of a carboxylic acid; surface activity in highly acidic, basic or oxidising media; low vapour pressure; and high density.

They are readily miscible in all proportions with most organic liquids. The hexanoic type is miscible in all proportions with water, but the octanoic acid has only limited solubility in water at 25° C. Since their toxicity has not yet been fully determined, normal practices employed for concentrated sulphuric acid must be considered in their use.

While these acids and their derivatives are new, indicated uses include promoters for

two-phase reactions; additives for metal treating baths; insecticidal dispersants; gelling agents for printing inks, polishes, and lubricating greases; rubber accelerators, anti-oxidants and stabilisers; and chemical intermediates.

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### **Activated Carbon from Peat**

THE Minister of Commerce for Northern Ireland has completed negotiations with the British Ceca Co. Ltd., of London for the establishment of a factory in the Londonderry area for the manufacture of activated carbon, using peat as a raw material. Output from the factory will represent the first source of peat-based activated carbon produced in the United Kingdom.

At present demands for this type of activated carbon are met from Continental sources and British Ceca have forecast that a ready market is assured for the Londonderry project both at home and in the Commonwealth countries. A new company, Ceca(N.I.) Ltd., has been formed to operate the venture with the participation of Charles Tennent(N.I.).

Plans for building a factory are advanced and production is expected to be started next year. The establishment of this industry results from peat surveys carried out by the Ministry's Department of Industrial & Forensic Science during the last three years. The British Ceca Co. Ltd. studied many samples of peat before deciding to locate the factory at Londonderry.

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### **West German Venture in Canada**

Hoesch Werke Aktiengesellschaft of Dortmund, the West German steel company, plans to build a \$3,000,000 factory at Regina, Saskatchewan, to manufacture pipe for the oil and gas industries. This was announced at a Canadian Press Conference when it was revealed that Hoesch (Canada) had bought 160 acres of land north of Regina. It is planned to have the plant operating by next spring.

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### **Olin Mathieson Open Montreal Branch**

In view of the industrial growth of Canada and its expanded needs for industrial chemicals, Olin Mathieson Chemical Corp., manufacturers of inorganic and organic chemicals, has established a Canadian branch office of its industrial chemicals division in Montreal.

# Publications & Announcements

ADVANTAGES are claimed for the evaporative process for the production of ammonium sulphate. A pamphlet published by Simon-Carves Ltd., Cheadle Heath, Stockport, describes their latest process, in which ammonia recovery is conducted as a continuous process completely separate from the production of sulphate crystals. Ammonia is absorbed in dilute sulphuric acid, using a bubble hood tower. The resulting solution is not saturated and can be stored indefinitely without precipitating crystals. The evaporator is of the normal callandria type operating under reduced pressure, the vacuum being maintained by a jet condenser. The crystals are pumped to a separating cone, surplus liquor being returned to the absorber. From the cone the crystal magma is taken to the centrifuge.

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THE USE of Jet Pipe Controllers of the Evershed unit type for controlling Economic boilers is discussed in the latest number of Evershed News (1955, 3 [3]), published by Evershed & Vignoles Ltd., Acton Lane Works, London W.4. The primary control in a central heating system should be the temperature of the water leaving the boiler house, but in high pressure systems it is possible to use the pressure of the steam in the boilers as an indication of the temperature. The master controller has a bellows type steam pressure measuring element connected to the steam balancing main. It is claimed that with this type of control the savings considerably exceed the initial cost after 18 months.

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PROCEEDINGS of the fourth International Conference on Electrodeposition and Metal Finishing, which was held in London from 21 to 24 April, are now available in book form. The lectures and discussions held covered the whole range of metal coating processes and this book should serve as a useful source of reference to anyone concerned in this industry. The subject matter was divided up as follows: anodic processes, fundamental matters, chromium and tin coatings, nickel plating, American electroplating practice, organic finishing, electrodeposition, and the future.

