The Chemical Age

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Notes and Comments

An Unreasonable Restriction

WE are surrounded by all kinds of restrictions in this country, but we can still make ice if we wish to do so. In the United States, however, "additions to productive capacity" without the explicit permission of the Code authority is forbidden in the ice industry. A number of codes contain similar provisions, but this appears to be the first case in which no question of wages or hours or any other code provision is in dispute. Our American contemporary, "Chemical Industries," discusses the ideas behind this apparently ridiculous proposition and speculates as to where it would lead any chemical process industry if it were followed to its logical conclusion.

It is suggested that the shrewder members of the ice industry had an inkling that their "partnership with the Government" could be made into a monopoly in which nobody else was ever again going to share. They were going to freeze the ice business as from the date the President accepted their code. It is a good trick—if it works. But to work it must assume first, that the ice market is frozen, and second, that they will be able to freeze all progress in the technique of refrigeration. This is piling absurdity upon absurdity, yet this is serious nonsense. For there are in Washington any number of bureaucrats who are eager to make just these same dangerous assumptions. The whole crop reduction plan is founded on the presumed ability of Government officers to guess correctly all the natural hazards of agriculture as well as what the consumption of the American people will be next year and the right of these same omnipotent officials to create monopolies for the benefit of men now in farming. By accepting such codes the N.R.A. accepts these same assumptions and takes unto itself the same powers. These freezing practices would be particularly fatal in chemical industries. Interchangeable raw materials and varying yields; by-product utilisation and waste disposal; new products and new processes make the chemical manufacturer dangerously susceptible to freezing to death, while the risks of exposure are greater even than in ice making.

German Trade

THERE was a time—so long ago that it seems to belong to another age, although in truth only some 15 years—when many people thought that one good way to improve trade was to eliminate our competitors. We are wiser now. We know that to eliminate one powerful competitor—unless by amalgamation—is to invite others to spring up in competition. As between nations we know that economic nationalism may be all very well for those who are satisfied barely to make ends meet, but that for those who would do more there must be a free flow of trade between country and country. To a maritime nation that is still more essential than to a purely inland country. Kipling recognised it in 1910 when he wrote:

> "Oh, where are you going to, all you Big Steamers,
> With England's own coal up and down the salt seas?"
> "We are going to fetch you your bread and your butter,
> Your beef, pork, and mutton, eggs, apples and cheese."

To-day we, too, recognise it, and it is for that reason the prosperity of other nations is welcomed and conversely we are concerned over their difficulties. The Reichs-Kredit Gesellschaft has made a report upon Germany's present position, and a paradoxical picture it is. In Germany, as in other countries where work has been provided by Government measures, a revival of employment was experienced, to the extent in Germany of no less than 4,000,000 people. The productive capacity of Germany is probably greater than it has ever been before, but it is a Government-induced activity having no relationship to foreign trade and therefore amounts to taking in each other's washing. Raw materials which are now being required for Germany in ever-increasing quantities cannot be purchased because there is no increased foreign trade to meet them. The imports have been greater every month this year than last year, whilst the exports have been less; whereas the imports have not in general been much greater than last year, the exports have been much less. With the greater quantities of raw materials which the world in general—not Germany alone—is requiring for its internal purposes the price of raw materials is tending to rise; the price of manufactured goods, however, has not risen and thus Germany finds herself unable to sell abroad as much as heretofore.

Exchange Agreement

THE present German internal activity depends upon the maintenance of adequate supplies of raw materials, most of which come from abroad. Internal German development has come to a point when it ceases to be self-supporting and there is no little risk of a collapse into the conditions of January, 1933, when not only the 4,000,000 recently added to the employment register will be again thrown out of work, but many others with them. The effect upon a world just

beginning to recover its confidence might be serious. The report declares categorically that "the present structure of German industry is entirely dependent upon continuing supplies of adequate raw materials." In addition the internal activity has raised the cost of living primarily through foodstuffs and through the rise in the cost of imported materials. Again, the result must assist the tendency to increase the price of manufactured goods exported. It cannot be denied that Germany has produced for export very cheap goods in the past for a variety of reasons with which we in England are not in sympathy; but we must hope that the high internal activity in Germany will not collapse. It is a warning of the danger of unbalanced internal market stimulation; for stability the internal trade expansion must keep pace with a similar expansion of the export trade.

The difficulties which have faced those who desire to trade with Germany are being resolved by the Anglo-German Exchange Agreement, which endeavours to liquidate the frozen debts. German importers are enabled to purchase goods in the United Kingdom for which foreign exchange would otherwise not be granted, the importers paying for these goods in marks—known as Sondermarks—which are credited to a special account at the Reichsbank in the name of the Bank of England. These marks are sold by the Bank of England for the benefit of the British exporter, and can only be used for the purpose of paying for goods imported into the United Kingdom from Germany. Since this country buys a good deal more from Germany than Germany does from England, there should be no difficulty in selling all the Sondermarks paid into the account by the German buyers of British goods, but it is important if the scheme is to be made to work that those who have dealings with Germany should make use of it.

Dictatorship and Industry

IT is perhaps fortunate for this country that there is no likelihood of a dictatorship. There are countries, and there are people, fitted for this mediæval-modern form of government. This is emphatically not one of them. The effect of dictatorship upon industry is apt to be devastating as is shown by the progress of hydrogenation in Germany. Brown coal is an excellent material for conversion into oil by the methods of hydrogenation. Germany happens to possess ample quantities of this material and at the same time in view of her difficulties in purchasing raw material, has decided to become self-supporting so far as may be possible. Clearly the production of oil from brown coal would be an essential feature of such a scheme and one would anticipate that brown coal producers would be as pleased as would the British colliery owner if the Government decided immediately to hydrogenate another 20,000,000 tons of coal annually. But on the contrary, brown coal shares have been falling.

This has been brought about by the Minister for Economic Affairs who has recently seen fit to issue a decree controlling the business. Producers of brown coal are forced to contribute to the cost of converting into motor fuel an amount of brown coal which could easily be produced by one of the big concerns in Central Germany. The highly successful firms at the head of the industry are now obliged to work in co-operation with the many weaklings. The firms whose production is too small to enable hydrogenation plants to be erected at their own works are compelled to send part of their coal to other works for treatment—also partly at their own expense. Direct control from the Ministry prevents producers from recouping themselves for their expenditure by raising the price of petrol. In spite of these economic disabilities, the new decree states that any losses made in carrying out the scheme will not be made up by the State, and presumably must fall upon the industry. Great are the blessings of a dictatorship—to the dictator.

Artificial Silk Progress

DR. HENRY DREYFUS, in addressing the fifteenth annual general meeting of British Celanese, Ltd., on October 25, spoke of the remarkable growth of the artificial silk industry in recent years. The entire industry has been raised to a high status, not without extensive experiments and invention, in which the concern over which Dr. Dreyfus presides has taken a leading part, and it is not the intention of the company that its competitors shall secure the benefit of the heavy research expenditure which it has incurred. Dr. Dreyfus stressed the desirability of further increasing the company's productive capacity, and outlined the efforts which are being made to this end by means of placing a number of new products on the market. He described in some detail the main features of the company's products, particularly its new strong yarn, one variety of which is produced in the form of a product which will dye like cotton or viscose but is superior from the point of view of strength and fineness and other qualities. These products will be able to replace natural silk, and as they will be cheaper in price they will open up a larger field of application than natural silk.

As regards the results since the end of the financial year (June 30), Dr. Dreyfus stated that although the earnings had been affected by the immediate consequences of the reduction in the excise duty, nevertheless they were so far satisfactory and improvements were expected by the directors in the next few months. Dr. Dreyfus made an interesting suggestion in regard to the excise duty. Soon after the duty had been reduced by 6d. general hesitation had been shown among customers to buy products forward owing to fears that if the remaining 6d. were to come off they would again sustain losses commensurate with their stocks. There was therefore a tendency to keep stocks as low as possible. To remove this state of uncertainty he suggested that the Chancellor, having in mind the exact date on which he intended to remove the duty completely, should, without divulging such a date, continue to collect the excise duty for a further three months and on announcing his decision to abolish the remainder of the duty should pass on the amount of the duties collected during the three months to the artificial silk spinners in order that they might transmit this benefit to their customers. He gave a good account of the progress of the American and Canadian Celanese Companies, and said that the production of the American Company had far exceeded previous records.

