The Chemical Age

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Notes and Comments

The World Economic Conference

THE King gave the World Economic Conference the best possible send-off on Monday, and his hope of a successful outcome of its deliberations will be universally shared. His Majesty spoke of the Conference as an assembly of all the nations of the world and he made a heartfelt appeal to the delegates to co-operate for the sake of the ultimate good of the whole world. After remarking on the amazing material progress which had lately taken place and on the new recognition of the interdependence of nations, the King declared that the opportunity had come to harness this new consciousness of common interests to the service of mankind. That indeed, was a high ideal to set before the Conference, and it is in that spirit that all the King's subjects, without distinction of party or class, welcome the presence in London of the world's political and economic leaders. The mere existence of the Conference has, without doubt, caused an improvement in the international economic position. It remains to be seen how far any practical agreement on the problems of currency, tariffs, quotas, debts, and other restrictions on commerce between the nations can be reached amid such a variety of conflicting interests.

Those who expect the world to be put right by the decisions of the Conference will be disappointed, for the millennium is not in the disposition of mortals. There is the further reflection that the world public after hard experience of international conferences since the war, is inclined to be sceptical of their ultimate value. The hope for the London meeting is based on the existence of an unparalleled crisis, and on the terrible responsibility which the British and other governments would incur if they failed to bring some sort of order out of the prevailing chaos.

Inter-relationship of the Sciences

THE Herbert Spencer lecture delivered at Oxford University by Dr. Einstein must make the thoughtful ponder on the dual voice of science. There are two concepts of science which seem opposed to one another and yet which actually work together in different ways to a common end. We distinguish them as "pure science" and "applied science." The Greeks, said Dr. Einstein, laid the foundations of Western science by the creation of a system in which each part logically followed on another and could not be attacked. Their science was *logically* unassailable, but the whole of this ancient concept of scientific phenomena could be and was destroyed by observation and experiment. The Greeks did not appreciate that no theoretical system could result in actual knowledge of reality unless it was based on experience; Newton and the physicists of the eighteenth and nineteenth centuries recognised this, and based their theory on experiment.

The scientist, gifted with a sufficiently vivid imagination, puts his dream into mathematical premises and grinds it in his mathematical mill. If the results can be checked experimentally and if they are then confirmed, there is considerable possibility that they are right. It cannot, however, be excluded that there are other explanations of observed phenomena. The best results are obtained by regarding chemistry, mathematics and physics as three branches of the same subject, whilst recognising the limitations of each in relation to the others. The subject of the Herbert Spencer lecture is therefore a particularly appropriate corollary to the Economic Conference. Economists have been theorising for many years and the world has been getting more and more unhappy. The nations have gone through a distressing economic experience, but so long as there were powerful theorists in the world, who had not put their equations to the test of experience or experiment so long was agreement impossible. Finally, the last of the theorists, America, was forced much against her will, and to the disgust of her citizens, to experiment—to experience a "depression." Now that *all* nations have a solid experimental basis for their deliberations, they may hope to achieve results of far-reaching importance.

Synthetic Sugar

THE article published in our last issue upon the production of sugar and alcohol from cellulose raises some important questions. Cellulose in almost any form appears to be the raw material *par excellence* of the chemical industry of the future. The use of cellulose in the form of wood for building purposes and for many manufactures appears to be circumscribed in the future because the development of the plastics industry is producing materials that may turn out to be better suited to our needs. The chemical industry now threatens to displace sugar by an artificial product made from wood. In playing at general post with our raw materials, let us be sure that we are really making solid progress. When the sugar planters of the East Indies complain that they are faced with ruin because the world cannot absorb their output, is it reasonable for us to build factories here in Europe to make their position worse? This is an example of lack of international co-operation.

A country which grows no sugar, which has no colonies growing sugar, may be pardoned for encouraging the home-produced article. So we, if we

do not wish to buy sugar from our own colonists, may encourage the growing of sugar beet. Since we can never be self contained, let us beware of going too far even in that direction, and let us never dream of establishing a synthetic sugar industry. Can we be sure, moreover, that the artificial product is really fit for food? Some of the experiences of past generations have been a warning to us regarding food manipulation. It is true that we are beginning to understand a little of the chemistry of the vitamins, the hormones and all those chemical bodies that make the difference between health and disease. But as yet we do not know everything.

A Hint to the Chemical Industry

CAN we be sure that an artificial sugar will really be beneficial to health? Nature produced foods for the animal and vegetable kingdom by certain defined processes; therefore let us be careful how we artificialise our foods and disturb those processes. We suggest that the chemical industry might be better advised to advocate naturally grown sugar—whether cane or beet—for which it can supply fertilisers, than to encourage the manufacture of synthetic sugar. The manufacture of synthetic sugar with a view to using it for the production of alcohol comes under another category. At the moment we have a world glut of fuel oil, due to a too greedy development of the oil fields of the world. Just because of that glut, however, we are using our oil supplies carelessly, and who can tell how soon they may be exhausted. It is true that exhaustion may be a long way ahead, but at the first hint of any such thing the price would soar. The world will need an ever-increasing supply of liquid fuel, and at present alcohol—methyl or ethyl—seems the one best fitted for synthetic manufacture in large quantities.

The industry, once established, might involve agriculture on a huge scale, with corresponding demand for fertilisers, to produce the necessary cellulose. The chemical industry would have it both ways. The next generation may possibly see themselves in an alcohol age; we trust they will withstand the obvious temptation. Already there is likelihood of extensive manufacture of alcohol from coke oven gas, via ethylene; the use of potatoes was suggested many years ago. Whilst there may be no immediate call for the erection of large synthetic alcohol factories, our chemical industry should be ready with plans which can be put into action as soon as opportunity offers or circumstances render it desirable.

Trend of Chemical Production

THE figures recently issued by the Board of Trade upon dyestuffs production show a highly satisfactory upward progress. The progress is still more satisfactory when it is realised how greatly we were unnecessarily dependent upon foreign dyes twenty years ago. It is natural that there should have been some falling away from the high level of output of 1929, but the continued increase during the years following is very gratifying. It is a matter for congratulation that the British chemical industry should have achieved so excellent a result. The record of past years shows that, given a realisation of the need, there is no limit—save that which lies beyond human possibilities—to what can be successfully undertaken. Do we realise what possibilities lie before us? Apart from the needs imposed by climate, the requirements of the more civilised nations are fairly similar. Much may be learned by studying the exports of the world's largest producer of chemicals—the United States. A summary of the latest information on this subject was published in our last issue. Many of the manufactures there undertaken, yielding valuable exportable products, might equally well be undertaken here. If present conditions are not sufficiently favourable, there might be made out a case for a certain measure of Government assistance based on the obvious value of the Dyestuffs Act in encouraging the dyestuffs industry. An example is sulphur.

The United States sulphur production in 1931 was 2,128,900 tons; another sulphur deposit has been found in Louisiana where one entirely new unit is about to produce 250,000 tons annually. We in England import large quantities of sulphur; why should we use the rather inconvenient spent oxide sulphur from gasworks when a process is available whereby all the largest gasworks, making probably 80 per cent. of the total gas, and all the coke ovens can produce sulphur in a commercially pure form. Here in this country a quantity of the order of 100,000 tons could be produced annually by this means. This sulphur would be valuable as the raw material for carbon bisulphide, of which the United States exports large quantities annually. The raw materials for the manufacture of methanol also abound in this country. In Belgium it is now being manufactured from coke oven gas, but here in England a great deal of this gas is being blown away to waste. There is room for an organisation, for example in Durham, which would collect the gas from three or four neighbouring plants and set up a methanol industry. These are mentioned as possible new developments. There must be many other chemicals that are not being exported in anything like the large quantities of a few years ago. Careful inquiry should be made to ascertain the reason for this and steps taken by individual manufacturers, by manufacturers' associations, or by Government action to rehabilitate any unsatisfactory chemical or to replace it by manufacturing whatever has taken its place in the markets of the world.

Increased Employment

WE are optimists. A reasoned optimism is the root of successful business ventures. The employment figures just issued lend point to our optimism. That employment should increase, and increase by a progressively greater amount each month, from January to May, until 372,000 more people are put into work during the past four months is a great achievement to the credit of the industry of this country at a time when other nations are still feeling the depths of the depression. It represents over 4 per cent. increase on the number working in January, and as compared with May of last year—a month in every way comparable with May of this year—there is an increase of 306,000 in the number of employed. Employment begets employment, as more money circulates. There are, moreover, signs that the investing public is ready to back new issues. Given a reasonably successful outcome of the summer conferences, there is reason to continue to regard the future with confidence.

The Technique of Modern Analysis

Some Recent Developments in Instruments and Equipment

THE CHEMICAL AGE for April 29, 1933, contained an article dealing in comprehensive fashion with the structure and fittings of a chemical laboratory. The present article, by a member of the technical staff of Baird and Tatlock (London), Ltd., seeks to supply a conspectus of some recent developments in instruments and equipment.

IT is hardly necessary to point out to readers of THE CHEMICAL AGE how important a place is taken in the structure of modern industry by the analytical laboratory. It is a commonplace that the application of science to industry, which has during this century been carried out to an unprecedented extent, would not have been possible without that contribution of clear and definite knowledge concerning processes and products which it is the province of the analytical laboratory to supply.

To be effective, the laboratory must be properly constructed and adequately equipped. This statement is axiomatic in the sense of the old geometry books—"an axiom is a theorem, the truth of which is so apparent as to be instantly admitted"—yet how often is it disregarded! Probably many readers are aware of factories or works, on a tour of which the visitor is taken into some low-roofed, ill-ventilated shed, where a "chemist" is to be seen, bravely struggling with his poor equipment to produce results on the accuracy and reliability of which the whole production of the entire factory depends. Fortunately, such examples of managerial myopia are becoming less common, although it is still rare to find a work's laboratory in which has been invested (not "on which has been spent") a due proportion of the total capital of the enterprise.

Sampling and Grading

The first step in the analysis of any material is the provision of a truly representative sample. This may be a task of greatly varying complexity, easy if the material is a mobile homogeneous liquid, very difficult if the material is a natural ore, in pieces of widely divergent size, and containing a small proportion of some vauable metal irregularly disseminated throughout the mass. In the case of solids, a first sample of adequate size must be drawn, which may in the case of a shipment of ore, comprise a hundredweight or more. This must be reduced in dimensions to the 1 gram, or thereabouts, necessary for the actual analysis, and in such a way that the final portion truly represents the composition of the large original sample. As the volume of the original sample is reduced in stages, by the well-known "quartering" technique, or by one of its variants, the particle size must be simultaneously reduced to the appropriate extent. The problems of grinding thus enter largely into those of sampling, and the attention of the analyst should be directed to various details in the technique of grinding, which, if neglected, may produce inaccurate results.

The most obvious of these possible errors is contamination of the sample due to abrasion of the grinding surfaces employed. To minimise this, mills employed in laboratory work usually have their working parts constructed either of special steel or of agate, usually the latter. When grinding is carried out with free access of the atmosphere, a variation in composition of the sample may result, through the evolution or the absorption of moisture, or through oxidation of some sensitive component in the sample. The grinding by hand of difficultly pulverisable substances is a tedious and prolonged operation, yet it is also one which cannot safely be entrusted to an unskilled laboratory assistant. Accordingly, an efficient and practical mechanically operated laboratory mill is almost a necessity, and such an instrument is depicted in Fig. 1.

The "Morrice" mechanical mortar and pestle is available in a variety of materials—special steel, porcelain or agate, and is driven by a universal electric motor. Motions are imparted to both the mortar and the pestle which have the effect of producing a speedy reduction in the particle-size of the material being ground, whilst simultaneously avoiding any tendency towards segregation of particles of differing size or density. The mortar and pestle may be covered with a glass bell, which prevents contamination from external sources, and reduces the risk of access of moisture. The atmosphere inside the glass cover may be desiccated, or may be replaced with a chemically inert gas. After the small sample has been prepared in the appropriate degree of fineness, the next step is usually to weigh out a portion for the analysis.

Analytical Balances

The analytical balance, although no longer the only instrument of precision employed in the chemical laboratory, is still perhaps the most important. Until recently it was a costly piece of equipment, but now an excellent balance of capacity and sensitivity, quite adequate for all but advanced research work, is available at a price as low as £10. Such an instrument is illustrated in Fig. 2. For a small additional charge, this balance may be had with an all-metal case, a refinement which, while almost a necessity for laboratories situated in tropical latitudes, will doubtless commend itself to numerous users working in less exacting climates. Further recent advances in balance design comprise the provision of damping devices, whereby the balance is rendered almost aperiodic, and the position of rest may be read off from a scale without the laborious necessity of taking readings of several oscillations; projection devices, by means of which enlarged images of the scale and pointer are projected on a screen conveniently situated for easy reading; and means either for adding the smaller weights by manipulation of keys on the balance-case, or for dispensing with such weights altogether as in the chainomatic balance. The net result of these improvements is enormously to accelerate the operation of weighing, and since an appreciable fraction of a routine analyst's time is usually spent in weighing, any expenditure on these refinements of modern balance construction will quickly pay for itself in reduced labour charges.

That necessary concomitant of the balance—the weights—must not be overlooked. The present author has been struck by the curious fact that whilst makers of balances almost invariably state the performance of their balances in figures, hardly any sets of weights are sold with a statement of their maximum limits of error. It is of no use to a potential purchaser to be informed that the weights are "most accurate" (if expensive), or "not so accurate" (in the cheaper qualities). Users should insist on being informed of the maximum limits of error to which the weights have been adjusted; they could then properly assess their value. In addition to the fact that the whole of the analytical work depends for its reliability directly on the accuracy of the weights, many laboratories carry out their own standardisation of volumetric apparatus, specific gravity bottles, and so on; obviously this work is quite useless unless the weights are definitely known to be of adequate accuracy. In any other than the very smallest laboratories, a set of weights with N.P.L. certificate should be kept, against which the working weights are carefully checked, on a good balance, by the method of double weighing, at regular intervals. In the long run this expenditure of time and money would prove to be well worth while in view of the increased reliability of the analytical results.

Volumetric Apparatus

As the volumetric analogue of the balance, we have the pipette, burette, and measuring flask. Here again, it is scarcely necessary to point out the absurdity of using, without check, cheap apparatus of unknown accuracy. Either vessels bearing the stamp of the N.P.L. (of Class A or Class B accuracy, as the work demands) should be used, or they should be carefully calibrated by the user himself. Even in this latter case, the vessels should be purchased from a reputable maker, as only thus can one ensure that a good quality glass, resistant to chemical attack, is obtained, and that the workmanship of the stoppers and stopcocks, and the perfection of the etched markings, are all that they should be.

The question of the basis of graduation need not be discussed at any length. All British makers of repute now graduate their apparatus on the basis of the litre (the volume occupied by a mass of 1 kilogram of water at its temperature

of maximum density) and the millilitre (the thousandth part of a litre) and mark it accordingly. In passing, however, it is curious to note how reluctant is the scientific word generally to adopt the term millilitre; many books and periodicals still appear containing the obsolescent and ambiguous " cubic centimetre."

Electrometric Analysis

Numerous as are the applications of ordinary volumetric analysis, employing appropriate indicators, cases frequently arise in technical laboratories dealing with highly coloured liquids (*e.g.,* beers, wines, fruit extracts, etc.), where the use of indicators is impossible. In these cases recourse may be had to electrometric methods of titration. The basis of these methods is to measure the e.m.f. developed by an appropriate electrode immersed in the solution to be tested (by forming a cell consisting of this electrode and one of the well-known standard half-elements) and to observe the change in e.m.f. consequent on the addition of a reagent. When a curve, connecting e.m.f. (E) with volume of reagent added (V) is drawn, the point of maximum value of dE/dV, which is easily determined by inspection, gives the end-point. The method is of very wide applicability, being available not only for acid-alkali titrations, but also for those involving oxidation-reduction reactions (*e.g.,* the determination of iron, chromium, manganese, zince, copper, titanium, molybdenum), precipitation reactions, and frequently the separate determination of several metals when present in the same solution. A complete review of the subject is given by Kolthoff and Furman, "Potentiometric Titration," 2nd edn., 1931. An accurate and convenient apparatus for such titrations is shown in Fig. 6. With this apparatus all the estimations mentioned above may be carried out.

Fig. 1. The " Morrice " Mechanical Mortar and Pestle

Hydrogen Ion Concentration

It is unnecessary to dwell on the importance of hydrogen ion concentration measurements in modern physico-chemical work, either in connection with research in pure science, or with process control in industry. In numerous industries, particularly those dealing with brewing, tanning, dyeing, the purification of water and sewage, the electro-deposition of metals, the manufacture of paper, sugar and photographic emulsions, and the distribution and preservation of foodstuffs, a knowledge of hydrogen ion concentration at various stages of the process is absolutely essential if the technical control is to be removed from the region of vague empiricism and placed on a sound scientific basis. The subject is of sufficient importance to merit a comprehensive article; here it will suffice to indicate some types of apparatus which are especially suited to the rapid measurement of hydrogen in concentration, or to adopt the mathematical symbol, the measurement of pH.

