The Chemical Age

A Weekly Journal Devoted to Industrial and Engineering Chemistry

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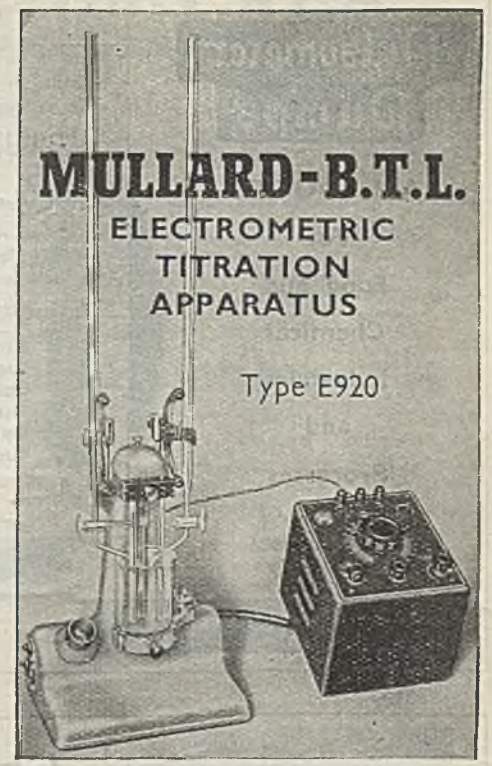

The Chemical Age

A Weekly Journal Devoted to Industrial and Engineering Chemistry

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Anglo-American Relations

IN devoting the Messel Memorial Lecture to the impact of science on Anglo-American relations, Dr. Wallace Cohoe ventured daringly into the difficult field of the relations between science and politics. There are not wanting those who declare that science, not politics, should govern the earth; who would see politicians displaced by scientists in the governing councils of the world. It is true that politicians are making a poor show just now, and that not only in this country; but whether any better show would be made by men of deep philosophical knowledge but without experience of government is at least doubtful. Politicians, for their part, decry the value of scientists in government, and generally maintain that scientists and technologists of all types should be at hand to advise their governments, but that no power should be entrusted to them. We have little doubt that the best practice lies midway between these extremes. If the House of Lords should be reorganised (we expressly rule out the expression "reformed") we shall confidently hope to see certain seats reserved for scientists, industrialists, and technical men of high reputation and achievement in order that the voice of science shall be heard in our legislative assemblies as a right, and not clandestinely in dark corners if anyone should happen to think of taking counsel from those who know the physical facts. In this hope we are greatly sustained by Dr. Cohoe's brilliant address.

Science, as Dr. Cohoe reminds us, advanced until it became dominant, and in late years, owing to the control secured over the release of atomic energy, predominant, in human affairs. That is an immense fact which must be given due weight by those who propose to govern the peoples of the world. Our own parliamentarians have gone some way towards recognising this in setting up the (unofficial) Parliamentary and Scientific Committee. Through that committee Members of Parliament are kept informed of scientific opinion. It may be questioned, however, whether it is of very much use to explain scientific facts to those without a certain basic knowledge of science; and while the present arrangement is better than nothing, it awaits the more general dissemination of scientific knowledge at our schools to have its full value.

It is of no use trying to control science. That is the kind of administrative *gaffe* which can so easily be made by those who do not recognise the facts. The only control that is

On Other Pages

possible in science is to leave it uncontrolled. There is no monopoly of brains, and if certain nations decided that scientists should take a holiday on the grounds that scientific discovery had outrun political and economic thought—and there are no other grounds on which we can imagine this attempt to be reasonably based—other nations would leave science uncontrolled, and would soon reap the benefits of possessing greater scientific knowledge than those who would put their ostrich-heads in the sand of forgetfulness. The history of Germany in regard to the outlawry of war, and of both Japan and Germany towards disarmament, shows clearly what would happen.

These facts must be accepted, and what we have to decide is what measures we shall take in the face of them. To-day, the English-speaking nations are scientifically pre-eminent over all other nations They have pre-eminence also in material production, thanks to their huge industrialisation. Atomic energy has enabled that pre-eminence to be maintained, but it exists in spite of this newer development of science. Dr. Cohoe speaks no less than sober truth, however, when he says that "it cannot be expected that this pre-eminent position can be maintained for any length of time unless our present position can be advanced continuously. The results of scientific studies are available to all and the scientific background of 1942 is available the world over. We must never forget that what the mind of one can conceive may be duplicated by another."

Science, however, is not concerned primarily with destruction or with the balance of material power in the political world. Science is ever working to perfect weapons against disease, to increase the sum of human happiness, to add to our knowledge of the universe. During the war that has just passed into history, the English-speaking nations of the world collaborated in all scientific and technical matters to an extent never before known. The result has been a surging forward of human knowledge and of human industry such as no generation has witnessed. Shall all this be thrown away now that peace has (theoretically) descended upon us? That is the question-mark that must stand clearly before the British and American peoples. The scientists would know how to answer it. Do the politicians know?

There have been examples during the year of peace that has been vouchsafed to us of the deterioration of political relations between allies. Nothing of this sort must be permitted to come between ourselves and the U.S.A. The English-speaking nations of the world must form a collaborative *bloc*, not in order to overawe the rest of the world, but as an example that in time shall show forth gloriously to all nations the value of mutual confidence that does not stop short of the fullest interchange of information. How this is to be brought about is a problem that must be solved. There will be in every nation individuals whose only regard is for their own selfish interests. We may call them "isolationists" or by any other name, but they will still be there and they will be loud in their protestations. The American loan indicates one form of collaboration and indicates also the dangers that beset attempts to put collaboration into practice. There are many who think the conditions of the loan are unsatisfactory The British dislike borrowing, they foresee many years during which their income must be used to pay it back—with interest. But the fact remains that this country has come out of the war poor, and unable to buy at the same time sufficient food and the new machinery needed to get industry working again. The loan if expended wisely would enable us to buy from the U.S.A. the plant necessary to modernise our industries much more quickly than if we tried to manufacture it for themselves. Provided that we do not squander this money on imitation jewellery and other foolishness which the Government has announced its intention of importing from America, this loan will go some considerable way towards the rehabilitation of our industry, and in that sense it can be considered as in the same category as any business loan made by a private concern from its bankers.

This is an example of co-operation in practice, and we are convinced that it is the sort of co-operation that we should encourage a good deal more in the future. There will naturally be rivalries between American firms and British firms to obtain certain markets just as there will be equal rivalries between two British firms or two American firms. That is all to the good because it leads to a healthy spirit of competition. There are equally many other examples, and this is particularly so in the chemical industry, where American and British firms are pooling their ideas, their knowledge and their patents. The existing trend towards co-operation fully rein-

forces the more philosophic and political proposals made by Dr. Cohoe.

Dr. Cohoe's hopes lie in the direction of increasing friendly intercourse, of "a recognition of the value and use of the religious motive in human action" and in a common interest in the affairs of everyday life. The increasing speed of the aeroplane, which makes London and New York no farther apart than London and Southampton or Hull and Manchester were 100 years ago, is tending to increase the knowledge that peoples have of one another. Broadcast talks from one nation to another must assist. If, moreover, books, films, and other media of entertainment or culture are interchanged we may quickly achieve the valuable result of possessing some understanding of each other's points of view so that due allowance may be made for differences of opinion, differences of outlook, and different modes of expression. Dr. Cohoe rightly points out that in warfare the Americans and the British became "one great family, vigilant, resourceful, cooperative, indefatigable, and successful." If this happy relation should be disturbed we shall go far towards encouraging further world wars and we shall undoubtedly set back the clock of progress by generations.

NOTES AND COMMENTS

The History of Chemistry

ALARMED at the increasing tendency towards specialisation, and the inclination of some of our younger scientists to know about one branch of one science only, a number of persons interested in education are advocating some sort of a return to humanism. The trouble is that nowadays, if a recruit to scientific industry is to succeed in his way of life, it is almost obligatory for him to specialise. What then is the solution? One suggested remedy, and not a bad one at that, is to encourage him to study the history of chemistry. While not taking the student too far off his professional road, this study does undoubtedly give him an insight into the lives of men working in conditions very different from his own. His outlook is thereby broadened, and he can be saved from developing that tedious disability, the single-track mind. Nowhere has the single-track mind become a greater danger to progress than in the United States, the home of specialisation; and it is to the credit of the Americans that they have taken some steps to correct this defect. Leading in this field is that admirable periodical, the *Journal of Chemical Education*. Its monographs on great chemists of the past neglect no aspect of their heroes' lives, technical or non-technical; interesting pictures are included; and the whole effect is to give readers an impression of the continuity of their science. We have no idea how great the influence of this journal is upon scientific industry in the U.S.; we hope it is considerable.

The Chemistry of History

EVIDENCE of a rather different approach to the more humanistic side of chemistry is provided by an article in the July issue of *J. Chem. Educ.*, the author, Mr. E. R. Caley, being a member of the Department of Chemistry, Princeton University, and on the staff of the American Excavations in the Agora at Athens. The subject is "Ancient Greek Pigments," and the materials were examined by micro or semi-micro methods, the chief difficulty being the small amount of material available for analysis. The main sources were the scrapings of pigments from terracotta shards found in the ruins of the ancient market-place, and the remains of bulk pigments found in the vessels in which they had been stored or mixed. Most of the pigments were found to be natural mineral products used in their native state or after slight mechanical refining. Such processes as were used, *e.g.*, the mechanical separation of cinnabar, bear out the descriptions of Theophrastus in *De Lapidibus*, and the appearance of a fine blue frit, an artificial calcium copper silicate, argues an import trade with Egypt, since according to Vitruvius the first European manufacture of this material was at Puteoli, near Naples, in Roman Imperial days. White lead, however, was certainly made in Greece, again on the authority of Theophrastus. The point of all this, of course, is that the study, by chemical analysis, of these materials, leads to an appreciation of the commercial and industrial circumstances of another age and clime, and we

feel sure that Mr. S. W. Midgley, Jr., the student who worked under the author's direction, was grateful for this subject which was assigned to him for a thesis. We can never see the paintings of Apelles; but we can at least learn the mechanical handicaps he had to contend with..

Fluorine in Food

ON a later page of this issue it will be seen that the Ministry of Food has announced its intention of making an order limiting the fluorine content in certain ingredients in common use in the preparation of food. It may be asked why this order is proposed, and, if proposed, why the matter was not attended to earlier. Explanation is given in a report prepared by the Inter-Departmental Committee on Food Standards at the instance of the Ministry. The main food ingredient involved is calcium acid phosphate (A.C.P.), the majority of which—some 80 per cent.—in this country is prepared by a process using elementary phosphorus, resulting in a high degree of purity. In an alternative process, however, the raw material is rock phosphate, and the product is contaminated by fluorine compounds. During the war years manufacturers had to use such rock phosphates as were available, leading in some cases to a heavier contamination that was customary before the war. Some manufacturers, indeed, claim that they have been selling A.C.P. containing as much as 3000 p.p.m. of fluorine without exception being taken by the Food and Drugs Authorities. In 1943 the Society of Public Analysts recommended a maximum fluorine content for acid phosphates and similar food components, but it has proved difficult to convince a court that where these proportions were exceeded an offence had been committeed.

Recommended Safety Limits

THIS was obviously an unsatisfactory situation, and to clarify it, manufacturers submitted, on request, a report of work carried out on their behalf by Mr. H. E. Archer and Mr. B. Leech, FF.R.I.C. In this report doubt was thrown on the contention that fluorine ingested in food is in any way toxic, and it was maintained that the absence in this country of any widespread mottling of teeth—claimed to be a highly sensitive indicator of fluorine absorption—it could be assumed that fluorine was not absorbed from A.C.P., or, if absorbed, was harmless. The committee, however, felt that further examination was required, and addressed a questionnaire on the subject to the Medical Research Council. As a result of this the points were made that (a) mottling is not the most suitable indicator of fluorine absorption except through the water supply; and (b) widespread fluorosis does occur in animals and humans in Algeria, a region from which rock phosphate is obtained. It was felt, therefore, that fluorine was a potentially toxic contaminant of food and that the risk to public health from the repeated ingestion of small amounts of the element was too serious to be disregarded. The difficulty was, in the absence of adequate evidence, to estimate the amount of fluorine that could be safely ingested over a period, and the recommended limits, which are more generous than those originally set by the Society of Public Analysts, have been made with due consideration of the probable total intake of the food ingredients concerned. A full report of the committee's procedure has been issued by the Ministry of Food.

University Grants Committee

AS has for some time been generally expected, the terms of reference of the University Grants Committee have been considerably broadened. In a written reply to a question in Parliament last week, Mr. Dalton, the Chancellor of the Exchequer, made an announcement to this effect, expressing his wish that the committee should take a fuller part in the planned development and rapid expansion of our universities. The new terms of reference go beyond inquiry into the financial needs of the universities, and the provision of advice to the Government on points concerning them; they include the acquisition and examination of information relating to university education both at home and abroad, and the rendering of assistance to the various bodies concerned in the preparation and development of such plans as may from time to time appear essential to ensure that the universities may themselves develop on a scale commensurate with national needs. Such terms open up a wide field of action to a vigorous committee; and it is to be hoped that present and future members will take advantage of the scope offered to them. The committee's record in the past has been good; our needs to-day are such that positive and strenuous action has become obligatory on any body responsible for the improvement of educational facilities.

Recent Developments in Analytical Chemistry—XVII

(from Our Analytical Correspondent)

As one of a series of spot tests for the detection of alloying elements in steels, α-benzoin oxime is recommended[1] as the reagent for copper. A drop of 5 per cent. ammonium persulphate solution in 5 per cent. ammonia is placed on the steel, allowed to stand until a brown precipitate forms, and then one drop of sulphuric acid (1:3) is added and allowed to remain for two or three minutes. The combined drop is then washed off, and the place where it had been is washed with acetone and allowed to dry. The reagent solution for the final test contains two parts of saturated ethanolic α-oxime, two parts of 0.88 ammonia, two parts of water, and one part of 50 per cent. citric acid. On applying a drop of this to the treated portion of the steel, a dirty green precipitate will form if copper is present. As little as 0.04 per cent. of copper in the steel can be detected, while a strong reaction is given if 0.9 per cent. of copper is present.