AFTER several years of research and experiment Jenolite Ltd., of London, consider they have developed the first completely practical method of removing mill scale from structural steel. Details of the process, using either one of two de-scalers which are in jelly form, are described in a pamphlet published by the company. Called Jenolite DJ1, and Jenolite DJ2, both are applied in the same way, although Jenolite DJ2 is designed for dealing with particularly heavy scale.

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CONTAINED in *Tin and its Uses* 1955, 32, is an article on the bonding of aluminium-tin alloys to steel. Bonding direct to clean steel was found to be very difficult. More reliable results have been obtained by bonding the aluminium-tin alloy to 'aluminised' steel, i.e., steel that has been hot-dipped in aluminium. The best aluminised steel is, however, produced by cold rolling the aluminium and steel at room temperatures after the surfaces have been chemically and mechanically cleaned. Another article, 'Tin—and Gastronomy', emphasises the importance of tin as a coating for all articles that come in contact with food. Tin, it is claimed, is not only the best, it is the cheapest covering material. When after long service it shows signs of wearing thin it is a simple matter to re-tin the surface.

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VOLUME 37, No. 1, of the *Journal of Science & Technology* published by the New Zealand Department of Scientific & Industrial Research contains articles on the use of chemical thinning sprays on apple trees by R. M. Davison, of the Fruit Research Station, Auckland, and on screening tests with fungicides for control of French-bean rust by H. Jacks and R. M. Brien, of the Plant Diseases Division, Auckland. In his article on the use of chemical thinning sprays, R. M. Davison reports on the results of alpha-naphthalene acetic acid and sodium dinitro-ortho-cresylate, together with other chemicals tested in the same two districts. In the French-bean screening tests the authors give detailed results and a list of effective compounds: lime sulphur + colloidal sulphur, colloidal sulphur, fine wettable sulphur, zineb, ferbam, maneb, thiram, ziram, captan, dichlone, chloranil, and nitrobenzene.

IN SEPTEMBER of this year there will appear the first part of the tenth volume of the *Metal Powder Report* which, since the appearance of the first number in September 1946, has provided a regular monthly survey of the theory and practice of Powder Metallurgy, including details of all outstanding patents published or referred to in technical literature, arising in all the important European countries including Soviet Russia. This journal caters for the requirements of those who employ powder metallurgy, and places before them, in abstract form, a reasonably complete survey of the work that is being done, and above all notes on the more important patents that are being filed having claims appertaining to metal powders, as well as the usual descriptive matter covering development and research in this field. *Metal Powder Report* is published monthly by Powder Metallurgy Ltd., 59/62 High Holborn, London W.C.1. Subscription £3 7s. 6d. per annum, post free.

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'MONSANTO Chemicals for the Rubber Industry' is the title of a brochure put out by Monsanto Chemicals Ltd., of Victoria Street, London S.W.1. The descriptions given are brief and the reader is referred to the appropriate technical bulletin for further details. A feature of this publication is that it lists both British and American products, the American materials being products of the Monsanto Chemical Company, St. Louis, US.

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CURRENT issue of *The Bonderizer*, published by the Pyrene Company, Metal Finishing Division, Great West Road, Brentford, Middlesex, describes some unusual applications of Pyrene phosphating. Massive components for Ministry of Supply test equipment were successfully treated by Parco-Lubrite, a manganese phosphate process which produces a coating in which the crystals are uniform in size, thus enabling allowance to be made for working tolerances. This process serves as a basis for molybdenum disulphide lubrication.

\* \* \*

PUBLICATION Number 66 issued by Whessoe Ltd., of London, gives an illustrated survey of the range of tank fittings which the company is now manufacturing under licence from the Shand & Jurs Co.,

of Berkeley, California. The booklet covers the complete range of tank fittings which Whessoe are now making for sale in all parts of the world except in the US.