It is well-known that the measurement may be made by either of two methods, the colorimetric or the electrometric. In the former, indicators are employed, which change colour with changing pH of the solution to which they are added. The apparatus is cheap, simple, and provided that certain possibilities of error (salt and protein error of indicators, low buffer capacity of certain types of solution) are guarded against, sufficiently accurate for most technical work. A simple comparator is employed for making the comparison; in addition to this, supplies of indicators and buffer solutions are needed to complete the equipment. The indicator method

Fig. 2. The " New Empire " Analytical Balance

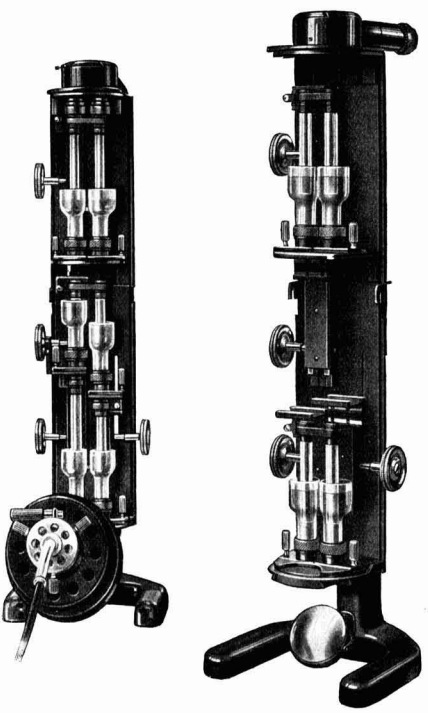


Fig. 3. Precision Colorimeter for Hydrogen Ion Determination

Fig. 4.
The Cosens
pH Meter

Fig 5. Dr. G. B. Harrison's Apparatus for pH Determination with the Glass Electrode

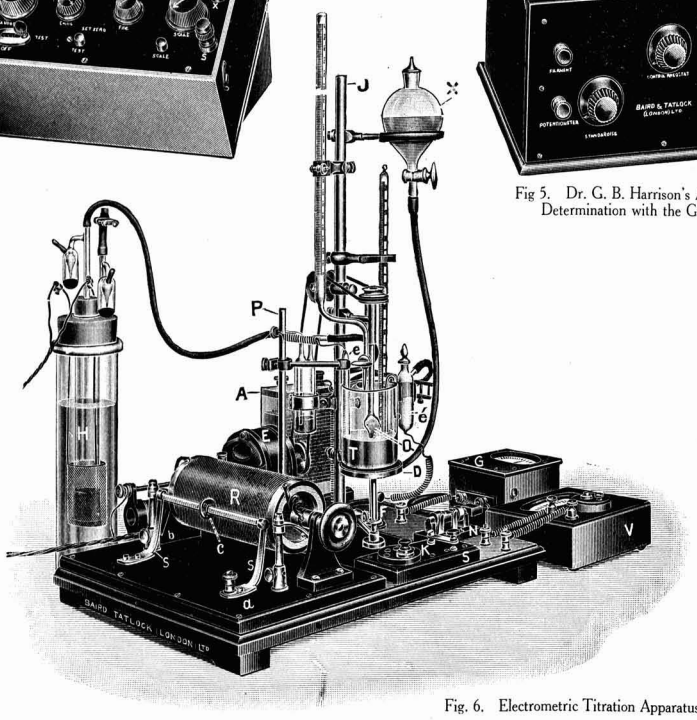


Fig. 6. Electrometric Titration Apparatus

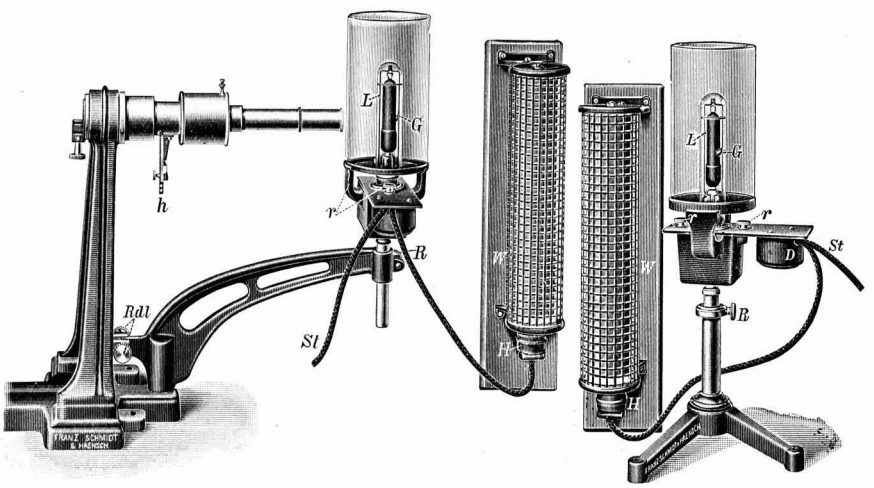


Fig. 7. Electric Sodium Lamp for Polarimetry

is capable of much greater refinement. A 3-stage precision colorimeter is now available (Fig. 3) with which pH measurements of great accuracy may be carried out, even on solutions which themselves possess considerable colour. The possibility of making measurements to within an accuracy of 0.01 pH unit is claimed under favourable conditions for this instrument. Such a colorimeter is available for all types of colorimetric analysis, and even, with further additions which have been designed, for nephelometry; it is thus a piece of apparatus of a versatility and range of utility which should ensure it finding a place in any well-equipped laboratory.

Employing the electrometric method, two instruments, each making use of a thermionic valve, have recently been made available, which should receive the attention of all who may be contemplating the installation of electrometric pH measurement. The Cosens pH meter (Fig. 4) is readily portable, and, except for a 4-volt accumulator and the quinhydrone or (hydrogen) cell, completely self-contained. When used with double quinhydrone or hydrogen electrodes, and with a buffer solution of known pH (say x) surrounding one of the electrodes, then the pH of solutions having values between ($x+2.5$ and $x-2.5$) may be read off directly from the instrument, with an accuracy of 0.02 pH, and are already corrected for temperature without any calculation. A special 4-electrode valve is employed, and owing to the small grid current (of the order of 10^{-9} ampere) drawn by this valve, the instrument may be used for measuring the *e.m.f.* of very small or readily polarisible cells without displacing their equilibria. It cannot, however, be used for measuring glass electrode potentials.

The glass electrode is now extensively employed as a method of determining the pH of solutions. Its great advantage is the universality of its use—it may be employed with practically any solution, however acid or alkaline, however deeply coloured, however loaded with colloidal substances, or with substances poisonous to other types of electrode. The disadvantage under which this electrode laboured until recently—the difficulty of measuring accurately the *e.m.f.* developed across the high resistance of the glass membrane—has been effectively removed by the use of a special electrometer valve, having its cathode lying between the grid and the anode, and an instrument embodying this valve is shown in Fig. 5. This instrument, designed by Dr. G. B. Harrison, is capable of yielding results to an accuracy of 0.02 pH unit, is robust, rapid in operation, and its manipulation can be learned in a short time by an unskilled operator. Several such instruments are now working in industrial laboratories, and have been found to be almost universal in their application.

Optical Methods of Investigation

Attention was drawn earlier in this article to the fact that the analytical balance is no longer the only instrument of precision in the modern chemical laboratory. The technique of modern analysis is coming to depend more and more upon physical measurements, particularly upon optical and electrical methods, for the derivation of its data. Mention has already been made of the modern precision colorimeter. Analyses by colorimetry are fast displacing those conducted by the older gravimetric and volumetric methods, frequently with a simultaneous gain in both speed and accuracy. For the quantitative determination of very small concentration of certain substances—down to values so low as one part in a hundred million parts of diluent, colorimetry offers the most convenient methods at present available. Concerning their speed, a striking example may be quoted from F. D. Snell, "Colorimetric Analysis," 1922 (p. 3), where it is stated that "a leading brass manufactory of the country obtains an analysis of its brass from the laboratory within 45 minutes after the delivery of the sample Of the five constituents determined, four are determined by colorimetric methods." The great utility of these methods to biochemical analysis is well known; had they not been available much modern work in quantitative biochemistry would have been quite impossible.

Another optical instrument of great accuracy and wide applicability is the refractometer, in one of its many forms. Cases frequently arise in the technical laboratory where a rapid analysis of a small quantity of some binary mixture, with known constituents (*e.g.*, an aqueous solution of some salt, or a mixture of two solvents) is required. A drop is placed in the refractometer, a reading taken, reference is made to tables previously prepared, and in the course of a minute or two an accurate result is available. The instrument is not, of course, limited to such uses; it is extensively employed in the examination of natural products, especially oils, fats and waxes. The polarimeter and spectrometer are also being increasingly employed as means of tackling analytical problems, otherwise difficult or perhaps impossible to solve. For the investigation of sugars, alkaloids, and many other natural products the polarimeter is, of course, indispensable. Mention may be made of the modern form of sodium lamp (Fig. 7) employing an electric discharge tube, energised from the supplying mains, and supplying an illumination the intensity and purity of which commend it highly to all who have ever been compelled to struggle with the fitful and inconstant light of a burner fed with salt. Here is an accessory which really does " supply a long-felt want."

Textile Finishing

The Problem of Prices and Standards

SPEAKING at the annual conference of the Textile Institute at Harrogate on June 8, Mr. C. M. Whittaker, of Courtaulds Dye Works, Droylesden, near Manchester, said dyers and finishers were always chasing the wheel of fashion. The exclusive trade in Great Britain was always running away from the big store trade. Immediately the big store trade took up a finish the exclusive trade went on to something entirely the opposite. It was very good for trade, no doubt, but it did put up continuously new problems to the finishing trade. The finishing trade had to be ready at any moment to take up a new fibre. It might be said that the British finishing trade was absolutely at the top of the tree in reputation throughout the world market, but unfortunately that was a disadvantage as well as an advantage. At the present time, and for some time past, the market had been a price market. When the British finisher had to play down to the prices he was up against an entirely different standard from that which was expected from his Continental competitors. When it was done by a British finisher, the merchant immediately stiffened his back and demanded a better finish than he was prepared to accept from Continental people.

Dr. T. Oliver, ex-principal of the Scottish Woollen Technical College, Galashiels, who delivered the annual Mather Lecture, criticised the excessive organisation of modern industry. No job was beneath the dignity of the typical manufacturer of the nineteenth century, said Dr. Oliver. When a foreman was ill the manufacturer did his work. He realised that his function was to help wherever he was needed, and no time was lost in grumbling about inefficient management or wasted in intrigue. Excessive organisation was a great drawback in modern industry. Every man had his title and his duties were strictly defined. If a worker wanted to communicate with the general manager, his message had to go through certain channels. By the time it reached the head, the suggestion had been killed by criticism. Manufacturers were apt to think that their workers were less efficient than themselves. If a worker was not doing well, it was generally the fault of the management.

Properties of Sulphur Monoxide

ON passing an electric discharge through sulphur dioxide at low pressures, the monoxide is formed. Its properties are described in a paper read by H. Cordes and P. W. Schenk before a recent meeting of the German Bunsen Society, a summary of which appears in the " Chemiker-Zeitung," May 31, 1933 (page 423).) This little-known substance is a gas at room temperature and can be stored unchanged for several days in a dry container. At higher temperatures, however, the rate of decomposition is enormously accelerated, a few minutes exposure at 100°C. sufficing for complete conversion into sulphur and sulphur dioxide. Remarkably enough, sulphur monoxide does not react with oxygen at room temperature, although the two gases can be made to combine by exposure to an electric spark. Among other reactions of sulphur monoxide may be mentioned the formation of sulphoxylates or thiosulphates on treatment with alkali.

A Wider Utilisation of Empire Products

Activities of the Imperial Institute during 1932

THE annual report of the Imperial Institute for 1932 shows that the investigation and intelligence services were extensively utilised by overseas Governments as well as by firms and individuals throughout the Empire, and many important questions relating to the development of Empire resources were dealt with in conjunction with the advisory councils and their associated committees.

During the year 1,369 inquiries were received for technical and commercial information regarding the production, utilisation and marketing of Empire raw materials of plant and animal origin and were dealt with by the Intelligence Section. These inquiries emanated from governments, firms and persons overseas and from official departments, manufacturers, merchants and others in this country. Requests for information as to supplies of raw materials from Empire sources have doubtless felt an impetus as a result of tariff considerations. An important inquiry in this connection from Canada had reference to Empire sources of chicle, gum arabic and jelutong, as to which information was supplied. Other applications were concerned with the marketing of overseas produce in the United Kingdom.

Tung Oil Cultivation

The sub-committee on tung oil has continued its work of encouraging the production of tung oil in the Empire and the investigation of cognate technical problems. Experimental cultivation trials have now been in progress for several years in many countries, and in some cases the trees have commenced to bear fruit. Plantations of *Aleurites Fordii* on a commercial scale have been, or will shortly be started in Burma, Assam, Australia and New Zealand. The results of the examinations of samples of tung fruits, seeds and oil produced in various parts of the Empire were published in the "Bulletin of the Imperial Institute," 1932, No. 3, and show that the oil is equal in quality to the best Chinese and American oil. In order to elucidate problems connected with crushing and extraction, a consignment of tung seed was purchased from America and a series of experiments carried out at the works of one of the large firms of oil-crushers. Feeding trials on poultry, dairy cattle and pigs with the meal obtained in the above experiments have been conducted at the Rowett Research Institute, Aberdeen, in order to determine whether this material can be safely employed as a feeding-stuff for animals, but results indicate that the meal will have little value for this purpose on account of its unpalatability.

At the request of the High Commissioner for India the committee on essential oils and resins considered questions relating to the utilisation and marketing of Indian lac, the demand for which is being adversely affected by the increasing use of artificial resin. A sub-committee which was appointed to advise as to the steps required to maintain and extend the industrial applications of lac submitted a report strongly advocating a scheme of applied research on lac in the United Kingdom in close touch with the consuming trades as the only effective means of meeting the competition of artificial resins, and proposing that funds should be raised for this purpose and also for propaganda by increasing the cess levied on lac exported from India. Questions relating to the production of essential oils in Kenya, Seychelles and Samoa were also considered and suggestions regarding a number of the oils which are being prepared commercially or experimentally in these countries. Another subject was the general question of the competition of artificial resins with natural resins.

Empire Tanning Materials

The committee on tanning materials had under consideration the results of the investigation carried out at the request of the Natal Wattle and Timber Growers' Association, with the approval of the Forestry Department, Union of South Africa, on the tanning value of the bark from green wattle trees (at various stages of growth) in comparison with that from black wattle, the tree which provides the Natal bark of commerce. The suitability of immature bark for extract making was also concerned. These problems are of special interest to the Natal wattle bark industry in view of the relative immunity of the green wattle tree to bagworm, the pest which is a serious menace to the black wattle tree. The recommendation was made that an investigtion of samples on a more comprehensive scale was desirable in order to obtain the information necessary to justify definite conclusions. Attention has been given to the possibility of increasing the supplies of gambier of reliable composition from Empire sources, and the subject has been brought to the notice of countries likely to be interested. Tanners using the material would welcome supplies from within the Empire to replace the present imports from foreign countries. The production of adequate supplies of gambier at a suitable price would permit of a greatly extended use of the material, which is recognised as a tanstuff possessing valuable properties.

Insecticidal Plants

Nearly fifty inquiries relating to plants which can be used in the preparation of insecticides were received during 1932. Most of these had reference to products already well-known in commerce such as pyrethrum flowers and Derris root, whilst others were concerned with materials not as yet on the market. Supplies of pyrethrum flowers have hitherto come from Japan and Dalmatia and production in the Empire is very desirable. Information as to the cultivation, preparation and marketing of pyrethrum has been supplied to planters, particularly in Kenya, where production on a commercial scale has already commenced, and also in Nigeria, India, Ceylon and British Malaya. Seed of selected strains has also been furnished to planters in Kenya for trial cultivation. Derris is produced on a commercial scale in Malaya, and inquiries have mainly been concerned with putting firms in this country and elsewhere in touch with suppliers.

Oils and Oilseed Cake

Information was also requested as to the market prospects in this country of sunflower seed oil and cake from Southern Rhodesia. The commercial possibilities of the products and the uses of the various grades of the oil were indicated; it was pointed out that the grade not suited for edible purposes has to compete with linseed oil, the present value of which is low. Supplies of sunflower seed oil are obtained from Russia and Rumania and are sold under a guarantee of composition. Before tangible business in the oil from Southern Rhodesia would be possible, the product would have to be introduced to the market and establish a satisfactory position. It was suggested, therefore, that a small trial consignment should be submitted, and the names of firms who had offered to handle such a parcel and furnish reports on the prospects of marketing the product in the United Kingdom and elsewhere were mentioned. With regard to sunflower seed cake information was furnished as to the present price of decorticated and undecorticated cake, and mention made of the fact that the latter is difficult to sell owing to its " woody " nature.

A planter in a part of Kenya, whence freight charges to the coast are high, wished to cultivate high-priced crops such as essential-oil yielding plants. He was supplied with particulars relating to the cultivation of peppermint and lavender and was informed where planting material of suitable varieties might be obtained. Firms who specialise in the manufacture of equipment for distilling the oils were mentioned and arrangements made for the inquirer to interview a leading firm of essential-oil distillers interested in Empire supplies with a view to discussing the prospects of essential-oil production generally and gaining practical experience of the working of stills. He was also advised to attend a course of instruction on the preparation of essential oils, a suggestion which he adopted.

Empire Beeswax

Arising out of the circulation of a memorandum dealing with the production of beeswax in the Empire, prepared by the Imperial Institute at the request of the Empire Marketing Board, the possibilities of increasing the production of beeswax for export was being considered in Tanganyika. In this

connection information obtained from a firm in the trade was furnished regarding the considerations that affect the marketing of beeswax to the best advantage, and it was pointed out that uniformity of quality and packing is the principal factor on which the extension of the industry in Tanganyika is likely to depend. Particulars and quotations for equipment for clarifying the wax and machinery for shredding the material were forwarded, together with notes regarding methods available for bleaching beeswax. Statistics relating to the world's production and trade in beeswax in 1931 were also furnished.

Other inquiries dealt with included sources, uses and market quotations for gum arabic; the cultivation of chenopodium for the production of oil; possibilities of fruit-canning in British West Africa; methods of preparation of nicotine sprays; manufacture of condensed milk; the market prospects for pimento; the uses of porpoise products; the manufacture and marketing of wood pulp; the commercial utilisation of cotton stalks; the cultivation of the Madagascar butter bean and principal market; the uses of pineapple fibre; the marketing of vegetable oils; the market for banana chips and flour; and machinery for the drying of wattle bark.

Colour Fastness Problems of the Dye House

By D. A. GRYDER*

COLOUR fastness is a subject in which each and everyone that is connected either directly or indirectly with dyestuffs is interested. With the dyestuff manufacturers probably the greatest responsibility lies. It is they to whom we generally look to supply us with new and better products and to make possible the fulfilment of fastness demands of the consumer on the dyer and coloured goods manufacturer. The colour companies are constantly trying to bring out new and better types of colours and remove all the known evils of the present ones. To them we owe a great deal.

The dyestuff distributors and their laboratories render valuable service to the dyers by devoting their service and laboratories to helping the dyer give the best that is expected of him. Their laboratories are constantly being asked to match this or that shade or supply this or that dye in a suitable fastness for the coloured goods market. Their technical men stand ready to aid the dyer in his troubles and to help where possible to promote good-will and understanding. To the dyer the problem is to take the dyes supplied by the dye manufacturers and apply them to all classes of fibres in a successful manner. To do this he must take advantage of his own knowledge and experience in colours, the ability to test them, plus the aid and co-operation of the laboratories who would help him to bring out the maximum ability of the dyes so as to give a satisfactory fastness.

A Serious Obstacle to Overcome

Ever since dyes have been in use, obtaining satisfactory fastness has been a serious obstacle to overcome. In the past thirty or forty years much forward progress and improvement has been made. In 1909, probably the most outstanding improvement occurred—the introduction of the vat colours. This class of colours made obsolete many of the old type of dyes and to-day reigns supreme in many respects. They have wash fastness, light fastness, and in most cases, good bleach fastness, especially to chlorine. In their fastness to peroxide bleaching some of these colours could be improved, as hot solutions of bleach cause bleeding. At this point the dyer must use extreme care in choosing the proper colours.