Separation of Copper and Cadmium

The method of Evans, Garrett and Quill for the separation of copper and cadmium in ordinary qualitative analysis[2] is based on the soluble copper tartrate complex which can be formed in alkaline solution; in the same conditions cadmium precipitates as the hydroxide. This method has been found[3] to be unreliable because of the ammonia which is present in the ordinary course of the analysis, which should be—but in general is not—completely removed on making the solution alkaline with sodium hydroxide. A variation in procedure is therefore proposed. After bismuth is precipitated by ammonia, as in the original procedure, the solution is acidified with nitric acid, taken to dryness, and heated to drive out ammonium salts completely. After cooling of the residue, it is dissolved in one or two drops of 6*N* nitric acid. One ml. of water is added, followed by ten drops of 6*N* sodium hydroxide and one ml. of 0.5 molar sodium potassium tartrate solution. Cadmium now precipitates completely as a gelatinous precipitate. In the presence of copper the precipitate will be blue in colour, but on washing twice with water the precipitate should now be completely white, indicating complete separation. On subsequently dissolving this precipitate in dilute sulphuric acid the cadmium may then be precipitated as sulphide.

An entirely different principle has been used by Bishop for the separation and identification of these two elements[4]. Using a small column of 8-hydroxyquinoline, 1 in. long, in a piece of quill tubing, inorganic chromatographic methods are brought into operation. The mixed neutral solution, of the strength usually met with in inorganic analysis, is passed through the column. The copper is removed as a greenish ring at the top of the column. If the column is now exposed to ultra-violet light, the cadmium compound, which fluoresces pure green, can be detected below the copper ring. Sufficient cadmium will also probably pass through into the filtrate to give the normal yellow sulphide precipitate with sulphuretted hydrogen.

Electrolytic Deposition of Copper

Sulphamic acid is recommended[5] for accelerating the deposition of copper in its determination in solutions containing nitric acid. The addition prevents interference from nitrogen oxides formed in the course of the electrolysis. In the case, for example, of a bronze, the alloy may be dissolved in nitric acid and tin filtered off. Lead and copper are then deposited simultaneously, sulphuric acid being added in the course of the electrolysis. Passage of current, at about 1.75 amp., is continued for about half an hour, and at this point 0.5 g. of sulphamic acid in 10 per cent. aqueous solution is added. Deposition is continued for a further 15 minutes. The electrolytic estimation of copper in bronzes is also dealt with by other authors. Ravner[6] describes its estimation, together with that of other elements, in a single sample of manganese bronze. A 2-g. sample is dissolved in a mixture of nitric and hydrofluoric acids. In such a medium, copper and lead may be separated quantitatively from stannic tin. Electrolysis, using 1 amp. for 30 minutes, should deposit all the copper on the cathode, lead appearing as the dioxide on the anode.

Normally, in such an acid medium, platinum is stripped from the anode and plated on to the cathode, giving erroneous results for copper. However, deposition of a lead dioxide coating on the anode prevents such action. Therefore it is recommended that if no lead dioxide appears on the anode in the first few minutes of the electrolysis (*i.e.*, lead is absent from the bronze) some lead nitrate solution should then be added to provide the protective coating. After half an hour sulphuric acid is added, and electrolysis continued till no further copper deposits. This can be observed by washing down with a little water, and watching the small ring of the cathode thus freshly

covered by solution. After washing with water and ethanol, the electrode is dried at 110° C. for two minutes and weighed. It is then stripped of copper and reweighed.

Instead of the hydrofluoric-nitric acid medium for solution, a perchloric-nitric acid mixture has been recommended for solution of a manganese bronze.[7] After solution, the whole is fumed down to remove the nitric acid. The solution in perchloric acid is then diluted considerably, and copper, tin, and lead are precipitated, using sulphuretted hydrogen. The combined precipitate is filtered off, ignited, and treated with nitric acid to separate the tin. The filtrate from this treatment is diluted, sulphuric acid and urea or sulphamic acid are added, and the copper is deposited electrolytically on a platinum gauze cathode. A current of 2.5 amp. is passed for an hour. Lead is deposited as the dioxide on the anode, and may be determined simultaneously.

Copper and Zinc Together

Copper and zinc may be determined together electrolytically in brass plating baths and allied materials[9]. This method, which is used as a routine control, first deposits the copper and zinc together from a cyanide solution containing ammonium sulphate and ethanolamine. The electrode is dried and weighed. The deposit is then stripped from the electrode by solution in a sulphuric-nitric acid mixture and, after partial solution, reversing the current to drive all the deposit into solution. The current is again reversed, and copper deposits. For the first minute 0.5 amp. is passed, and then the current is increased to 1.5 amp., deposition being complete in about ten minutes. On drying and reweighing the electrode, the weight of the copper is found. The weight of the zinc is given by the difference in the two deposits.

Perchloric-nitric acid mixture is used for the solution of aluminium alloys and high silicon alloys containing copper, which dissolve readily in this medium[9]. After solution, electrolysis is begun with a current of 2-3 amp., and the copper is deposited completely on a platinum gauze cylinder in 30-40 minutes.

The application of controlled potential methods, for which a relatively simple apparatus has been described,[10] has been applied to the estimation of copper in copper and tin base alloys.[11] The potential is maintained at the desired constant potential throughout the electrolysis. The alloy sample, weighing from 0.5 to 2 g., is dissolved in a hydrochloric-nitric acid (4:1) mixture, boiled, and 100 ml. of a solution containing 23 g. sodium tartrate, 1 g. urea and 10 ml. of 5*N* sodium hydroxide are added. The whole is diluted to 200 ml., 1-2 g. of hydroxylamine hydrochloride are added for anodic depolarisation, and electrolysis is carried out at a potential of −0.36 volt against standard calomel, for an hour. Using this method it is possible to determine accurately a few hundredths of a gram of copper in the presence of as much as 2 g. of tin.

Titration Methods for Copper

A rapid control method for copper in steel utilises a volumetric finish.[12] The sample is dissolved in a perchloric-nitric acid (1 : 1) mixture, and treated with a few drops of hydrofluoric acid to remove silica. Gentle fuming then removes the nitric acid. The solution is cooled and diluted, and the copper is precipitated as cuprous thiocyanate by treating with sodium thiocyanate and sulphurous acid, the solution being buffered with sodium acetate. The precipitate is filtered off, washed, and treated with chloroform, hydrochloric acid, and iodine monochloride. The whole is titrated against potassium iodate solution to the end point, when the pink colour in the iodine layer disappears.[13] The maximum error for this method is ± 0.02 per cent., and the whole determination can be carried out in less than 15 minutes.

Ammonium nitrosophenyl hydroxylamine (cupferron) has been found suitable as a reagent for the determination of copper by conductometric titration.[14] A sharp break occurs in the curve of conductivity plotted against mls. of standard aqueous cupferron, at the end point. The method is stated to be suitable for the determination of copper in brass if the tin content is not above 5 per cent. Zinc, nickel and cobalt have no effect on the accuracy of the titration. Iron, however, which also forms an insoluble compound with the reagent, should be removed. The reagent solution should be kept in the dark, and should be restandardised if it has been allowed to stand for more than three days.

Polarographic Methods

The polarographic analysis of aluminium alloys has been described by Kolthoff and Matsuyama.[15] The alloy is first attacked by 20 per cent. sodium hydroxide solution, and complete solution achieved in nitric acid (1 :1). Hydrochloric acid must not be used, as it interferes with the subsequent determination. To an aliquot of the solution gelatin is added, and the current is measured at + 0.15 and − 0.15 volt against standard calomel. These represent respectively the amounts of iron, and of iron and copper present, when corrected for the residual current given by a standard aluminium solution at the same potentials. If much iron is present, it is reduced by hydroxylamine hydrochloride, when the corrected diffusion current at − 0.15 volt represents the value for copper. Observation of the

current at + 0.2 volt will show whether there is still a trace of iron unreduced.

The polarograph has been used to determine copper in plant and animal tissues[16]. Such determinations have normally been associated with a preliminary ashing procedure. The present authors make use of the fact that in acid solution copper is released from copper proteins. Citric acid is used, and after the extraction the solution is buffered to *p*H 4 by adding sodium hydroxide, in effect forming a sodium citrate buffer. Copper is then determined polarographically, using fuchsin as a maximum suppressor, and heptyl alcohol to prevent foaming. Using this method, from 1 to 100 μg. of copper can be determined with an average deviation of ± 3 per cent.

Cranston[17] applies the same principle of extraction to traces of copper in milk and similar products. The sample is treated with perchloric acid to bring it to *p*H 1.0, releasing the copper from the proteins, and obviating the necessity for digestion or ashing of the sample. The filtrate from the acid treatment contains all the copper. An ion-exchange resin (Amberlite IR-100) is then used to remove the copper, the solution, neutralised with ammonia, being passed through a 150 × 12 mm. column of the resin. The copper is then stripped from the column by dilute hydrochloric acid, and determined polarographically. Amounts of copper up to 1 mg., which would be expected from 100 ml. of milk, are dealt with successfully. Alternatively, the determination may be completed photometrically, using dithizone, by a procedure already described in this series.[18]

An indirect polarographic method for copper has been described by Carruthers.[19] The method has been applied to extracts of copper in animal tissue. A measured excess of salicylaldoxime is added to precipitate the copper. The residual reagent is determined polarographically, thus enabling the copper content to be calculated. Since zinc gives a wave at about the same voltage as salicylaldoxime, it interferes with the determination. The determination has been applied to amounts of copper ranging from 4 to 600 μg. For the lower range an accuracy of about ± 3 per cent. is to be expected, while this is improved to about ± 1 per cent. with the larger amounts.

Colorimetric Methods

In synthetic ammonia plant it is necessary to keep a check on the cupric content of the ammoniacal copper solution which is used for absorption of carbon oxides. A method has been devised[20] which allows continuous recording of this value. The method is photometric, depending on the deep blue cupric ammino ion. A light beam passing through the solution is measured photoelectrically and the transmission recorded. In this connection, it has been found by Miller[21] that the blue cuprammonium colour, while dependent on the amount of ammonia present, and therefore troublesome to use by ordinary colorimetric methods, may be employed satisfactorily under certain conditions. The maximum absorption point for the colour is about 620 mμ, and if measurements are made with a spectrophotometer at this wavelength, the ammonia content has to be controlled very carefully. If, however, the measurement is made at 580 mμ, the absorption is independent of the ammonia content, and is an accurate measure of the amount of copper present. Based on this, Milner has devised a method employing this colour for the determination of copper in corrosion-resistant steel.

Spectrophotometric Methods

Traces of copper, for example in milk, can readily be determined spectrophotometrically using diphenylthiocarbazone.[22] The sample is decomposed by a sulphuric-nitric acid digestion, and an aliquot of the resulting solution is placed in a flask. The *p*H is adjusted to 2.3 (the yellow colour with cresol red) and a solution of the reagent in carbon tetrachloride is added. After transference of the copper, together with silver, mercury, and bismuth, to the organic (lower) layer by shaking, the upper layer is carefully poured away. Extraction of the remainder with acid potassium iodide solution transfers the interfering metals to the aqueous layer as complex iodides, so that after this is once more poured away, only copper dithizonate remains in the carbon tetrachloride. A pipette with a curved tip is used to draw off the last few drops of the aqueous layer. The carbon tetrachloride solution is then measured spectrophotometrically at 520 mμ, and the copper determined from a calibration curve.

For the spectrophotometric determination of small amounts, from 0.025 to 0.2 mg. of copper, dithio-oxamide (rubeanic acid) has been proposed.[23] The copper solution, free from mineral acid, is buffered to *p*H 4.8 with acetic acid-ammonium acetate, and is treated with a 0.1 per cent. ethanolic solution of rubeanic acid. The olive-green colour may be measured spectrophotometrically at 400 or at 650 mμ. An accuracy of ± 0.1 p.p.m. is claimed.

Sodium diethyldithiocarbamate has been used for the determination of copper by a number of workers. Partridge,[24] determining copper in aluminium alloys, dissolves the alloy in a mixture of sulphuric, nitric, and hydrochloric acids (5 : 8 : 8), which has been diluted with about an equal amount of water. The solution is then heated till sulphur trioxide fumes appear, or to dryness. On cooling, the residue is dissolved in hot water. Nickel, if present, is removed from an aliquot of the solution by dimethyl-

glyoxime precipitation and filtration.. A 0.1. per cent. solution of the reagent is added, and the yellow complex is extracted with carbon tetrachloride. The extract is matched colorimetrically against standards, or read against a calibration curve. Results obtained agree closely with those obtained electrolytically.

The same reagent has been used for the colorimetric determination of copper in blood serum.[25] The copper is extracted from the serum by three successive treatments with trichloracetic acid, centrifuging, and decantation. The extract is then treated with sodium pyrophosphate, ammonia, and an aqueous 0.1 per cent. solution of the reagent. The colour is determined photoelectrically. An average error of about 3 per cent. is found.

Finally, Strafford, Wyatt, and Kershaw have devised a scheme[26] for the determination of small amounts of metals in medicinals, in which copper is determined by the reagent. Two schemes are presented, the first dealing with copper, arsenic, lead, zinc, and iron. Because of the interference of bismuth with copper, these two elements are included in an extended scheme, together with cadmium and nickel.

Determination of Silver

As a confirmatory test for silver, Baker and Reedy[27] have proposed a test which is carried out on silver chloride precipitate. As applied to the silver analytical group, where lead and mercurous ions may also appear, the solution is precipitated with dilute hydrochloric acid, and chlorine water is added to oxidise mercurous to mercuric. The suspension is warmed to coagulate the precipitate, which is filtered off and washed till free from chloride, lead and mercury. The precipitate is then aspirated till it is practically dry, and a drop of a solution of potassium tetraiodomercurate is added. A bright orange colour will form with the precipitate obtained from a single drop of 0.001 molar silver nitrate.

The reagent, potassium tetraiodomercurate, is prepared by shaking 24 g. of mercuric iodide with 100 ml. of warm molar potassium iodide solution, and allowing to settle. The excess mercuric iodide, in contact with the solution, keeps the reagent stable for several months.

The volumetric determination of silver is described by Evans and Higgs.[28] Potassium cobalticyanide is used to precipitate the silver in the first instance. A quantitative separation from lead is obtained when the solution contains 5 per cent. nitric acid. The silver precipitate is washed with 1 per cent. reagent in 5 per cent. nitric acid, and is then dissolved in dilute ammonia. The final determination is carried out by a cyanide titration.

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German Technical Reports

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London's Chemical Industry

II. Fertilisers in West Ham

by W. A. PARKS, B.Sc., and E. A. RUDGE, Ph.D., F.R.I.C., A.M.I.Chem.E.