\* \* \*

COPIES of a new publication 'Zinc Dust in Protective Coatings' published by the Zinc Pigment Development Association, 4 Berkeley Square, London W.1, will be sent to anyone on request. This booklet reviews the development of zinc metal pigmented paints and describes their formulations, properties and applications. It is claimed that zinc-rich paints (those containing more than 93 per cent metallic zinc in the dry paint film) confer the same type of protection as the other better known zinc coatings and can often be used where older methods of applying zinc are impracticable.

\* \* \*

CONTAINED in 'Review of Benzole Technology 1954' is an account of present knowledge relating to the technology and chemistry of benzole and its constituent substances. This book, of just over 100 pages, is divided into 12 chapters, each of which consists of a summary of work in one particular field together with extensive references to the original literature. The products from carbonisation processes are described in chapter one. Laboratory tests have shown that the yield of light oil increases with the volatile content of the coal, but that the ratio of benzene to the total yield of liquid product decreases. The aromatic content of the light oil was shown to depend on the temperature of carbonisation rather than on the composition of the coal. Chapter five reviews methods of refining benzole. A novel method for desulphurising hydrocarbon oils uses either nascent hydrogen or ozone produced from electrolytic hydrogen or oxygen by passing the gas through a high frequency oscillating electric field. It is claimed that the sulphur content of a cracked distillate was reduced from 0.092 per cent to 0.035 per cent in this way. The publishers of this volume, the National Benzole and Allied Products Association, Wellington House, Buckingham Gate, London S.W.1, say that they believe that many chemists and others would be interested in it. Copies are available at the price of 21s. plus sixpence postage.

# 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.)

**ROTAMETER MANUFACTURING CO. LTD., CROYDON.**—20 July, debenture to Industrial & Commercial Finance Corp. Ltd. securing all moneys due or to become due from the company to the holders; all charged on Derwent Works, 602, Purley Way, Croydon, with fixed plant, machinery, etc., and a general charge. \*£17,100. 25 March, 1955.

### Increases of Capital

**ANCHOR CHEMICAL COMPANY LTD., Clayton Lane, Clayton, Manchester, 11,** increased by £150,000, in 5s. ordinary shares, beyond the registered capital of £225,000.

**TRETOL LTD.,** chemical manufacturers, etc. The Hyde, Edware Road, N.W.9, increased by £50,000, in £1 ordinary shares, beyond the registered capital of £20,000.

**RIVER CHEMICAL CO. LTD.,** 1 Kyte Street, Lenton, Nottingham, increased by £5,000, in £1 ordinary shares, beyond the registered capital of £10,000.

**VISUAL EFFICIENCY LTD.,** manufacturers of soap preparations, chemicals, gases, drugs, etc., 9 Arundel Street, W.C.2, increased by £14,000, in £1 7½ per cent cumulative redeemable preference shares, beyond the registered capital of £1,000.

**BALE & CHURCH LTD.,** chemical manufacturers, etc., 7 Crompton Way, Manor Royal, Crawley, Sussex, increased by £9,000, in £1 ordinary shares, beyond the registered capital of £5,000.

**E. BOYDELL & CO. LTD.,** mechanical, chemical, electrical and motor engineers, etc., Elsinore Road, Old Trafford, Manchester 16. Increased by £397,500, beyond the registered capital of £2,500.

**GRANGE CHEMICALS LTD.,** Devonshire House, Piccadilly W.1, increased by £299,910, in 199,940 'A' and 99,970 'B' shares of £1, beyond the registered capital of £90. Between 4 March and 17 March, 1955, 100,000 'A' and 50,000 'B' shares were allotted, all the 'A' to British Petroleum Chemicals Ltd., and the 'B' to Oronite Chemical Co., of San Francisco.

**GALLWEY CHEMICAL CO. LTD.,** 17 Surrey Street, W.C.2, by £3,000, in 1,500 ordinary and 1,500 A shares of £1, beyond the registered capital of £2,000.

**NORFOLK LAVENDER LTD.,** lavender & oil manufacturers, etc., Floretum, Lynn Road, Hunstanton, Norfolk, by £1,500, in £1 B ordinary shares, beyond the registered capital of £1,600.