Along with the introduction of new colours come new processes and new requirements of these colours. Fastness problem will always be with us, for as each new colour is introduced new fastness requirements are demanded by the ever changing demands of the customer. At the present time such a condition exists, due to the unusually slow market conditions brought on by lack of buying power of the consumers. The coloured goods manufacturers and the dyers are being pressed to imitate more expensive cloths and cheaper ones. To meet the price at which these goods sell the dyer must use the most economical dyes if he expects to make a profit, hence direct colours are used, vats being too expensive. Tremendous quantities of these direct colours are being used at present, especially on rayon draperies and upholstering. The fastness of these colours is questionable. Their ease of application plus their low cost has overshadowed quality to a great extent.

So-Called Light-Fast Colours

We know that these so-called light fast colours have very little wash fastness; however some of these colours are improved by after-treating with various chemicals with which we are all familiar. This, however, makes matching the colour more difficult, as most colours change considerably with this treatment. The process of after-treating has gained quite a bit of prominence, especially in hosiery dyeing, in the last year or so because of the demand for a faster hose to washing. The light fast qualities of direct colours are somewhat better, although not equal to the vat colours in this respect and not many if any, will stand the rigours of a June or July sun in a southern window. In spreads both light and wash fastness are needed. The developed and sulphur colours have simplified the problem on this class of goods, especially where brilliance of colour is not so essential. Any materials where direct colours are used should not be subjected to the same harsh or severe treatment as the more fast colours. However, this is often the case. Frequent complaints arise in the slashing of direct colours about bleeding in the size box. The inherent weakness of these dyes will not permit their use at boiling temperature. The treatment of these colours should be tempered with a large portion of common sense. If serious trouble arises it is because of improper co-operation with the dyer or else utter disregard for the type of dye used. Unfortunately, the dyer does not always have control of the uses or processes to which the materials are subjected. He can only hope that it is done by competent men, who endeavour to stay within the bounds of reason and to follow as closely as possible the standards and tests set up by this organisation. There are no "fool-proof" colours. Just because some colours are bought and sold as sun-fast or laundry-fast does not mean that they are suitable for awnings or that they will stand a strong alkaline boil.

A High Degree of Efficiency.

Theoretically, we may test the various colours to light, washing or bleaching and obtain a very high degree of efficiency, but on a practical scale they will not be successful. Most dyers have a supply of literature given them by the various dyestuff concerns showing different percentage dyeings along with fastness charts. This information is very helpful in a way, especially in obtaining the tone of the various colours tested. Otherwise, they only supply about as much information as a straw vote on some political problem—just an idea of what to expect. Let us enlarge on that statement a little. How many dyers or technical men would depend on a formula taken from a sample book on which to make a dyeing? None. Most tables give a fast to light rating of 1 to 6, or a similar ration. If these ratings were based on exposures made on a 2 per cent. dyeing then a 1 per cent. or a 3 per cent. dyeing would have a different rating. The density of colour effects the rate of fading very sharply. There is an inverse ration between light fastness and wash fastness. The heavier the dyeing, the better the light fastness; however, the reverse is true for the wash fastness of the colour. A heavy shade will crock and bleed much worse than light shades. The dyer must be careful in deciding the type of colour to use as the wrong choice may cause trouble. For example, where light fastness is important a black might stand eight to ten weeks but grey dyed from the same colour would be destroyed in a week's time. In the case of wash fastness in heavy shades it may be necessary to change to naphthols or vats to get the proper fastness. This condition is true in most cases as light shades show several times a faster rate of fading than heavy dyed shades.

* Reprinted from the "American Dyestuff Reporter."

Direct sunlight is the most severe test to which any colour will be submitted and in most cases fading is rapid. In subdued light, or light other than direct sunlight, the fading is slower and more uniform. We know that the intensity of light decreases with the square of the distance from its source. That is, the fading of an object three feet from a window is nine times slower than that of an object placed in the window. A colour on upholstering or bedspreads probably would be satisfactory, yet the same colour on draperies would not do. Another fastness requirement that the dyer must keep in mind is in the case of colour combinations. Choosing the proper combinations for light and wash fastness is as important as choosing the proper combination for level dyeing. In regards to wash fastness, no combined shade is faster than the weakest colour of the combination. However, this condition is not true in every respect in relation to light fastness. Yellow FF and Blue 4GL are considered fairly fast as self shades, yet in combinations the resultant green is much less fast than either of the original shades. In combinations of some other weaker colours an improvement in fastness is noted over the self shades.

We know that by treating cotton with a strongly alkaline bath such as a mercerising bath, that a much greater affinity for dyestuffs is set up in the fibres. Along with this condition another interesting thing happens, light and medium shades dyed on mercerised yarns have better wash fastness than the corresponding colours dyed on cotton. Another feature is brought out when dyed rayon and cotton are exposed together. The rayon seems to reflect light to a great extent thereby causing less fading than the cotton which absorbs more light. Sometimes a colour dyed on rayon would be entirely satisfactory and yet the same colour on cotton would receive a complaint. Seldom, if ever, do rayon garments receive as severe treatment as those made of cotton; complaints, therefore, are fewer.

End of "Hit and Miss" Methods

To-day, dyeing of the various fibres in jigs, padders, packages or warps has reached a higher plane. The haphazard, or hit and miss method of dyeing is gone forever in most dye houses. The skilful dyer is trained in his profession to apply scientific control methods to all his dyeings. To me it seems that the real problem of the dyehouse is not the actual dyeing operation but the choice of the proper colour and the ability to test that colour thoroughly. Fully 90 per cent. of the dyeing troubles are caused from improper matching of the colour before the dyeing is started or improper choice of colours for combination shades. If additions to the dye bath are necessary, faulty dyeings are usually the result either from streaks, poor fastness or damaged material through over processing. This especially is true in the dyeing of rayon yarns as the nature of this yarn will not permit abuse from any source. The successful dyer is not one who can make additions to a dye bath, but one who can keep from making them. Not all of the dye houses have sufficient laboratory equipment for testing the fastness of colours so that the dyer may do justice to himself and to the colours that he uses. Therefore, he must depend on the tests and matches of the laboratory from whom he purchases the dye. The success of these colours depends to a great extent on the skilful way in which they are compounded.

The Society of Chemical Industry

Arrangements for the Annual Meeting at Newcastle

FULL particulars have been issued of the arrangements for the fifty-second annual meeting of the Society of Chemical Industry, to be held at Newcastle-on-Tyne from July 10 to 14. This will be the third occasion on which the Society has held its annual meeting at Newcastle, previous meetings having been held there in 1884 and 1920. Dr. R. H. Pickard will deliver his presidential address on "The Industrial Use of Textiles," and Dr. J. T. Dunn, of Newcastle, will be elected as President of the Society for the ensuing year.

The arrangements have been made by the Newcastle Section of the Society, of which Mr. J. W. Craggs is hon. secretary. Arrangements are being made for privileges of membership of certain clubs and societies in Newcastle to be available to members of the Society on presentation of their Society tickets during the period of the meeting. Following is a summary of the programme:—

Monday, July 10, 7.30 p.m.—Informal reception in King's Hall, Armstrong College.

Tuesday, July 11, 10 a.m.—Meeting of Council of the Society in Council Room, Armstrong College. 10.45 a.m.—Annual general meeting in the King's Hall. Welcome to the Society by the Lord Mayor of Newcastle-upon-Tyne, Dr. J. W. Leech and the Principal of Armstrong College, Sir William Marris. Address by the president, Dr. R. H. Pickard, "The Industrial Use of Textiles." 1 p.m.—Luncheon at the New Assembly Rooms, Barras Bridge, by invitation of the chairman and committee of the Newcastle Section. 2.30 p.m.—Chemical Engineering Group Session in the Chemistry Lecture Theatre. Chairman: Mr. J. Arthur Reavell. Paper by Dr. S. L. Pearce, engineer-in-chief of the London Power Company, "The Application to the Battersea Power Station of Researches into the Elimination of Noxious Constituents from Flue Gases and Treatment of Resulting Effluents." Discussion initiated by Mr. G. Monhebel, of I.C.I., Ltd., Billingham. Discussion on a written contribution made by Mr. A. T. King, the Wool Industries Research Association, "The Fading of Dyed Fabrics under the influence of Sulphur Gases in the Atmosphere." 2.30 p.m.—Excursions for ladies to (a) Places of historic interest in the city, and (b) Durham Cathedral and Castle. 7.45 p.m. —Civic reception in the Laing Art Gallery, New Bridge Street, by invitation of the Lord Mayor and Lady Mayoress on behalf of the City Council.

Wednesday, July 12, 9.30 a.m.—Plastic Group Session in the Chemistry Lecture Theatre. Chairman: Mr. H. V. Potter. Paper by Professor B. Rassow, of Leipzig, "Plastic Masses, their Physical Importance and Applications." Discussion will be opened by Dr. L. A. Jordan. 11.15 a.m.—King's Hall. Presentation of the Medal of the Society to Professor W. A. Bone, who will deliver an address, "Forty Years of Combustion Research." 12.15 p.m.—Visit to Roman Wall (Housesteads), including luncheon, by invitation of the Lord Mayor and Lady Mayoress on behalf of the City Council. 7.30 p.m.—Annual dinner, New Assembly Rooms, Barras Bridge.

Thursday, July 13, 10 a.m.—Food Group Session. Chairman: Dr. L. H. Lampitt. General discussion on "How Science can help the Nation to produce more of its own Food." Speakers will include Professor H. D. Kay, head of the National Institute for Dairy Research, Reading, and Mr. H. J. Page, head of the Agricultural Research Station, of Imperial Chemical Industries, Jealotts Hill, Berks. 2.0 p.m.—Works visits: (a) North Eastern Electric Supply Co., Ltd., Dunston power station, (b) Co-operative Wholesale Society, Ltd., Dunston soap works, (c) C. T. Maling & Sons, Ltd., Pottery Works, Walker Road, Newcastle, (d) Armstrong Saurer, Commercial Vehicles Ltd., heavy oil engine works, Scotswood, Newcastle, (e) Consett Iron Co., Ltd., by-product coke works, Derwenthaugh, near Swalwell, (f) Swan Hunter, Wigham Richardson, Ltd., Dry Docks, Wallsend-on-Tyne, (g) A. S. Wilkin, Ltd., toffee works, Cremona Park, Benton. 7.30 p.m.—Reception in the King's Hall, Armstrong College, by the chairman of the College Council, Sir Cecil A. Cochrane, and the principal, Sir William Marris. A series of exhibits illustrating research and local industry will be on view.

Friday, July 14, 10 a.m.—Works visits: (a) Imperial Chemical Industries (Fertilizer & Synthetic Products), Ltd., Billingham, Stockton-on-Tees, (b) The Ashington Coal Co., Ltd., Ashington Collieries, Northumberland, (c) The North British Rayon Co., Ltd., artificial silk works, Jedburgh, Scotland.

Letter to the Editor

Applications of Chlorinated Rubber

SIR,—I was much intrigued by the title of the article on "Chlorinated Rubber," which appeared in THE CHEMICAL AGE, of June 3, more particularly as I have been interested in the manufacture and use of this product for over eight years. Both the discovery and the practical application of chlorinated rubber is essentially British, and dates back much longer than the two years given by Dr. Krumbhaar. My surprise at this initial inaccuracy was in no way lessened when I read that "the resistance of pure colourless chlorinated rubber films against water, that is, their swelling resistance, is relatively small. Thus when dipped in water they quickly become white. Resistance to water and aqueous solutions of acids and alkalies develops only when the film is pigmented."

While this may be true of German chlor rubber, though I venture to doubt even this, it is certainly not true of dry films of the British product, nor does resistance to acid or alkali depend on pigmentation. With properly made chlorinated rubber and correct formulation, adhesion is excellent, and its stability under normal conditions unimpeachable.

There are other points in the lecture open to criticism, but the statement relating to the impermeability to vapour is the most remarkable. We are told that conditions being equal a chlor rubber film is five to ten times less permeable than a linseed stand oil film, but that such impermeability is only reasonable, and alas not absolute. What must Dr. Krumbhaar's opinion of the permeabiilty of a stand oil film be? Chlorination rubber must indeed be a material to reckon with if it occasions such attacks as these.—Yours faithfully,

F. C. DYCHE-TEAGUE.

Technical Laboratories,
32 Great Dover Street, S.E.1.

Use of Pulverised Fuel

The "Grid" Burner

As a result of investigations into the use of pulverised fuel directed towards the burning of the fuel in the relatively small combustion spaces available in Lancashire and marine type boilers, the Department of Scientific and Industrial Research has issued a report (Fuel Research Technical Paper No. 36. Published for the Department of Scientific and Industrial Research by H.M. Stationery Office, price 6d. net) describing the design and performance of a new "grid" burner developed at the Fuel Research Station.

The new burner is stated to be cheap to construct, simple in operation, and, as far as can be judged from experience with experimental plant, reliable and easy to operate. The data contained in the report of tests carried out in an open combustion chamber in a Babcock and Wilcox boiler and in a Lancashire boiler bring out the adaptability of the boiler to varying loads and to variations in the type of coal used.

"It is considered," the report states, "that the 'grid' burner has been developed to a stage sufficiently advanced to prove that the principles involved in its design are capable of application to the commercial operation of a Lancashire boiler fired with powdered coal containing as little as 21 per cent. of volatile matter." At the same time it is emphasised that the results given do not represent finality, but rather show the lines on which development is proceeding.

Monel Metal in Cast Iron Welds

WHEN cast iron is welded with a steel or iron electrode the fusion point is extremely hard and non-machinable, and the surface can only be finished by grinding. For this reason Monel metal electrodes were introduced and their use is now being extended, experience having shown that, with proper welding apparatus, they give a surface capable of being machined as readily as the parent metal. The Monel metal rods supplied for the metallic arc welding of cast iron are coated with a special flux, which protects the weld metal from oxidation and fluxes off any oxides which may be formed. Bare Monel metal wire is supplied for oxy-acetylene welding and refined powdered borax should be used as a flux.

W. J. Bush and Co., Ltd.

A Satisfactory Year Reported

THE increase shown in the net profit made by W. J. Bush and Co., Ltd., for the year 1932, has been a source of satisfaction to the management, said Mr. J. M. Bush, the chairman and managing director, on the occasion of the company's annual general meeting, held in London on June 8.

Referring to the unfortunate explosion which occurred at the company's Mitcham factory in March last, the chairman said that premises, plant and stock were adequately insured, and they also carried a loss of profits insurance policy. Whatever their legal liability may be, they proposed to compensate third parties for losses sustained provided the evidence submitted is satisfactory. This matter is still being investigated, and at the moment the company does not know how much money will be involved, but resources are ample to provide for this contingency.

The most striking features in the balance sheet, compared with that of last year, are the expenditure of £18,593 in additions to plant and machinery and the reduction of £27,000 in bank loans secured on assets in Australia, whereas the reduction in cash on current and deposit accounts amounts to £19,700. Both the American and Canadian subsidiary companies show a decline in net profits, but possess substantial surpluses; business done by the Australian branch showed a most satisfactory recovery. The results of the Ottawa Conference up to the present have been somewhat disappointing so far as the company is concerned. The Canadian market, however, seems to offer the most benefits, and the company hopes very shortly to be in a position to take full advantage of the opportunities offered. Export business with foreign countries continues on a low level.

After providing the amount required for dividends on the preference shares and income tax, there remains a balance of £134,012, which is to be dealt with by the payment of a final dividend of 6 per cent. on the ordinary shares, making, with the interim dividend already paid, 9 per cent. for the year, and carrying forward the balance of £111,512.

Lord Hayter seconded the resolution adopting the report and statement of accounts, which was carried unanimously. On the proposition of the chairman, seconded by Mr. A. W. Bush (one of the managing directors), the final dividend recommended was approved. The chairman then proposed the re-election of Lord Hayter as a director of the company. Dr. P. C. C. Isherwood, Ph.D., F.I.C., seconded this resolution, and it was unanimously adopted.

The Mitcham Explosion

It is now two months since the explosion at Mitcham, when a number of the houses adjoining the factory were shattered and many rendered uninhabitable. It was attributed to a bolt becoming loose in a methylated spirit still, and the vapour escaping. Emergency measures were taken on behalf of those families whose houses were rendered uninhabitable. Fifty families were concerned in the explosion, and 17 of those are now residing in the Holborn Schools, at Mitcham. Others have found houses in which to live, and the remainder still live in the damaged houses. These families have had to put up with a little discomfort, but the Mitcham Urban District Council has done its part of the work and is still carrying on.

The position as it now stands is that those houses which were completely destroyed are not going to be rebuilt, as the Council does not consider it a suitable site, and some of them would not comply with the modern by-laws. Quite a lot of these families have received compensation, and the bulk of the claims have been paid. Accommodation has already been found for a number of these people in municipal houses. Those not yet housed are living in the Holborn Schools, and they are going to be housed as soon as the Council can get houses built for them.

There is a third group, comprising those families who are still living in the area where the explosion took place, but whose houses were partially damaged. In these instances the Council has served notices on the owners whereby they should make good the damage. Some of these houses have not yet been repaired as the owners are waiting for their claims to be met by the insurance companies concerned.

Boots Pure Drug Co., Ltd., under British Control

Lord Trent Suggests Unemployment Remedies

PRESIDING at the forty-fifth annual general meeting of Boots Pure Drug Co., Ltd., at Nottingham, on June 8, Lord Trent, chairman of the directors, said the company's new factory at Beeston was without doubt the finest block of buildings for its purpose in this country to-day, and all the business people who had seen it had expressed their admiration for the way the buildings had been laid out.

Referring to the profit and loss account, he said the net balance amounted to £701,453, or a decrease of £30,437 on the previous year. Bearing in mind the national unemployment figures, with cuts in so many salaries and wages, and the effect these had on the purchasing power of the great bulk of the company's customers, he thought the results should be considered satisfactory. After payment of all preference and preferred ordinary dividends, and of four quarterly dividends of 6 per cent., less tax, on the ordinary shares, there was a balance from the year's profits of £244,703, which together with the balance from last year amounted to £465,186. The directors recommended the payment of a bonus of 1s. per share, free of income tax, on the ordinary shares, absorbing £75,000, which was the same as last year. They also recommended a transfer to the reserve fund of £100,000, which would then stand at £1,500,000, and a transfer to the works development fund of £100,000, leaving £190,186 to be carried forward to next year.

A British Controlled Company

A matter which had naturally caused a great deal of concern to the staff had been the publicity and rumours about the change in the ownership of the company. The directors wished to thank all employees for their loyalty and the confidence they had shown during this trying time. Although the actual sale did not take place during the financial year under review, it was important to the company that he made no apology for referring to it on that occasion. They were now in the happy position of being again a British-controlled company. It was only fair to say that, during the time the business was controlled by American interests, they never attempted to interfere with the management in any way, and always welcomed any suggestion made by the directors which was for the good of the business as a whole. The shares were being widely distributed throughout the country, and if the new shareholders realised that it was up to them to support their own company when making any purchases of articles which could be obtained in the company's shops, it should materially help the business. The directors would welcome suggestions from customers, which would enable them to give a better service to the pubic.