DURING the early years of the nineteenth century, West Ham, Stratford, and East Ham were villages, still in a rural setting. There were, however, the beginnings of industry in Stratford, near Bow Bridge, and, by the middle of the century, this industry was predominantly chemical. In earlier years still, Stratford itself had been the slaughterhouse of the metropolis. The coming of the railways, and the building of the Royal Victoria Docks in 1855, paved the way for a renewal of the trade in cattle. The district immediately east of Bow Bridge, and the newly developing area around the docks, enjoyed, or suffered, an influx of trades largely connected with the disposal of animal refuse.

In 1852, James Odams, of Holloway, took out a patent for treating liquid blood for the preparation of a manure. The blood from the slaughterhouse was treated in a lead-lined vessel, and into it was stirred commercial sulphuric acid. To this was added animal charcoal and mineral phosphate. When action had ceased, the mixture was taken out and allowed to dry, when it was ready for direct use as a manure. Odams had acquired land on the waterfront at Silvertown for use as a cattle market and slaughterhouse for imported cattle. In 1855, on a neighbouring site, his factory for the manufacture of this manure was opened, and began trading as the Patent Nitro-Phosphate and Blood Manure Company.

Sold to German Firm

As a result of an Order in Council concerned with the control of cattle plague, the landing of cattle was subsequently confined to Deptford, and Odams' slaughterhouse site was sold to a German firm controlled by Baron von Ohlendorff. This firm entered the rapidly expanding business of importing Peruvian guano, and their works were established in 1873. The fertiliser works of Odams continued, however, until about 1920, when they were sold, and the fertiliser business taken over by the Anglo-Continental Guano Works, Ltd., the direct descendants of Ohlendorff's. Ohlendorff's began by importing Peruvian guano in its raw state. It was brought over in sailing ships, and supplied to farmers as it was. The farmers found the stones, which were mixed with the guano, a great nuisance, and the firm, in consequence, began to screen the material before delivery. At a later stage it was both screened and bagged at Silvertown.

Although it had long been known that the nitrates were valuable additions to natural manures, and the work of de Saussure and Liebig had suggested the use of salts of ammonia for the same purpose, it was mainly the insistence of Liebig on the necessity for restoring the inorganic constituents of the soil that led to the increasing use of artificially prepared inorganic fertilisers. Liebig had shown that phosphates from bone or mineral sources could be rendered more effective by being made soluble with sulphuric acid. This work stimulated J. B. Lawes in his experimental work at Rothamsted. In 1843, Lawes established his Deptford works for the manufacture of superphosphate, and other such works followed. Evidence is lacking as to the earliest date of the manufacture of superphosphate in West Ham, but there were vitriol works in 1868, on what was called Plaistow Marsh, and at this works Gibbs, Bell & Company were certainly making superphosphate by 1874.

Superphosphate Manufacture

The Ohlendorff Company started making their own acid for superphosphate manufacture in 1880. The acid plant of this firm has already been described in a previous article (THE CHEMICAL AGE, 1946, *54*, 359). The method of superphosphate manufacture used at that time differed from the modern process mainly in the lack of mechanical contrivances. The crushed phosphatic rock was treated with sulphuric acid in dens, the earliest dens being sometimes of tarred pitch-pine and sometimes of brick. The Ohlendorff Company started with a horizontal mixer in which the rock was mixed with the acid. When mixing was complete, a door in the bottom of the mixer was opened, and the contents dropped into the den below. Here they remained overnight, and were then "picked" by hand, a particularly unpleasant task, since quite copious amounts of hydrogen fluoride and chloride are evolved during the maturing process. The whole process of maturing took from one to two months. In 1900 the firm introduced a new den of German pattern, with a capacity of 80 tons. Progress since that time has been in the direction of more complete mechanisation.

The firm remained German-owned until the 1914 war, after which it became a British company, and was absorbed by Fisons, Limited, in 1937. Old employees still remember the annual visits of Baron von Ohlendorff and his sons. These gentlemen, dressed immaculately in frock coats, after making their tour of inspection would

remove their white gloves and throw them to be scrambled for by excited and admiring work-people. With this gesture, partly perhaps of largesse, or even symbolic of the shaking of the dust of Silvertown from their persons, the important visitors made their departure.

In 1932, the Anglo-Continental Guano Works, Ltd., now well established as a British concern, installed a complete plant

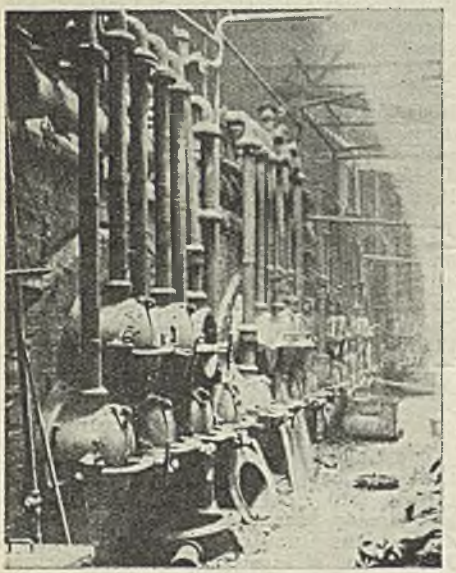

Fig. 1. A set of ancient retorts, dismantled before the war, and now demolished, formerly in Hunt's Charcoal Works. The original 1870 set were probably much the same as these.

of the American Broadfield pattern. They were the first in England to introduce continuous mixing and feeding. The feeding apparatus, designed to introduce the requisite quantity of ground rock into the mixer at the appropriate time, was designed at Silvertown and was patented in America. The advantages of this are more intimate mixing, and thus quicker maturing. The time for maturing has been reduced from one or two months to from three to seven days.

Other vitriol makers and manure manufacturers, such as Thomas Farmer, Mark Finch, and Henry Glover, operated works in the Silvertown district during the latter half of the nineteenth century, but these have now disappeared as separate entities.

Manure made from animal refuse has long been one of the main industries of West Ham and neighbourhood. The bone-boilers and soapmakers naturally disposed of some of their products in this way. Of these, in the last quarter of the century, there were many, but, as early as 1852 the only blood-drier mentioned in the London directories was one Richard Toms, of Bow Common, just on the London side of the River Lea.

Manures of this kind were prepared by Frederick Hempleman, of West Ham Abbey, from the 1860's onwards. Other firms, such as E. Cook & Son, who transferred their soap making to Stratford in 1859, and J. T. Hunt, utilised bones in their preparation. Hempleman was a blood-boiler. In fact, he was one of the last of his kind, for, although the simple boiling of blood was obsolescent by 1876, he was still practising this older process at his works. There were two methods of blood-boiling current at the time. One consisted of boiling the blood in a large pan by means of an open fire, the other utilised free steam. Hempleman used the latter process. The blood was first mixed with water, and, after boiling by injecting steam, the coagulated mass was strained from the liquid, and subsequently further dried by pressure. The residue was then either dried on a kiln heated by a fire beneath, or sold in the condition in which it came from the press.

The firm of J. T. Hunt, now Hunt's Charcoal, Ltd., was established in 1820 on the Thames side at Lambeth. As a result of an increasing stringency of local by-laws they left Lambeth in 1868, and moved to a site on the waterways near Bow Bridge. While at Lambeth they used local bones for boiling and for the manufacture of bone meal, at Stratford they began to import bones in addition to relying on local supplies. They produced superphosphate from bones, made bone meal, and, at one period, soap. Rumour has it that they also prepared phosphorus from bones. The apparatus was set up on the banks of one of the streams, and, in the event of fire—probably a none too rare occurrence—the plant was extinguished by the simple expedient of pushing it into the stream. At that time Stratford was still surrounded by agricultural land, and the fertilisers from this works were so popular that there would often be a long queue of farmers' wagons at the works awaiting their turn for supplies.

Bone Charcoal and Bone Meal

Shortly after the move to Stratford the production of bone charcoal was begun. This, and bone meal, are now the main products of the firm. The bones were originally burned in horizontal retorts very similar to the coke ovens of the gas works. The issuing gases were scrubbed to remove ammonia, and were then burnt in open jets to light the workshops. The ammoniacal liquor was treated in open tanks with sulphuric acid, and the sulphate disposed of as a fertiliser. The modern plant consists

of vertical retorts. Much of the charcoal is used in sugar refining.

Ammonium sulphate was produced from bones by S. Carey, of East Ham, about the year 1865. Local gas works did not treat their liquors at first. These were exported from the works, and some were used locally. The Gas Light & Coke Company, of Beckton, set up their sulphuric acid plant in 1879 (THE CHEMICAL AGE, *loc. cit.*), and started delivering sulphate in the same year.

Clay & Son, Ltd., are another old-established fertiliser firm in the neighbourhood. The founder, Samuel Clay, was a Colchester farmer who had experimented with various forms of fertiliser. In or about 1875 he established a works in Stratford to produce different varieties of fertiliser, mainly from blood, bones, and the like. The firm is well known for its agricultural and garden fertilisers.

Other smaller manufacturers existed, for more or less short periods, in the district. Legislation affecting the location of Offensive Trades had the effect of driving some of the older firms from sites nearer London, and the less stringent regulations in West Ham in these early days led many newcomers to try their fortunes in this type of business. Some of them, no doubt, were unsuccessful, and disappeared. But lest it be thought that West Ham remains to-day in the state in which Victorian writers described it, we hasten to add, in conclusion, that the activities of an energetic local authority, and of public-spirited firms, have reduced the nuisance value of the various works in this class of business to a negligible minimum. The firms which remain have long conducted their factories in an up-to-date and efficient manner.

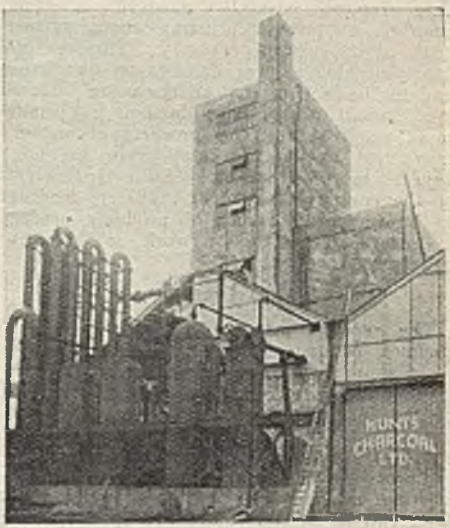

Fig. 2. Hunt's Charcoal Works, Stratford, as they are to-day.

ACKNOWLEDGEMENTS.

The writers wish to acknowledge, with thanks, their indebtedness to Fisons, Ltd., of Ipswich and Silvertown, Hunt's Charcoal Ltd., the Sanitary Inspector of the County Borough of West Ham, and Kelly's Directories for their kindly assistance.

Oil Fuel for Chemical Plant

Lord McGowan's Plans for the Future

ADDRESSING Liverpool shipowners on Thursday last week, Lord McGowan, chairman of I.C.I., referring to the coal situation, said: "The position is so serious that we are considering not only converting many of our coal burners to oil, but using that form of energy in our great extension scheme." He pointed out that his company was now paying £3,500,000 more for its coal than in September, 1939; and stated that he had very good reason for saying that there could be no hope of any substantial improvement in output or reduction in price until 1950. The country as a whole, he thought, would be millions of tons short of the target figure for coal in April, 1947, and the coming winter would be a very trying one.

Speaking of the industrial situation in general, he warned manufacturers not to expect to export the same types of goods as before the war. "We must," he said, "apply our scientific, technical, and manufacturing experience to produce goods which other countries cannot manufacture for themselves." Although there was a general impression of prosperity at home, and we were "on the crest of a sellers' market," there were also many disturbing signs.

Of I.C.I. itself, Lord McGowan remarked that workers returning from the forces were showing a discipline and a desire to work which had been notably absent after the first world war. To break down the fears of unemployment and any atmosphere of suspicion, he urged industrialists to devote much more of the management's time to explaining things to employees: the balance sheet, marketing problems, expansion programmes, and the like—particularly in reference to the fuel problem. I.C.I., he said, were working on the development of light alloys, and were making a new leather-cloth product. "Vynide," with special flame-resisting properties.

Italian Chemical Notes

Improved Position

ITALY'S chemical industry is, according to reports recently received in this country, at present utilising about 25 per cent. of its pre-war capacity. This decline has been due to war damage on one hand and to the lack of coal on the other. However, repair of the war damage has made rapid progress and the prospect of an improvement in the fuel supply position now appears more favourable. An early revival of the country's chemical industry, leading to an increased output of products needed in general reconstruction work, is therefore being reckoned on.

Capital Increases

The report that two of Italy's leading chemical companies have decided to increase their share capital in the near future has to be related to the general improvement in the industry's position. According to the *Agenzia Economica e Finanziaria*, the board of the Montecatini group has decided to propose, at an extraordinary general meeting, an increase in the share capital from two to eight milliard lire by the issue of 20,000,000 shares of 100 lire each which are to be offered to the shareholders in the proportion of one new share for each old share at a price of 110 lire. The remaining 4 milliard lire are to be derived from a revaluation of the group's assets and it is reported that Sig. Corbino, the Minister in charge of the Italian Treasury, has already consented in principle to this plan, by which the nominal value of the old shares is to be doubled.

The " Rumianca " Societa per l'Industria Elettrica chimica e Mineraria," of Turin, has also worked out a plan to increase its share capital from 200 to 320 million lire, of which 100 million will be offered to shareholders, while the remaining 20 million will remain at the board's disposal for future " industrial combinations."

Rumianca's Progress

The company's report makes reference to the large sums that had to be expended for the reconstruction of the war-damaged plants at Apuania and Pieve Vergonte (in Novara Province), as well as for the purchase of equipment and raw materials which had been looted by the Germans. Whether or no these sums will be refunded by the State depends on the general settlement of war damage compensation, but the company hopes that by a revaluation of assets, and as a result of the capital increase, the company will be able to raise the necessary funds for future expansion of its activities. Furthermore, the company lays great stress on the financing of its plans without having recourse to bank credits. After last year's critical winter period had been passed, the company's development proceeded favourably and it is hoped that the revival of agriculture and the textile industry—within which are found Rumianca's chief customers—will lead to a further improvement.

German Patents

Allied Conference to Decide their Status

A CONFERENCE to consider the question of the future treatment of German-owned patents in Allied countries took place in London at the end of last month. Delegates attended from Australia, Belgium, Canada, Czechoslovakia, Denmark, France, Luxembourg, Netherlands, Norway, Union of South Africa, United Kingdom, United States of America. The chairman of the conference was Sir Harold Saunders, Comptroller of Patents in the United Kingdom.

Patents taken out by Germans exist in varying numbers in all countries of the world. Complete unanimity prevails among the Allied nations that in no circumstances shall any such patents within their territories revert to the former German owners, and the question as to how such rights shall in future be disposed of presents many difficulties. A strong sentiment prevails that it would be unfortunate if the continued existence of these patents should hamper international trade.