**POWELL & SCHOLEFIELD LTD.,** chemical manufacturers, etc., 38 Queensland Street, Liverpool 7, by £40,000, in £1 shares, beyond the registered capital of £10,000.

## New Registrations

### Chemigraph Ltd.

Private company (553,368.) Capital £100. To carry on the business of engineers, architects and general designers, etc. Directors: Clifford D. Witton and Evelyn B. M. Gould. Reg. office: Cross Keys House, 56 Moor-gate, London E.C.2.

### Howells & Griffiths Ltd.

Private company (553,470.) Capital £1,000. To carry on the business of consulting, analytical, manufacturing, pharmaceutical and general chemists, etc. Directors: Albert Howells, M.P.S., and Ronald E. Griffiths, M.P.S. Secretary: Albert Howells, Reg. office: 150 Long Lane, Bexleyheath, Kent.

### Power Fumigants Ltd.

Private company (553,462.) Capital £100. To carry on the business of manufacturers of and dealers in insecticides, vermin destroyers and fumigating preparations of all kinds, etc. Subscribers (each with one share): R. H. V. Dixon and A. G. Staplehurst. The first directors are to be appointed by the subscribers. Solicitors: Travers Smith Braithwaite & Co., 4 Throgmorton

Avenue, London E.C.2. Reg. office: 3 Throgmorton Avenue, London E.C.2.

## Company News

### Monsanto Chemicals Ltd.

At a meeting on 23 August the directors of Monsanto Chemicals Ltd. declared a first interim dividend of  $6\frac{2}{3}$  per cent (4d. per 5s. unit), less tax, on the company's ordinary stock. This dividend will be paid on 30 September to ordinary stockholders on the register at the close of business on Friday, 26 August. Net sales for the half-year to 30 June were £6,517,242 as compared with £6,142,468 for the corresponding period in the previous year.

### Incandescent Heat Co. Ltd.

The sales of the parent company and the group showed an increase of 25 per cent compared with 1953, and the first six months of 1955 produced a similar increase over the same period in 1954. Considerable success was reported for the newly-formed Heat Exchange Division whose designs have found acceptance by foremost aeronautical interests. Improved designs and special gas atmosphere plants for both the furnace and chemical industries; accelerated heating and cooling systems as applied to steel and other industries resulting in increased production and substantial fuel economy; expansion in the application of incandescent high temperature and velocity jet-type radiant tube system; new methods of continuous treatment of electrical steels all contributed to the progress made during 1954.

### Lawes Chemical Co.

Lawes Chemical Co., fertiliser manufacturers, is to maintain its equity dividend of 10 per cent on capital increased from £272,675 to £30,844 by a 25 per cent scrip issue. Group profit has advanced from £110,041 to £122,213, and this time the tax provision with no EPL liability, is less at £58,665 against £60,564.

### Powell Duffryn Ltd.

The consolidated trading profit and other income of Powell Duffryn Ltd. for the year ended 31 March, after deducting interest on debenture stock, directors' remuneration, and profits attributable to outside shareholders, amount to £2,034,747 as compared with £1,810,362 in the previous year. Taxation requires £1,192,936, leaving consolidated net

profit at £841,811. The recommended dividend on the ordinary stock is 10 per cent actual, less tax at 8s. 6d. in the £. An interim dividend of 3 per cent actual was paid on 31 January.

### Catalin Ltd.

Group net profit of Catalin Ltd., manufacturers of plastics, for 1954 was £25,646 compared with £18,870 in 1953. Tax amounts to £13,287, leaving £12,359 which, together with the balance of profit brought forward of £4,123, amounts to £16,482 from which is to be deducted £4,634 for general reserve. The company is building a new plant at Waltham Abbey, Essex, which will enable it to enter a field of production closely associated with its normal activities in the industrial resin field.