Since 1929 the company's depreciation funds had increased by £157,143, total reserves by £600,000, and fixed assets by £951,560. The employees, too, were sharing in the company's prosperity. During these four years there had actually been a clear increase in staff; they had all been working on full time and the provision for staff pension fund has increased by £164,552. During that period they had paid a steady dividend of 24 per cent. and a bonus of 1s., which was still paid tax free, despite the increase in income tax.

Spending Power of the Public

The vital thing for the retail trade and ultimately for all trade was the spending power of the public, and whilst realising the need for rigid economy in unnecessary things, it was obvious that the country could not go on being taxed on the present scale, and that the present payments to the unemployed did not leave any margin to be spent on anything save bare necessities. It was equally obvious that they could not have millions of people permanently without work. No man of common sense would believe that it was practical politics to pay men for doing nothing, but not practical, by co-operating with industry, to pay them for normal work.

There had been many schemes for dealing with unemployment, of which Mr. Ernest Bevin's was the latest. There was not sufficient data to know to what extent a shorter working week would be generally practicable, and they must have facts to go upon before instituting a compulsory scheme, but there was no reason on earth why it should not be tested. Why should not the Government go to employers and say, "if you are willing to experiment, possibly not all over the works, but only in certain departments, on these lines, we will pay you a substantial percentage, say, two-thirds, of the unemployment pay for every extra hand you engage for a definite period of nine months, or a year, in order to work shifts, to see whether or not you can so increase your output that, although your workpeople are working shorter hours for the same wage, you are lowering your costs and able to sell more."

Finding Work for 100,000 People

It was ridiculous to say that the Government could not establish adequate safeguards to prevent such an experimental scheme from being exploited in the interests of individual employers. It was just as much in the interests of all the political parties as of the Government to obtain this data, as sooner or later 2,500,000 unemployed would bring any Government down.

More people were engaged in retailing in this country than in any other single occupation, and, moreover, there was no question of foreign competition where retailing is concerned. It was impracticable to reduce the hours worked in shops without seriously curtailing the opportunities for shopping which the public required. He therefore suggested "a compulsory month's holiday every year, with pay, for all employees engaged in retail trade." It would have to be enacted by law, since it would be impossible for a retailer to act on his own because his extra costs would be prohibitive. As far as one could judge, this should provide the equivalent of a year's work for approximately 100,000 additional people in the retail trade throughout the country. Retail prices might have to be slightly increased to cover the extra expense, but the public had not been seriously disturbed in recent years by much wider fluctuations than this scheme would involve. Moreover, in the long run, prices would readjust themselves because the existence of more people with money to spend and time in which to spend it would increase sales, and thereby reduce overheads. Special provision would no doubt have to be made for the smaller retailer, but he was confident that if the Government gave the lead that they had a right to expect of it it would find many progressive employers ready and willing to co-operate in such schemes as this to reduce unemployment and increase purchasing power.

A Definite Improvement

It was not possible generally—there were, of course, a few exceptions—for business to be prosperous and growing as long as the present vast number of unemployed existed. Great hopes were centred on the World Economic Conference for the betterment of world trade. There were many external conditions which they could not control without the co-operation of other nations, but there was still much that could be done to improve internal trade by a bolder attack on the twin problems of spending power and employment.

If a material fall in unemployment could be brought about, either by the means he had suggested or in any other reasonable manner, which would lead both to a decrease in taxation and also to an increase in the spending power of the public, they could view the future with optimism. From inquiries he had made in other businesses and from the figures of their own widely spread business, it was evident that there was a definite improvement over 12 months ago. This was not reflected at the moment in greatly improved figures, but there were more inquiries for work to be done, in a number of cases wholesale prices were hardening, there appeared to be a progressive decline in unemployment figures, and there was a distinctly better feeling in the air. But this was no excuse for sitting still and waiting for things to right themselves.

The Government made an excellent start by its handling of the national finances. Now was the time for a further step forward by an active move to increase the spending power of the public.

Works Equipment News

Three New Types of Inspection Handlamps

SEVERAL eminently useful types of shockproof handlamps have recently been evolved by the General Electric Co., Ltd. They are British-made throughout, and incorporate a number of refinements which should appeal to a wide circle of users. They have been expressly designed and produced in oak finish moulded Bakelite to comply with Home Office requirements, and are therefore recommended for workshop and factory use.

Ii the general workshop type (Fig. 1), special features well worthy of note are the Bakelite shield which effectively covers the lamp cap, thus minimising the possibility of accidental contact, and the tinned wire guard which is hinged at the bottom to facilitate lamp removal. This is held in position by slots between the moulded handle and the back-plate lampholder. The fixing screws are recessed on each side and cannot be removed by any unauthorised person. The guard is in no way electrically connected with the lampholder, and thus any risk is removed of the operator receiving a shock should one of the guard wires become detached. A similar type of handlamp is also available, in which the wire guard is, by a special process, completely covered with a rubber coating.

A further type of factory inspection handlamp (Fig. 3), with ebonised hardwood handle, strong galvanised wire guard, cord grip and Bakelite lampholder, together with a patented spring ring attachment for engaging the lamp and holding

Fig. 1. Fig. 2. Fig. 3.
Three New Types of G.E.C. Handlamps.

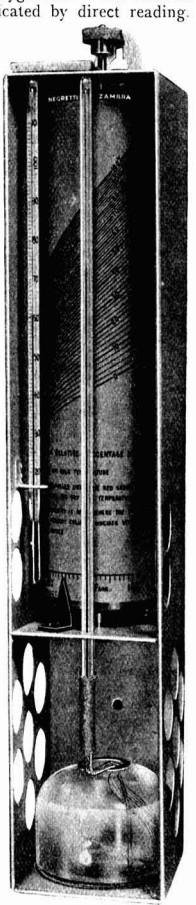
it in position, finds its chief advantages in the fact that it cannot be used unless the guard is properly fixed in position. If it should happen that the bulb of the lamp is shattered, the lamp cap is automatically ejected, so that no live parts are left exposed. Another point is that the person using the lamp is never faced with the problem of removing a lamp cap with jagged edges of glass from the holder. Should the lamp bulb only be cracked the retaining spring ring helps to support the lamp in position and prevents broken glass from falling into machinery or on to any special work that is being done. This method of fixing the lamp into the holder (which has two vertical slots devoid of the usual hooks for holding the pins of the lamp cap in the holder), acts also as a buffer and shock absorber which protects the lamp if it is dropped or knocked—the shock being taken up by the spring support. This device therefore contributes towards protecting and prolonging the life of the bulb.

A further type of handlamp (Fig. 2) possesses many advantages over the older types with wood handles and brass lamp holders, as it is fitted with an aluminium reflector in place of the ordinary wire guard. This is polished on the outside and frosted inside. It is secured between a Bakelite handle and the lampholder by means of recessed screws. The lamp fixes into a Bakelite holder and all risk of contact with the cap of the lamp is therefore removed. The handlamp is fitted with a polished brass hook so that it can be hung on handrails, etc. It gives a concentrated beam of light which can be directed wherever it is required, and it is thus extremely useful for reading charts, thermometers, etc., especially at night when the general lighting is subdued. The diameter of the reflector is $4\frac{1}{2}$ in.

A Direct Reading Hygrometer

IN the Negretti and Zambra "Hygrovisor" the relative humidity of the atmosphere is indicated by direct reading. The instrument is suitable for factories and industrial use generally, requiring little attention and no skill in reading. It is a modified form of the wet and dry bulb hygrometer suggested by Mr. E. A. Griffiths, government physicist, South Africa.

With the usual forms of wet and dry bulb hygrometers readings are obtained independently and reference made to a table or chart in order to obtain the relative humidity. These hygrometers are in common use, but they are not direct reading and require some skill or experience if humidity is to be obtained with accuracy. For industrial use the hair hygroscope is largely used because it is direct reading, but it can only give an approximation of relative humidity; although it is of value in showing the dry and wet conditions of the atmosphere, it cannot give the accurate readings of ventilated wet and dry bulb hygrometers. The "Hygrovisor" overcomes the main objection of the wet and dry hygrometer inasmuch as it gives a direct reading. A scale of humidity is mounted on a drum, and the relative humidity is read direct from this scale. If the air temperature has changed, the drum is set to the required dry bulb temperature and the reading of humidity is again directly obtained. The curves of relative humidity agree closely with the Bureau of Standards tables for use with artificially ventilated wet and dry bulb hygrometers. It is assumed that the instrument will be subjected to a free flow of air or that, if in stagnant air, the bulbs will be fanned before a reading is taken.



The "Hygrovisor"

The "Hygrovisor" is constructed with two mercury-in-glass thermometers, one figured and divided on the stem, and the other a wet bulb thermometer undivided on the stem but mounted in front of a vertical drum on which the scale of humidities are marked, together with a scale of wet bulb temperatures. The ventilated sheet metal case gives ample protection. A large water bottle contains sufficient distilled water for one week, and providing the supply of water is maintained and the wick on the wet bulb renewed from time to time, the instrument requires no checking or further attention.

Lovibond Comparator for pH Determinations

Lovibond Comparator showing Test Tubes and Standard Colour Glasses

A Convenient Form of pH Comparator

IN response to repeated requests for permanent colour standards for *pH* determinations, Tintometer, Ltd., have co-operated with The British Drug Houses, Ltd., in the production of a handy form of comparator in which the colour produced, on the addition of a measured quantity of indicator to the liquid under examination, is compared with permanent colours prepared with the well-known Lovibond glasses. These colour slides have been established by very careful comparison with solutions of known pH and B.D.H. indicators.

The Lovibond comparator, here illustrated, consists of a metal case 3½ in. x 3¼ in. x 1¼ in., opening like a book, and furnished at the back with an opal glass screen and two partitions to take the test-tubes containing the liquid under examination. In the front portions are two round holes, 7/16 in. in diameter, situated side by side opposite to the opal glass screen and coinciding with the partitions for the test-tubes. The standard coloured glasses, nine in number, are fitted into a flat bakelite disc which may be rotated in the front half of the case; this brings the standard colours in turn opposite the left-hand hole, behind which is a test-tube filled with the liquid being tested. The right-hand test-tube contains the same liquid together with the specified quantity of the appropriate indicator, and this coloured solution is viewed hrough the right-hand hole, and the colour comparison is made with the permanent standards on the left-hand side. In this way, compensation is made for any inherent colour of the liquid. The pH values, corresponding with the colours in the field of view, are engraved on white ivorine discs which appear in a third hole in the front of the case. Provision is made in the case for a bottle of indicator and a graduated pipette for its measurement.

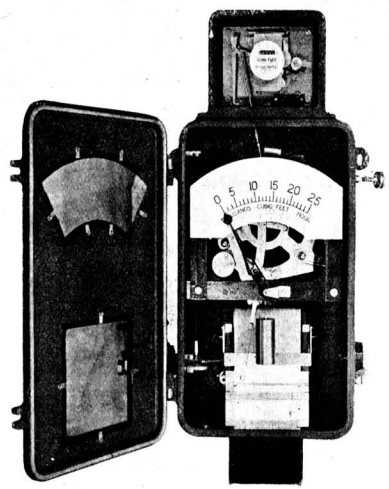
Each bakelite disc containing the standard coloured glasses represents the complete colour change of one indicator in steps of 0.2 pH. The discs are interchangeable and may be readily removed from the comparator and replaced by the appropriate disc for another indicator. Discs standardised on B.D.H. indicators are at present available for a variety of ranges in pH value.

A Balanced Pressure Recorder

RECENT developments in the measurement of the flow of low pressure air and gas include an interesting type of recorder manufactured by George Kent, Ltd. This instrument, known as the "ring type" balanced recorder operates in conjunction with an orifice fitting or differential pressure creating device. The meter is so designed that it is particularly immune to dust, heat and vibration. These qualities combined with accuracy and a robust mechanism make it suitable for use in steel works and for measuring furnace gases, furnace blast, coke oven gas, etc.

The instrument consists essentially of two closed chambers, to which the differential pressure from the orifice plate is brought, these chambers being carried by a frame which is pivoted on a knife edge made of glass-hard and rustless material, and which also carries the recording pen and indicating pointer. The width of the chart between zero and full load is 5 inches. The speed of feed of the diagram is 1, 2 or 3 inches per hour, 1 inch being the standard figure. At a speed of 1 inch per hour the chart roll is sufficiently long to last for 30 days. The chart drive is at the centre of the chart, thus practically eliminating errors due to expansion and contraction of the paper. The drive is above the pen position so that the chart can be cut off right up to this position at any time. The flow lines are equally spaced, and the pen records accurately down to 1/10th of the flow. The chart clock can be either an eight day spring clock or an electric clock operated from A.C. supply.

Due to the precaution taken in design and manufacture, the level and the specific gravity of the oil used in the drum, may vary between wide limits without affecting the accuracy of the meter. The recorder can be operated at full flow on differential heads of 1, 2 and 4 inches W.G. On overloads the oil will continue to seal within the drum until 8 inches W.G. differential, after which it releases the differential, and returns to correct zero when the flow subsides or the meter equalised. The integrator mechanism consists of a spindle which is rotated by a "Warren" motor at a speed of one revolution per minute, and a clutch which is thrown into gear at a point in the revolution corresponding to the quantity to be added to the counter reading. The motor is synchronously driven from one phase of alternating current supply mains and consumes about 4 watts. Variations of frequency ordinarily met

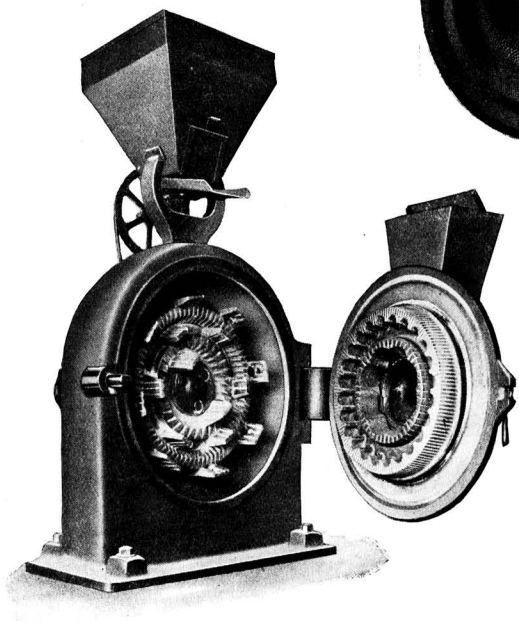


The Kent "Ring Type" Balanced Pressure Recorder

with are not sufficient greatly to affect the accuracy of the integrator. The meter is designed for a maximum working pressure of 20 lb. per sq. in. and accuracy is guaranteed to within 2 per cent. down to 1/7th of the maximum flow.

Commercial Pulverisation

DURING the last few years a great and definite step forward has been taken in the design and efficiency of grinding machinery, and International Pulverisers, Ltd., can claim to manufacture a mill, the "Pulmac," which is not only a sound engineering job, but a most efficient machine in every way, and is an all-British production. This Pulmac mill has many unique and important features. It is not only an impact mill, but has also shearing and grinding actions and grinds material against material. It performs ten successive operations in one throughout, reducing even the most abrasive materials to an impalpable powder, or to the fineness desired, giving a uniform product. Any fineness can be obtained by the special clearance adjustment device, with which the clearance between the rotor and stator crowns can be increased or decreased at will. A further advantage of this very ingenious device is that any wear on the crowns can be taken up with the result that the crowns can be worked to destruction without impairing the grinding capabilities of the mill.



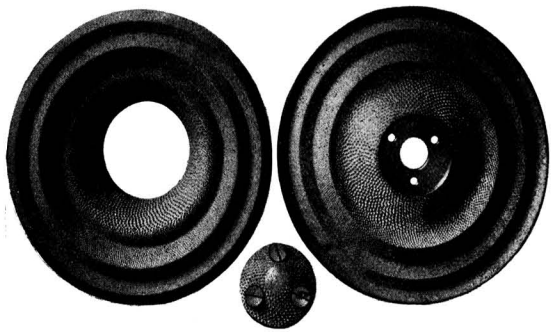
The "Pulmac" Mill, showing Interior and Crowns

This mill is claimed to reduce grinding costs and speed up output; it takes less power than its competitors, the reason for this being, that the maximum duty is performed near the shaft and not at the periphery. The mill is manufactured in four sizes. It needs the minimum of attention, and occupies very little floor space; it needs no heavy and expensive foundations, and most important of all, is built to stand the roughest usage. The standard crowns are made of manganese steel, which stands up to the most abrasive materials. When used for grinding of rubber, cork, paper and similar materials, rasped crowns are substituted for the standard crowns. For the grinding of cork, to a fine granulation, this mill stands alone, as it gives only 2 per cent. of dust.

Among the many materials for which the Pulmac mill is being successfully employed are asbestos, asphalt, bakelite, cellulose acetata, chalk, china clay, coal, fertilisers, graphite, gypsium, isinglass, limestone, mica, oyster shells, roots, rubber, salt, soapstone, etc.

Choosing the Right Fuel

WITH all steam gerenation plant the correct policy is to equip the installation so that any variety of solid fuel can be burned, and then use the fuel which represents the cheapest price per available heat unit under the given local conditions. In many cases the savings to be obtained are of a most substantial character. A notable recent example in London is a 30 ft. x 8 ft. "Lancashire" boiler in one of the Government departments operated entirely for hot water circulation. Originally there was burnt high grade Welsh steam coal costing 34s. 6d. per ton. This boiler, however, was modernised, and a hand-fired "Turbine" forced draught steam jet furnace installed, operated with a motor-driven fan and suitable trunking taking the air down to the front of the boiler beneath the grate, with suitable control by means of dampers.



The fan requires a 2 h.p. motor, delivering 3,000 cu. ft. of air per minute, and as a result Kent washed coal smalls are now being used at 19s. per ton instead of the previous Welsh coal, at 34s. 6d per ton. Further, the amount of Kent coal is only 7½ per cent. more than in the case of the Welsh coal, so that the saving obtained is enormous, over 40 per cent. of the coal bill. There are, however, a very large number of cases where 25-40 per cent. can be saved.

Another example using these forced draught furnaces, supplied by the Turbine Furnace Co., Ltd., is on a plant of two "Lancashire" boilers in Kent, operated by natural draught. Previously there was burnt Nottingham hard steam coal at 38s. per ton, in spite of the fact that the plant is almost adjoining the Betteshanger Colliery in Kent. However, forced draught furnaces were installed, in this case using steam jets, and there is now burnt Betteshanger washed small coal at 19s. per ton, giving the same steam output with about the same amount of coal, corresponding to approximately 50 per cent. saving in the coal bill.