As a result of the discussions at the conference, the representatives of France, the Netherlands, the U.K. and the U.S.A. have signed an accord which will have the effect of making all patents of former German ownership now controlled by their Governments, and in which there was no non-German interest existing on August 1, 1946, available within their respective territories to all nationals of the countries party to the accord without payment of royalties or without any requirement to manufacture within the country where the patents exist. The representatives of Australia, Canada, Czechoslovakia, and the Union of South Africa have agreed to recommend to their respective Governments that the accord should also be signed on behalf of those Governments. Representatives of Belgium, Denmark, Norway, and Luxembourg feel that the special difficulties which exist in their countries render it necessary for their Governments to give the scheme a more detailed examination.

As stated above, the accord has been signed by four countries, and it remains open for signature by other members of the United Nations and by neutral countries until January 1, 1947. It will come into force as soon as it has been signed by these further countries provided they sign before the end of 1946.

British Patents in Enemy Countries

Statement by the Chartered Institute

ABOUT a year ago, the Chartered Institute of Patent Agents issued a pamphlet on "Enemy-owned Patents and Patent Applications"* which has now been followed by a pamphlet dealing with the complementary problems of "British-owned Industrial Property in Enemy Countries." This journal has published articles and comments on these problems† and some of the recommendations of the first-mentioned pamphlet have been considered in the Patents and Designs Act, 1946.‡ It will be interesting to see to what extent these new recommendations of the Chartered Institute come to be considered in the peace treaties.

These recommendations are briefly as follows: Following the example set by the Patents and Designs Act, 1946, the council differentiates between "The main agressors" (Germany and Japan) and other enemy, or enemy-occupied, territory, the latter being subdivided into: "the subservient aggressors" (Italy, Austria, Hungary, Rumania, Bulgaria, Finland) and "the overrun countries and merely technical enemies" (Czechoslovakia, Poland, Norway, Denmark, Holland, Belgium, Luxembourg, Greece, Yugoslavia). However, the recommendations of the Council group the "subservient aggressors" with the "main aggressors" as regards the sanctions to be imposed on them, while the Patents and Designs Act, 1946, grouped them together with the overrun countries (including France).

Arrangement with France

The patent relations between the United Kingdom and France have been settled by the Anglo-French Agreement of August 29, 1945, which left the way in which the terms for the extension of patents, claiming of priority, etc., were to be arranged, to the national legislation: this is in this country the Patents and Designs Act, 1946, the Patents, Designs, Copyright and Trade Marks (Emergency) Act, 1939, with numerous Statutory Rules and Orders, and the Emergency Laws (Transitional Provisions) Act, 1946; in France the most important laws are those of July 20, 1944 (providing mainly for the patents filed before January 1, 1939), and of April 2, 1946 (providing mainly for the patents filed after January, 1939). The Council suggests leaving it to the national legislation of the other liberated countries to make provisions most suitable to their internal legislation, and to conclude agreements with the United Kingdom on the model of the Anglo-French Agreement.

As regards the aggressors (main and subservient), the following recommendations are made:

(a) British applicants for patents, designs, or trade marks whose applications were pending on/or after September 3, 1939, should have the option to revive their applications without penalties.

(b) British-owned patents, etc., that were in force in aggressor countries on September 3, 1939, should be restored without penalties upon application of their owners.

(c) The normal terms of patents, etc., should be extended, without payment of additional fees, on application of their owners, to compensate for war losses.

(d) If the ordinary term for filing patent, etc., applications under the International Convention has expired since September 3, 1939, it should be extended.

(e) Licences, etc., imposed on British-owned patents, etc., without the owner's consent should be terminated at the will of the owner.

(f) Royalties, etc., which have become due since September 3, 1939, should be paid to the party in the United Kingdom to whom such payments would have been made but for the war.

(g) Actions for damages in respect of past infringements should not be precluded by the lapse of time.

(h) No "third-party rights" such as the right of user after the formal lapse of the patent, should be recognised.

(i) In the above, the word "Patent" should cover also the German "Gebrauchsmuster" and the Japanese "Industrial Design."

The German Danger

The reason why these suggestions extend to the main aggressor states and satellite states alike, while the Patents and Designs Act, 1946, applies to Germany and Japan only, seems to be because British patents, etc., owned by nationals of the satellite states are not considered to constitute a political or economic danger, whereas experience after the War of 1914-18 has shown that the restoring of German-owned patents was a great mistake.

On the other hand, no difference should be made in the protection of British-owned patent rights, etc., in any one of the former Axis states. The term "British" should, as under the International Convention, include also patentees, etc., permanently resident in the United Kingdom, who are not British subjects.

* THE CHEMICAL AGE, 1945, *53*, 205.
† THE CHEMICAL AGE, 1945, *52*, 147, 182.
‡ THE CHEMICAL AGE, 1946, *54*, 337.

Sulphuric Acid Production

Quarterly Statistical Summary

THE National Sulphuric Acid Association has published details relating to the production and consumption of sulphuric acid, etc., in the U.K. and Eire for the period April 1 to June 30, inclusive, and these are summarised in the following tables:

TABLE I.—SULPHURIC ACID AND OLEUM.
(*Tons of 100 per cent. H_2SO_4*)

	Chamber only	*Contact only*	*Chamber and Contact*
Stock, April 1, 1946 ...	34,156	25,154	59,310
Production	186,146	162,640	348,786
Receipts	42,074	26,882	68,956
Oleum feed	—	1,873	1,873
Adjustments	+88	+4	+92
Use	116,666	77,784	194,450
Despatches	110,863	109,653	220,516
Stock, June 30, 1946	34,935	29,116	64,051
Total capacity represented	220,290	180,870	401,160
Percentage production	84.5	89.9	86.9

TABLE II.—RAW MATERIALS
(*Tons*)

	*Pyrites**	*Spent Oxide*	*Sulphur and H_2S*	*Zinc Concentrates*
Stock, April 1, 1946	74,085	132,901	23,205	74,955
Receipts	88,949	56,878	69,089	27,070
Adjustments ...	+720	+2,677	+1,182	+3,215
Use	80,179	48,830	50,007	40,255
Despatches ...	138	4,258	270	538
	25†	240†		
Stock, June 30, 1946	83,412	139,128	43,199	64,447

* "Receipts" and "Use" include anhydrite "converted" to pyrites.

† Used at works for purposes other than sulphuric acid manufacture.

Note.—The above figures exclude all Government plants—*i.e.*, R.O.Fs., agency factories and other Government-financed plants.

TABLE III.—CONSUMPTION OF SULPHURIC ACID AND OLEUM
UNITED KINGDOM AND EIRE
(*April 1 to June 30, 1946*)

Trade Uses		*Tons 100% H_2SO_4*
60	Accumulators	2,054
61	Agricultural purposes	982
63	Bichromate and chromic acid ...	2,409
*64	Borax and boracic acid (*see* 105) ...	
65	Bromine	1,770
*66	Chlorsulphonic acid (*see* 105) ...	
67	Clays (fuller's earth, etc.) ...	1,585
68	Copper pickling	559
69	Dealers	3,401
70	Drugs and fine chemicals ...	3,053
71	Dyestuffs and intermediates ...	14,468
72	Explosives	3,679
73	Export	517
*74	Formic acid (*see* 105)	
75	Glue, gelatine and size	77
76	Hydrochloric acid	14,003
77	Hydrofluoric acid	636
78	Iron pickling (including tin plate)	17,459
79	Leather	1,262
81	Metal extraction	249
82	Oil (mineral) refining	6,901
83	Oil (vegetable) refining	1,321
84	Oxalic, tartaric and citric acids ...	1,639
85 & 80	Paint and lithopone	15,687
86	Paper, etc.	770
88	Phosphates (industrial)	999
89	Plastics, not otherwise classified	4,183
90	Rare earths	2,412
91	Rayon and transparent paper ...	27,796
92	Sewage	2,265
93	Soap and glycerine	678
94	Sugar refining	228
*95	Sulphate of alumina (*see* 105) ...	
96	Sulphate of ammonia	60,689
97	Sulphate of barium	926
98	Sulphate of copper	7,283
99	Sulphate of magnesium	2,382
100	Sulphate of zinc	534
101	Superphosphates	116,160
102 & 62	Tar and benzol	3,547
103	Textile uses	4,417
105	Unclassified—*Uses known ...	17,696
	Uses unknown ...	6,607
	TOTAL	353,283

Cornish Tin Mines

Appeal for Skilled Worsker

AN appeal for skilled miners, to make good the present shortage of labour in the only two tin mines now operating in Cornwall, was made by Mr. Harry Rich, chairman of the South Crofty Mine, at a recent meeting of the Cornish Chamber of Mines.

Urging that a special effort should be made to obtain more men in view of the fact that the Government is supplying the mines with the necessary money for development, Mr. Rich said his company was prepared to take on a hundred men at the South Crofty Mine at once. He suggested that steps should be taken to impress men returning from the Forces that good wages could be earned in the tin mines. The Ministry of Fuel, to whom it had been suggested that Polish miners who did not wish to be repatriated could be given work in the Cornish tin mines, had pointed out that there were difficulties of accommodation for such men, but Mr. Rich thought the now disused W.A.A.F. station near Portreath could be taken over for them.

Mr. G. W. Simms, chairman of Geevor, Ltd., also spoke of the necessity of obtaining more skilled workers, or trainees.

The Chamber agreed to write to the Minister of Fuel, welcoming the recent appointment of a Government committee to investigate the tin mining industry and offering assistance in its inquiries.

New Control Orders

Aluminium and Light Alloys

GOVERNMENT control of the purchase of aluminium and light alloys is removed with effect from August 1, under two orders made by the Ministry of Supply: the Control of Aluminium (No. 7) Order, 1946, and the Light Metals and Alloys Fabrication (No. 2) (Revocation) Order, 1946 (S. R. & O. 1946, Nos. 1269, 1270). As the Ministry has made a contract for the supply of 215,000 metric tons of virgin aluminium from Canada during the years 1946-1947, it will continue to be the sole buyer and seller of virgin aluminium.

The Ministry is also cancelling directions previously issued to the light alloy industry requiring the segregation of light alloy scrap into various categories, and the making of statistical returns. Arrangements have been made for statistics to be furnished on a voluntary basis by the industry, and totals will be issued monthly by the Ministry of Supply for publication. Inquiries should be made of the Light Metals Control, Ministry of Supply, Southam Road, Banbury, Oxon.

Chemicals in Food

Fluorine Content

AS a result of recommendations made by the Inter-Departmental Committee on Food Standards, the Ministry of Food has under consideration the issue of an Order under Regulation 2 of the Defence (Sale of Food) Regulations, 1943, prescribing limits, as under, for the fluorine content of the following foods:

	Parts per million
Calcium acid phosphate and sodium acid pyrophosphate when used for food purposes	300
Baking powder and golden raising powder	100
Self-raising flour and other food products containing aerating ingredients	8

Comments on these proposals should be forwarded in writing to the Ministry of Food, Miscellaneous Food Products Division, 39-40, Portman Square, London, W.1, not later than August 31.

Calcium Carbonate in Flour

The Minister of Food announces that on the advice of the Special Diets Advisory Committee of the Medical Research Council, from Sunday, August 11, the rate of addition of calcium carbonate (creta praeparata) to national flour will be increased from 7 oz. to 14 oz. per sack of 280 lb. This is to compensate for the increased phytic acid content of 90 per cent. extraction flour.

Digest of Statistics

Chemical and Allied Figures

AN improvement in the production of chemicals in the U.K. during May is recorded in the recently-published July issue of the *Digest of Statistics* (H.M.S.O., 2s. 6d. net). The figures quoted are in thousand tons.

Sulphuric acid production, which, after rising to the record figure of 165.1 in March, dropped to 160.3 in April, recovered in May to 164.3, and superphosphate production, which, after reaching 88.1 in March, fell in April to 84.5, climbed in May to 95.4, which is higher than it has been for any month in more than ten years. On the other hand, the production of compound fertilisers, which rose in April to 146.0 after being 138.3 in March, dropped to 116.0 in May.

Consumption of pyrites remained about the same, the May figure being 18.5 as compared with 18.0 for April and 19.1 for March. The consumption of sulphur for the manufacture of sulphuric acid likewise showed little change: for May it was 17.9, as against 17.0 for April and 16.8 for March. Spent oxide consumption remained almost unchanged, the figures for March, April and May being 16.6, 16.4 and 16.5 respectively. An increase is recorded for sulphuric acid consumption—176 for May as compared with 158 for April. The consumption of phosphate rock for fertilisers, which dropped from 68.6 in March to 62.3 in April, rose in May to 70.3. Superphosphate consumption fell to 111.9 in May, after being 116.8 in April and 128.1 in March. There was a slump in the consumption of compound fertilisers, the May figure being 101.3 after the record April figure of 231.1 and the March figure of 217.0.

Stocks of pyrites, recorded at 82 in April, again reached the March figure of 84 in May, and stocks of sulphur for the manufacture of sulphuric acid rose even higher than previously, reaching 69.3 in May after being 59.0 in April and 39.3 in March. Stocks of spent oxide also went up, the May figure appearing as 138.5, as compared with 134.6 for April and 132.7 for March. There was a slight improvement in the position of ammonia stocks (excluding ammonia produced in by-product factories and converted directly into ammonium sulphate): the May figure was 3.59, in comparison with 3.26 for April and 3.07 for March.

Iron ore production dropped from 245 in May to 226 in June, but pig iron production went up slightly—from 151 in May to 152 in June. Virgin aluminium production, which reached 3.29 in April, dropped in May to 2.53 (the June figures are not available).

The estimated number of people employed in chemical and allied works rose slightly, the figures (in thousands) being: April, 225.3; May, 226.9.

Jubilee of Hoffman-La Roche

50th Anniversary of Formation

(from a Correspondent)

THE Swiss chemical and pharmaceutical company, F. Hoffman-La Roche & Co., Basle, well known all the world over for its pioneer work in a number of important fields, has recently celebrated the 50th anniversary of its foundation by Frederick Hoffman. In 1896, industrial production of pharmaceutical and allied products was still in its infancy, and it required more than the usual degree of enterprise to lay the foundation of an industry in a limited domestic market such as that of Switzerland, a country which has to import the largest part of its raw-material requirements. As the co-founder, Dr. Emil Barell, who could look back on his 50th year as president of the board of administrators, pointed out in a speech delivered at the anniversary celebration, the company had never sought the support of any major international chemical group.