Texture and Chemical Resistance

Dr. C. H. Desch Explains Matters to the Institution of Chemical Engineers

THE influence of texture on chemical resistance of materials was the subject of a public lecture which Dr. C. H. Desch, superintendent of the Metallurgical Department of the National Physical Laboratory, delivered before the Institution of Chemical Engineers on October 27.

The lecture was largely of a metallurgical nature and it was pointed out that the degree of resistance which a given material of construction can present to chemical attack depends essentially on three properties of the material, *viz.* (1) chemical composition, (2) distribution of the chemical components into distinct constituents or " phases," in the sense introduced by Willard Gibbs, and (3) arrangement of those constituents in space, this latter being described as the "texture." It was emphasised, however, that even when the chemical composition and the distribution of the chemical components into distinct constituents have been dealt with, the description of the material is still incomplete and the lecturer therefore considered in considerable detail the third property mentioned, *viz.*, " texture," which has been shown to have a profound effect on the resistance of a metal to chemical attack.

Some Important Differences

As a crude example, it was pointed out that a steel made by the open hearth process and a wrought iron made by the puddling process might differ very little in chemical composition. The rate of attack by a dilute acid might be much the same for the two metals, but the appearance after the attack might be very different. The inclusions of slag or cinder, so characteristic of wrought iron, formed long threads parallel with the direction of rolling. When the acid reached one of these threads it was deflected in its course and tended to run along parallel to the threads. On the other hand, the attack on mild steel would be uniform as the inclusions in that case took the form of short threads or spindle-shaped masses, incapable of deflecting the attack to any considerable extent. There was the same kind of effect upon wrought iron from atmospheric corrosion which developed in pits. Such a pit, however, would not develop through the iron, but would be deflected along the laminations of the iron. The quality of wrought iron therefore depended largely on the regular distribution of these threads of cinder through the mass. A bar, made up largely of fragments of scrap and insufficiently worked, had a very irregular texture. Still worse was the hybrid product, largely sold under the name of wrought iron, containing a high proportion—sometimes even the greater part—of steel scrap. Such a product had an uneven texture and corroded irregularly; it had not the characteristic resistance to corrosion of properly made wrought iron and its manufacture and sale had done much to damage the trade.

Grey Cast Iron

The chemical behaviour of grey cast iron depended in a similar way on its texture. This metal was essentially a conglomerate in which plates of graphite—a soft and mechanically weak substance, but highly resistant to chemical influences—were embedded in crystals of soft iron ferrite in which iron carbide and iron phosphide are dispersed in various ways, in quantities depending on the composition. Leaving out of account the special acid-resisting cast irons, which were mainly alloys of iron and silicon, and also those highly alloyed chromium and nickel irons which had inherent corrosion-resisting properties, Dr. Desch said the resistance of cast irons to chemical action, including that of air and other gases at high temperatures, is mainly a function of the size and distribution of the flakes or graphite. A cast iron vessel used for the storage of sulphuric acid quickly had its surface coated with a thin layer of ferrous sulphate, which became dense enough to protect the iron against further attack. But if a large graphite grain reached the surface, the adhesion of the graphite to the iron was so weak, and the differences of thermal expansion were so considerable that the junction of the two materials acted as a crack, into which acid entered, and the increase of volume caused by the formation of ferrous sulphate widened the crack, which could then spread into the thickness of the material. A vessel would ultimately burst under such conditions.

An example of the effect of texture of a relatively crude kind, continued Dr. Desch, was the behaviour of concrete exposed to waters capable of acting on it chemically. Solutions of sulphates were very destructive to cements, and in a well-made concrete the spaces were filled as completely as possible by grading the aggregate and sand so that successive orders of void found particles of the right size to fill them, and by thoroughly tamping the concrete whilst plastic.

Returning to the texture of metals, it was pointed out that a homogeneous metal or alloy in the annealed condition can be obtained with very widely differing sizes of grain. In a fine-grained metal the ratio of boundary area to mass was greater than when the grain was coarse so that the resistance to chemical action might be expected to be different. The evidence on that point, however, was conflicting. At the same time, the resistance of metals to chemical attack was affected by the grain size, the presence of cold-worked regions, the smoothness of the surface, and the directional effects of rolling and drawing. It was a curious fact that rupture in metals in a condition of high internal stress is only brought about by specific chemical agents. For instance, a highly cold-worked brass rod might be dissolved in nitric acid or in most of the usual solvents without any indication that it was in a state of stress, but if touched with a solution of a mercury salt it would split, often with a loud report. Drawn brass rods, placed in a mercury solution, might split into fibres like bamboo. Ammonia, even in small quantities, would produce the same effect, although not so suddenly. Work at the Research Department, Woolwich, however, had proved that annealing at a low temperature—about 200° C.—was sufficient to remove the dangerous internal stress without materially affecting the hardness, and as the same treatment was effective with other alloys, season cracking was no longer a serious matter.

Behaviour of Aluminium

How greatly the resistance of a metal which formed an oxide film in air depended on the texture of that film was well shown by aluminium. A film of aluminium oxide of quite extraordinary thinness would protect the metal against atmospheric attack to such an extent that mirrors of aluminium deposited on glass are now widely used for astronomical work and they preserved their brilliancy in air so perfectly that they were superseding silver for that purpose. Magnesium also formed a protective oxide film. The addition of 1 per cent. of tin to brass condenser tubes had been shown to lessen corrosion, and the addition of about 0.25 per cent. of copper to mild steel had become a common practice with the same object in view. Copper-bearing steels undoubtedly had a greater resistance to corrosion in the atmosphere, and, under some conditions of exposure, to solutions, compared with steels otherwise of the same composition, but containing no copper. At the same time, it was stressed that experiments in which steels are placed in an acid solution afford no guide whatever to their behaviour on exposure to the atmosphere or to ordinary waters. Under such conditions, the attack is mainly determined by the nature of the local electrical couples and the products of corrosion are removed as fast as they are formed. In the absence of such continuous removal, the initial rate of attack was unimportant and the amount of corrosion depended mainly on the texture of the corrosion product. Hence the failure of most " accelerated tests " for corrodibility.

The influence of the texture of a protecting film of oxide on the metal on which it has been formed might be expressed quantitatively when the film was one produced by heating. This had been done by Pilling and Bedworth, whose work had been confirmed by others, especially Dunn. The general conclusion drawn from their experiments was that the metals could be divided into two classes according to the nature of the oxide formed. If the volume of the oxide be greater than that of the metal from which it was formed, the film was protective, but if it be less, the film cracks and does not protect.

Naturally, such a simple rule could only hold for films below a certain limiting thickness; above this, secondary changes might set in and the character of the film might change profoundly. Molybdenum could not form a protective film at high temperatures on account of the volatility of its oxide, so that in an oxidising atmosphere the oxide was continuously removed and the metal wasted away. Pilling and Bedworth had also noticed differences in the behaviour of copper and nickel when a fairly thick layer had been formed.

How important small differences of texture might be, had been shown by some work of Smitheils and his colleagues on alloys of the nichrome type, as used in the form of wire for heating elements. A remarkable instance of the effect of impurities on the formation of oxide scale was met with in the course of the investigations on the wastage of locomotive firebox stays and plates, which were carried out by the Non-Ferrous Metals Research Association. In that case the introduction of smoke to the mixture of gases used in the laboratory experiments caused a scale to form, which was as hard and adherent as that found in practice. Previously the artificially-produced scale detacher itself quickly, leaving a fresh surface for attack. How the sooty matter affected the texture had not yet been determined, but the effect was very striking. The use of small quantities of hydrochloric acid, in the laboratory experiments, had quickened oxidation very greatly but, as mentioned, the scale soon fell off.