British Colour Standards

Object of the Scheme

STEADY progress is being made with the British colour standardisation scheme which was referred to in THE CHEMICAL AGE last week. Mr. R. F. Wilson, general manager of the British Colour Council, informs us that his Council is taking the lead in the work, the object of which is to establish recognised standards for colours employed in industry, and not, as suggested by critics, to impose arbitrary restriction upon the use of colours outside the range adopted as standards.

The proposed standard card will be quite different from the seasonal cards issued by the Council, and is necessitated by the chaotic state that exists with regard to colours in constant demand. At present there are no fixed standard definitions which can be applied in the same way that definitions can be applied to length or weight. There is, for instance, no definite colour which can be recognised as "sky blue," and a similar condition exists where other colours are concerned.

We hope to publish a communication from Mr. Wilson on the subject next week.

Chemical Industry Lawn Tennis Tournament

First Round Results: Second Round Draw

THE first round matches in the third annual Chemical Industry Lawn Tennis Tournament were concluded last week-end, and the draw for the second round was completed on Tuesday. Features of the first round matches in the men's doubles have been the defeat of S. E. Chaloner and W. Speakman (Monsanto Chemical Works, Ltd., Ruabon), holders of THE CHEMICAL AGE silver challenge cup, and of C. G. Copp and W. W. Marchant (Doulton and Co., Ltd.), who were in the semi-final last year. L. Giltrow and G. F. Hammond (Williams, Hounslow, Ltd.) the runners-up in 1932, and C. W. Urban and H. Barningham, the latter in the place of F. S. Mortimer (Monsanto Chemical Works, Ltd., London), who reached the semi-final, have won their first round matches. In the singles, Speakman, Chaloner, Urban and Barningham have been defeated and Marchant has scratched, but Giltrow and Copp have proceeded to the second round. Appended are the results of the first round matches.

Singles

P. A. Tunstall (Salt Union, Ltd., Liverpool) beat S. E. Chaloner (Monsanto Chemical Works, Ltd., Ruabon) 6—4, 6—3.

I. Williams (Monsanto Chemical Works, Ltd., Ruabon) beat J. L. Wilkinson (J. Crosfield and Sons, Ltd., Warrington), 6—2, 6—2.

R. C. Pennington (J. Crosfield and Sons, Ltd., Warrington) beat W. Speakman (Monsanto Chemical Works, Ltd., Ruabon) 4—6, 6—4, 6—2.

R. S. Law (Howards and Sons, Ltd.) beat W. Backinsell (Le Grand Sutcliff and Gell, Ltd.) 6—3, 6—1.

L. Giltrow (Williams (Hounslow), Ltd.) beat R. Frost (The British Oxygen Co. Ltd) 6—3, 6—2.

J. Wilson (British Celanese, Ltd.) beat R. C. Mugridge (Borax Consolidated, Ltd.) 6—0, 6-2.

D. Blow (The British Drug Houses, Ltd.) beat D. B. Hodgson (George Scott and Son (London) Ltd.) 6—2, 6—3.

W. L. Alldis (Brandhurst Co. Ltd.) beat P. Smith (Bakelite, Ltd.) 6—2, 6—2.

R. George (J. Crosfield and Sons, Ltd., Warrington) walk-over B. T. Francis (Bakelite, Ltd.) scratched.

W. J. Sharman (Williams (Hounslow), Ltd.) beat E. C. Keeley (Bovril, Ltd.) 6—4, 7—5.

A. Collins (British Oxygen Co., Ltd.) beat R. A. Nottingham (Le Grand Sutcliff and Gell, Ltd.) 6—3, 6—1.

S. B. Perridge (Brandhurst Co., Ltd.) beat F. G. Pretlove (George Scott and Son (London) Ltd.) 6—1, 8—6.

E. A. Thomsett (British Oxygen Co., Ltd.) walk-over W. W. Marchant (Doulton and Co., Ltd.) scratched.

A. Tickner (British Celanese, Ltd.) beat H. R. Whittaker (Williams (Hounslow) Ltd.) 2—6, 6—4, 6—2.

C. G. Copp (Doulton and Co., Ltd.) beat H. Barningham (Monsanto Chemical Works, Ltd.) 7—5, 4—6, 6—3.

L. F. Grape (Borax Consolidate, Ltd.) beat J. W. Urban (Monsanto Chemical Works, Ltd.) 6—2, 6—4.

Doubles

W. B. Miller and G. Lord (British Celanese, Ltd., Derby) beat G. E. Mountney and E. G. Almond (Bakelite, Ltd., Birmingham) 6—1, 7—5.

R. C. Pennington and R. George (J. Crosfield and Sons, Ltd., Warrington) beat S. E. Chaloner and W. Speakman (Monsanto Chemical Works, Ltd., Ruabon) 8—6, 6—1.

R. Welsh and E. Thomsett (British Oxygen Co. Ltd.) beat R. A. Nottingham and F. Pritchard (Le Grand, Sutcliff and Gell, Ltd.) 6—4, 6—4.

J. Wilson and A. Tickner (British Celanese, Ltd.) beat C. G. Copp and W. W. Marchant (Doulton and Co., Ltd.) 9—7, 6—3.

W. J. Sharman and H. R. Whittaker (Williams (Hounslow), Ltd.) beat D. Blow and K. L. Fuller (The British Drug Houses, Ltd.) 6—1, 6—2.

W. L. Alldis and S. B. Perridge (Brandhurst Co., Ltd.) walk-over B. T. Francis and P. Smith (Bakelite, Ltd.) scratched.

L. F. Grape and A. F. Childs (Borax Consolidated, Ltd.) beat A. A. Killick and G. A. Brittain (B. Laporte, Ltd.) 6—4, 6—3.

L. Giltrow and G. F. Hammond (Williams (Hounslow), Ltd.) beat L. R. Fradin and R. C. Mugridge (Borax Consolidated, Ltd.) 6—1, 6—0.

V. J. Prosser (John Haig and Co., Ltd.) and A. Baxter (United Yeast Co., Ltd.) beat G. Ormiston-Smith and E. Smith (Riley Harbord and Law) 6—4, 6—0.

E. C. Keeley and G. H. Trigg (Bovril, Ltd.) beat B. J. Eckett and S. Harbour (Williams (Hounsow), Ltd.) 7—5, 6—1.

H. W. Drew and W. G. Baldock (Williams (Hounslow), Ltd.) beat M. B. King and R. H. Hornsby (Howards and Sons, Ltd.) 6—4, 6—4.

A. Collins and H. Sibley (British Oxygen Co., Ltd.) beat A. G. R. Clarke and E. C. Browne (G. A. Harvey and Co. (London) Ltd.) 6—4, 6—4.

N. Hogg and H. Short (Riley, Harbord and Law) walk-over C. H. B. Jones and Eric Cox (Anglo-Persian Oil Co., Ltd.) scratched.

R. F. Porter and R. S. Law (Howards and Sons, Ltd.) beat D. B. Hodgson and F. G. Pretlove (George Scott and Son (London) Ltd.) 6—3, 5—7, 7—5.

J. W. Urban and H. Barningham (Monsanto Chemical Works, Ltd.) beat H. R. Rowlinson and R. Whiteman (British Drug Houses, Ltd.) 6—0, 6—1.

J. Haines and F. G. Hawley (Anglo-Persian Oil Co.) beat M. H. How and H. Shaw (Johnson, Matthey and Co., Ltd.) 6—3, 6—4.

Details of the second round draw are given below. All second round matches must be played by **Monday, July 3,** and the results, signed by all players (winners and losers) must be forwarded to reach the Editor of THE CHEMICAL AGE not later than 9.30 a.m. on Tuesday, July 4. A summary of the rules, so far as they govern the second round of the tournament, is reproduced.

The Second Round Draw

SINGLES.

Copp, C. G. Doulton & Co., Ltd., 28, High Street, Lambeth, London, S.E.1. (Reliance 1241.)	*v*	**Sharman, W. J.** Williams (Hounslow), Ltd., Hounslow. (Hounslow 2929.)
Tickner, A. British Celanese, Ltd., 22/3, Hanover Square, London, W.1. (Mayfair 8000.)	*v*	**Blow, D.** The British Drug Houses, Ltd., Graham Street, City Road, London, N.1. (Clerkenwell 3000.)
Perridge, S. B. Brandhurst Co.. Ltd., Vintry House, Queen Street Place, London, E.C.4. (Central 1411.)	*v*	**Giltrow, L.** Williams (Hounslow), Ltd., Hounslow. (Hounslow 2929.)
Wilson, J. British Celanese, Ltd., 22/3, Hanover Square, London, W.1. (Mayfair 8000.)	*v*	**Collins, A.** British Oxygen Co., Ltd., Angel Road, Edmonton, London. (Tottenham 2647.)
Law, R. S. Howards & Sons, Ltd., Uphall Works, Ilford, Essex. (Ilford 1113.)	*v*	**Alldis, W. L.** Brandhurst Co., Ltd., Vintry House, Queen Street Place, London, E.C.4. (Central 1411.)
Tunstall, P. A. Salt Union, Ltd., 20, Water Street, Liverpool. (Central 4370.)	*v*	**Pennington, R. C.** J. Crosfield & Sons, Ltd., Bank Quay, Warrington. (Warrington 800.)
Williams, I. Monsanto Chemical Works, Ltd., Ruabon, North Wales. (Ruabon 3.)	*v*	**George, R.** J. Crosfield & Sons, Ltd., Bank Quay, Warrington. (Warrington 800.)
Thomsett, E. A. British Oxygen Co., Ltd., Angel Road, Edmonton, London. (Tottenham 2488.)	*v*	**Grape, L. F.** Borax Consolidated, Ltd., 16, Eastcheap, London, E.C. (Royal 1450.)

DOUBLES.

Giltrow, L., & Hammond, G. F. Williams (Hounslow), Ltd., Hounslow. (Hounslow 2929.)	*v*	**Collins, A., & Sibley, H.** British Oxygen Co., Ltd, Angel, Road, Edmonton, London N.18. (Tottenham 2647 and 2488.)
Pennington, R. C. & George, R. J. Crosfield & Sons, Ltd., Bank Quay, Warrington. (Warrington 800.)	*v*	**Miller, W. B., & Lord, G.** British Celanese, Ltd., Spondon, near Derby. (Derby 2200.)

Grape, L. F., & Childs, A. F.
Borax Consolidated, Ltd., 16, Eastcheap, London. (Royal 1450.)

v

Wilson, J., & Tickner, A.
British Celanese, Ltd., 22/3 Hanover Square, London, W.1. (Mayfair 8000.)

Haines, J., & Hawley, F. G.
Anglo-Persian Oil Co., Britannic House, Finsbury Circus, London, E.C.2. (National 1212.)

v

Welsh, R., & Thomsett, E.
British Oxygen Co., Ltd., Angel Road, Edmonton, London. (Tottenham 2488.)

Hogg, N., & Short, H.
Riley, Harbord & Law, 16, Victoria Street, London. (Victoria 2661.)

v

Alldis, W. L., & Perridge, S. B.
Brandhurst Co., Ltd., Vintry House, Queen Street Place, London, E.C.4. (Central 1411.)

Drew, H. W., & Baldock, W. G.
Williams (Hounslow), Ltd., Hounslow, Middx. (Hounslow 2929.)

v

Urban, J. W., & Barningham, H.
Monsanto Chemical Works, Ltd., Victoria Station House, London. (Victoria 1535.)

Sharman, W. J., & Whittaker, H.R.
Williams (Hounslow), Ltd., Hounslow. (Hounslow 2929.)

v

Prosser, V. J., John Haig & Co., Ltd., 2 Pall Mall East, London (Whitehall 1040), & **Baxter, A.,** United Yeast Co., Ltd., 238, City Road, London. (Clerkenwell 0303.)

Keeley, E. C., & Trigg, G. H.
Bovril, Ltd., 148/166, Old Street, London. (Clerkenwell 1202.)

v

Porter, R. F., & Law, R. S.
Howards & Sons, Ltd., Ilford, Essex. (Ilford 1113.)

Rules

The competition shall be conducted on the knock-out principle, and the best of three advantage sets shall be played in all matches, except in the Final of the Singles, when the best of five sets shall be played.

The Editor of THE CHEMICAL AGE shall have the right to scratch any players who fail to play off their matches by the stipulated dates, or who otherwise fail to conform with the rules and regulations governing this competition.

Except in the case of the special period set apart for the final stages of the competition, players drawn against each other must make their own arrangements for playing off their match on a court mutually agreed upon. In the event of disagreement, the first name drawn shall have the right to choose the ground.

The result of each match must be sent by the winners to the Editor of THE CHEMICAL AGE, signed by all players (winners and losers) immediately after the match, and must reach the office of THE CHEMICAL AGE not later than by the first post on the day following the final day for playing off the round. In the case of the second round the results must be received not later than 9.30 a.m. on Tuesday, July 4.

If any player be not present at the agreed place or time of the match, opponents shall be entitled to a walk-over, after having allowed reasonable time (say, a maximum of one hour) for the others' appearance. If the players find it impossible to play off their match on the day originally chosen, they must play it on any other day, to which both sides agree, within the stipulated period.

Any dispute arising between players, or otherwise, shall be referred to the arbitration of the Editor of THE CHEMICAL AGE, whose decision shall be final.

While competitors will make their own arrangements as to hard or grass courts for the preliminary rounds, it must be understood that the Finals will be played on hard courts.

"The Independent"

A New Weekly Review

ANOTHER new journal is to be published from Bouverie House, under the title of "The Independent." Published by Independent Weekly Publications, Ltd., with Sir Ernest Benn as editor, Dr. T. E. Gregory in charge of economics and finance, and Mr. E. G. Hawke in charge of literary and general matters, "The Independent" will be a high class sixpenny weekly review, the newspaper of liberty, economy and individualism. Its policy will be anti-political. The writer with a scheme for the control of others, the expert in the way that others should behave, the spender of other people's money, the committee-man and the conference-monger who know how to reconcile right with wrong, will find no place in its pages.

While "The Independent" owes its origin to the Individualist Bookshop and the Friends of Economy, it will not be merely a financial or economic review, but it will aim at serving and helping all those citizens who feel that there are higher forms of citizenship than the present mania for meddling in everybody's affairs.

According to a preliminary announcement issued this week, the first number of the new journal will be published on October 7.

World Petroleum Congress

An Extensive Programme of Papers

THE World Petroleum Congress, organised by the Institution of Petroleum Technologists, is to be held at the Imperial College of Science and Technology, South Kensington, from July 19 to 25. A general programme, giving titles of papers to be presented, may be obtained on application to the Secretary of the Congress, Institution of Petroleum Technologists, Aldine House, Bedford Street, London, W.C.2.

Papers to be presented in the Refining and Chemical Engineering Section include, "A Historical Account of Hydrogenation," by Dr. F. Bergius; "Ten Years' Research on the Hydrogenation of Materials at the University of Delft," by Professor H. I. Waterman; "An Historical Account of Hydrogenation and a demonstration," by Dr. W. R. Ormandy, "Recent Progress on Catalysis and Hydrogenation," by Dr. M. Pier, "Hydrogenation of Gas Oil *vis-à-vis* the Cracking of Gas Oil," by R. T. Haslam; "The Upgrading of Lubricating Oils by Hydrogenation," by R. T. Haslam; "Hydrogenation of Coal," by K. Gordon; "The Principles of Solvent Extraction Applied to the Refining of Oils," by T. G. Hunter and Professor A. W. Nash; "Selective Solvents," by Dr. J. Rosenberg; "Phenol as a Selective Solvent in the Refining of Lubricating Oils," by Dr. R. K. Stratford, H. H. Moor, and O. S. Pokorny; "Sulphonation of Light Lubricating Oil Fractions by means of Sulphur Trioxide," by J. M. Kligerman; "Theory of Refining by Extraction," by Dr. W. J. D. van Dyck; "Refining of Cracked Gasolines," by Jacque C. Morrell and Gustav Egloff; "Refining of Cracked Gasoline," by W. H. Thomas; "The Refining of Motor Spirits from the Low-Temperature Carbonization and Hydrogenation of Coal," by A. B. Manning; "Gasoline Inhibitors," by G. Egloff, J. C. Morrell, C. D. Lowry, Jr., and C. G. Driver; "The Inhibitory Action of Various Substances on the Deterioration of Olefinic Fuel Spirits," by E. W. J. Mardles and H. Moss; "The Polymerisation of Gaseous Olefines as a Source of Liquid Fuels," by A. R. Bowen and Professor A. W. Nash; "Colloidal Fuels," by W. H. Cadman; "Compressed Gases," by Dr. C. M. Walter; "Alcohol Fuels," by Dr. W. R. Ormandy; "Producer Gases as Fuels," by J. Russel; "Substitute Diesel Fuels and Lubricating Oils," by D. A. Howes; "Low-Temperature Carbonization," by F. S. Sinnatt.

Membership of the Congress is open to all persons interested in the petroleum industry; the fee of membership is 10s. His Majesty's Government has intimated its willingness to give a Government reception to the delegates. Arrangements are being made for a lecture by Sir John Cadman, at the Royal Institution (by courtesy of the Managers), a banquet at the Mayfair Hotel, on Monday, July 24, and a dinner by the Council of the Institution of Petroleum Technologists to the foreign delegates to the Congress at the Mayfair Hotel on Thursday, July 20. Exhibitions of films illustrating the petroleum industry will be given in the Cinema of the Imperial Institute, and there will also be visits to works and laboratories of interest. The Oil Industries Club are also arranging social functions during the Congress week. Those wishing to become members of the Congress are requested to communicate with the Secretary, enclosing their fee of 10s. as soon as possible. Only members of the Congress will be permitted to attend the meetings and other functions provided in the programme.

New Dyestuffs Licences

Applications in May

THE following statement relating to applications for licences under the Dyestuffs (Import Regulation) Act, 1920, made during May, has been furnished to the Board or Trade by the Dyestuffs Advisory Licensing Committee. The total number of applications received during the month was 733, of which 655 were from merchants or importers. To these should be added the one case outstanding on April 29, making at total for the month of 734. These were dealt with as follows: Granted, 717 (all dealt with within seven days of receipt). Referred to British makers of similar products, 14 (all dealt with within seven days of receipt); outstanding on May 31, three. Of the total of 734 applications received, 731 or nearly 100 per cent. were dealt with within seven days of receipt.