Secrets of Success

The company's location in Basle, a town and inland port which had for centuries maintained close literary and commercial contacts with all the world, had been of beneficial influence to the young company, leading, in conjunction with hard work based on systematic scientific research, to a highly developed export trade. As a matter of fact, 95 per cent. of the company's sales before the war had been in foreign markets. However, there had also been critical periods, such as the sudden elimination of the vast Russian market after the 1914-18 war, which entailed heavy financial losses to the company.

Referring to the position held by Swiss industry, Dr. Barell pointed out that it has to buy all raw materials in world markets and that it does not produce goods which are not also at the disposal of other nations. To this he added comments which can well be applied to post-war conditions in this country. In order that Swiss industry might grow and prosper, the president emphasised, it had to depend solely on its own strenuous work, and because of its distinctly less favourable position, compared with foreign competitors having access to rich natural resources, Swiss industry had to put in relatively more work in order to be equal or superior to world market conditions. Instead of reducing the wage rates in order to discount the high cost of production, Swiss industry had only one road open: to overcome the high-cost handicap by the special quality of its products. In addition, it had either to find ways of producing new products of such high standard that they brought a higher price, or else to develop processes of producing known products at lower cost. Industrial research, the speaker maintained, was "not merely mental enjoyment, but the direst necessity if employment at a sufficient remuneration was to be maintained."

Professor A. von Muralt, of Berne, made due acknowledgement of the company's contribution to the progress of science.

Major Scientific Achievements

To make brief reference to some of the company's major scientific achievements, its production, in 1904, of Digalen, the first digitalis preparation capable of being injected, marked a milestone in pharmaceutical history. In 1909, a soluble preparation, containing all the opium alkaloids in a constant relation, was marketed under the name of Pantopon. A number of opiates and sedatives and other products followed, until in 1931 the company's pride, Prostigmin, was produced which, as Dr. Mary Walker discovered in this country in 1935, yielded excellent results in its stimulating effects on the muscular system.

After Professor Reichstein carried out the first laboratory synthesis of vitamin C in Zürich, the company took in hand the technical adaptation of the process, and in 1933 it marketed the first synthetic vitamin. Since then it has produced, by synthesis, practically all the known vitamins, partly as the result of work done in its own laboratories or in co-operation with university laboratories.

Endowment of Research

Allusion must also be made to the company's decision to endow two important foundations. In order to promote scientific research by team work in Switzerland, the sum of 2,000,000 francs has been set aside for the Fritz Hoffman-La Roche Foundation, which will not only be a memorial to the work of the company's founder, but will also enable Swiss scientists to approach a problem simultaneously from various angles. Furthermore, the sum of 1,000,000 francs, contributed jointly by the firm, by Dr. Barell, and by another foundation, will establish the Emil Barell foundation for the Training of Chemical Engineers. This foundation will make it possible for the well-known Federal Technical Institute at Zürich (E.T.H.) to institute a new chair of chemical engineering. Chemical engineers are much in demand to-day, and the comment was made that unless Switzerland takes steps to train such experts herself, both the standard and the reputation of her chemical industry may, in the long run, be impaired.

Parliamentary Topics

Removal of Fuel Oil Duty

IN reply to a written question from Mr. Scott-Elliot on Thursday last week, the Chancellor of the Exchequer said that, after consultation with the Minister of Fuel and Power, he had decided to propose in next year's Finance Bill that the import duty of 1d. per gallon should be removed from heavy fuel oil and gas oil. Mr. Dalton added: "From October 1, until the date when the import duty is removed, a subsidy of £1 per ton will be paid to consumers in this country of such oils, whether imported or home-produced. The procedure for paying this subsidy and the precise grades of oil to which it will apply will soon be announced. These arrangements will afford an appreciable relief against the higher operating costs of oil-burning plant as compared with coal-burning plant, and I hope they will result in conversions from coal to oil to the maximum extent possible."

[In a subsequent statement the Minister of Fuel and Power said that steps were being taken to encourage conversion of plant temporarily from coal burning to oil-fuel burning where it was clear that this might be done with advantage to relieve the pressure on coal supplies. Every assistance would be given to industrialists to make the change as speedily as possible. Regional officers were now consulting industrial undertakings where plant conditions were suitable for conversions, and special attention had been paid to continuous process industries. Direct applications from consumers for conversion to oil firing were being authorised though, with a few exceptions, the quantity of oil involved in each case would be relatively small.]

Potash

Mr. D. Marshall asked the President of the Board of Trade whether he was aware that 62,000 metric tons of potash fertiliser had been exported from the British zone in Germany up to July 1, 1946, and that only 17,000 tons were sent to the U.K.; and, as potash was in short supply in England and urgently required in the interest of agriculture, whether he would endeavour to obtain a higher proportion of the available export.

Mr. Driberg asked the President of the Board of Trade whether he was aware that fruit growers and other agriculturists in this country were in urgent need of potash fertiliser; and whether he would endeavour to secure a larger percentage than hitherto of the supplies of it available for export from the British zone of Germany

Sir Stafford Cripps replied that world supplies of fertilisers during the year ended June 30, 1946, were allocated among consuming countries by the Combined Food Board in Washington, and supplies for the current season had been allocated by the International Emergency Food Council. Under the latter allocation, all potash produced in the British zone of Germany would be retained for use within the zone, but the U.K. would be entitled to obtain from other sources a quantity sufficient to cover its estimated requirements. Every effort would be made to do so.

Soap Substitutes

Mr. William Shepherd asked the Minister of Food why the largest manufacturers of the basic material for soapless detergents were required to export so much of their production as to cause them to lessen supplies to the domestic market.

The Minister of Food replied that while the present soap shortage lasted exports of the raw material for soap substitutes would, as from August 15, be restricted to token quantities. More soap substitutes in general would become available.

Barytes and Lithopone

Mr. Marquand, in reply to a question by Mr. W. Shepherd, said it was unlikely that barytes would be available for export from Germany before the end of the year. Supplies for the U.K. would be imported by the Board of Trade on Government account. It was too early to say how distribution would be effected in this country. It was not possible to indicate at present when lithopone would be available for export from Belgium.

Export of Peat to U.S.A.

Major Lloyd asked the President of the Board of Trade whether he was aware that a large firm of exporters of Scottish granulated peat for fertilising purposes was unable to accept a U.S. order of at least 1,000,000 dollars because the suppliers of peat moss in Scotland were unable to obtain the necessary labour or secure permits to erect the special plant required.

Sir Stafford Cripps replied that his regional officers were in touch with the peat producers, who would be given all possible assistance to overcome their difficulties.

Linseed Oil and Glycerine

Mr. Bossom asked the President of the Board of Trade why, since he was experiencing the utmost difficulty in obtaining linseed oil and commercial glycerine, which were indispensable in the manufacture of paint, this country exported, in the first three months of this year, more than double

the amount exported in the corresponding period in 1938, and about seven times as much as was exported in the same period in 1945.

Sir Stafford Cripps replied that linseed oil exports this year had been extremely small in comparison with those in 1938. The exports of glycerine during the first three months of the year were mainly to fulfil a commitment to the U.S.A. entered into last November, when there were substantial stocks in the U.K. and there was no reason to suspect the shortage which had since developed.

Glue, Gelatine, Size

Answering Sir J. Mellor, Sir S. Cripps said that control of the supply and acquisition of glue, gelatine, and size had been reimposed after consultation with the Trade Advisory Committee to ensure that available supplies, which are considerably less than the total demand, were distributed to the best advantage in the national interest. All practicable steps were being taken to increase supplies.

Plaster of Paris

Questioned by Capt. Baird, the Minister of Works, Mr. Wilson, stated that the output of all types of gypsum plaster was limited both by the supplies of gypsum and by manufacturing capacity, but steps were being taken to overcome these difficulties. Meanwhile manufacturers of plaster had been asked to give preference to dental and surgical requirements.

Penicillin

Mr. J. Lewis asked the Minister of Supply (1) the price at which penicillin was supplied by the manufacturers; (2) whether any price agreement existed between them; and (3) which firms were engaged in the manufacture of penicillin in this country, and the output of each concern for May and June.

Mr. Leonard: "Glaxo Laboratories, Ltd., operating commercially, and The Distillers Co., Ltd., operating a Government factory as agents for the Ministry of Supply, are the main producers of penicillin in this country. Production on a smaller scale is undertaken by Boots, I.C.I., and Kemball Bishop. The great bulk of the output of these concerns is purchased by the Ministry of Supply and it would be contrary to established practice to disclose details of the contracts. There is no price agreement among the manufacturers." In answer to a further question, Mr. Leonard said that there were no restrictions on firms not previously engaged in penicillin production, who now wished to produce it, apart from normal compliance with the Therapeutic Substances Act if the penicillin was to be used for injection.

DDT

Colonel Hutchison asked the Minister of Supply whether he was aware that the surplus Government stocks of insecticide known as DDT, widely advertised as being sold by chemists, had no wording on the package to show that they must be used with care and that several cases had recently been treated in hospital for maladies resulting from the use of this insecticide; and what steps he was taking to meet this situation.

Mr. Woodburn referred his questioner to the reply made by the Minister of Health to Mr. Austin on February 21 (see THE CHEMICAL AGE, 1946, *54*, 241), and stated that the only sale of surplus Government stocks by the Ministry of Supply was in fact made to one of the original manufacturing firms.

Streptomycin

Mr. Brooks asked the Minister of Health what steps were being taken to import supplies of streptomycin from the U.S.A.; and what efforts were being made for its manufacture in this country.

Mr. Bevan: I am informed that American production of streptomycin is too small to permit export to this country. Arrangements are being made with the Ministry of Supply and the Medical Research Council to set on foot the manufacture in Great Britain of sufficient streptomycin for adequate clinical trials."

The Rutherford Unit

Measure of the Strength of Radioactive Sources

THE U.S. National Bureau of Standards advocates the name "rutherford" for a unit to designate the strength of radioactive sources, in order to avoid the erroneous use for that purpose of the curie, which, by original definition, is "the amount of radon in equilibrium with one gram of radium." The quantity to be specified is the disintegration rate, determined by the decay constant and the number of atoms of the radioactive isotope in the source. This is simply a number, and to establish a unit the only requirement is to select a convenient number of disintegrations per second and to give it a name. A number which fits the requirement is 10^6—a small unit, of the order of magnitude of many sources used in laboratory measurements, and sufficiently different in size from the curie to obviate confusion. Any measuring device which will determine the total number of disintegrations per second will directly provide the strength of the source in rutherfords. The suggested abbreviation is rd., with such adaptations as krd., mrd., etc., to express multiples and submultiples.

Personal Notes

MR. T. WALTON has retired from the chairmanship of British Glues and Chemicals, Ltd., after 25 years in that capacity, but retains his seat on the board. He is succeeded by MR. R. DUNCALFE.

MR. J. A. CHADWICK, works foreman in the Bury chemical works of Arthur Ashworth, Ltd., who celebrated his 80th birthday recently, has been with the company more than 56 years.

The engagement is announced between MR. ROBERT H. S. ROBERTSON, son of Sir Robert Robertson, K.B.E., F.R.S., F.R.I.C., (lately Government chemist), and MISS ISOBEL S. MCNEILLY, of Lochwinnoch, Renfrewshire.

MR. E. H. MCCONNELL, manager in Northern Ireland of the interests of George Cohen, Sons & Co., Ltd., who has been awarded the M.B.E., played an important part in organising the export from Northern Ireland of scrap for use in the national war effort, and also organised the Red Cross Salvage Scheme in conjunction with the Ministry of Commerce for Northern Ireland.

MR. ROGER HEYWORTH, an executive of Unilever, Ltd., and youngest brother of the managing director, Mr. Geoffrey Heyworth, has been appointed a member of the U.K. Trade Mission which is due to leave for China next month. He will represent general merchanting interests. Another member is MR. A. H. CARMICHAEL, director of the British Non-Ferrous Metals Federation, who will represent light engineering interests.

MR. G. C. MANN and MR. J. A. E. HOWARD have been appointed directors of Howards & Sons, Ltd. Mr. Mann has been connected with the export side of the business since 1925 and will continue in his present position as commercial manager, with Mr. J. A. E. Howard as his assistant. The latter, who is the eldest son of Mr. Geoffrey Howard, chairman of the company, joined the firm early in 1938. Soon after the outbreak of war he joined the army and he was released last year after being a prisoner of war in Germany for nearly five years.

L.M.S. Chemists

The London, Midland and Scottish Railway has announced some staff changes in its scientific research department. MR. H. W. KEYS, F.R.I.C., divisional chemist at Derby, who entered the service of the old Midland Railway in 1903, retired on August 1, and has been succeeded by MR. S. BAIRSTOW, M.A., formerly divisional chemist at Stonebridge Park, who joined the service of the company in 1933. The new divisional chemist at Stonebridge Park is DR. G. H. WYATT, Ph.D., F.R.I.C., formerly assistant divisional chemist there, who entered the service of the company in 1935. MR. H. E. EKINS, who entered the service of the old Midland Railway in 1901 and has recently been assistant divisional chemist at Derby, retired on August 1.

Mineral Development

Committee of Inquiry Appointed

THE constitution of the committee of inquiry into the metalliferous and other mineral resources of this country, and their development, was announced this week by the Minister of Fuel. The committeee will have the title of Mineral Development Committee with the following terms of reference: "To inquire into the resources of minerals in the U.K., excepting coal, oil, bedded ironstone, and substances of widespread occurrence; to consider possibilities and means of their co-ordinated, orderly, and economic development in the national interest, and to make recommendations in regard thereto."

Lord Westwood is chairman of the committee and other members are: Mr. T. Balogh (Institute of Statistics, University of Oxford); Mr. A. R. Davies, A.M.Inst.M.E. (T. C. Horabin & Partners, industrial consultants; Professor W. R. Jones, D.Sc., M.Inst.M.M. (Imperial College of Science and Technology, adviser to Board of Trade (China Clay), and chairman of China Clay Working Party); Mr. L. C. Hill, M.Inst.M.M., B.Sc. (technical adviser to Rio Tinto, Ltd.); Professor A. O. Rankine, O.B.E. (chief physicist, Anglo-Iranian Oil Co., Ltd.); Professor J. A. S. Ritson, M.Inst.M.M., B.Sc. (Professor of Mining, Royal School of Mines, and deputy chairman of Coal Commission); Mr. S. Robson, M.Inst.M.M. (Imperial Smelting Corporation, Ltd., and Foreign Secretary of the S.C.I.); Mr. T. Steele, M.P.; Capt. P. Thorneycroft, M.P.; and Mr. R. E. Yeabsley (Hill, Vellacott & Co., chartered accountants). The secretary is Mr. W. C. C. Rose, M.Sc., M.Inst.M.M., to whom all communications should be addressed at the Ministry of Fuel and Power, 40 Upper Brook Street, London, W.1.