In the latter part of his lecture Dr. Desch referred to the manner in which other substances have their chemical properties determined by the shape of the molecules, mentioning those substances which have "giant molecules," such as graphite or other forms of carbon, textile fibres and the zeolites. Whether on a coarse scale as in the grading of a concrete, or on the minute scale of the molecular structure of a fibre or zeolite, it was clear that texture, as well as chemical composition, determines the chemical properties of a solid. For this reason the microscope was an essential tool in the laboratory for the study of chemically resistant substances. This had long been recognised by the metallurgist.

At the Sign of the Cheshire Cat—VI

"The Mechanicals" follow Nebuchadnezzar
They are fed on Grass
Rhapsody at Storey's Gate

WE live in a mechanical age—seeing that we now fan our way through the air to the Antipodes in well under three days. A counter-irritant is at work in chemistry; so much so, that even "The Mechanicals" have been led to ask for a dose of it and have wisely appealed to the modern Nebuchadnezzar of botanical science and husbandry to guide them to Grass. We shall next have "The Civils" claiming to be called to the Cow Byre: they have sufficiently neglected it hitherto.

Fifty years ago, engineers were just escaping from their wanderings in the wilderness of pure and undiluted practice and premium, beginning to toy with University Education; now, probably some of them have too much of it, at least in the higher academic walks. Sheffield has been shamed by a Hadfield into discovering a Hatfield; so far is the industry gone that we can no longer ask the question: "What makes iron rust?" It doesn't, when it's *Staybrite;* only when it's steel rails for electrically driven buses to rock upon. We can still gaze with joy, especially on Sundays, weather permitting and inducing it, at the sudden appearance of a rich yellow-brown bloom upon side-track rails left unhammered a few hours. Crucible steel is no longer hotpotted by furnace flame—instead, electricity is dipped with pencil point into the charge, an electricity scarce known fifty years ago. The hereditary occupation of crucible-steel maker is gone—as so much of craftsmanship is going, under the influence of our beastly modern way of using knowledge. The man who can use chisel and hammer is in demand as a museum specimen. Sheffield could not for ever remain without understanding of what it was doing. It admits to-day that it can make steel without smoke, in fact, sometimes even makes it with town's gas.

Sir Frederick Keeble, in the lecture on "The Green Plant as Agricultural Engineer," which he delivered at the Institution of Mechanical Engineers, on Friday, October 26, in memory of their former member, Thomas Hawksley, a great character in his day, seeking to show how entirely engineers and indeed all are captives of the air, told a romantic story of the green plant which, in itself, as a story, was more than remarkable, in language quite unusual in scientific circles, even giving Mr. Bernard Shaw (who was present) and his like a lesson. The great man was clearly impressed. In briefly supporting the vote of thanks, he spoke of the lecturer's literary ecstasy and thought he must have been made drunk by the products of his own gardening skill at Boar's Hill, Oxford; the lecture was obviously so beyond him that he sat down without further comment: probably the first occasion on which he has been reduced to silence or to brevity. A lecture is not often given that so stirs the imagination. Very few in the room will have understood its epic story; it was so much told by implication, and so wide in range, "The Mechanicals," in fact, not only had a great lesson but the lecture of their lives. We may look forward to repercussions; the standard both of matter and style of public discourses will have been so raised.

Sir Frederick is about as far from looking like a mechanical engineer as is possible; in life he is an artist but has a knowledge of mechanisms outmatching that of any professional engineer—with an ability that is more than rare of discoursing effectively about them. He might be taken from "Trilby"; sometimes he talks like "Little Billee." His weakness in ordinary eyes, perhaps, is the profound contempt he has and expresses of ignorance. Hereby he shows both lack of patience and that he has not sufficiently mastered Carlyle's advice. He seeks more florid writers. Florid himself, his address is the distilled essence of the flower. As "The Mechanicals" are not usually fed upon musk, they may find the strength of the perfume with which they are anointed a little overpowering.

As to the man, he first became known as a student of the Coffee Disease in Ceylon. The tropical profusion and beauty of the vegetation at *Peradinia* may well have entered into his soul and made vulgarity hateful. Later, he became first Professor of Botany at Reading College, now stilted into an Academic, Degree-giving University—whereas it should have been kept a great high school of bread and milk, butter and butter beans, a school solely bent upon adoration of the soil.

Next, Professor of Botany in the University of Oxford, during far too short a period to give botanic life to that old bag of classic bones, noted before everything for its lawns, yet knowing nothing of them but how to mow them into a perfection which makes them the envy of the world—chiefly worshipped through the corrupted saying "all flesh is grass," by too much meat at mealtimes; a connection that is unthought of at the tables. Someday, if we read Sir Frederick's lecture aright, a future Keeble will make Oxford the University of the Lawn, though not such as is worn of clerics; a great agricultural school for gentlemen, bent on making them men of the world.

In his last phase of activity, Sir Frederick was scientific

adviser in agricultural inquiry—not agricultural research but actual, practical, scientific inquiry—to Imperial Chemical Industries, Ltd., the founder of their experimental station at Jealotts Hill. Now he is but a retired adviser and free lance; not forced to think and direct, as he should be.

He is the author of one of the most exquisite scientific romances ever written, "Plant Animals," long out of print, shame to the publishers be it said. Why is it that books worth reading are always out of print—never kept to the fore? There should now be imperious demand for a large reprint; every "Mechanical" will need to have it at his bedside, to read of the loves of *Clamydomonas* and *Convoluta*, both children of the sea.

He also fathers a "Life of the Plant," which is good but not so good as "Plant Animals." Recently he has published a work of Imperial Importance—"Fertilisers and Food Production"—summarising the work he did at Jealotts Hill, work he should never have been allowed to relinquish. Openly be it said, the station has been without importance since his withdrawal. English industry, like the French Republic of old, has no need of savants. Men of real ability are sufficiently guillotined to-day by not using them to public ends. We need but go to Carlyle with his valet for an explanation: only the brave deserve the fair. When there are no brave, the fair are left unpursued.

In addition to being a Professor, Sir Frederick has been Editor of the "Gardener's Chronicle" during over 25 years. Well may he write well with so much experience in leader writing. His editorials have been like the Waverley pen—a boon and a blessing to men of the gardening craft. Himself, he is the perfect gardener. He is even succeeding in forcing Kimmeridge Clay into fruitfulness and has made coal from straw on his premises. At the time of the war he was one of the very few to enforce upon a dull officialdom the extreme value of fresh fruit and vegetables as food; as Horticultural Adviser to the Board of Agriculture he did great service in moderating the evil effects of the policy of the calorie fanatics of the Royal Society.

As to the lecture—we cannot keep pen from it, though told officially that it is not for publication until after it has appeared in the Proceedings of the Institution. Reading it in proof, we had difficulty in explaining its inception. Light only came the day before it was delivered, on reading an essay review of a new life of Alexander Pope in "The Times Literary Supplement." Pope, writing to a friend, tells him that "he had some thoughts of writing a Persian Fable, in which he would have given full loose to description and imagination. It would have been a very wild thing." Later, he writes:

> I have long had an inclination to tell a fairy tale, the more wild and exotic the better; therefore a *vision*, which is confined to no rules of probability, will take in all the variety and luxuriancy of description you will. . . .

Poet Keeble has been carried away by a like idea and has told his story in the allusive way in which Pope describes the tea table:

> For lo! the board with cups and spoons is crown'd,
> The berries crackle, and the mill turns round;
> On shining altars of Japan they raise
> The silver lamp; the fiery spirits blaze:
> From silver spouts the grateful liquors glide,
> While China's earth receives the smoking tide. . . .

Here Pope has facts to go upon—poets too often work only upon fancy. The poet of the future will be the poet of knowledge. Sir Frederick has written a prose poem upon the Green Plant, with Nitrogen in the background, by way of example. He carries his hearers into a garden of live flowers—at least of language. Our wise Cat nudges us and suggests here that some "Mechanicals" may have said to themselves, as Alice did to herself when trying to find her way in: "I should see the garden far better if I could get to the top of the hill; and here's a path that leads straight to it—at least, no, it doesn't do that—but I suppose it will at last. But how curiously it twists. It's more like a corkscrew than a path."