### Boots Pure Drug Co.

Boots have announced an interim dividend of three per cent on the capital of £10,240,000 as doubled by the scrip issue, against 5 per cent last year on the old capital. The reason given for this is that it is to reduce disparity between the interim and final dividend, but it must not be assumed to indicate any increase in the total distribution for the complete financial year. The 1955 interim will absorb £176,640 against £140,800.

### George Adlam & Sons

Net profit for the year, before taxation, of George Adlam & Sons, manufacturers of plant and machinery for chemical, refrigerating, and vinegar manufacturers, etc., was £40,197 against £38,762 for the previous year. After tax and provisions for dividend on the ordinary share capital of 2d. per share, comparable with  $1\frac{1}{2}$ d. on last year's capital, £7,608 was added to the balance carried forward.

### National Chemical Products

It is announced from Cape Town that National Chemical Products contemplates issuing 83,503 ordinary shares in Ply Resin Products, of which National Chemical Products already holds 170,184 shares, or 25 per cent of the capital. Holders of 307,464 shares, representing about 45 per cent, have indicated that they would accept the offer which involves an exchange of six 5s. shares in Ply Resin for one £1 share in National Chemical. If the offer is accepted National Chemical Products will move most of the Ply Resin plant from East London to Germiston.





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## Honeywell-Brown Training

'YOU have heard instrumentation described as the "key to industrial progress". We fashioned that key—now we are training men to use it.' This was how Mr. E. C. Vorlander, managing director of Honeywell-Brown Ltd., referred to his company's recently-established training school at Perivale, near London.

Mr. Vorlander was speaking at a dinner given in London's Cumberland Hotel to mark the end of the school's first nine-week course in industrial instrumentation. This course was for 'internal' training. Half the students were employees of Honeywell-Brown Ltd., the rest were sent by other European companies within the International Division of the Minneapolis-Honeywell Regulator Company.

All twenty-five students who took the course attended the dinner where they were presented with certificates by Mr. V. D. MacLachlan, sales director and general manager of Honeywell-Brown Ltd. The school is fully equipped to provide intensive training in all aspects of industrial instrumentation. The aim is to teach by lecture and laboratory practice the theory, operating characteristics, industrial applications, and maintenance of the company's instruments and automatic controls.

Besides offering customer and basic training courses the school will keep trained men up to date by providing refresher courses as often as possible. Customer courses will start in the near future.

## Glycerine Standards

BRITISH Standards for five grades of glycerine have recently been issued in one volume by the British Standards Institution. They are:—

B.S.2621—soap lye crude glycerine, B.S.2622—saponification (hydrolyser) crude glycerine, B.S.2623—pale straw glycerine, B.S.2624—dynamite glycerine, B.S.2625—chemically pure glycerine (glycerin).

Specification requirements are given in respect of each grade, together with methods of sampling and of analysis of the materials. Some further methods of test, additional to those required for determining compliance with the British Standard, are also given in an appendix.

The Admiralty, the Association of British

Chemical Manufacturers, the Association of Fatty Acid Distillers, the British Pharmacopœia Commission, the Ministry of Supply, the Society of British Soap Makers, the Society for Analytical Chemistry and the United Kingdom Glycerine Producers Association Ltd., collaborated in the preparation of these standards.