Minute units of the radioactive isotope of carbon, Carbon-14, are reported by the New York correspondent of *The Times* to be the first peace-time product of the U.S. Government's atomic energy plants. They were produced in the same chain-reaction uranium ovens which produced the atomic bomb. This is the first fulfilment of the promised production of some hundreds of radioactive isotopes to be turned out at Oakridge.

General News From Week to Week

"The War Effort of Sulzer Bros. (London) Ltd." is the title of a well-produced brochure which describes hitherto-unknown activities of that company and does them much credit.

The Minister of Food wishes to remind chemists that rape oil should not be sold by retail to the general public. Owing to the extreme shortage of this oil, it can only be issued for making up medicines.

The Minister of Town and Country Planning is stated to have given his approval to the use of the Wilton site as a general chemical factory by I.C.I., Ltd., subject to certain conditions.

All the oil refineries of the Anglo-Iranian Oil Co., Ltd., have survived the war in good condition, the chairman announced at the annual meeting last week, with the exception of that at Courchelettes, in France.

The address of the British Sulphate of Copper Association is now 1 Great Cumberland Place, London, W.1 (Telephone: PADington 5068-9; telegrams: Britsulcop Phone, London).

Among bequests of the late Mr. R. J. Colman, director of J. & J. Colman, Ltd., who left £1,034,880 (net personalty £993,376), was one of £5000 to the directors of the company for the benefit of employees of the Carrow works.

The Minister of Food announces that there will be no change in the existing prices of unrefined oils and fats and technical animal fats allocated to primary wholesalers and large trade users during the four weeks ending August 31.

In accordance with the recommendation of the Royal Commission on Safety in Coal Mines, the Scotland Mines and Quarries Inspection Division is now divided into three Districts, each in charge of a District Inspector as follows: *East Scotland*: T. A. Rogers, 4 Eglinton Crescent, Edinburgh, 12; *West Scotland*: J. A. Grove, 170 Hope Street, Glasgow; *Ayrshire*: H. S. Stephenson, Nile Court, Ayr. Mr. A. H. Steele will continue as Divisional Inspector in general charge of the three districts.

Designed to make the best possible use of available supplies of linseed oil, a paint distribution scheme was introduced on August 1 by the Board of Trade, after full discussion with the paint industry. Under the scheme manufacturers must use their allocations of linseed oil in the manufacture of three classes of paint—building, transport, and general industrial—so that, in the aggregate, the Government can count on a known quantity of each class being available.

The research laboratories at Hammersmith of the Vitamins Group of Companies (Agricultural Food Products, Ltd., Bemax Sales, Ltd., and Vitamins, Ltd.) are being extended, as is their field station at Henley. In his speech at the annual meeting, the chairman of the Group, Mr. H. C. H. Graves, expressed confidence that the research department would maintain and advance the reputation of the Group's products.

Reed Brothers (Engineering) Ltd. announce that the equipping of their welding department at Albion Works, Alberta Street, Kennington, S.E.15, is now completed. They are accordingly in a position to undertake welding repairs, fabricating of machines, plant and structures to customers' requirements. Inquiries should be addressed to head office, Bevis Marks House, London, E.C.3. (Tel: AVEnue 1901/5).

Foreign News

The first post-war fair to be held in Prague will take place between September 15 and 22.

Nine industrial alcohol plants in the United States were closed up to the beginning of July last because of the lack of imported molasses.

Czechoslovakia is to export china clay and chemical products to Sweden, in return for iron ore, machinery, roller bearings and turpentine.

It is reported that a North American concern is to set up two factories in Brazil for the manufacture of dry ice, one at Rio de Janeiro and the other at S. Paulo.

The Kaiser Wilhelm Institute for Scientific Research, Berlin, has been dissolved by a decision of the occupying Powers. Certain of the laboratories will continue to function for peaceful ends.

A loss of 3,783,373 francs for 1945 is reported by the Belgian fertiliser company, Engrais et Produits Chimiques de la Meuse, making a total debit balance of 9,712,783 francs.

The conversion of a kiln for the exclusive production of chemical-grade bauxite at Paranam, Dutch Guiana, has been delayed by the non-arrival of the necessary structural steel, but it is expected to be in operation by next month.

Limited commercial distribution (through hospitals) of streptomycin in the U.S.A. was due to begin on August 1, according to a statement of the Civilian Production Administration, the same plan being followed as with the initial distribution of penicillin. Production of streptomycin in April was 36,982 gm., against 26,340 gm. in March.

A tantalite deposit, described as "one of the richest and largest in the world," has recently been discovered east of Yellowknife, Mackenzie, in the Canadian North-West. It is reported that a company financed by Canadian and United States miners is planning to exploit the occurrence.

Under a five-year plan, the industrialisation of Estonia is to be promoted at a rate of expenditure of 3500 million roubles. Tallinn, the capital, is to become the centre of the engineering industry, and the output of the shale oil industry is to be increased from the pre-war level of about 500,000 tons to 8,400,000 tons in 1950.

According to a note in *L'Industrie Chimique* (July, 1946) the reopening of the mines of Les Malines (Gard), once prosperous, but closed since 1932, are about to be reopened by the Société Minière de Peñarroya. The ore—calamine and blende—was previously worked for its zinc, lead, and silver content; it now appears that the 3 per cent. cadmium content is also to be exploited.

The well-known French chemical concern of Saint-Gobain reports substantial progress during 1945. At the beginning of the year only one lead chamber and four anhydrite plants were in operation. Import of pyrites and phosphate rock restarted in the summer, and by the end of December 14 lead chambers and 15 anhydrite plants were working. Production of phosphatic fertilisers rose from 1900 tons in March to 17,800 tons in December. A summary of the report is published in *L'Industrie Chimique* (July, 1946, p. 130).

New Companies Registered

Multipro, Ltd. (414,051).—Private company. Capital, £250 in £1 shares. Manufacturers of, agents for and dealers in chemicals, etc. Subscribers: W. J. Bates; J. Bates. Registered office: 71 Moorgate, E.C.2.

Gatford, Ltd. (414,190).—Private company. Capital, £100 in £1 shares. Manufacturers of and/or dealers in chemicals, pigments, dyestuffs, oils, soaps, etc. Directors: G. Thompson; B. R. Fisher. Registered office: 15 Eynsford Rise, Eynsford, Kent.

Othmer Mellenger, Ltd. (414,483).—Private company. Capital, £1000 in £1 shares. Manufacturers of and dealers in plastics, chemicals, paints, etc. Directors: E. R. Mellenger; D. Boyd; D. C. Cann. Registered office: Eldon Street House, Eldon Street, E.C.2.

Stewart Brothers (London), Ltd. (415,707).—Private company. Capital £5000 in £1 shares. Chemical, mechanical and electrical engineers, etc. Directors: J. H. Stewart, W. T. Stewart. Registered office: Offices of Graham Smart & Annan, 109 Jermyn Street, S.W.1.

Sterling Products Co. (Lancashire), Ltd. (413,924).—Private company. Capital, £4000 in £1 shares. Manufacturers and/or vendors of artificial and chemical manures and fertilisers, etc. Directors: H. Blackburn; R. Parr. Registered office: Sidings Road, Fleetwood, Lancs.

A. E. Seargeant & Co., Ltd. (413,833).—Private company. Capital, £500 in £1 shares. Manufacturers of and dealers in chemicals, gases, drugs, plastics, disinfectants, etc. Directors: A. E. H. I. Seargeant; Mrs. D. M. I. Seargeant, 8 Oxford Gardens, Winchmore Hill, N.21.

United Laboratories, Ltd. (413,419).—Private company. Capital, £2000 in £1 shares. Wholesale and retail chemists and druggists, laboratory proprietors, etc. Subscribers: J. A. Steemson; W. M. Isaacs. Registered office: Mount Pleasant, Alperton, Wembley, Middlesex.

Murray-Martin, Ltd. (413,406).—Private company. Capital, £2000 in £1 shares. Consulting, analytical, manufacturing and general chemists, etc. Directors: J. Murray; Mrs. D. Murray; T. P. Martin; M. Martin. Registered office: 372 Cowbridge Road, Cardiff.

Southern Plastics, Ltd. (416,193).—Private company. Capital £2000 in £1 shares. Manufacturers of and dealers in all organic and inorganic chemical substances and products, natural or synthetic plastics and plastic substances, etc. Directors: F. W. S. Searles; J. M. Houston; R. L. Porter; H. G. Porter. Registered office: Albert Ironworks, Green Street Green Road, Darford, Kent.

Company News

British Colloids, Ltd., Gorst Road, Park Royal, London, N.W.10, has changed its name to Crookes Laboratories, Ltd.

Thawpit (Proprietary) Ltd., Woodstock Grove, W.12, has changed its name to Thawpit, Ltd.

Sangers, Ltd., report a net profit, for the year ended March 31, of £266,036 (£224,590 for 11 months). A final ordinary dividend of 15 per cent. has been declared, plus 5 per cent. bonus, making 30 per cent. for the year (25 per cent. for 11 months).

An increase in net profit from £99,047 to £140,939 is reported by **Fison's, Ltd.,** for the year ended September 30, 1945. The ordinary dividend was maintained at 10 per cent. A final dividend of 7½ per cent. on the ordinary shares, together with interim dividend of 2½ per cent. in respect of the current year, is payable on August 23.

Commercial Intelligence

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

Mortgages and Charges

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

ANODISING & PLATINGS, LTD., London, S.W. (M., 10/8/46.) July 10, mortgage and charge, to Midland Bank, Ltd., securing all moneys due or to become due to the Bank; charged on Tower Works, Holland Street, Radcliffe, together with machinery, fixtures, etc., also general charge. *£2500. December 25, 1945.

BRAMSON & BLADES, LTD., London, E.C., aluminium manufacturers. (M.10/8/46.) July 12, debenture, to Lloyds Bank, Ltd., securing all moneys due or to become due to the Bank; general charge (subject to, etc.).

Satisfactions

METAL SALTS, LTD., Chester. (M.S., 10/8/46.) Satisfaction July 18, of mortgage registered March 8, 1943.

NORTH-BRITISH CHEMICAL CO., LTD., Manchester. (M.S., 10/8/46.) Satisfaction July 18, of debentures registered September 16, 1933, to the extent of £2700.

Chemical and Allied Stocks and Shares

HOLIDAY influences prevented improvement in the volume of Stock Exchange business, although generally firmer conditions developed under the lead of a sharp advance in colliery shares, which reflected hopeful assumptions as to compensation based on the industry's global award in respect of nationalisation. Gains in colliery shares ranged up to 8s., while iron and steel shares were better and generally there was a firmer tendency in the nationalisation groups, including home rails. Leading industrials rallied, and in some directions were higher on balance, while oil shares were more active on the Government's efforts to encourage the use of fuel oil in place of coal.

Imperial Chemical, after their recent decline to 42s. 6d., have rallied well to 43s. 9d. Moreover, United Molasses at 53s. 7½d., Turner & Newall 89s. 9d., and Dunlop Rubber at 72s. 3d. have responded to moderate improvement in demand. There was buying of the units of the Distillers Co., which rose to 139s. 3d. Associated Cement moved up to 70s. 6d., and British Plaster Board were better at 34s. 6d. Triplex Glass 10s. ordinary attracted more attention and improved to 42s. 6d. on revived talk of an increased dividend for the financial year ended June 30, although this is not generally expected. Amalgamated Metal shares eased to 20s. 7½d., Borax Consolidated held firm at 46s. 3d., the pending debenture conversion operation opening up the prospect of a higher dividend on the ordinary shares, according to some views. British Glues eased to 15s. 4½d., but Goodlass Wall at 30s. 1½d. regained part of an earlier decline. Levers weakened to 52s. 6d., but later were inclined to rally in accordance with the better trend of markets. Fisons were 61s. 9d. Johnson Matthey have changed hands at slightly over 70s., while B. Laporte remained at 100s. Burt Boulton marked 26s. 3d., and W. J. Bush 89s. 4½d. Greeff-Chemicals 5s. ordinary were around 13s. Monsanto Chemicals 5½ per cent. preference were 23s., and Leeds Fireclay preference 17s. 6d. A sharp rise to 21s. 3d. in Splintex Glass preference shares was attributed to homes of improved financial results or of a scheme to fund dividend arrears.

Among sharp gains in colliery shares, Staveley jumped 3s. to 49s. 9d. Shipley were up 2s. at 36s. 6d., while Bolsover at 59s. were prominent, having risen 8s. 6d. Powell Duffryn showed firmness at 24s. Iron and steel shares were also better, United Steel being 24s. 9d., Dorman Long 25s. 3d., and Stewarts & Lloyds 48s. 9d., while Tube Investments improved to £5 13/16. Thomas & Baldwins remained under the influence of the higher profits for the past year, but Hadfields reacted to 25s. on disappointment with the reduced interim payment. Elsewhere, Allied Ironfounders improved to 55s. 9d.

Boots Drug at 63s. 3d. regained part of an earlier decline, as did Beechams deferred at 26s., while Sangers strengthened to 34s. 6d. immediately following the news of the increased payment. Electric equipment shares were lower on balance, General Electric being 98s. 9d. English Electric 60s. with the new preference shares at 1s. 4½d. premium. De La Rue were lower at £12. Fine Spinners firmed up to 24s. Among textiles, Bradford Dyers were 24s. 3d., Calico Printers 23s. 6d., and Bleachers 14s. 3d. Courtaulds rallied to 56s. 7½d., and British Celanese were 35s. 6d.

Babcock & Wilcox were 63s. 6d., and Ruston & Hornsby rose 2s. 6d. to 61s. 3d. on the Government's efforts to secure increased use of fuel oil. Leading oil shares were slightly higher, although Anglo-Iranian eased to 99s. 4½d. on the latest news from Persia.

Prices of British Chemical Products

THERE has been little alteration in the general position on the London chemical market and in most sections supplies are taken care of for some time to come. Contract deliveries, apart from the annual holiday interruption, are up to schedule, and the flow of export orders shows no sign of falling off. Values throughout the industrial chemical market are fully maintained and the undertone is strong. There have been no special features in the coal-tar products market, where the volume of business depends mainly on the availability of supplies. Quotations are very firm.