News from the Allied Industries

Pottery

WHILE THREE MEN were clearing rubbish from between two kilns, prior to the erection of a flat roof between the two structures, at the Ellgreave Pottery, of Wood and Sons, Burslem, on June 13, the front of one of the kilns collapsed. John Thompson (37), of Hall Street, Burslem, the father of nine children, was buried by falling debris, and was killed. Charles Adams, of Albert Street, Burslem, and Samuel Smith, of Hitchen Street, Burslem, are detained in the Haywood Hospital, Burslem. Adams's condition was stated to be critical.

Iron and Steel

THERE WERE SEVENTY-TWO FURNACES in blast at the end of May, an increase of three since the beginning of the month, four furnaces having been blown in and one having ceased operations. The production of pig iron in May amounted to 339,900 tons compared with 324,700 tons in April and 315,300 tons in May, 1932. The production includes 84,900 tons of hematite, 149,600 tons of basic, 82,900 tons of foundry and 11,600 tons of forge pig iron. The output of steel ingots and castings in May amounted to 599,600 tons, compared with 509,600 tons in April, and 416,900 tons in May, 1932.

Fertilisers

UNDERWRITING is being arranged by the Anglo-Continental Guano Works, Ltd., for an issue of £250,000 of 5½ per cent. debentures at 105. The company has an authorised £225,000 of 7 per cent. debenture stock—£125,350 issued (the outstanding balance of £150,000 issued at 99 per cent. in December, 1922), and the balance deposited with bankers against loans. This stock is redeemable by an annual sinking fund of 1 per cent. of the total stock authorised, plus the amount of the annual interest on stock redeemd, the fund to be applied in purchases below 105 per cent. before January 1, 1934, and thereafter below 102½ per cent. or in drawings at 105 per cent. before January 1, 1934. The company also reserves the right to redeem the 7 per cent. stock in whole or part on three months' notice within the same dates at the same prices.

Artificial Silk

WITH A VIEW TO PROFITING by the fall of the dollar, the board of the Tubize Artificial Silk Works has decided to repay three-quarters of its debt owing to the International Holding Co. This will be accomplished through the sale, on favourable terms, of part of the Tubize investments.

China Clay

THE SHIPMENTS OF CHINA CLAY for May shows an improvement on the preceding month by nearly 5,000 tons, the detailed statistics of the traffic is as follows:—

						tons	
Fowey	33,830	tons of	china clay	against	29,943	in	April.
,,	1,226	,, ,,	,, stone	,,	963	,,	
,,	2,038	,, ,,	ball clay	,,	100	,,	
Par	7,479	,, ,,	china clay	,,	9,356	,,	
,,	185	,, ,,	,, stone	,,	1,123	,,	
Charlestown	6,640	,, ,,	,, clay	,,	6,466	,,	
,,	423	,, ,,	,, stone	,,	744	,,	
Penzance	1,527	,, ,,	,, clay	,,	504	,,	
Looe	298	,, ,,	,, ,,	,,	nil	,,	
Plymouth	137	,, ,,	,, ,,	,,	93	,,	
Newham	54	,, ,,	,, ,,	,,	41	,,	
Railborne Traffic (Inland towns)	5,741	,, ,,	,, ,,	,,	4,594	,,	

The total aggregate was therefore 59,578 tons as compared with 53,927 tons in April.

ON HIS RECENT VISIT to the Cornish china clay industry the Prince of Wales expressed his pleasure that the firms of English Clays-Lovering, Pochin and Co., Ltd., were continuing the development of their research department. This firm has recently appointed Mr. R. J. Davies in this department and they are to be congratulated upon the appointment of the first research worker in the china clay industry. Mr. Davies, who was a student at the St. Austell County School, entered the University College of the South West, Exeter, in 1926, and after obtaining his B.Sc. with honours in physics he did two years research work under the direction of Professor Newman at the Washington Singer Laboratories, following which he was awarded the M.Sc. of London University. His new duties will include the setting up of a research laboratory, routine tests, and original investigations.

Trade with North Africa

Algerian Esparto Grass—Tunisian Phosphates

THE position of Algeria as a distributing market for neighbouring countries is emphasised in a report on Algeria, Tunisia, and Tripolitania issued by the Department of Overseas Trade (H.M. Stationery Office, price 3s. 6d.) Export trade in esparto is an important source of wealth to Algeria. The average weight of esparto exported during 1921-30 was 64,496 tons. Great Britain took 96.14 per cent. of the weight in 1929, 97.77 per cent. in 1930, and 99.65 per cent. in 1931.

Various factors which have developed within the last two years, such as competition from wood pulps from Northern Europe and Danube reed, and the use of bamboo for paper-making in Japan instead of the esparto pulps formerly imported from England, have contributed to the fall in market prices. The situation of the market has, moreover, been seriously aggravated by the abandonment of the gold standard in Great Britain and its effect upon the exchange. Tunisia is not the only source of supply; esparto is gathered in Algeria, in Morocco, in Tripolitania and in Spain and all possible measures have been taken in those countries to encourage and assist exportation. In Tunisia, on the contrary, the high export duty and railway freights are paralysing the trade. In Algeria the export duties have been reduced to 1s. 3d. per metric ton whereas in Tunisia they are about 12s. 6d. In Tunisia the railway freight is 17s. 6d. per ton; in Algeria it is about 15 per cent. less. The net cost price of esparto is £1 5s. per ton at the place of production, consequently the exporter has to pay 50 per cent. of the value of the merchandise as export duty. Handling and packing costs amount to about 10s. per ton and loading, storage and insurance varies between 6s. 9d. and 7s. 6d. per ton. The result is that the cost is nearly £3 10s. per ton and existing quotations are from £3 6s. to £3 7s. 3d.. These figures are merely nominal as business is dead.

The principal mineral mined in Tunisia are natural phosphates of lime, iron, lead, and zinc. In the first two months of 1932, 1,215,304 tons were exported. Upon the departure of Great Britain from the gold standard the question arose of the fulfilment of contracts for phosphates hitherto made in sterling. The Tunisian producers were confronted with a new situation in which payment in sterling would cause them heavy losses, particularly as phosphates are a low priced article in which prices are cut to the limit. They therefore insisted on the Tunisian Government taking steps to protect the industry, and the result was a Decree subordinating the export of phosphates of lime to permits granted by the Ministry of Finance. The grant of permits was made conditional on contracts being made in French currency, or in foreign currency which had not depreciated in gold value at a date after that on which the price of the tonnage to be exported was fixed, or in foreign currency which had subsequently depreciated but where an agreement has been made between the parties in regard to the amount of tonnage for which an export permit is requested. The decree is still in force but exporters have not availed themselves of its protective clauses, having made agreements as to the rates of exchange.

There were eight phosphate mines working in 1930 employing about 11,000 workmen, production was about 3,300,000 tons valued at £3,000,000. There were also eight mines working in 1931, employing 8,300 workmen, when production was about 2,150,000 valued at £2,000,000.

Weekly Prices of British Chemical Products

Review of Current Market Conditions

THE following market report is based on information supplied by the British manufacturers concerned, and unless otherwise qualified the figures quoted apply to fair quantities, net and naked at makers' works. Where no locality is indicated, the prices are general for the United Kingdom. Particulars of the London chemical market are specially supplied to THE CHEMICAL AGE by R. W. Greeff and Co., Ltd., and Chas. Page and Co., Ltd., and those of the Scottish chemical market by Chas. Tennant and Co., Ltd.

PRICES still remain very steady in the London chemical market and there is a good demand. There is a distinct improvement in inquiry for coal tar products and a reasonable amount of business is possing. Business in chemicals on the Manchester market this week has opened quietly after the holidays. Sales have not been extensive so far but the undertone is reasonably cheerful and some expansion of business is looked for when conditions settle down again. Steady to firm prices continue to rule in almost all sections of the market. Buying has been better during the past week in the Scottish heavy chemical market, and prices generally remain unchanged.

General Chemicals

ACETONE.—LONDON: £65 to £68 per ton; SCOTLAND: £66 to £68 ex wharf, according to quantity.

ACID, ACETIC.—Tech. 80%, £38 5s. to £40 5s.; pure 80%, £39 5s.; tech., 40%, £20 5s. to £21 15s.; tech., 60%, £28 10s. to £30 10s. LONDON: Tech., 80%, £38 5s. to £40 5s.; pure 80%, £39 5s. to £41 5s.; tech., 40%, £20 5s. to £22 5s.; tech., 60%, £29 5s. to £31 5s. SCOTLAND: Glacial 98/100%, £48 to £52; pure 80%, £39 5s.; tech. 80%, £38 5s. d/d buyers' premises Great Britain. MANCHESTER: 80%, commercial, £39; tech. glacial, £52.

ACID, BORIC.—SCOTLAND: Granulated commercial, £26 10s. per ton; B.P. crystals, £35 10s.; B.P. powder, £36 10s. in 1-cwt. bags d/d free Great Britain in 1-ton lots upwards.

ACID, CHROMIC.—11d. per lb., less 2½%, d/d U.K.

ACID, CITRIC.—LONDON: 9½d. per lb.; less 5%. MANCHESTER: 9¾d.

ACID, CRESYLIC.—97/99%, 1s. 1d. to 1s. 7d. per gal.; 98/100%, 1s. 5d. to 2s.

ACID, FORMIC.—LONDON: £47 10s. per ton.

ACID, HYDROCHLORIC.—Spot, 3s. 9d. to 6s. carboy d/d according to purity, strength and locality. SCOTLAND: Arsenical quality, 4s.; dearsenicated, 5s. ex works, full wagon loads.

ACID, LACTIC.—LANCASHIRE: Dark tech., 50% by vol., £24 10s. per ton; 50% by weight, £28 10s.; 80% by weight, £48; pale tech., 50% by vol., £28; 50% by weight, £33; 80% by weight, £53; edible, 50% by vol., £41. One-ton lots ex works, barrels free.

ACID, NITRIC.—80° Tw. spot, £18 to £25 per ton makers' works, according to district and quality. SCOTLAND: 80°, £23 ex station full truck loads.

ACID, OXALIC.—LONDON: £47 7s. 6d. to £57 10s. per ton, according to packages and position. SCOTLAND: 98/100%, £49 to £52 ex store. MANCHESTER: £48 to £52 ex store.

ACID, SULPHURIC.—Average prices f.o.r. British makers' works, with slight variations owing to local considerations; 140° Tw. crude acid, £3 per ton; 168° Tw. arsenical £5 10s.; 168° Tw. non-arsenical, £6 15s. SCOTLAND: 144° quality, £3 12s. 6d.; 168°, £7; dearsenicated, 20s. per ton extra.

ACID, TARTARIC.—LONDON: 11½d. per lb. SCOTLAND: B.P. crystals, 10¾d., carriage paid. MANCHESTER: 11½d. to 1s.

ALUM.—SCOTLAND: Lump potash, £9 per ton ex store.

ALUMINA SULPHATE.—LONDON, £8 5s. to £9 10s. per ton. SCOTLAND: £8 to £8 10s. ex store.

AMMONIA, ANHYDROUS.—Spot, 10d. per lb. d/d in cylinders. SCOTLAND: 10d. to 1s. containers extra and returnable.

AMMONIA LIQUID.—SCOTLAND: 80°, 2½d. to 3d. per lb., d/d.

AMMONIUM BICHROMATE.—8d. per lb. d/d U.K.

AMMONIUM CARBONATE.—SCOTLAND: Lump, £32 per ton; powdered, £34, in 5-cwt. casks d/d buyers' premises U.K.

AMMONIUM CHLORIDE.—£37 to £45 per ton, carriage paid. LONDON: Fine white crystals, £19 to £20. (See also Salammoniac.)

AMMONIUM CHLORIDE (MURIATE).—SCOTLAND: British dog tooth crystals, £32 to £35 per ton carriage paid according to quantity. (See also Salammoniac.)

ANTIMONY OXIDE.—SCOTLAND: Spot, £24 per ton, c.i.f. U.K. ports.

ANTIMONY SULPHIDE.—Golden 6½d. to 1s. 1½d. per lb.; crimson, 1s. 3d. to 1s. 5d. per lb., according to quality.

ARSENIC.—LONDON: £19 c.i.f. main U.K. ports for imported material; Cornish nominal, £23 f.o.r mines. SCOTLAND: White powdered, £24 ex wharf. MANCHESTER: White powdered Cornish, £23 at mines.

ARSENIC SULPHIDE.—Yellow, 1s. 5d. to 1s. 7d. per lb.

BARIUM CHLORIDE.—£11 per ton.

BISULPHITE OF LIME.—£6 10s. per ton f.o.r. London.

BLEACHING POWDER.—Spot 35/37% £7 19s. per ton d/d station in casks, special terms for contract. SCOTLAND: £8 15s. in 5/6 cwt. casks.

BORAX, COMMERCIAL.—Granulated, £15 10s. per ton; powder, £17 packed in 1-cwt. bags, carriage paid any station Great Britain. Prices are for 1-ton lots and upwards.

CADMIUM SULPHIDE.—2s. 10d. to 3s. 2d.

CALCIUM CHLORIDE.—Solid 70/75% spot, £5 5s. per ton d/d station in drums.

CARBON BISULPHIDE.—£30 to £32 per ton, drums extra.

CARBON BLACK.—3½d. to 5d. per lb., ex wharf.

CARBON TETRACHLORIDE.—£41 to £46 per ton, drums extra.

CHROMIUM OXIDE.—10d. to 10½d. per lb., according to quantity d/d U.K. Green, 1s. 2d. per lb.

CHROMETAN.—Crystals, 3½d. per lb. Liquor, £19 10s. per ton d/d

COPPERAS (GREEN).—SCOTLAND: £3 15s. per ton, f.o.r. or ex works.

CREAM OF TARTAR.—LONDON: £4 per cwt.

DIPHENYLGUANIDINE.—2s. 2d. per lb.

FORMALDEHYDE.—LONDON: £28 per ton. SCOTLAND: 40%, £28 ex store.

LAMPBLACK.—£45 to £48 per ton.

LEAD ACETATE.—LONDON: White, £34 per ton; brown, £1 per ton less. SCOTLAND: White crystals, £34 to £36; brown, £1 per ton less. MANCHESTER: White, £31 10s.; brown, £30.

LEAD NITRATE.—£28 per ton.

LEAD, RED.—SCOTLAND: £27 per ton d/d buyer's works.

LEAD, WHITE.—SCOTLAND: £39 per ton, carriage paid.

LITHOPONE.—30%, £17 10s. to £18 per ton.

MAGNESITE.—SCOTLAND: Ground Calcined £9 per ton ex store.

METHYLATED SPIRIT.—61 O.P. Industrial 1s. 8d. to 2s. 3d. per gal. Pyridinised Industrial, 1s. 10d. to 2s. 5d. Mineralised, 2s. 9d. to 3s. 3d. 64 O.P. 1d. extra in all cases. Prices according to quantities. SCOTLAND: Industrial 64 O.P., 1s. 9d. to 2s. 4d.

NICKEL AMMONIUM SULPHATE.—£49 per ton d/d.

NICKEL SULPHATE.—£49 per ton d/d.

PHENOL.—9d. to 10d. per lb. nominal.

POTASH, CAUSTIC.—LONDON: £42. MANCHESTER: £41.

POTASSIUM BICHROMATE.—Crystals and Granular, 5d. per lb. net d/d U.K. Discount according to quantity. Ground 5¾d. LONDON: 5d. per lb. with usual discounts for contracts. SCOTLAND: 5d. d/d U.K. or c.i.f. Irish Ports. MANCHESTER: 5d.

POTASSIUM CHLORATE.—LONDON: £37 to £40 per ton. SCOTLAND: 99⅔/100% powder, £37. MANCHESTER: £38.

POTASSIUM CHROMATE.—6¼d. per lb. d/d U.K.

POTASSIUM NITRATE.—SCOTLAND: Refined Granulated £29 per ton c.i.f. U.K. ports. Spot, £30 per ton ex store.

POTASSIUM PERMANGANATE.—LONDON: 8¼d. per lb. SCOTLAND: B.P. crystals, 9d. MANCHESTER: Commercial, 8¼d. B.P., 8¾d.

POTASSIUM PRUSSIATE.—LONDON: 8¾d. to 9d. per lb. SCOTLAND: Yellow spot material, 8¼d. ex store. MANCHESTER: Yellow, 8½d.

SALAMMONIAC.—First lump spot, £42 17s. 6d. per ton d/d in barrels.

SODA ASH.—58% spot, £5 17s. 6d. per ton f.o.r. in bags, special terms for contracts.

SODA, CAUSTIC.—Solid 76/77° spot, £14 5s. per ton d/d station. SCOTLAND: Powdered 98/99%, £17 10s. in drums, £18 15s. in casks, Solid 76/77%, £14 10s. in drums; 70/73%, £14 12s. 6d., carriage paid buyer's station, minimum 4-ton lots; contracts 10s. per ton less. MANCHESTER: £13 5s. to £14 10s. contracts.

SODA CRYSTALS.—Spot, £5 to £5 5s. per ton d/d station or ex depot in 2-cwt. bags.

SODIUM ACETATE.—£22 per ton. LONDON: £23.

SODIUM BICARBONATE.—Refined spot, £10 10s. per ton d/d station in bags. SCOTLAND: Refined recrystallised £10 10s. ex quay or station. MANCHESTER: £10 10s.

SODIUM BICHROMATE.—Crystals cake and powder 4d. per lb. net d/d U.K. discount according to quantity. Anhydrous, 5d. per lb. LONDON: 4d. per lb. with discounts for quantities. SCOTLAND: 4d. delivered buyer's premises with concession for contracts. MANCHESTER: 4d. less 1 to 3½% contracts, 4d. spot lots.

SODIUM BISULPHITE POWDER.—60/62%, £16 10s. per ton d/d 1-cwt. iron drums for home trade.

SODIUM CARBONATE (SODA CRYSTALS).—SCOTLAND: £5 to £5 5s. per ton ex quay or station. Powdered or pea quality 7s. 6d. per ton extra. Light Soda Ash £7 ex quay, min. 4-ton lots with reductions for contracts.

SODIUM CHLORATE.—£32 per ton.

SODIUM CHROMATE.—3¾d. per lb. d/d U.K.

SODIUM HYPOSULPHITE.—SCOTLAND : Large crystals English manufacture, £9 5s. per ton ex stations, min. 4-ton lots. Pea crystals, £15 ex station, 4-ton lots. MANCHESTER : Commercial, £9 5s.; photographic, £15.

SODIUM NITRATE.—LONDON : Spot, £18 to £20 per ton d/d station in drums.

SODIUM PERBORATE.—LONDON : 10d. per lb.

SODIUM PHOSPHATE.—£12 10s. per ton.

SODIUM PRUSSIATE.—LONDON : 5d. to 5½d. per lb. SCOTLAND : 5d. to 5⅝d. ex store. MANCHESTER : 4⅜d. to 5⅜d.

SODIUM SILICATE.—140° Tw. Spot £8 5s. per ton d/d station, returnable drums.