So is the lecturer's story. He drives no wide by-pass road across the field of fancy but takes us, by meandering lanes and footpaths of natural engineering, by way of leading us ultimately to the hay yard and the supreme value of summer grass. The story is to be read in conjunction with his last book and the lecture he gave, in March last year, at the Royal Institution, on "The Nitrogen Hunger of the World." He has a vision, maybe "wild and exotic," at present, yet one that must be fathomed if the world is to have safe control of its destiny, connecting, as it does, air with soil, through the mysterious workings of the green plant.

The story is full of green passages—purple is no colour of grass—which the gushing critic in the Sunday paper would call superb writing. The great fact is that it is a real story, told at high level, from real life, advisedly written by way of example. Every line is packed with meaning, without an immoral word. The green plant at all times sets the highest possible example. The modern novel, especially when written by a woman, is a disgrace to civilisation—so empty of matter, so full of amoralities and immorality. Often the poet too does little more than make music of words—he has no feeling for inner meaning but is content to worship outward beauty. The tendency is very obviously in the Indian poet, Rabindranath Tagore, who can write, in his "Religion of Man":

> "from my infancy I had a keen sensitiveness which kept my mind tingling with consciousness of the world around me, natural and human. We had a small garden attached to our house; it was a fairyland to me, where miracles of beauty were of everyday occurence,"

without caring the least to understand the beauty of the supermiraculous inner activity of the plant—in fact, disclaiming the value of such knowledge. Even Walt Whitman, in his "Leaves of Grass," can only admit his ignorance and write vague nothings.

> "A child said: *What is Grass?* fetching it to me with full hands. How could I answer the child? I do not know what it is any more than he

He "guesses" at its nature in all sorts of fanciful ways:

> "And now it seems to me the beautiful uncut hair of graves.
> Tenderly will I use you curling grass,
> It may be that you transpire from the breasts of young men,
> It may be if I had known them I would have loved them."

To-day the botanic chemist has something real to set against such nonsense—for it is nonsense, as it cannot be interpreted. He is beginning to know at last what is the value of Grass to man—something of its ways of working. Will the world learn to value such knowledge? "I know not," said the Hawkesley lecturer, "whether man is satisfied with what he has done and is doing with his own world but I know he has by no means made the best of the other world—the world of the green plant. If he had his own would be very different from what it is; far higher and happier." This, perhaps, is the most pregnant passage in the whole address—the one to be most fully considered by engineers. Our present public disregard of such matters is nothing short of criminal; due mainly to former Oxford classic conceit and lethargy.

The address is written in an unusual staccato rhythm, in some ways reminiscent of Maeterlinck: a Debussy background, like that to Pelléas and Mélisande, would suit it. Overcome as artist by his treatment of his theme, the lecturer unconsciously followed too closely the written rhythm and spoke in too restrained a manner. Actually, an exultant treatment was called for—a pæon of praise throughout. "See the Conquering Hero comes," as an accompaniment, would have been in the right spirit; even some tub-thumping. It would have been well, had a kindly voice in the Gallery cried out: Spit it out! The charms of *Clamydomonas* and *Convoluta* might well have been sung upon such high and militant note that engineers would all desire to make baptismal use of the names. Hearing the lecture, Thomas Hawksley would certainly have named his son *Clamydomonas* rather than Charles.

Having listened earlier in the week to the dissonances and concealed melodies of the *Delius-Nietzsche* despondent "Mass of Life," "Thus spake Zarathruatra," set to music; then to the scientific assonances of Sir Frederick Keeble's story of the Green Plant as an upbuilding, vital force, we prefer the botanist's *Preislied*, feeling that natural science must triumph even over musical expression, if once given proper literary expression. However concealed the harmonies of Nature may be, they are open to study and ultimately to statement in terms of precision: in an age of intelligence, they will be the substance of song and set to music, though this can never be of the beauty of Nature's own music, wisely heard. Unlike *Nietzsche*, we mourn no sunset but see a rising orb of glorious knowledge, to be used with joy.

The Enamelling of Iron

Troubles and Means for Avoiding Them

ONE of the greatest weaknesses which wrought iron has, when utilised for vitreous enamelling, is its inherent characteristic of non-uniformity. Due to the fact that it is made in small quantities, invariably containing a large amount of slag, it does not possess the homogeneity and uniformity of iron which is made under modern processes, said Mr. N. H. Oakley Evans, in his paper on "Enamelling Iron," which was read at meetings of the Institute of Vitreous Enamellers in London, Birmingham and Manchester, on October 24, 25 and 26 respectively.

Although created primarily to cope with the problem of corrosion, pure iron was soon recognised as an ideal base metal for the exacting requirements of the enamelling industry, which demanded (1) cleanliness of structure and surface, (2) freedom from distortion, (3) a surface suitable for a tight bond with the enamel, (4) uniformity and consistency in quality, (5) accuracy in gauge, size and flatness, (6) reliable welding properties, and (7) deep drawing qualities. A clean enamelling shop is a prerequisite to good enamelling, and likewise clean ingredients are essential in the materials which are utilised in most successful enamelling.

Cleanliness Imperative

Cleanliness in metal is imperative. A uniform ferrite structure is desirable, virtually without iron carbides, which are common to steel. For the best results, it is essential that a sound structure be accompanied by uniformly clean sheet surface. Good surface is not only the result of sheet rolling, but is dependent upon exacting care being exercised throughout processing, from the ingot to the final operation on the sheets. Heating of ingots in the soaking pits prior to blooming and bar rolling should be done so that a uniform temperature is attained without burning or overheating the iron. Conditions of blooming and bar mills must be such that heavy scale, scabs, lapped bars and rough edges are eliminated. Cleanliness must again be exercised in heat treating, whether sheets are box annealed or normalised, temperatures pyrometrically controlled and the fuel and furnace conditions such that proper reducing atmospheres obtain. Pickling operations demand constant checks on temperatures, acid concentration and freedom from foreign matter which might be detrimental to sheet surfaces. Throughout the processing of enamelling metal, great care is also exercised in all handling, rolling and shearing to avoid surface contamination by oil, grease or any extraneous matter.

Freedom from Distortion

Freedom from distortion or sagging is a characteristic which is largely dependent upon the purity of the metal. Inherently, a pure iron is homogeneous and free from localised segregations—consequently, less prone to warp. Adequate annealing to relieve all rolling strains also helps in the attainment of flatness. The critical changing point in pure iron is higher than in the case of steel, consequently it can be annealed at higher temperatures than steel with less structural disturbances than the latter.

A great deal of research has been conducted to determine the best type of sheet surface for vitreous enamelling metal. A happy medium must be found between a rough surface, from which defects may arise owing to scale or pits, and that of highly polished or cold-rolled surface, the slickness of which interferes with a satisfactory bond. Extreme smoothness of surface requires a very critical viscosity, or set up of the slip, in order to maintain the proper weight of enamel distributed uniformly over the sheet surface. It is extremely difficult with excessive smoothness of surface to prevent the so-called secondary drainage. With a properly cleaned and roughed sheet surface the ideal conditions exist for ease of control of enamel distribution on the sheet surface. A matt-like surface is most desirable which, under the microscope, shows minute tentacles which grip and bind the enamel coating to the base metal, forming a sound, solid foundation. Microscopic study has revealed that this type of surface, common to pure iron, is much more satisfactory from the standpoint of adhesion. The ground coating penetrates into the open pores of the iron and is so firmly held, by the tiny protruding hook-like fingers, that the enamel and metal can scarcely be separated by impact or bending. Through the combined effect of these metallic tentacles reaching into the body of the enamel, and the enamel penetrating into the pores of the metal, a bond is developed, the strength of which is oftentimes greater than the tensile strength of the enamel itself.

In addition to strong adhesive forces between enamel and base metal, certain other conditions can be provided which assist the adherence of enamel. One of these is a certain irregularity of the interface between enamel and base metal. The advantages of an irregular interface arise from the fact that it increases the surface to which adhesion can tie the enamel; it breaks up those stresses which develop into multi-directional rather than simple shearing stresses; the general characteristic called adherence is aided by the precipitous irregularity of the interface, producing an interlocking effect between enamel and base metal; and such a surface controls drainage of the slip so as to result in a uniform weight of enamel. Another factor favourable for generally improved adherence is that of high strength of the enamel.