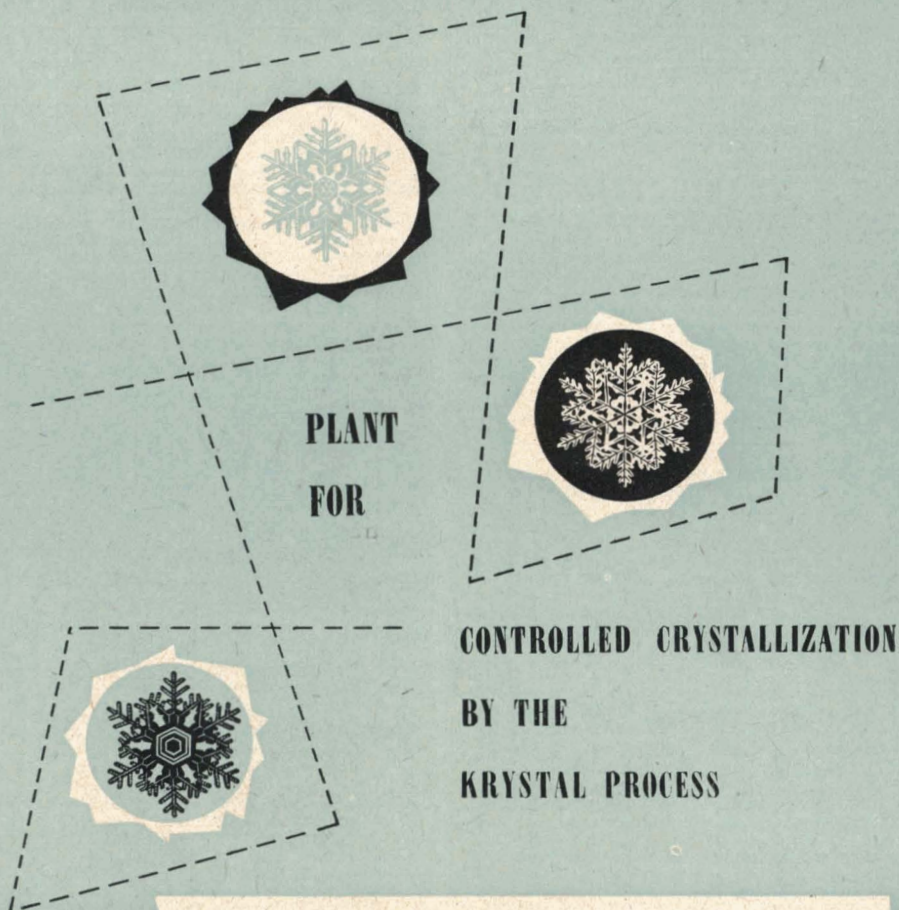
B.S.2621-5 may be obtained from British Standards Institution, Sales Branch, 2 Park Street, London, W.1. Price 10s.

## Market Reports

LONDON.—Conditions in the industrial chemicals market during the past week have been reasonably active for the period, and a fair amount of new business has been put through both on home account and for export. The leading soda products and the potash chemicals are moving well against contracts. Quotations show no definite trend but spot prices are firm. Lead oxide prices increased by the same margin as they were reduced two weeks ago. The basis price for red lead is £135 10s. per ton and for litharge £137 10s. All sections of the coal tar products market are quietly steady and in most cases producers are well sold forward. Pitch is receiving more enquiry with a better demand for export. ADF cresylic acid is now quoted at 85 cents per US gallon, c.i.f., New York.

MANCHESTER.—Prices of heavy chemicals on the Manchester market during the past week have been on a generally firm basis, the outstanding change being an advance of £5 a ton in sulphate of copper to £113 15s., less 2 per cent, f.o.b. Liverpool. A steady trade has been done in most sections of the market, though the outlook for textile chemicals is not too promising at the moment having regard to the situation in the cotton industry. Shippers' enquiries during the week have been on a fair scale. The movement of fertilisers, except in one or two lines, is slow, but a steady trade is being done in the leading light and heavy by-products.

GLASGOW.—The heavy chemical market has been rather steadier during the past week. Deliveries against contracts have been maintained with spot deliveries against normal requirements. Prices on the whole this week have remained unchanged with a few exceptions showing an increase due as usual to rising production costs. The report on the export market is still satisfactory.