SODIUM SULPHATE (GLAUBER SALTS).—£4 2s. 6d. per ton d/d. SCOTLAND : English material £3 15s.

SODIUM SULPHATE (SALT CAKE).—Unground Spot, £3 15s. per ton d/d station in bulk. SCOTLAND : Ground quality, £3 5s. per ton d/d. MANCHESTER : £3 2s. 6d.

SODIUM SULPHIDE.—Solid 60/62% Spot, £10 15s. per ton d/d in drums; crystals 30/32%, £8 per ton d/d in casks. SCOTLAND : For home consumption, Solid 60/62%, £10 5s.; broken 60/62%, £11 5s.; crystals, 30/32%, £8 2s. 6d. d/d buyer's works on contract, min. 4-ton lots. Spot solid 5s. per ton extra. Crystals, 2s. 6d. per ton extra. MANCHESTER : Concentrated solid, 60/62%, £11; commercial, £8.

SODIUM SULPHITE.—Pea crystals spot, £13 10s. per ton d/d station in kegs. Commercial spot, £9 10s. d/d station in bags.

SULPHATE OF COPPER.—MANCHESTER : £16 10s. per ton f.o.b.

SULPHUR.—£11 15s. per ton. SCOTLAND : Flowers, £11; roll, £10 10s.; rock, £9; ground American, £10 ex store.

SULPHUR CHLORIDE.—5d. to 7d. per lb., according to quality.

SULPHUR PRECIP.—B.P. £55 to £60 per ton according to quantity. Commercial, £50 to £55.

VERMILION.—Pale or deep, 4s. 4d. to 4s. 6d. per lb.

ZINC CHLORIDE.—SCOTLAND : British material, 98%, £18 10s. per ton f.o.b. U.K. ports.

ZINC SULPHATE.—LONDON AND SCOTLAND : £12 per ton.

ZINC SULPHIDE.—11d. to 1s. per lb.

Pharmaceutical and Fine Chemicals

ACID, CITRIC.—9½d. per lb.

ACID, TARTARIC.—11¾d. per lb., less 5%.

CADMIUM IODIDE.—14s. 6d. per lb.

IRON QUININE CITRATE.—9¾d. to 1s. 0½d. per oz.

LINALOL (ex Shui oil).—5s. 9d. per lb.

MENTHOL.—A.B.R. recryst., B.P., 15s. per lb.; synthetic detached crystals, 8s. 6d. to 10s. 6d. per lb.

PHENACETIN.—4s. to 4s. 6d. per lb.

POTASSIUM BITARTRATE, 99/100% (Cream of tartar).—£4 per cwt.

SODIUM BARBITONUM.—13s. to 15s. per lb.

SODIUM POTASSIUM TARTRATE (Rochelle sale).—£3 10s. per cwt.

TARTAR EMETIC, B.P.—3s. 9d. to 4s. 6d. per lb.

Essential Oils

ALMOND, FOREIGN, S.P.A.—9s. per lb.

BERGAMOT.—6s. 6d. per lb.

BOURBON GERANIUM.—25s. 3d. per lb.

CAMPHOR.—Brown, £4 per cwt.; white, £4 5s. per cwt.

CINNAMON.—3s. 6d. per lb.

CITRONELLA, JAVA.—2s. 9d. per lb.; Ceylon, 2s. 3d. per lb.

CLOVE.—90/92% English.—4s. 9d. per lb.

LAVENDER, MONT BLANC, 38/40%.—10s. per lb.

LEMONGRASS.—3s. per lb.

PEPPERMINT, JAPANESE.—6s. 6d. per lb.

SANDALWOOD, AUSTRALIAN, B.P. and French Codex, 92/95%, 15s. 6d. per lb.

Intermediates and Dyes

IN the following list of intermediates delivered prices include packages except where otherwise stated :—

ACID, BENZOIC, 1914 B.P. (ex Toluol).—1s. 9½d. per lb.

ACID, GAMMA.—Spot, 4s. per lb. 100% d/d buyer's works.

ACID, H.—Spot, 2s. 4½d. per lb. 100% d/d buyer's works.

ACID, NEVILLE AND WINTHER.—Spot, 3s. per lb. 100% d/d buyer's works.

ACID, SULPHANILIC.—Spot, 8d. per lb. 100% d/d buyer's works.

ANILINE OIL.—Spot, 8d. per lb., drums extra, d/d buyer's works.

ANILINE SALTS.—Spot, 8d. per lb, d/d buyer's works, casks free.

BENZALDEHYDE.—Spot, 1s. 8d. per lb., packages extra.

BENZIDINE BASE.—Spot, 2s. 5d. per lb. 100% d/d buyer's works.

p-CRESOL 34-5° C.—1s. 9d. per lb. in ton lots.

m-CRESOL 98/100%.—2s. 3d. per lb. in ton lots.

DICHLORANILINE.—2s. 3d. per lb.

DIMETHYLANILINE.—Spot, 1s. 6d. per lb., package extra.

DINITROBENZENE.—8d. per lb.

DINITROTOLUENE.—48/50° C., 8d. per lb.; 66/68° C. 8¾d. per lb.

DIPHENYLAMINE.—Spot, 2s. per lb., d/d buyer's works.

α-NAPHTHOL.—Spot, 2s. 4d. per lb., d/d buyer's works.

β-NAPHTHOL.—Spot, £78 15s. per ton in paper bags; £79 15s. in casks, in 1-ton lots.

α-NAPHTHYLAMINE.—Spot, 11¾d. per lb., d/d buyer's works.

β-NAPHTHYLAMINE.—Spot, 2s. 9d. per lb. d/d buyer's works .

o-NITRANILINE.—5s. 10d. per lb.

m-NITRANILINE.—Spot, 2s. 7d. per lb. d/d buyer's works.

p-NITRANILINE.—Spot, 1s. 8d. per lb. d/d buyer's works.

NITROBENZENE.—Spot, 4½d. per lb.; 5-cwt. lots, drums extra.

NITRONAPHTHALENE.—9d. per lb.

SODIUM NAPHTHIONATE.—Spot, 1s. 9d. per lb.

o-TOLUIDINE.—Spot, 9½d. per lb., drums extra, d/d buyer's works.

p-TOLUIDINE.—Spot, 1s. 11d. per lb., d/d buyer's works.

m-XYLIDINE ACETATE.—3s. 4d. per lb.

Coal Tar Products

ACID, CARBOLIC.—Crystals, 9d. to 10d. per lb.; crude, 60's, 2s. 5d. to 2s. 6d. per gal.; 2% water 3s. 0¾d. MANCHESTER : Crystals, 9½d. to 9¾d. per lb.; crude, 2s. 7d. per gal. SCOTLAND : 60's, 1s. 7d. to 1s. 8d.

ACID, CRESYLIC.—99/100%, 11d. to 1s. 8d. per gal.; pale 95%, 11d. to 11½d.; dark, 10d., all according to specification; refined, 1s. 7d. to 1s. 8d. LONDON : 98/100%, 1s. 3d.; dark, 95/97%, 11d. SCOTLAND : Pale 99/100%, 1s. 3d. to 1s. 4d.; 97/99%, 1s. to 1s. 1d.; dark 97/99%, 11d. to 1s.; high boiling acid, 2s. 6d. to 3s.

ANTHRACENE OIL.—Strained, 4½d. per gal.

BENZOL.—At works, crude, 9d. to 9½d. per gal.; standard motor 1s. 4d. to 1s. 4½d.; 90%, 1s. 5d. to 1s. 6d.; pure, 1s. 7½d. to 1s. 8d. LONDON : Motor, 1s. 7¾d. SCOTLAND : Motor, 1s. 6½d. to 1s. 7½d.; 90%, 2s. 0½d. to 2s. 1½d.

CREOSOTE.—B.S.I. Specification standard, 3d. per gal. f.o.r. Home, 3¾d. d/d. LONDON : 3d. to 3½d. f.o.r. North; 4d. to 4½d. London. MANCHESTER : 2½d. to 3½d. SCOTLAND : Specification oils, 3½d. to 4d.; washed oil, 3½d. to 4d.; light, 3d. to 3½d.; heavy, 4½d. to 5d.

NAPHTHA.—Solvent, 90/160%, 1s. 4d. to 1s. 5d. per gal.; 95/160%, 1s. 7d.; 90/190%, 9d. to 1s. 1d. LONDON : Solvent, 1s. 3¼d. to 1s. 4d.; heavy, 11d. to 1s. 0½d. f.o.r. SCOTLAND : 90/160%, 1s. 3d. to 1s. 3¾d.; 90/190%, 11d. to 1s. 2d.

NAPHTHALENE.—Crude, Hot-Pressed, £6 1s. 3d. per ton. Flaked, £10 per ton. Purified crystals, £9 10s. per ton in bags. LONDON : Fire lighter quality, £3 to £3 10s.; 74/76 quality, £4 to £4 10s.; 76/78 quality, £5 10s. to £6. SCOTLAND : 40s. to 50s.; whizzed, 65s. to 70s.

PITCH.—Medium soft, £4 5s. per ton. MANCHESTER : £3 15s. f.o.b. LONDON : £4 to £4 2s. 6d. f.o.b. East Coast part.

PYRIDINE.—90/140, 3s. 9d. to 4s. 6d. per gal.; 90/180, 2s. to 2s. 6d. SCOTLAND : 90/160% 4s. to 5s.; 90/220%, 3s. to 4s.

REFINED COAL TAR.—SCOTLAND : 4d. per gal.

XYLOL.—Common, 1s. 10d. to 1s. 11d. per gal.; pure, 2s. 1d. to 2s. 2d.

TOLUOL.—90%, 2s. to 2s. 1d. per gal.; pure, 2s. 4d.

Wood Distillation Products

ACETATE OF LIME.—Brown, £8 15s. to £9 per ton. Grey £14 to £15. Liquor, brown, 30° Tw., 6d. per gal. MANCHESTER : Brown, £9 10s.; grey, £15 10s.

ACETIC ACID, TECHNICAL, 40%.—£17 to £18 per ton.

AMYL ACETATE, TECHNICAL.—95s. to 110s. per cwt.

CHARCOAL.—£6 to £11 per ton.

WOOD CREOSOTE.—6d. to 2s. per gal., unrefined.

WOOD NAPHTHA, MISCIBLE.—2s. 7d. to 4s. per gal. Solvent, 3s. 9d. to 4s. 9d. per gal.

WOOD TAR,—£2 to £6 per ton.

Nitrogen Fertilisers

SULPHATE OF AMMONIA.—Export, £6 per ton f.o.b. U.K. ports in single bags; home, £6 10s. per ton, delivered in 6-ton lots to consumer's nearest station.

NITRATE OF SODA.—£8 16s. per ton, delivered in 6-ton lots to consumer's nearest station.

CYANAMIDE.—£7 per ton, delivered in 6-ton lots to consumer's nearest station.

NITRO-CHALK.—£7 5s. per ton, delivered in 6-ton lots to consumer's nearest station.

CONCENTRATED COMPLETE FERTILISERS.—£10 9s. 6d. to £11 per ton according to percentage of constituents.

Latest Oil Prices

LONDON, June 14.—LINSEED OIL was barely steady. Spot, small quantities, £22 15s.; June, £19 15s.; July-Aug., £19 17s. 6d.; Sept.-Dec., £20 5s., naked. RAPE OIL was quiet. Crude, extracted, £29; technical, refined, £30 10s., naked, ex wharf. COTTON OIL was steady. Egyptian, crude, £20 10s.; refined common edible, £23 10s.; and deodorised, £25 10s., naked, ex mill. TURPENTINE was quiet. American, spot, 58s. 9d. per cwt.

HULL.—LINSEED OIL, spot, £20 5s. per ton; June, £19 15s.; July-Aug., £20; and Sept.-Dec., £20 5s. COTTON OIL, Egyptian, crude, spot, £21; edible, refined, spot, £23 5s.; technical, spot, £23 5s.; deodorised, £25 5s. naked. PALM KERNEL OIL, crude, f.m.q., spot, £20 10s., naked. GROUNDNUT OIL, extracted, spot, £24 10s.; deodorised, £28 10s. RAPE OIL, extracted, spot, £27 10s.; refined, £29. SOYA OIL, extracted, spot, £22, deodorised £25 per ton. COD OIL, June, 17s. per cwt. CASTOR OIL, pharmaceutical, spot, 39s.; first, 34s.; second, 31s. per cwt. TURPENTINE, American, spot, 60s. 6d. per cwt.

Inventions in the Chemical Industry

Specifications Accepted and Applications for Patents

THE following information is prepared from the Official Patents Journal. Printed copies of Specifications accepted may be obtained from the Patent Office, 25 Southampton Buildings, London, W.C.2, *at 1s. each. The numbers given under* "Applications for Patents" are for reference in all correspondence up to the acceptance of the Complete Specification.

Dicalcium Phosphate

GROUND mineral tricalcium phosphate can be decomposed with a solution containing phosphoric acid and monocalcium phosphate, say at 50-60° C., and dicalcium phosphate is precipitated from *the solution by heating, for example, to the boiling point,* the decomposing solution being so concentrated with respect to the acid as to contain free phosphoric acid after the decomposition, and after the precipitation of dicalcium phosphate. According to Specification No. 388,663 of I. G. Farbenindustrie, the filtrate after separation therefrom, may, after addition of more phosphoric acid, be employed for decomposing fresh mineral phosphate. A mixture of phosphoric and sulphuric acids may be added in lieu of phosphoric acid, in which case a fertiliser containing dicalcium phosphate and calcium sulphate is obtained. In another method, the added phosphoric acid may be wholly replaced by sulphuric acid, this being added to the filtrate from a previous decomposition, which is then used after separation from the precipitated gypsum. Vessels of V_2A steel fitted with stirrers and heating apparatus may be employed.

Specifications Accepted with Dates of Application

POLYMERISATION OF VINYL DERIVATIVES AND IN COATING COMPOSITIONS.—E. I. Du Pont de Nemours and Co., W. E. Lawson and L. T. Sandborn. Oct. 14, 1931. 392,924.

TREATMENT OF DINITRONAPHTHALENE.—Imperial Chemical Industries, Ltd., and H. H. Hodgson. Nov. 17, 1931. 392,914.

CATALYTIC OR ADSORPTION PROCESSES AND THE MANUFACTURE OF PLURAL OR MIXED GELS THEREFOR.—Silica Gel Corporation. Nov. 21, 1930. 392,954.

MANUFACTURE OF RUBBER AND THE LIKE MATERIALS AND COMPOUNDS THEREOF.—Dunlop Rubber Co., Ltd., and D. F. Twiss. Nov. 27, 1931. 392,958.

PROCESS OF REFINING SULPHUR.—N. E. Lenander. Dec. 1, 1931. 392,980.

METHOD OF CONSOLIDATING CORK PARTICLES.—W. Jurges. Dec. 8, 1931. 392,985.

MANUFACTURE OF THIO-DERIVATIVES.—W. W. Groves (I. G. Farbenindustrie). Jan. 18, 1932. 393,011.

RESINOUS COMPOSITIONS DERIVED FROM POLYHYDRIC ALCOHOLS AND POLYBASIC ACIDS.—British Thomson-Houston Co., Ltd. Feb. 26, 1931. 393,034.

PRODUCTION OF RUBBER ARTICLES FROM DISPERSIONS OF OR CONTAINING NATURAL RUBBER LATEX.—Dunlop Rubber Co., Ltd., Anode Rubber Co., Ltd., D. F. Twiss and W. McCowan. March 3, 1932. 393,036.

PROCESS FOR PRODUCING GREEN PATINA ON COPPER AND ITS ALLOYS. W. H. J. Vernon. March 7, 1932. 393,039.

FERTILISERS.—Norsk Hydro-Elektrisk Kvaelstofaktieselskab. May 8, 1931. 393,071.

METHOD OF, AND APPARATUS FOR, BLEACHING PULP.—C. B. Thorne. May 3, 1932. 393,106.

METHOD OF REMOVING IMPURITIES FROM OILS AND FATS.—Harburger Oalwerke Brinckman and Mergell and A. Frieburg. July 19, 1932. 393,108.

MANUFACTURE OF CALCIUM CYANAMIDE.—Akt.-Ges. für Stickstoffdunger. Aug. 15, 1931. 393,128.

ROTARY TUBE FURNACE FOR DESULPHURISING ORES IN A FINE OR DUST-LIKE CONDITION.—Metallges. Oct. 26, 1931. 393,144.

PROCESS FOR TREATING SOYA BEANS.—Dr. L. Berczeller. Sept. 15, 1932. 393,146.

LIQUIDS OR PLASTIC PREPARATIONS USED FOR THE TREATMENT OF FIBROUS MATERIALS.—H. T. Böhme. Nov. 7, 1931. 393,165.

PRODUCTION OF ALCOHOLS.—Naamlooze Vennootschap de Bataafsche Petroleum Maatschappij. Oct. 17, 1931. 393,152.

MANUFACTURE OF HALOGENATION PRODUCTS OF ACENAPHTHINDANDIONE DIKETIMIDES.—I. G. Farbenindustrie. Oct. 10, 1931. 393,158.

MANUFACTURE OF SYNTHETIC RUBBER.—E. I. Du Pont de Nemours and Co. Nov. 2, 1931. 393,172.

MANUFACTURE OF SOLID PRODUCTS CONTAINING ALKALI HYPOCHLORITE.—Henkel et Cie Ges. Feb. 19, 1932. 393,221.

MANUFACTURE OF IODO NAPHTHOL SULPHONIC ACIDS.—Chemische Fabrik Vorm. Sandoz. Feb. 29, 1932. 393,238.

MANUFACTURE OF OXYDIPHENYL-ETHER-CARBOXYLIC ACIDS.—Chemische Fabrik von Heyden Akt.-Ges. May 13, 1932. 393,240.

Specifications Open to Public Inspection

PROCESS FOR THE MANUFACTURE OF A CATALYST FOR THE CONVERSION OF TERPENES.—Schering-Kahlbaum Akt.-Ges. Nov. 25, 1931. 19035/32.

MANUFACTURE OF ACETYLENE AND ORGANIC COMPOUNDS THEREFROM. Standard Oil Development Co. Nov. 25, 1931. 30283/32.

PROCESS OF IMPROVING CELLULOSE-CONTAINING FABRICS THREADS, AND THE LIKE.—Heberlein and Co. Nov. 23, 1931. 32996/32.

PREPARATION OF BASIC NITROGEN COMPOUNDS.—Girdler Corporation. Nov. 23, 1931. 33127/32.

PROCESS OF REMOVING AND RECOVERING ACIDIC GASES FROM GAS MIXTURES CONTAINING SAID ACIDIC GASES.—Girdler Corporation. Nov. 23, 1931. 33128/32.