Gauge Uniformity

Gauge uniformity is also of importance to the enameller. Definite temperatures are established for various thicknesses and consequently irregular results in the enamelling process would arise to some extent if gauge variation were unreasonable.

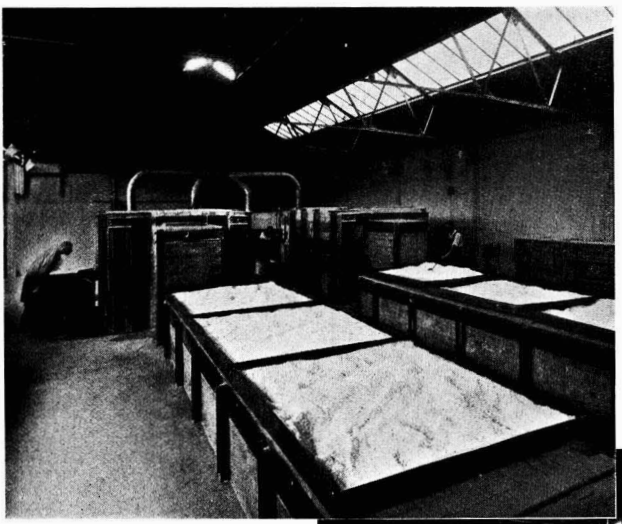
So many enamelled products to-day are subjected to drawing and assembly by welding that it is of great importance for the base metal to be welded easily without blistering. Here again, pure iron has proved in practice to be superior, as it lends itself admirably to a strong uniform weld, over which enamel coatings may be fused with scarcely a trace of the joint being discernible. Many products such as signs, table tops, exterior stove and refrigerator panels and the like do not require particular drawing properties, but rather demand extreme flatness. There are, however, many applications such as refrigerator linings, oven doors, and a multitude of accessory parts, which definitely do necessitate material suitable for deep drawing work. For spinning and deep stamping, the best results are obtained with a normalised grain structure, which is smaller and more tenacious than that commonly obtained from box annealing.

Vitreous enamelling is eminently desirable and practical where lasting durability, consistency of surface protection, attractiveness of colour, good appearance and hygienic cleanliness are called for. For instance, drawn metal, which is light, strong, attractive and economical, is now replacing cast iron for sanitary applications such as hot water tanks, geysers, etc., where cleanliness is important. In England at the present time, excellent progress is also being made with the manufacture and sale of vitreous enamelled piping for interior and exterior drainage systems, as well as for roofing gutters, roofing tiles and corrugated enamelled roofing.

Pooling of Interests

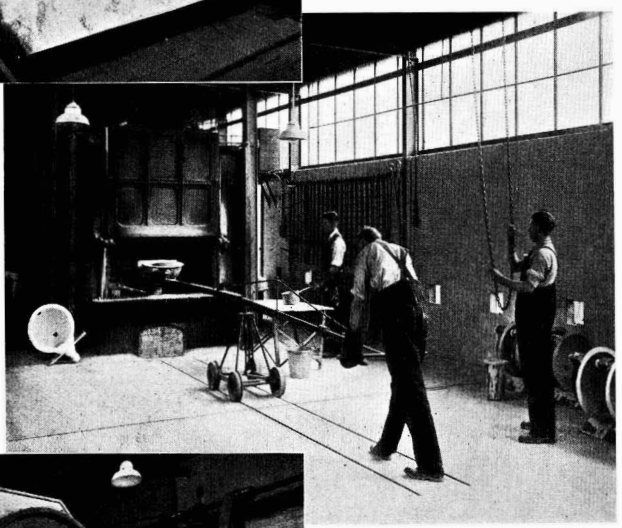
Factors which may hamper, to some degree, the more extensive use of vitreous enamelling are the troubles which are commonly suffered in the application of a satisfactory enamel coating. It is only by pooling interests and by close co-operation that these problems can be solved by the joint efforts of iron makers and enamellers. Among difficulties which are not always traceable to the metal "copperheading" may be discussed. During the firing of the enamel, there is a normal oxidation of the metal surface before the enamel fuses. This oxidation is a result of the infiltration of air between the particles of the dried enamel coating. This oxidation begins as soon as the iron reaches sufficient temperature to oxidise and continues until the enamel has fused. The amount of oxidation is governed by many conditions such as: rate of heating, furnace atmosphere, the metal used, gauge of metal,

Modern Methods in the Enamelling Industry

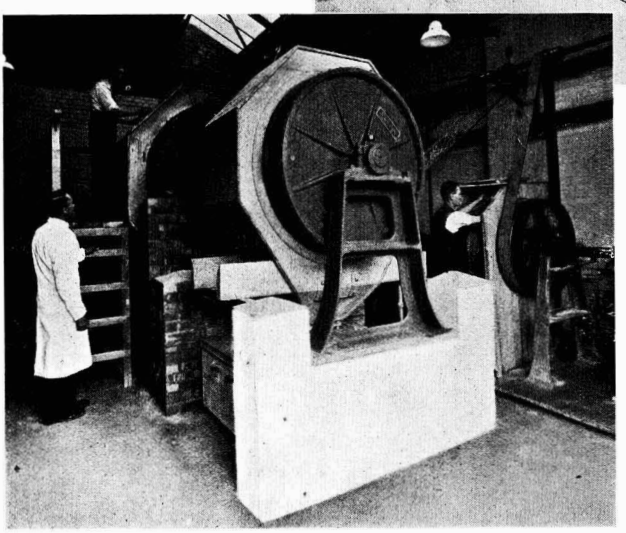


An up-to-date factory has been erected at Swains Road, Tooting, to cope with the increasing demand for Escol enamels manufactured by J. F. Stewart and Co., Ltd. The popularity of these enamels is due to their efforts to anticipate the requirements of the industry and to the constant study by their associates, J. Gray and Sons, Ltd., of the enamelling industry and the requirements of the enameller. Careful thought has been given to the selection of the site and the lay out of the plant.

The frit kilns shown above are so arranged that the combustion of the fuel is completed before the resultant incandescent gases are delivered into the smelting chamber, thus preventing contamination of the frit.



The illustration on the right shows the dry process (dusting) department.



The mill room is shown on the left. Enamelling by the dry process (dusting) has been a speciality for many years, and this department has been transferred from the old works at Stratford to the new Tooting factory.

thickness of enamel coating, fineness of grinding, and so on

It has been proved that "copperheading" is a result of oxidation of the metal in a local spot, such that excess iron oxide is produced at that spot. Under such a condition, a portion of the iron oxide dissolves in the enamel and during cooling may recrystallise in bronze or copper-coloured iron oxide crystals. There may occur all degrees of oxidation from just sufficient iron oxide to dissolve in the enamel and leave a slight depression or dark spot free from bubbles in the enamel, to a large excess of iron oxide in which there is only scale covering the metal. In the mechanism of "copperheading" *something* serves to make the condition whereby excessive oxidation may occur. This *something* may be only an air bubble in the enamel "slip," poor cleaning practice in which dirt forms gas and opens up the enamel coating, pits in the metal not properly cleaned, hard firing of the enamel, and even the flowing characteristics of the enamel itself, as well as many other conditions.

The "*fish scaling*" of enamel has many causes. It is true that proper attachment of the enamel to the metal will usually prevent this trouble—however, the metal though often blamed, may not be the inherent cause. The cleaning of the surface, the proper firing of the enamel, the proper range of expansion of the enamel, may all affect the strength of the attachment of metal and enamel and thus cause "fish scaling." The chief causes for "fish scaling" which have been advanced are chemical balance of the enamel, improper smelting or milling, failure to stir liquid ground coat enamel frequently, improper pickling of iron, underburning or overburning and leaky muffle furnaces.