MANCHESTER.—The Manchester market for both light and heavy chemicals during the week has been decidedly under the influence of the holidays and fresh buying on home trade account has been noticeably affected. There have also been fewer inquiries in evidence from shippers, though export buying interest is expected to stage an early recovery. On the whole, however, apart from those consuming works directly affected by the holidays, contract deliveries of the soda products and most other chemicals, including the mineral acids, have been on a fair scale, and this also applies to the leading coal-tar products.

GLASGOW.—The improved demand for general chemicals for the home trade has been maintained, and the short supply of some products has meant that all demands could not be met. Prices continued at round about previous levels. The export market has again been busy.

Price Changes

Rises: Ammonium bicarbonate (Manchester); calcium acetate; copper carbonate (Manchester); lead nitrate (London and Manchester); lithopone; oxalic acid (London and Manchester); sodium sulphide; sulphur.

General Chemicals

Acetic Acid.—Maximum prices per ton: 80% technical, 1 ton, £47 10s.; 80% pure, 1 ton, £49 10s.; commercial glacial, 1 ton, £59; delivered buyers' premises in returnable barrels, £4 10s. per ton extra if packed and delivered in glass.

Acetone.—Maximum prices per ton, 50 tons and over, £65; 10/50 tons, £65 10s.; 5/10 tons, £66; 1/5 tons, £66 10s.; single drums, £67 10s.; delivered buyers' premises in returnable drums or other containers having a capacity of not less than 45 gallons each. For delivery in non-returnable containers of 40/50 gallons, the maximum prices are £3 per ton higher. Deliveries of less than 10 gallons free from price control.

Alum.—Loose lump, £16 per ton, f.o.r. MANCHESTER: £16 to £16 10s.

Aluminium Sulphate.—Ex works, £11 10s. per ton d/d. MANCHESTER: £11 10s.

Ammonia, Anhydrous.—1s. 9d. to 2s. 3d. per lb.

Ammonium Bicarbonate.—MANCHESTER: £40 per ton d/d.

Ammonium Carbonate.—£37 10s. to £38 per ton d/d in 5 cwt. casks. MANCHESTER: Powder, £43 d/d.

Ammonium Chloride.—Grey galvanising, £22 10s. per ton, in casks, ex wharf. Fine white 98%, £19 10s. per ton. See also Salammoniac.

Ammonium Persulphate.—MANCHESTER: £5 per cwt. d/d.

Antimony Oxide.—£110 to £117 per ton.

Arsenic.—Per ton, 99/100%, £26 10s. for 20-ton lots, £31 for 2 to 10-ton lots; 98/99%, £25 for 20-ton lots, £29 10s. for 2 to 10-ton lots; 96/99% white, £21 15s. for 20-ton lots, £25 15s. for 2 to 10-ton lots.

Barium Carbonate.—Precip., 4-ton lots, £19 per ton d/d; 2-ton lots, £19 5s. per ton. bag packing, ex works.

Barium Chloride.—98/100% prime white crystals, 4-ton lots, £19 10s. per ton, bag packing, ex works.

Barium Sulphate (Dry Blanc Fixe).—Precip., 4-ton lots, £18 15s. per ton d/d; 2-ton lots, £19 10s. per ton.

Bleaching Powder.—Spot, 35/37%, £11 to £11 10s. per ton in casks, special terms for contract.

Borax.—Per ton for ton lots, in free 1-cwt. bags, carriage paid: Commercial, granulated, £30; crystals, £31; powdered, £31 10s.; extra fine powder, £32 10s. B.P., crystals, £39; powdered, £39 10s.; extra fine, £40 10s. Borax glass, per ton in free 1-cwt. waterproof paper-lined bags, for home trade only, carriage paid: lump, £77; powdered, £78.

Boric Acid.—Per ton for ton lots in free 1-cwt. bags, carriage paid: Commercial,

granulated, £52; crystals, £53; powdered, £54; extra fine powder, £56. B.P., crystals, £61; powder, £62; extra fine, £64.

Calcium Bisulphide.—£6 10s. to £7 10s. per ton f.o.r. London.

Calcium Chloride.—70/72% solid, £5 15s. per ton, ex store.

Charcoal, Lump.—£22 to £24 per ton, ex wharf. Granulated, supplies scarce.

Chlorine, Liquid.—£23 per ton, d/d in 16/17 cwt. drums (3-drum lots).

Chrometan.—Crystals, 5⅝d. per lb.

Chromic Acid.—1s. 10d. to 1s. 11d. per lb., less 2½%, d/d U.K.

Citric Acid.—Controlled prices per lb., d/d buyers' premises. For 5 cwt. or over, anhydrous, 1s. 6¾d., other, 1s. 5d.; 1 to 5 cwt., anhydrous, 1s. 9d., other, 1s. 7d. Higher prices for smaller quantities.

Copper Carbonate.—MANCHESTER: £8 15s. per cwt. d/d.

Copper Oxide.—Black, powdered, about 1s. 4½d. per lb.

Copper Sulphate.—£33 10s. per ton, f.o.b., less 2%, in 2 cwt. bags.

Cream of Tartar.—100 per cent., per cwt., from £13 17s. 6d. for 10-cwt. lots to £14 1s. per cwt. lots, d/d. Less than 1 cwt., 2s. 5½d. to 2s. 7½d. per lb. d/d.

Formaldehyde.—£27 to £28 10s. per ton in casks, according to quantity, d/d. MANCHESTER: £28.

Formic Acid.—85%, £54 per ton for ton lots, carriage paid.

Glycerine.—Chemically pure, double distilled 1260 s.g., in tins, £4 to £5 per cwt., according to quantity; in drums, £3 19s. 6d. Refined pale straw industrial, 5s. per cwt. less than chemically pure.

Hexamine.—Technical grade for commercial purposes, about 1s. 4d. per lb.; free-running crystals are quoted at 2s. 1d. to 2s. 3d. per lb.; carriage paid for bulk lots.

Hydrochloric Acid.—Spot, 7s. 6d. to 8s. 9d. per carboy d/d, according to purity, strength and locality.

Hydrofluoric Acid.—59/60%, about 1s. to 1s. 2d. per lb.

Hydrogen Peroxide.—11d. per lb. d/d, carboys extra and returnable.

Iodine.—Resublimed B.P., 10s. 4d. to 14s. 6d. per lb., according to quantity.

Lactic Acid.—Pale tech., £60 per ton; dark tech., £53 per ton ex works; barrels returnable.

Lead Acetate.—White, 57s. to 60s. per cwt., according to quantity.

Lead Nitrate.—About £55 per ton d/d in casks. MANCHESTER: £55.

Lead, Red.—Basic prices per ton: Genuine dry red lead, £71; orange lead, £83. Ground in oil: Red, £84; orange, £95. Ready-mixed lead paint: Red, £86; orange, £98.

Lead, White.—Dry English, in 8-cwt. casks, £83 per ton. Ground in oil, English, in 5-cwt. casks, £94 10s. per ton.

Litharge.—£57 10s. to £60 per ton, according to quantity.

Lithium Carbonate.—7s. 9d. per lb. net.

Magnesite.—Calcined, in bags, ex works, £36 per ton.

Magnesium Chloride—Solid (ex wharf), £22 per ton.

Magnesium Sulphate.—£12 to £14 per ton.

Mercuric Chloride.—Per lb., for 2-cwt lots, 9s. 1d.; smaller quantities dearer.

Mercurous Chloride.—10s. 1d. to 10s. 7d. per lb., according to quantity.

Mercury Sulphide, Red.—Per lb., from 10s. 3d. for ton lots and over to 10s. 7d. for lots of 7 to under 30 lb.

Methylated Spirit.—Industrial 66° O.P. 100 gals., 3s. per gal.; pyridinised 64° O.P. 100 gal., 3s. 1d. per gal.

Nitric Acid.—£24 to £26 per ton, ex works.

Oxalic Acid.—£100 to £101 per ton in ton lots packed in free 5-cwt. casks. MANCHESTER: £5 per cwt.

Paraffin Wax.—Nominal.

Phosphorus.—Red, 3s. per lb. d/d; yellow, 1s. 10d. per lb. d/d.

Potash, Caustic.—Solid, £65 10s. per ton for 1-ton lots; flake, £76 per ton for 1-ton lots. Liquid, d/d, nominal.

Potassium Bichromate. — Crystals and granular, 7¾d. per lb.; ground, 8¼d. per lb., for not less than 6 cwt.; 1-cwt. lots, ¼d. per lb. extra.

Potassium Carbonate.—Calcined, 98/100%, £57 per ton for 5-ton lots, £57 10s. per ton for 1 to 5-ton lots, all ex store; hydrated, £51 per ton for 5-ton lots, £51 10s. for 1 to 5-ton lots.

Potassium Chlorate.—Imported powder and crystals, nominal.

Potassium Iodide.—B.P., 8s. 8d. to 12s. per lb., according to quantity.

Potassium Nitrate.—Small granular crystals, 76s. per cwt. ex store, according to quantity.

Potassium Permanganate.—B.P., 1s. 8½d. per lb. for 1-cwt. lots; for 3 cwt. and upwards, 1s. 8d. per lb.; technical, £7 14s. 3d. to £8 6s. 3d. per cwt., according to quantity d/d.

Potassium Prussiate.—Yellow, nominal.

Salammoniac.—First lump, spot, £48 per ton; dog-tooth crystals, £50 per ton; medium, £48 10s. per ton; fine white crystals, £19 10s. per ton, in casks, ex store.

Salicylic Acid.—MANCHESTER: 1s. 8d. to 2s. 1d. per lb. d/d.

Soda, Caustic. — Solid 76/77%; spot, £16 7s. 6d. per ton d/d.

Sodium Acetate.—£42 per ton, ex wharf.

Sodium Bicarbonate.—Refined, spot, £11 per ton, in bags.

Sodium Bichromate.—Crystals, cake and powder, 6½d. per lb.; anhydrous, 7½d. per lb., net, d/d U.K. in 7-8 cwt. casks.

Sodium Bisulphite. — Powder, 60/62%, £19 10s. per ton d/d in 2-ton lots for home trade.

Sodium Carbonate Monohydrate.—£25 per ton d/d in minimum ton lots in 2 cwt. free bags.

Sodium Chlorate.—£36 to £45 per ton, nominal.

Sodium Hyposulphite.—Pea crystals 19s. per cwt. (ton lots); commercial, 1-ton lots, £17 per ton carriage paid. Packing free.

Sodium Iodide.—B.P., for not less than 28 lb., 9s. 11d. per lb., for not less than 7 lb., 13s. 1d. per lb.

Sodium Metaphosphate (Calgon).—11d. per lb. d/d.

Sodium Metasilicate.—£16 10s. per ton, d/d U.K. in ton lots.

Sodium Nitrite.—£22 10s. per ton.

Sodium Percarbonate.—12½% available oxygen, £7 per cwt.

Sodium Phosphate.—Di-sodium, £25 per ton d/d for ton lots. Tri-sodium, £27 10s. per ton d/d for ton lots (crystalline).

Sodium Prussiate.—9d. to 9½d. per lb. ex store.

Sodium Silicate.—£6 to £11 per ton.

Sodium Sulphate (Glauber Salt).—£4 10s. per ton d/d.

Sodium Sulphate (Salt Cake).—Unground. Spot £4 11s. per ton d/d station in bulk. MANCHESTER: £4 12s. 6d. to £4 15s. per ton d/d station.

Sodium Sulphide. — Solid, 60/62%, spot, £20 2s. 6d. per ton, d/d, in drums; crystals, 30/32%, £13 7s. 6d. per ton, d/d, in casks.

Sodium Sulphite.—Anhydrous, £29 10s. per ton; pea crystals, £20 10s. per ton d/d station in kegs; commercial, £12 to £14 per ton d/d station in bags.

Sulphur.—Per ton for 4 tons or more, ground, £14 5s. to £16 10s., according to fineness.

Sulphuric Acid.—168° Tw., £6 2s. 8d. to £7 2s. 8d. per ton; 140° Tw., arsenic-free, £4 11s. per ton; 140° Tw., arsenious, £4 3s. 6d. per ton. Quotations naked at sellers' works.

Tartaric Acid.—Per cwt., for 10 cwt. or more, £15 8s.; 5 to 10 cwt., £15 9s. 6d.; 2 to 5 cwt., £15 11s.; 1 to 2 cwt., £15 13s. Less than 1 cwt., 3s. 1d. to 3s. 3d. per lb. d/d, according to quantity.

Tin Oxide.—Nominal.

Zinc Oxide.—Maximum prices per ton for 2-ton lots, d/d; white seal, £54 5s.; green seal, £53 5s.; red seal, £51 15s.

Zinc Sulphate.—Tech., £25 per ton, carriage paid.

Rubber Chemicals

Antimony Sulphide.—Golden, 1s. 5d. to 2s. 6d. per lb. Crimson, 2s. 2d. to 2s. 6d. per lb.

Arsenic Sulphide.—Yellow, 1s. 9d. per lb.

Barytes.—Best white bleached, £8 3s. 6d. per ton.

Cadmium Sulphide.—6s. to 6s. 6d. per lb.

Carbon Bisulphide.—£37 to £41 per ton, according to quality, in free returnable drums.

Carbon Black.—6d. to 8d. per lb., according to packing.

Carbon Tetrachloride.—£44 to £49 per ton, according to quantity.

Chromium Oxide.—Green, 2s ped lb.

India-rubber Substitutes.—White, 6 3/16d. to 10½d. per lb.; dark, 6 3/16d. to 6 15/16d. per lb.

Lithopone.—30%, £28 2s. 6d. per ton.

Mineral Black.—£7 10s. to £10 per ton.

Mineral Rubber, "Rupron."—£20 per ton.

Sulphur Chloride.—7d. per lb.

Vegetable Lamp Black.—£49 per ton.

Vermilion.—Pale or deep, 15s. 6d. per lb for 7-lb. lots.

Plus 5% War Charge.

Nitrogen Fertilisers

Ammonium Phosphate.—Imported material, 11% nitrogen, 48% phosphoric acid, per ton in 6-ton lots, d/d farmer's nearest station, in August, £19 12s., rising by 5s. per ton per month to September, then by 2s. 6d. per ton per month to March, 1947.

Ammonium Sulphate.—Per ton in 6-ton lots, d/d farmer's nearest station, in August, £9 12s. 6d., rising by 1s. 6d. per ton per month to March, 1947.

Calcium Cyanamide.—Nominal; supplies very scanty.

Concentrated Fertilisers.—Per ton d/d farmer's nearest station, I.C.I. No. 1 grade, where available, £14 18s. 6d.

"Nitro Chalk."—£9 14s. per ton in 6-ton lots, d/d farmer's nearest station.