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BARIUM CHLORIDE  
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BENZENE HEXACHLORIDE  
COPPER SULPHATE  
DICYANDIAMIDE  
DI-SODIUM PHOSPHATE  
EPSOM SALTS  
FERROUS SULPHATE  
GLAUBER'S SALTS  
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SULPHATE  
NICKEL SULPHATE  
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POTASSIUM CHLORATE  
POTASSIUM DICHROMATE  
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SILVER NITRATE  
SODIUM ACETATE  
SODIUM CARBONATE  
MONOHYDRATE  
SODIUM CARBONATE  
DECAHYDRATE  
SODIUM CHLORIDE

SODIUM DICHROMATE  
SODIUM NITRATE  
SODIUM NITRITE  
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SODIUM SESQUICARBONATE  
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# CLASSIFIED ADVERTISEMENTS

## SITUATIONS VACANT

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

**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.

**ASSISTANT EXPERIMENTAL OFFICER** required by **LONDON COUNTY COUNCIL** for duty at **NORTHERN OUTFALL WORKS, BECKTON, E.6.** 18-22. £324-£438 15s.; 23 or over, £472 10s.—£607 10s. Qualifications. Higher School Certificate with Chemistry as principal subject, or G.C.E. in five subjects including at least two scientific subjects (Chemistry and one other) at advanced level, or equivalent qualifications. Post pensionable. Details and application form from Medical Officer of Health (PH/D.1). The County Hall, S.E.1. Last day, 19 September, 1955. (1389)

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

## SITUATION WANTED

**YOUNG** Man, experienced Merchanting Export/Import Chemicals, seeks progressive position with London manufacturers or merchants. **BOX NO. C.A. 3426, THE CHEMICAL AGE, 154, FLEET STREET, LONDON E.C.4.**

## FOR SALE

**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.**

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**DOUBLE-DRUM DRIER**—by John Brown. Two main steam-heated cylinders 10 ft. by 32 in. diam. Material to be dried is fed through rollers, removed by doctor knives, under which are two water-cooled rolls for cooling, producing flaky material. Material then collected in two motorised worm conveyors. Pressure, 90 lb. sq. in. in main cylinder. Capacity with soap, 9/12 cwt. per hr. reducing from 30 per cent to 10 per cent.

**3 NEW VACUUM DRYING OVENS.** Welded mild steel construction. 7 ft. long by 42 in. wide by 42 in. deep, fitted 9 steam-heated shelves to carry 36 acid-resisting trays 36 in. by 16 in. by 1½ in. Davit-swing door each end, hand wheel closing. Motorised horizontal wet vacuum pump, gauges, metal trays, etc.

**13 Totally Enclosed SOLUTION MIXERS**—12 ft. long by 6 ft. 6 in. diam. Capacity 10,000 litres. Construction, mild steel plate, with dished ends and heavy glanded spiral-type agitators motorised 400/3/50. Mounted on mild steel stands. Vessels have top manway 18 in. diam. and 7 in. by 2 in. diam. bottom outlet. W.P., 70 lb.

**80 qt. Peerless MIXER**—4-speed type, with sun and planet type agitator, 400/3/50. Fitted whisk and 80 and 50 qt. bowls.

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**KINGS PATENT AGENCY, LTD.,** (B. T. King A.M.I.Mech.E., Patent Agent), 146a, Queen Victoria Street, London, E.C.4. **ADVICE** Handbook, and Consultation free. Phone: City 6161.

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**PROCESS SALVAGE, LTD.,** offer the highest prices obtainable in this country for 40/45-gallon bung type and full aperture **STEEL DRUMS.** We are interested in purchasing any quantities of either type you may have available for disposal and can arrange for cash payments and immediate collections. — Please ring Advance 1676 (four lines) or write **PURCHASING DEPARTMENT, PROCESS SALVAGE, LTD., 79/83 COBORN RD., BOW, LONDON, E.3.**

**WANTED,** Bulk Liquid Storage Capacity in principal industrial areas for between 125,000 and 375,000 gallons. Storage with good access to rail, road and sea transport preferred. Reply, giving full particulars, to **BOX No. C.A. 3425, THE CHEMICAL AGE, 154, FLEET STREET, LONDON, E.C.4.**