Reboiling and black specking are troublesome defects which originate from many causes, some of which are well defined. Reboiling of enamel is that boiling of the ground coat when the temperature of the piece passes through range 590° C. to 650° C. when ground coat is refired with or without cover coats. The cause of reboiling is closely associated with those factors which control stresses in the enamel since such things as exceedingly slow heating through the fusion range of the enamel or slow cooling tend to prevent it. Annealing at 510° C. for 24 hours tends to prevent a reboiling condition. Also, the use of lightweight ground coats properly fired assist in the control of this defect. There are many factors isolated which show conclusively that reboiling is associated with a fracturing of enamel and a subsequent rise and breaking of a gas bubble which may form black specks in the enamel. The proper strength of the enamel is developed only with difficulty when heavy coats of enamel are used and it is believed that heavy coating is contributory to reboiling. The normal thickness of ground coat is generally agreed to be 0.003 in. to 0.004 in. and if it is heavier, *i.e.*, 0.006 in., trouble may be expected. Once reboiling occurs it is difficult to cover with white coats, as reboiling probably will be repeated with each successive firing. The heavier the enamel coat becomes, the greater likelihood of reboiling. It has been noted that experimental firing at temperatures of about 980° C. will often cause the enamel to show reboiling, although samples fired with the same enamel and metal at 870° C. do not develop the reboiling condition.

Very light gauge metal is usually free from reboiling. For example, it is difficult to produce reboiling on 26 gauge material, due very probably to the small differences of temperature which develop between the enamel and the base metal during cooling. On heavy gauge metal the trouble may be checked by the control of factors which influence stress formation in the enamel layer.

"Copperheading" condition is often associated with reboiling and it seems possible that such oxidation may occur during the time of breaking of a few of the reboiling bubbles. In regard to the open surface of sheets as a cause for black specks, it is true that unclean pits may be responsible as a result of the formation of "copperheads" or excessive iron oxide crystals over these spots. In such a case, a roughened or boiling condition should be observed in the ground coat. If pits are large they may not be cleaned properly, but this may be detected readily by an examination of the surface.

Since the enamel slip is a suspension of the enamel particles in water, the wetting properties of the slip for the metal surface is very much like that of water for these two conditions of the glass surface. If the metal surface is thoroughly cleaned, the water in the slip wets the surface of the metal uniformly and results in a uniform distribution of the slip during drainage over the surface of the metal. If, on the other hand, the surface of the metal is not thoroughly cleaned, primary drainage will not be uniform. In fact, there may be spots which have not been wetted at all. It is on this account that more uniform results are obtained by spraying methods than by dipping. The fact is that the high velocity, with which the enamel strikes the metal surface in the spraying method, makes it possible to enamel sheet surfaces satisfactorily, even though they have been distinctly less satisfactorily cleaned, whereas it may be impossible to enamel these same sheets by the dipping process.

Cast Iron Enamelling in 1934

A Modern Factory at Tooting

RECENT advances in the enamelling industry and in the domestic and industrial demand for enamelled products have necessitated the erection of many new factories and the extension of existing works, as well as the modernisation of plant and methods of production. A striking example of modern progress is the new factory recently erected at Swains Road, Tooting, by J. F. Stewart and Co., Ltd., and their associates, J. Gray and Sons, Ltd., some illustrations of which appear in page 401.

In selecting the site, attention was paid to the isolation of the factory from other industrial processes which might possibly have contaminating effects upon the production of high-grade enamel. The new factory is situated in ideal surroundings, and is particularly well equipped with laboratories in which the research staff is engaged in testing raw materials used in the production of Esco! enamels. Research is constantly being devoted to the improvement of enamels and the development of new products to meet the demand of modern vitreous enamelling.

The raw materials, after being approved in the laboratories, are weighed under the supervision of a member of the chemical staff and special care is taken to ensure thorough mixing of the ingredients. The mixing chambers installed at Tooting are of a new type and are provided with exhaust system and external settling chambers to ensure for the operators working in the vicinity complete freedom from the effects of inhaling silica dust, as required by Home Office regulations.

The smelting of the enamels is carried out in specially designed frit kilns so arranged that the combustion of the oil fuel is completed before the gases are delivered into the smelting chamber. There is therefore no possibility of the frit becoming contaminated. The kilns are charged from overhead and the enamels are smelted to the correct temperature and time to result in complete homogeneity.

Complete evaporation of moisture is obtained by the use of dryers of a special type. This complete drying of the frit ensures the removal of frit dust in the subsequent operations, and in after-weighing the correct dry weight of the frit is obtained. The frit is afterwards stored in zinc-lined bins, whence it is drawn, screened for the removal of dust and hand-picked for the removal of large particles and extraneous matter, so that all frit sent out is of uniform size.

Special small grinding mills are used for the milling of test quantities of wet process enamels, and these enamels are applied under production conditions. Spraying of enamel is carried out by modern methods.

Enamelling by the dry process (dusting) has been a speciality of J. F. Stewart and Co., Ltd., for many years, and this department has been transferred from the old works at Stratford to the new works at Tooting.

The Coke Oven Managers' Association

Mr. G. J. Greenfield's Presidential Address: Speeches at the Annual Dinner

PRESIDING at the nineteenth annual meeting of the Coke Oven Managers' Association held at the Hotel Victoria, London, on October 25, Mr. G. J. Greenfield reviewed the by-product coking industry, with special reference to the various fields in which scientific investigation might usefully be pursued. He did not expect to see much work on ammonia. Its removal from the gas was already carried out with high efficiency. The world market for nitrogen products in general, and for sulphate of ammonia in particular, was far over-saturated, so that little benefit could be expected from efforts either to produce more ammonia or to produce it in different forms. He hoped to see investigations into the relation between the conditions of carbonisation and the quality and quantity of tar, as to what changes in the principal constituents of tar were to be expected when the output of a plant was changed, or when the temperature in the oven, particularly the temperature at the top, was changed. Research on hydrogenation of tar and on cracking of tar was beyond most of them, but the results of such research might be of great benefit to many.

Benzol Rectification

In the benzol department, advances in the immediate future were likely to be in the direction of rectification, rather than in the direction of recovery. The man who perfected a quick test for the gum forming properties of a motor spirit would be a benefactor. The tendency for gas undertakings to purchase coke oven gas continued to increase. In industrial areas, the use of gas by all sorts of industries was expanding rapidly as the benefits of this fuel became better known and better developed. Operations so diverse as steel melting and fish frying were being carried on with great benefit to those industries, substituting gas for other fuels. He was convinced that more profitable uses existed for gas than simply selling it to gas companies. In some cases it might be suitable to start a subsidiary industry alongside the coking plant, and under the same ownership, such as brick-making, glass-making, or hydrogenation of coal, in which the surplus gas could be used as fuel or as an ingredient of manufacture. As long as the Central Electricity Board retained its policy of carting fuel about the countryside in order to generate dear electricity in magnificent power stations, so long would it be worth the while of the steel, coal, and other industries which used power on a large scale, to generate their own, and while this was so, there would be cases where it was more remunerative to use the gas for the associated collieries or steelworks, than to sell it as gas. There would also be cases where it was worth while to work out processes for manufacturing other products out of the gas. Among those whose production had already been accomplished or studied were methyl and ethyl alcohols, acetone, benzol, formaldehyde, and synthetic resins. Research in these directions was needed and should be undertaken either collectively or by individual firms.

Future of Compressed Gas

The future of compressed gas for motor vehicles depended, in his opinion, on the production of gases of high calorific value. One possibility was to separate the hydrocarbons by liquefaction, *e.g.*, by the Claude liquid-air type of process, producing a gas of high calorific value for motor vehicles, and leaving a gas of low calorific value and low carbon content, consisting chiefly of hydrogen, which could be used like producer gas in a battery of compound ovens, or passed on to an adjacent hydrogenation plant. The recognition of gas as a major by-product opened up a great new vista of research, investigation and development. Those who had been urging the greater usage of surplus gas for so many years could now look with pride upon the results of their advocacy. If gas was valuable, they must aim for the maximum amount of available gas. They ought to study this matter, so as to provide sound advice for the industry. Could a standing committee be set up which would conduct independent tests on coke oven batteries, their results being accepted equally by owners and constructors? He suggested that they might initiate conversations, with this object in view, between interested parties.

For years succeeding presidents had referred to the depressed state of trade in general, and of the coking industry in particular. Last year his predecessor took up his duties at a time of growing commercial confidence, and it fell to his fortunate lot to record the continuation and extension of that happy state of affairs. Never since the "Ruhr" boom of 1922-23 had so much coke been produced in this country as at present. Much leeway had yet to be made up, and many new devices would be tried, before they reduced the hordes of unemployment to a satisfactorily small size, but the whole world seemed to be sharing in a steady trend towards better trade.