MANUFACTURE OF *a*-CHLOR-ETHYL-BENZENE AND RELATED COMPOUNDS.—I. G. Farbenindustrie. Nov. 24, 1931. 33272/32.

PROCESS FOR THE MANUFACTURE OF AZO DYESTUFFS.—I. G. Farbenindustrie. Nov. 24, 1931. 33273/32.

MANUFACTURE OF ORTHO-AMINCARYLALKYLSULPHONES, ORTHO-AMINCARYL-ARALKYL-SULPHONES, AND AZO DYESTUFFS THEREFROM.—I. G. Farbenindustrie. Nov. 24, 1931. 33278, 33279/32.

MANUFACTURE OF CELLULOSE DERIVATIVE COMPOSITIONS.—E. I. Du Pont de Nemours and Co. Nov. 28, 1931. 33387, 33388/32.

PURIFICATION OF LIQUIDS BY MEANS OF ACTIVATED CARBON.—Naamlooze Vennootschap Octrooien Maatschappij Activit. Nov. 25, 1931. 33417/32.

PROCESSES FOR THE MANUFACTURE OF SOAPS HAVING A DISINFECTING ACTION AND SOAPS PRODUCED THEREBY.—Deutsche Gold- und Silber-Scheideanstalt Vorm. Roessler. Nov. 28, 1931. 33547/32.

Applications for Patents

PLASTIC COMPOSITION, ETC.—H. Dodd, C. W. Richards and Imperial Chemical Industries, Ltd. May 30. 15637.

MANUFACTURE OF WETTING AGENTS, ETC.—E. L. Du Pont de Nemours and Co. May 29. (*United States, May 28, '32.*) 15523.

MANUFACTURE OF CELLULSE ETHERS.—E. I. Du Pont de Nemours and Co. June 2. (United States, June 2, '32.) 16029.

APPLYING RUBBER TO FABRICS, ETC.—J. Flipo. June 2. (France, June 4, '32.) 15995.

COATING COMPOSITIONS, AND PRODUCTION THEREOF.—P. Friedrich. June 1. 15908.

REMOVAL OF HYDROGEN SULPHIDE FROM GASES, ETC.—Gas Light and Coke Co., H. Hollings and W. K. Hutchinson. June 1. 15899.

PROCESS FOR DYEING PELTS, ETC.—W. W. Groves (I. G. Farbenindustrie). June 2. 16070.

INSECTICIDES.—T. Halford and C. E. Moore. May 31. 15656.

MANUFACTURE OF HIGH MOLECULAR ORGANIC ESTERS.—Henkel et Cie. May 20. (Dec. 20, '32.) (Germany, Jan. 4, '32.) 15644, 15645, 15646.

STERILISING PLANT.—S. L. Hetherington. May 31. 15659.

MANUFACTURE OF DYESTUFFS.—I. G. Farbenindustrie. May 29. (Germany, May 30, '32.) 15494.

MANUFACTURE OF SHAPED ARTICLES FROM HEAVY METAL SALTS OF POLYMERIC CARBOXYLIC ACIDS.—I. G. Farbenindustrie. June 1. (Germany, June 2, '32.) 15864.

MANUFACTURE OF COMPOUNDS OF DIPHENYLAMINE SULPHONE SERIES.—I. G. Farbenindustrie June 1. (Germany, June 2, '32.) 15896.

AZO DYES.—I. G. Farbenindustrie. June 2. (Germany, July 7, '32.) 16069.

MANUFACTURE OF ANTHRAQUINONE DERIVATIVES.—Imperial Chemical Industries, Ltd. May 29. 15471.

MANUFACTURE OF CELLULOSE ESTERS.—Imperial Chemical Industries, Ltd. May 30. 15638.

MANUFACTURE OF VALUABLE HYDROCARBONS.—J. Y. Johnson (I. G. Farbenindustrie). May 29. 15465.

MANUFACTURE OF DYESTUFFS.—J. Y. Johnson (I. G. Farbenindustrie. May 29. 15466.

TREATMENT OF RUBBER LATEX.—Leyland and Birmingham Rubber Co., Ltd., R. W. Lunn and W. H. Reece. June 1. 15811.

MANUFACTURE OF RUBBER GOODS OF CELLULAR STRUCTURE.—Leyland and Birmingham Rubber Co., Ltd., and W. H. Reece. June 1. 15812.

MANUFACTURE OF ANTHRAQUINONE DERIVATIVES.—R. J. Loveluck. May 29. 15471.

CHEMICAL MANUFACTURE.—Mathieson Alkali Works. June 1. (United States, June 4, '32.) 15912.

MANUFACTURE OF PIGMENTS.—L. Paindavoine. May 29. (Italy, Aug. 19, '32.) 15495.

MANUFACTURE OF LUBRICANTS.—A. A. Roberts. May 30. 15586.

MANUFACTURE OF CELLULOSE ESTERS.—L. Rubenstein. May 30. 15638.

PRODUCING EFFECTS ON TEXTILE MATERIALS.—Soc. of Chemical Industry in Basle. May 31. (Switzerland, June 1, '32.) 15734.

DYEING HIDES.—Soc. of Chemical Industry in Basle. June 1. (Switzerland, June 2, '32.) 15862.

From Week to Week

THE DEATH OCCURRED on June 9, at Salisbury, of Major Walter Craven Ball, late Royal Engineers, D.Sc., F.I.C., of the Manor House, Idmiston, Wilts.

LORD LEVERHULME PRESIDED at the sixty-third Individualist Luncheon in London on June 14, when Professor T. E. Gregory gave an address on "The New Age of Absolutism."

THE CONTRACT FOR LIGHTING the Press room at the World Economic Conference and the catalogue room of the British Museum, has been awarded to G.V.D. Illuminators.

MAJOR G. M. PALMER, chairman of the Marley Hill Chemical Co., died suddenly in Paris on June 12 at the age of 54. In addition to his activities in the chemical industry, Major Palmer was managing director of John Bowes and Partners, colliery owners, and chairman of Chislet Colliery, Ltd.

MR. JAMES WOOD, of Wallhouse, Torphichen, West Lothian, died on June 9 in his 94th year. Born in Paisley, he became a coal merchant, and in 1871 he purchased pits in Armadale, West Lothian. He was a pioneer in the shale oil industry. He sold his pits in 1902 to the United Collieries. Mr. Wood was a director of the Atlas Steel Foundry and Engineering Co.

OVER A HUNDRED ROAD EXPERTS representing eight countries have arrived at Lucerne for the International Road Tar Conference which opened on June 14 under the presidency of Sir David Milne Watson. The British delegates included Mr. R. C. Clarry, M.P., chairman, and Mr. W. E. Cone, secretary of the Conference.

WEST BROMWICH FIRE BRIGADE was called on Thursday to the works of W. H. Keys, Ltd., chemical manufacturers, Church Lane, West Bromwich. On arrival it found the contents of two tanks, each containing about 400 gal. of naphthalene, well alight. The firemen put the foam generator at work, and after about an hour succeeded in extinguishing the flames, and prevented them extending to other parts of the premises. The contents of the other tanks were destroyed.

THE FIGURES GIVEN in the estimate of the cost of production of sulphate in the new Manchurian nitrogen plant in THE CHEMICAL AGE last week related to the cost of producing 240 tons of sulphate. For one ton the estimated figures are: Coal, 8s., electric current 13s., sulphuric acid £1 3s. 8d., and other direct charges, £1. Miscellaneous other charges and the transportation of the fertilised from the plant to Dairen City bring the cost to slightly over £4 16s. per metric ton, according to other estimates.

DR. M. O. FORSTER, F.R.S., writes from Mysore City: "I shall be obliged by your kindly rectifying an error in a paragraph in THE CHEMICAL AGE, of April 29 (page 399), which suggests that I had applied for the directorship of the newly established Department of Chemical Technology, University of Bombay, and states that I have been appointed thereto. Although I am sensible of the compliment, there is not the slightest foundation for implying that I offered myself, either directly or indirectly, as it had not occurred to me that I might possess the necessary qualifications."

TWO MEN were knocked off a gantry and another was burned by an explosion at the South Yorkshire Chemical Works, near Rotherham, recently. They were not seriously hurt. Rotherham Corporation Fire Brigade, who were at work on an outbreak at the Rotherham Forge and Rolling Mills at the time, sent two engines to the chemical works, where a gas main in the sulphate house was on fire at one of the joints. Foam generators were used. The joints in the main were eventually sealed and the fire put out. It is thought that a spark from a rivet may have started the fire.

A FIRE broke out on June 10 at the tar and oil distillery of the Welsh Navigation Steam Coal Collieries, Ltd., Coed Ely, Llantrisant, near Cardiff. The manager of the plant, Mr. E. Wautier, stated that the fire was seen about 3.30 p.m., and in a few minutes the distillery and main tanks filled with inflammable spirit burst into flame and smoke rose to a great height. The Llantrisant, Pontypridd and Cowbridge fire brigades were requisitioned, but it was found impossible to save the valuable machinery and plant of the main works, and efforts were concentrated on the surrounding tanks and buildings, which were filled with highly inflammable spirit. A building nearby contained large quantities of benzol, and after 3½ hours the firemen prevented what might have been a disastrous explosion. Owing to the fierceness of the flames it was impossible to save the main plant. The workmen had left before the fire broke out, and there was no personal injury. The fire was entirely subdued by 7 p.m., but the brigades continued to play on the buildings nearby for another hour. The valuable oil distillery was completely burned out.

SIR ALFRED EWING, F.R.S., last year's President of the British Association, has been presented with the freedom of Dundee, the city in which he was born in 1855.

THE CHEMISTS' CLUB, New York, has elected Dr. Lewis H. Marks as president. Dr. Marks is the executive secretary of the Industrial Alcohol Institute and has been a member of the Society for a number of years.

RECENT WILLS INCLUDE:—Mr. Donald Mustard, of Elgin, solicitor, secretary of the Scottish Pot Still Malt Distillers' Association, £17,277 personal estate in Great Britain; Mr. William Alexander Aitken, of Gravesend, paper manufacturer, £18,177 (net personalty £13,614).

THE DEATH HAS OCCURRED, at the age of 57, of the Norwegian paper manufacturer, Mr. Hjalmar Wessel, president of the Borregaard Co., one of the greatest paper and pulp combines of Northern Europe. Since 1917 he had been president of the Kellnes Partington Paper Pulp Co., and the Borregaard Co.

SIR FREDERICK GOWLAND HOPKINS, President of the Royal Society, was the recipient of the honorary degree of Doctor of Science at the Cambridge University Congregation on June 8. The Vice-Chancellor of the University presided in the absence of the Chancellor, Mr. Stanley Baldwin.

MR. C. W. WHEAL, of the Sturtevant Engineering Co., Ltd., is now in residence at 54 Doveridge Road, Hall Green, Birmingham. This will enable him to maintain closer contact with his many friends in the Birmingham area. His telephone number is Shirley 1046.

EXPORTS OF CHEMICALS, drugs, dyes and colours during May amounted to a total of £1,502,956, being £151,107 lower than the figure for May, 1932. Imports totalling £842,409 were higher by £296,607, and re-exports totalling £38,189 were higher by £888 as compared with the corresponding month of last year. Our usual monthly summary of the figures will appear next week.

A VERDICT OF "ACCIDENTAL DEATH" was returned at a Hinckley inquest on June 7, on Stewart Alan Reid, 51, of Northfield Road, Hinckley, who was scalded by falling into a vat of black dye at the Sketchley Dye Works, where he was employed. He died the following day. It was stated that such an accident had not occurred for at least 40 years. The jury expressed the opinion that the blocks on which the men stand should be wider.

MR. FREDERICK GEORGE HAWDON, chairman and managing director of John Dickinson and Co., the paper making firm which was founded in 1804, died suddenly on June 12 at his home at Berkhamsted, in his 61st year. He joined the firm in 1897 and six months later was made manager of Home Park Mills. In 1909 he was appointed manager of the Apsley Mills envelope department, which under his guidance showed a remarkable expansion. It was in 1930, on the retirement of Mr. R. H. Ling, he was appointed chairman and managing director.

PRINCE GEORGE visited the plastics exhibition, held at the Science Museum on June 9, where he was received by the director Sir Henry Lyons, Professor G. T. Morgan, and others, who are specially interested in the development of the plastics industry. He was shown the chemicals, resins, casein, and celluloid from which all the plastic materials are built up and a great variety of articles made from them, ranging from door knobs, telephone instruments, and imitation china to furniture made of synthetic "wood," laminated gear wheels, etc.

THE KING HAS CONFERRED the decoration of C.V.O. upon Mr. Claude Taylor, the director of the British Industries Fair. Mr. Taylor has been associated with the Fair from its inception in 1915, first as secretary, then, since 1932 as director; and his knowledge of British exhibitors and exhibits, extending back to the big international exhibitions of pre-war days, is probably unique. Every exhibitor at the Fair knows Mr. Taylor, and many of them have had reason to be grateful to him for his swift and courteous attention to any difficulty brought to his notice; while with the general public he is a familiar figure as the Queen's cicerone during her yearly visits to Olympia and the White City.

FIELD MARSHAL LORD ALLENBY will receive a distinguished company at Stationers' Hall, London on June 22, on the occasion of the annual dinner of the East End Hostels Association. Lord Allenby, who will be in the chair, will be supported by the Headmaster of Rugby School, Mr. J. B. Priestley, Sir John Reith, Mr. Wedgwood Benn and Sir Ernest Benn, all of whom will speak on behalf of the John Benn Hostel at Stepney. An encouraging account of the work of the Hostel was submitted to subscribers and friends of the Hostel, at the annual meeting held at the end of last month. In spite of the financial depression, 1932 was a year of great progress in all directions, but a declined revenue was met by economies in expenditure.

Chemical Trade Inquiries

The following trade inquiries are abstracted from the "Board of Trade Journal." Names and addresses may be obtained from the Department of Overseas Trade (Development and Intelligence), 35 Old Queen Street, London, S.W.1 (quote reference number).

Belgium.—A wholesale firm of manufacturers, dealers and agents, established at Brussels, wishes to obtain the exclusive representation, on a commission basis, of United Kingdom manufacturers of metallurgical products. (Ref. No. 839.)

British India.—An old-established Parsee firm of indentors and commission agents in Bombay is desirous of securing the representation, on commission, of United Kingdom manufacturers of bone glue for Bombay Presidency. (Ref. No. 832.)

Australia.—The British Trade Commissioner at Melbourne reports that the State Electricity Commissioner of Victoria is calling for tenders, to be presented in Melbourne by July 17, 1933, for the supply of steam and water service instruments. (Ref. A.Y. 11846.)

Poland.—The Commercial Secretary to H.M. Embassy at Warsaw reports that a local firm desires to be placed in touch with United Kingdom manufacturers of lead-coated strip used for the manufacture of electrical conduit. Firms in a position to offer this material made in the United Kingdom can obtain further details of the enquiry on application to the Department of Overseas Trade, quoting Ref. G.Y. 12651.

Company News

International Nickel of Canada.—The directors have declared a quarterly dividend of 7 per cent. per annum on par value of preferred stock, payable on August 1.

Boots Pure Drug Co., Ltd.—An interim dividend at the rate of 24 per cent. per annum, less tax, on the ordinary shares, for the quarter, is announced payable on July 1. This is the same as in the previous three months.

Canadian Celanese, Ltd.—The directors have declared on the 7 per cent. cumulative participating preferred stock a quarterly dividend of $1.75 per share and a further dividend on the same stock of $1 per share on account of arrears of preferred dividends accrued thereon, both payable on June 30.

Molassine Co.—The profit for the year to March 31 last amounts to £15,605, against £29,301 in the previous year, which, with £1,018 brought forward, makes £16,623. The directors have allocated for depreciations £3,268; to reserve £2,500, and propose to carry forward £8,747. It is proposed to distribute a dividend of 1s. 2½d. per share on the 7 per cent. non-cumulative participating preference shares, and a dividend of 4.598d. per share on the ordinary shares. The annual meeting will be held at Tunnel Avenue, East Greenwich, London, on June 19, at 12 noon.

British Alkaloids.—The gross profit for the year to March 31 last was £26,268, and, after deduction of distribution, general and overhead expenses, the profit was £5,464, to which is added the balance brought forward of £409, making £5,872. The directors have written off preliminary expenses £300, advertising account £2,490, and have transferred to tax reserve £500, and now recommend a dividend of 8 per cent., less tax, on participating preference shares, leaving to be carried forward £733.

American I.G. Chemical Corporation.—The report for the year ended March 31, 1933, shows net income of $1,245,621, after Federal taxes, interest, etc., equivalent, under participating provisions of shares, to $1.58 a share on 486,207 no-par shares of Class A common stock and 16 cents a share on 3,000,000 no-par shares of Class B common stock. This compares with net income in preceding year, after deducting $256,115 net loss on sale of securities of $1,718,397, equal to $2.18 a share on Class A and 22 cents a share on Class B stocks. Balance sheet shows total assets of $63,748,245 ($69,788,809). Capital surplus was $6,684,434 and earned surplus $7,375,413, making a total of $14,059,848, against total surplus of $14,491,813. Current assets including $16,377,146 cash and marketable securities at cost or market, whichever lower, amounted to $17,682,401 and current liabilities were $744,222. This compares with cash and marketable securities at cost or market, whichever lower, of $15,263,525, current assets of $17,161,564, and current liabilities of $1,352,821 at the end of preceding year.

English Beet Sugar Corporation.—The report for the year ended March 31 last states that the company again operated the Kelham factory of Home Grown Sugar, Ltd. The results were unfavourable by reason of the decline in sugar values and because of the unsatisfactory refining margin. The loss was £34,238, which, under the working agreement, has been borne as follows: by Home Grown Sugar, £22,826; by English Beet Sugar Corporation, £11,412. The sum of £33,149 from general reserve was required for the dividend in respect of 1931-32. The special reserve of £40,000 against contingent losses has been liquidated, £33,076 having been applied to writing off losses on forward contracts and the balance of £6,924 transferred to general reserve. After transferring the development reserve of £3,069 and allocating £24,626 from the profits for the year the general reserve shows a net increase of £1,470. After providing for income-tax and all charges, after the allocation of £29,667 for depreciation, and after transferring £24,626 to general reserve as mentioned above, there is a balance of net profit of £50,000. The directors propose to apply this to a dividend on the ordinary shares of 10 per cent. free of tax. The annual meeting will be held on June 22.

Forthcoming Events

June 17.—North of England Institute of Mining and Mechanical Engineers. 2.30 p.m. Newcastle-on-Tyne.

June 19.—British Science Guild. Annual general meeting. "Some Problems of British Forestry." Professor R. S. Troup. 4.30 p.m. Mansion House, London.

June 20 and 21.—Society of Glass Technology. Burlington House, Piccadilly, London.