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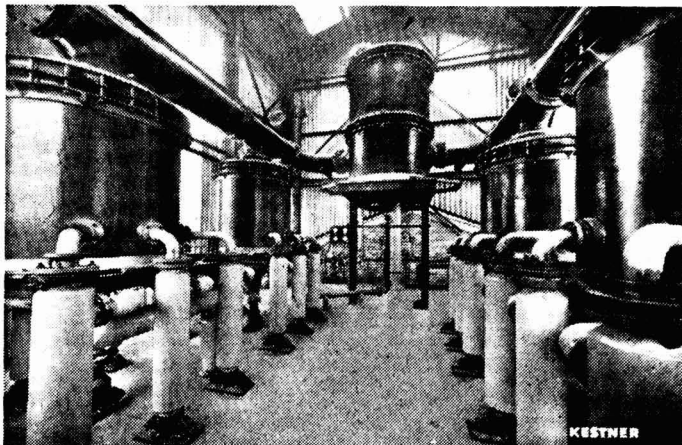
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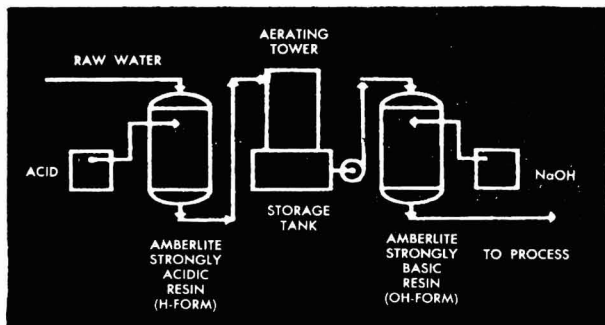
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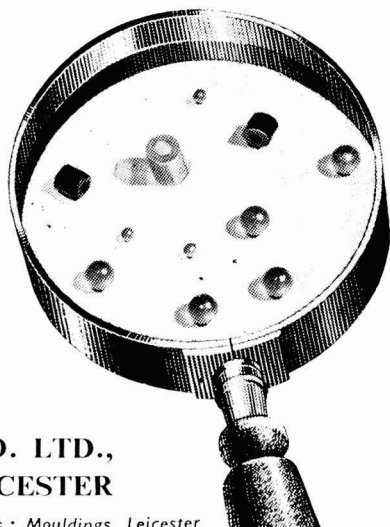
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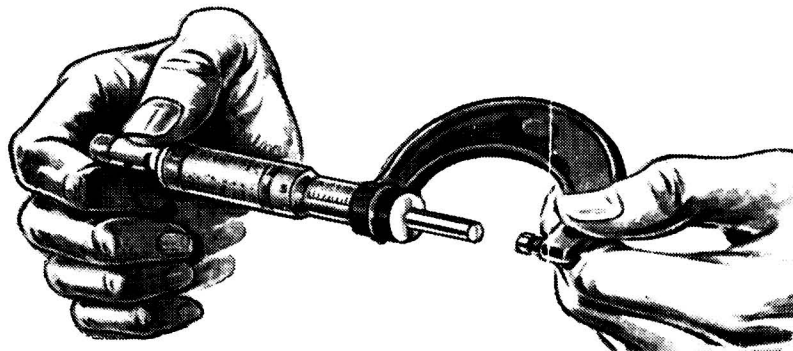
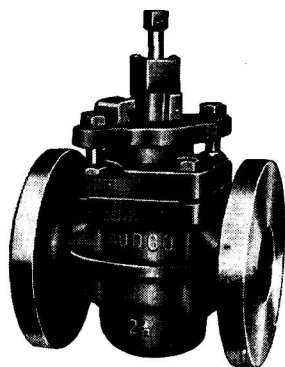
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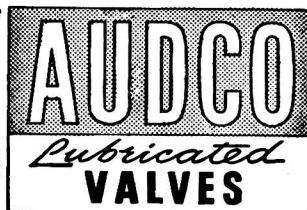


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