The Pursuit of Efficiency

In the present state of affairs, where did the coke oven manager fit in? He who during the slender years had steadily kept his plant in good repair, worked out improvements, kept every item keyed up to an efficient pitch, and held himself abreast of current developments of knowledge by reading the technical and scientific press, was now beginning to reap the reward of his prescience. He who had, either of his own volition or by instructions from above, been led away by the desire for dividends into cheeseparing paths of so-called economy, might now be left behind in the race. If it had been necessary to pursue efficiency in slack times, for the sake of clearing a slender profit or avoiding a loss, it was no less necessary now in busy times, lest in the drive for output, output and ever more output, they tripped into pitfalls. What were they?

First, it was possible to overload the ovens to the point of diminishing the yields of by-products per ton of coal, or of reducing the quality of the coke. For a given coal in an oven of a given width there was an optimum coking time. This differed from coal to coal. Second, it was possible to reach a point where the more rapid usage of machinery resulted in wear and tear much greater than was proportional to the rate of usage. Third, it was possible to become so engrossed in the affairs of the moment as to lose sight of developments and inventions taking place in the world around them. No man in charge of technical or engineering operations ought ever to have to admit, even to himself, that he had no time to read the press of his own industry.

The Annual Dinner

The annual dinner followed the business meeting, Mr. G. J. Greenfield presiding over one of the largest gatherings of the kind in the history of the Association. Mr. C. Valon Bennett, president of the Institution of Gas Engineers, sent a telegram apologising for his absence.

Sir SAMUEL ROBERTS, M.P., chairman of Newton, Chambers and Co., Ltd., proposing "The Coke Oven Managers' Association," congratulated Mr. Greenfield on having been elected president of the Association. He recalled the days not long ago when they got 6os. per ton for coke, £22 per ton for ammonia, £5 per ton for crude tar and 4s. per gallon for motor spirit. Those days had gone and could not return. It was a wonder that the industry was able to exist at all. There were two reasons, however. One was that the scientists and the coke oven managers had reduced the cost of production, and the other was that new methods of disposal had come about. He could not help feeling that there was some danger of over-production. That had been the curse of most primary industries in recent years; it was the curse of agriculture to-day, it was the curse of the coal trade and of other products, but he hoped it would not be found in the

coke oven industry that by over-production they would all cut each other's throats. All over the country new batteries of ovens were being built. In some cases these were replacements of existing ovens and would not increase the supply of coke. In other cases, however, they were entirely new and were mainly put up on steel works for their own use. The point was how that would affect the coke oven industry. He was speaking from the point of view of a colliery coke oven owner and he was not quite sure that it would affect them adversely because those new plants at Corby and elsewhere were for the purpose of producing steel that in the past had been produced by the foreigner, and not at home, and if the steel works did not put in coke ovens to produce the fuel they required it would be necessary to buy in the open market. Therefore he did not think the coke oven industry need fear much in that way.

Production of Motor Spirit

Speaking of by-products, Sir Samuel said, as far as motor spirit was concerned, he felt that the market was fairly sure because we could consume in this country all the motor spirit that we could produce as long as the Government kept a substantial import duty on the imported commodity. Otherwise motor spirit would not be worth making, because that part of the industry existed by and through the import duty. Parliament was pledged to keep a certain motor spirit duty in force for a certain number of years, but that was not much use to them as makers of benzol and motor spirit and they wanted the 8d. to be kept on indefinitely, or 1s. if they could get it.

Without science and management the owners could not do anything. In spite of what had been done, however, he felt that a great deal more could be done to help the industry in the future by way of further research. It would be rather an interesting subject for discussion as to whether that research should be pooled or whether it should be carried on at individual ovens and the results pooled.

Mr. GREENFIELD, responding to the toast, referred to Sir Samuel Roberts's remarks on over-production. He could hardly feel that those remarks applied to coke since the experience had been that the production of coke was, willy nilly, regulated according to the demand. The latest estimates placed the world's resources of coal at about 700 years, but the resources of petroleum were placed at not much more than 100 years. Therefore by so much as it was possible to increase the production of benzol and other substances which might be used in place of imported petroleum products, they were lengthening the period during which petroleum would be available for the world's use. Possibly, however, the petroleum people might not thank them for that solicitude for the welfare of their products. On the general question of over-production, the president said he looked to the production of entirely new products from coke ovens. It had been said that some people thought that the primary object of coke ovens was to produce coke, but that was a view which he emphatically denied. The primary object of the coke oven was to produce money and if new products which enabled them to produce more money were to be produced there must be more research. By the nature of the industry technical staffs were few in numbers but the proportion carrying out investigations of one sort or another was surprisingly high. That was a fact which he was proud to be able to proclaim to the world, but it had a definite bearing on the question of the co-ordination of their efforts in research to which Sir Samuel Roberts had referred.

The Guests

Mr. W. E. MORDECAI, immediate past-president, who proposed the toast of "Our Guests," said they were delighted to welcome the representatives of research organisations dealing with coke, refractories, tar, benzol and oil and to assure them of an increasing interest in their work on the part of the members of the Association and of a desire to collaborate with them in the fullest possible degree. The Association was honoured by the presence of Sir Samuel Roberts whose labours and activities both within and without the industry had contributed a great deal to the welfare of many classes of the community, and finally, said Mr. Mordecai, he was pleased to couple with the toast the name of Sir Ernest Benn.

Sir ERNEST BENN, in his response to the toast, said he was not a politician and was not able to explain in eloquent terms exactly what those in the coke oven industry ought to do in every detail of their lives and business. This was an age of politics *par excellence*. As Mr. Mordecai had reminded them, we had to nationalise, socialise, standardise, organise, synchronise, and do that sort of thing in all directions, but he warned them against any sort of process which ended in "isation." He doubted them—even civilisation. He was, like most people, nevertheless, interested in these things as a taxpayer. Taxpayers were a decent lot and were very catholic in their tastes. There were a few things which touched remotely upon their great industry. They started by providing the coalminer with the dole because there did not appear to be sufficient work for him. That came out of one pocket. Then they went into the other pocket and set up the Fuel Research Board so that there should be no need for the miners at all and they could all go on the dole. Then they dipped again into the same old pocket and put up £60,000,000 for a thing called a grid. Part was spent in a curious mystery called standardisation, but he was still searching and hoped in time to discover what this standardisation represented. In the southern part of England it seemed to have some relation to the absence of a Sunday dinner. Something had already been said on the vital question of research and in such a company he need not emphasise the importance of it. But he ventured to make a mild suggestion because proposals for research into all sorts of matters were coming upon us fast and furious. They should be looked into carefully to ascertain that there was as much interest in them as in the salaries and pensions which the taxpayer would provide for the research workers.

Service to Others

The Association was a scientific and, to some extent, a commercial organisation and he would offer a few observations on the general question of organisation and union, the idea that we must get together and co-operate and work in the mass. There was a great deal in the idea that was very prevalent in that connection, but he suggested it was worth while devoting a little thought now and again to the principles of union and organisation as a subect in itself, because one could not help noticing, when one got into the realms of marketing boards and some of the efforts recently of his friend Mr. Walter Elliot, for example, that some of these bodies lacked a knowledge of the old principles of trade and service. The first principle which any association should have in mind was service. Everybody existed simply and solely by rendering service to others and the only excuse for the existence of any organisation was that it should move towards progress and help society. The organisation which had for its purpose the promotion of the greed of the server—trade unionism at its worst, the price ring, the limitation schemes—came into another class, but we really ought to think more seriously in these days on these matters. It was a matter for alarm that the whole world should be struggling to secure wealth out of scarcity. It was a retrograde step and yet in some curious way we all seemed to be drifting in that direction. There was another danger, and that was the type of organisation which tended to suppress the individual and developed an inferiority complex in the man which made him feel he was a mere cog or unit in some supposed force which was beyond his control. That must always be an anti-social and a bad organisation.