Sodium Nitrate.—Chilean super-refined for 6-ton lots d/d nearest station, £17 5s. per ton; granulated, over 98%, £16 per ton.

Coal Tar Products

Benzol.—Per gal. ex works: 90's, 2s. 6d.; pure, 2s. 8½d.; nitration grade, 2s. 10½d.

Carbolic Acid.—Crystals, 11½d. per lb. Crude, 60's, 4s. 3d. MANCHESTER: Crystals, 9½d. to 11½d. per lb., d/d; crude, 4s. 3d., naked, at works.

Creosote.—Home trade, 5⅞d. to 8d. per gal., according to quality, f.o.r. maker's works. MANCHESTER, 6½d. to 9½d. per gal.

Cresylic Acid.—Pale, 97%, 3s. 6d. per gal.; 99%, 4s. 2d.; 99.5/100%, 4s. 4d. American, duty free, 4s. 2d., naked at works. MANCHESTER: Pale, 99/100%, 4s. 4d. per gal.

Naphtha.—Solvent, 90/160°, 2s. 10d. per gal. for 1000-gal. lots; heavy, 90/190°, 2s. 4d. per gal. for 1000-gal. lots, d/d. Drums extra; higher prices for smaller lots. Controlled prices.

Naphthalene.—Crude, ton lots, in sellers' bags, £7 2s. 6d. to £10 per ton, according to m.p.; hot-pressed, £11 10s. to £12 10s. per ton, in bulk ex works; purified crystals, £25 15s. to £28 15s. per ton. Controlled prices.

Pitch.—Medium, soft, home trade, 75s. per ton f.o.r. suppliers' works; export trade, 120s. per ton f.o.b. suppliers' port. MANCHESTER: 75s. to 77s. 6d. f.o.r.

Pyridine.—90/140°, 18s. per gal.; 90/160°, 14s. MANCHESTER: 14s. 6d. to 18s. 6d. per gal.

Toluol.—Pure, 3s. 1d. per gal.; 90's, 2s. 4d. per gal. MANCHESTER: Pure, 3s. 1d. per gal. naked.

Xylol.—For 1000-gal. lots, 3s. 3½d. to 3s. 6d. per gal., according to grade, d/d.

Wood Distillation Products

Calcium Acetate.—Brown, £21 per ton; grey, £25. MANCHESTER: Grey, £25 per ton.

Methyl Acetone.—40/50%, £56 per ton.

Wood Creosote.—Unrefined, about 2s. per gal., according to boiling range.

Wood Naphtha, Miscible.—4s. 6d. to 5s. 6d. per gal.; solvent, 5s. 6d. per gal.

Wood Tar.—£5 per ton.

Intermediates and Dyes (Prices Nominal)

m-**Cresol** 98/100%.—Nominal.

o-**Cresol** 30/31° C.—Nominal.

p-**Cresol** 34/35° C.—Nominal.

Dichloraniline.—2s. 8½d. per lb.

Dinitrobenzene.—8½d. per lb.

Dinitrotoluene.—48/50° C., 9½d. per lb; 66/68° C., 1s.

p-**Nitraniline.**—2s. 5d. per lb.

Nitrobenzene.—Spot, 5½d. per lb. in 90-gal. drums, drums extra, 1-ton lots d/d buyer's works.

Nitronaphthalene.—1s. 2d. per lb.; P.G., 1s. 0½d. per lb.

o-**Toluidine.**—1s. per lb., in 8/10 cwt. drums, drums extra.

p-**Toluidine.**—2s. 2d. per lb., in casks.

m-**Xylidine Acetate.**—4s. 5d. per lb., 100%.

Latest Oil Prices

LONDON.—August 7.—For the period ending August 31 (August 17 for refined oils), per ton, naked, ex mill, works or refinery, and subject to additional charges according to package: LINSEED OIL, crude, £65. RAPESEED OIL, crude, £91. COTTONSEED OIL, crude, £52 2s. 6d.; washed, £55 5s.; refined edible, £57; refined deodorised, £58. COCONUT OIL, crude, £49; refined deodorised £56; refined hardened deodorised, £60. PALM KERNEL OIL, crude, £48 10s.; refined deodorised, £56; refined hardened deodorised, £60. PALM OIL (per ton c.i.f.), in returnable casks, £42 5s.; in drums on loan, £41 15s.; in bulk £40 15s. GROUNDNUT OIL, crude, £56 10s.; refined deodorised, £58; refined hardened deodorised, £62. WHALE OIL, crude hardened, 42 deg., £84; refined hardened, 46/48 deg., £85. ACID OILS: Groundnut, £40; soya, £38; coconut and palm-kernel, £43 10s. ROSIN: Wood, 32s. to 45s.; gum, 44s. to 54s. per cwt., ex store, according to grade. TURPENTINE, American, 87s. per cwt. in drums or barrels, as imported (controlled price).

Inventions in the Chemical Industry

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

Applications for Patents

Liquid-flow control.—T. M. Fraser, J. H. Carter, and I.C.I., Ltd. 20397.

Sulphonamides.—General Aniline & Film Corporation. 19806-8.

Dyestuffs.—Gevaert Photo-Producten N. V. 19788.

Silver halide emulsions.—Gevaert Photo-Producten N.V., P. F. F. de Smet, and A. E. van Dormall. 20149.

Cholesteral.—Glaxo Laboratories, Ltd., A. E. Bide, and P. A. Wilkinson. 20176-7.

Insecticides.—J. R. U. Hatton. 20084.

Fertilisers.—G. E. Heyl. 19876.

Trichlorethanes.—R. M. Hughes (J. R. Geigy A.-G.). 19953-4.

Dyestuffs.—J. D. Kendall, F. P. Doyle, and Ilford, Ltd. 19762.

Esters.—Lever Bros. & Unilever, Ltd. 20367.

Borates.—E. M. Meade, and Lankro Chemicals, Ltd. 19844.

Ricinoleic compounds.—E. M. Mead, and Lankro Chemicals, Ltd. 19845, 19847.

Chemical compounds.—Merck & Co., Inc. 19727.

Calcium lead alloys.—National Smelting Co., Ltd., and L. J. Derham. 19735.

Alloys.—Purdue Research Foundation. 19884.

Thermosetting resin.—Quaker Oats Co. 19878-9.

Alloys.—Soc. Le Carbone-Lorraine. 19889.

Carbides.—Soc. Le Carbone-Lorraine, 19890.

Treatment of aluminium.—A. H. Stevens (Aluminium Co., of America). 19760.

Artificial resins.—A. H. Stevens (Quaker Oats Co.). 19761.

Detergents.—Sylvania Industrial Corporation. 19862.

Electro deposition of metals.—Udylite Corporation. 19681-2.

Hydrocarbons.—Universal Oil Products Co. 19722.

Thiazole derivatives.—Ward Blenkinsop & Co., Ltd., A. A. Goldberg and W. Kelly. 20031.

Amino-alcohols.—Abril Corp. (Great Britain), Ltd., C. D. Moore, and N. Longley. 20697.

Heat exchangers.—Aluminium Plant & Vessel Co., Ltd., R. Seligman, H. F. Goodman, and G. H. Botham. 20744.

Resinous material.—American Cyanamid Co. 20597.

Esters.—American Cyanamid Co. 20752-3, 20757.

Insecticides.—American Cyanamid Co. 20893.

Deposition of metallic films.—Andre Rubber Co., Ltd., and S. Buchan. 20771.

Drying ceramic ware.—Apex Construction, Ltd., G. C. A. Peck, and W. C. Peck. 20965.

Hydrocarbons.—J. C. Arnold (Standard Oil Development Co.). 20533.

Polycarbamates.—W. Baird, P. Gaubert, A. Lowe, and I.C.I., Ltd. 20879.

Protein-containing compositions! — L. Berger & Sons, Ltd., H. J. Tattersall, and L. E. Wakeford. 20991.

Condensation products.—L. Berger & Sons, Ltd., H. J. Tattersall, and L. E. Wakeford. 20992.

Polyureas.—L. Bradford, W. Charlton, H. Plimmer. E. B. Robinson, and I.C.I., Ltd. 20464.

Condensation products.—L. Bradford, W. Charlton, E. B. Robinson, C. D. Weston, and I.C.I., Ltd. 20463.

Organic compounds.—J. G. M. Bremner, R. K. F. Keeys, and I.C.I., Ltd. 20568.

Complete Specifications Open to Public Inspection

Recovery of oils from fat animal matter. —A/B Separator. January 11, 1945. 34746/45.

Production of metals and metal alloys.—A/S Smeltemetoden. January 13, 1945. 1087/46.

Cyanuric chloride.—American Cyanamid Co. January 16, 1945. 21564/45.

Continuous process of isolating substantially anhydrous pyridine bases from aqueous mixtures.—American Cyanamid Co. January 16, 1945. 35229/45.

Silica gels.—American Cyanamid Co. January 16, 1945. 1352/46.

Heating liquid baths.—M. Boss. November 19, 1938. 18125/46.

Allyl alcohol.—Carbide & Carbon Chemicals Corp. January 16, 1945. 28809/45.

Treatment of hydrophilous cellulose textiles.—Comptoir des Textiles Artificiels. April 21, 1944. 17988/46.

Vacuum distillation process and apparatus.—Distillation Products Inc. January 10, 1945. 437/46.

Solid and semi-solid polymers of olefinic hydrocarbons.—E. I. du Pont de Nemours & Co. December 19, 1942. 21178/43.

Sensitising photographic silver halide emulsions.—N.V. Gevaert Photo-Producten. May 22, 1941. 17596/46.

Pulverising of difficultly frangible materials.—International Pulverising Corp. June 17, 1942. 17790/46.

Alkyl silicon halides.—Dow Chemical Co. January 15, 1945. 960/46.

Formaldehyde.—E. I. du Pont de Nemours & Co. January 11, 1945. 1016/46.

Anti-freeze compositions.—Lonza Electric & Chemical Works, Ltd. January 10, 1945. 787/46.

Sterilisation and preservation of comestible materials.—Mathieson Alkali Works. January 11, 1945. 27058/45.

Manufacturing iodated proteins and cattle food containing the same.—N.V.Mij. tot Exploitatie der Oliefabrieken Calve-Delft. July 9, 1943. 17986/46.

Immersion cells for conductivity measurements of liquids.—N.V. Philips Gloeilampenfabrieken. April 16, 1942. 18035/46.

Manufacture and application of cold-swelling starches.—N.V. W. A. Scholten's Chemische Fabrieken. October 22, 1943. 17604/46.

Electro-recovery of metals.—National Lead Co. January 13, 1945. 29039/45.

Protection of substances or mixtures against oxidative alterations.—J. E. Nyrop. January 15, 1945. 298/46.

Fluorescent materials.—Philips Lamps, Ltd. January 2, 1945. 11/46.

Complete Specifications Accepted

Recovery of glycerine from fermented liquors.—R. A. Walmesley, and I.C.I., Ltd. July 16, 1940. (Addition to 515,831.) 578,259.

Recovery of glycerol from fermented liquors.—R. A. Walmesley, and I.C.I., Ltd. Sept. 18, 1940. (Cognate applications 14328/40 and 18242/40.) 578,260.

Treatment of polysulphide resins.—L. A. Jordan, J. K. Aiken, and G. L. Holbrow. April 16, 1943. 578,656.

Manufacture of organic monosulphides.—W. A. Robshaw and Monsanto Chemicals, Ltd. May 9, 1944. 578,684.

Process for the preparation of metallisable polyazo dyestuffs.—Sandoz, Ltd. July 2, 1943. 578,537.

Preparation of penicillin salts.—Schering Corporation. Jan. 6, 1942. 578,590.

Densifying finely divided materials.—Shawinigan Chemicals, Ltd. June 4, 1943. 578,658.

Controlled oxidation of aralkyl hydrocarbons and of their partially halogenated derivatives.—Shell Development Co. 578,608.

Preparation of amino alcohols.—Shell Development Co. Feb. 13, 1943. 578,635.

Manufacture of esters of phosphoric acid.—Soc. of Chemical Industry in Basle. July 21, 1941. 578,551.

Apparatus for drying fertilisers and like materials.—G. M. Tyler. April 19, 1943. 578,518.

Synthesis of 4-hydroxy-coumarins.—Wisconsin Alumni Research Foundation. Aug. 29, 1942. 578,589.

Methods of concentrating ores.—American Cyanamid Co. March 31, 1942. 578,694-5.

Production of producer gas.—M. H. M. Arnold, D. R. Pryde, R. J. Morley, and I.C.I., Ltd. June 2, 1944. 578,711.

Anti-friction bearings having fluid passages.—R. C. Braithwaite, and Metropolitan-Vickers Electrical Co., Ltd. May 28, 1940. 578,734.

Apparatus for producing aerosols.—British Thomson-Houston Co., Ltd. March 24, 1943. 578,783.

Cyclopentadiene addition products.—P. G. Carter, H. Plimmer, and I.C.I., Ltd. September 7, 1944. 578,867.

Process for the production of alkyl esters from fats and fatty oils.—Colgate-Palmolive-Peet Company. October 17, 1942. 578,751.

Polymerisation process.—Distillers Co., Ltd., J. J. P. Staudinger, and D. A. Bennett. September 6, 1943. 578,849.

Manufacture of polymeric materials from butadiene or its homologues.—E. G. Edwards, D. B. Kelly, W. M. Morgan, and I.C.I., Ltd. February 15, 1943. 578,846.

Method of connecting metal parts by brazing.—Engineering & Research Corporation. February 17, 1943. 578,705.

Fluid-solid contact-surfaces.—A. A. Griffith. August 25, 1942. 578,763.

Interpolymerisation of vinyl acetate and methyl methacrylate.—Imperial Chemical Industries, Ltd. September 18, 1941. 587,767.

Drowning of nitrocellulose and apparatus for use therein.—J. D. Pearson, D. G. Ashcroft, and I.C.I., Ltd. (Cognate applications 15793/41 and 380/43.) December 8, 1941. 578,691.

Detection of carbon monoxide in admixture with other gases.—E. W. Russell. August 25, 1942. 578,745.

Liquid containers and the manufacture thereof.—L Shakesby, and I.C.I., Ltd. March 27, 1944. 578,706.

Flexible containers for liquids.—L. Shakesby, S. H. Smith, and I.C.I., Ltd. February 25, 1944. 578,855.

Heat-exchange apparatus.—G. R. Shepherd (Westinghouse Electric International Co.). January 17, 1944. 578,804.

Manufacture of lubricants.—Standard Oil Development Co. April 17, 1941. 578,692, 578,723-25.

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