The final toast was that of "The President," which was given with musical honours.

United States Glycerine Imports

IMPORTS of crude glycerine into the United States, entered for consumption, totalled 11,000,000 lb. valued at $728,600 in the first 8 months of 1934, compared with 4,765,524 lb., value $172,799, in the corresponding period of 1933. Imports of refined glycerine in the 8-month period of 1934, according to preliminary figures, aggregated 1,409,500 lb., value $132,750, against 2,273,262 lb. (value $129,484) in the January-August period of 1933.

Notes and Reports from the Societies

The Chemical Club

Sixteenth Annual General Meeting

THE sixteenth annual general meeting of the Chemical Club was held at the Club on Monday evening, under the chairmanship of Mr. F. A. Greene. A message of good wishes was received from Lord Leverhulme, president of the club, who was unable to attend owing to an engagement in Liverpool.

The annual report showed that financial difficulties had continued to cause anxiety, but, owing to the increased subscription and to the exercise of strict economy, income had more nearly balanced expenditure than it did a year ago, though there was still a deficit. The committee decided early in the year that circumstances appeared to be favourable for a membership campaign, and to this end it prepared an attractive booklet describing the club and its amenities. Copies were supplied to all members interested with a request for their assistance in securing new members. Approaches of a personal nature were made by members of the committee to a large number of individuals connected with chemistry who were likely to be interested, and who would be suitable candidates. A number of new members had been secured, but the response was by no means adequate. The committee would continue its efforts and requested all members to do likewise, because a substantial addition to the membership was essential to put the club's finances in a really healthy state. The net membership at August 31, 1933, was 549. Resignations and deaths amounted to 68, while the number of new members, including reinstatement, was 35. Thus the net loss was 33 and the net total membership at August 31, 1934, was 516. Every effort must be made to raise the membership figure to 600.

The committee reconsidered the question of Sunday opening and decided as an experiment to open on Sunday from 11 a.m. to 6 p.m. for a trial period of about six months, and to keep a record of the number of members using the club. The committee examined the record at the end of nine months and decided to discontinue the practice as from the end of the present calendar year.

Lord Leverhulme was re-elected president, and other appointments were: Chairman of executive committee, Mr. F. A. Greene; hon. treasurer, Mr. T. H. Fairbrother; hon. secretary, Mr. J. Davidson Pratt. Thanks were accorded to all the officers for the past year, and to Mr. J. Arthur Williams, secretary, and the staff of the club.

Institute of Fuel

North-Western Section

AT a meeting of the North-Western Section of the Institute of Fuel, held at the Engineers' Club, Manchester, on October 24, Major V. F. Gloag, the new chairman, gave an address on "Modern Developments in Coal Cleaning."

Major Gloag prefaced his address by pointing out that in Great Britain during 1933 sixty-six million tons of coal were cleaned by the wet process and eleven million tons by the dry process, thus indicating the relative importance of the two systems. A most important feature of present-day cleaning processes was the automatic control of the plants, since such control ensured both a higher standard of cleaning and greater uniformity in the products. In view of the fact that the price of coal generally increased with the size, considerable attention had been given to eliminating breakage throughout the modern cleaning plant. In this connection much benefit had been derived by eliminating raw coal bunkering (except in cases of emergency or at times of excessive overload) and the bunkering of the washed products. In the latter case the practice of employing rubber belt loading conveyors, running right into the empty wagons, was becoming general. Throughout the process a minimum of fall and of conveying was aimed at. Again, considerable degradation was avoided by the use of horizontal, instead of revolving, screens.

In referring to the importance of de-dusting prior to washing, Major Gloag pointed out that this preliminary treatment was now almost invariably effected by air currents from a centrifugal fan impinging on the coal or by jigging across a table, and that it had resulted in the production of a cleaner and drier slurry. After discussing slurry cleaning, the extent of which is largely dependent upon the condition of the washery water, methods of water clarification, namely, flocculation, sedimentation, and filtration were dealt with; and in his remarks on the more recent types of filtering apparatus explained the mechanism of the stationary and rotary "Blomco" filters.

Chemical Society

X-Rays and Spectroscopy in the Elucidation of Chemical Structure

AN ordinary scientific meeting of the Chemical Society will be held at the University, Manchester, on November 9 and 10, when there will be a discussion on "Applications of X-rays and Spectroscopy to the Elucidation of Chemical Structure." A review of the application of X-ray methods to chemical problems will be given by Professor W. L. Bragg, F.R.S. Other papers include:—"X-Ray Studies of the Interaction of Proteins and Water," by Mr. W. T. Astbury. "Metrical Representation of Some Organic Structures by Quantitative X-Ray Analysis," by Dr. J. M. Robertson. "The Crystallography of Isatin and its Methyl Ethers," by Dr. E. G. Cox. "Optical Properties of Conjugated Systems," by Professor T. M. Lowry, F.R.S. "A Contribution to the Vitamin-A Problem and the Alleged Occurtence of α- and β-Forms," by Professor I. M. Heilbron, F.R.S., Mr. A. E. Gillam, and Dr. H. W. Thompson. "Ultra-Violet Absorption Spectroscopy in relation to the Molecular Structure of Polycyclic Aromatic Compounds," by Dr. J. W. Cook. "The Ultra-Violet Absorption Spectra of Purines and the Constitution of the Purine Nucleosides," by Dr. J. M. Gulland and Dr. E. R. Holiday. "Some Aspects of the Interpretation of Spectral Data," by Dr. R. A. Morton.

Bedson Club

Some Aspects of Photochemistry

THE 27th Bedson lecture was delivered by Professor A. J. Allmand, of King's College, at Armstrong College, Newcastle-upon-Tyne, on October 27, Dr. Riley presiding. The history of photochemistry was dealt with in surprising detail and in a remarkably concise manner, leading up to the application of the quantum theory by Planck and Einstein and later modifications, including the interpretation of absorption spectra. Theoretical considerations were everywhere illustrated by actual examples of photochemical reactions many of which were measured in the King's College laboratories. A large attendance of members and visitors heard the lecture and left no doubt as to their appreciation.

Institution of Chemical Engineers

The Associate-Membership Examination

THE report of the board of examiners on the 1934 associate-membership examination of the Institution of Chemical Engineers has just been issued. The method of examination was on the same lines as in 1933, the general arrangement and choice of questions being the same as in previous years.

The examiners state that they consider that the standard of answers suubmitted for the "home paper" is being maintained, and still believe that this part of the examination is the most satisfactory test of the candidate's knowledge and experience. The standard of draughtsmanship exhibited by the candidates still leaves something to be desired, and it is

recommended that at the next examination the number of drawings required should be reduced. In any case, a working drawing of some individual portion of plant should be asked for, and a higher standard should then be required.

The following candidates satisfied the examiners: Stanley Jones, Louis Arthur Lawrence, William Neilson Neilson, Daniel Thomas Phillips, Leonard Unthank Salkield, and Edward Eric Stimson.

Society of Chemical Industry

Liverpool Section : The Blast Furnace as a Chemical Plant

IN his address as chairman of the Liverpool Section of the Society of Chemical Industry on October 26, Professor C. O. Bannister made some interesting observations on the blast-furnace and its use as a chemical plant. He pointed out that the world's production of iron in 1929 was 97,000,000 tons, which involved the production of an enormous quantity of combustible gas, and that for every ton of iron produced, some 5½ tons of combustible gas left the furnace. From Scottish districts using splint coal as fuel instead of coke, considerable amounts of tar and ammonia were formerly recovered, but coal-fired furnaces were rapidly becoming mere memories of the past.

Recent Russian experiments on the use of a mixture of oxygen-enriched air and steam as a blast for the production of a waste gas, which, by subsequent conversion of the carbon monoxide present and removal of the carbon dioxide, yielded a gas containing suitable proportions of nitrogen and hydrogen for the manufacture of synthetic ammonia, were described. The recovery of potash from blast-furnace gases under special circumstances, and the removal and recovery of zinc from certain blast furnace charges, was also dealt with. Lastly, Professor Bannister spoke of the use of blast-furnaces for the production of phosphorus and phosphoric acid by direct reduction and fluxing of mineral phosphates and silica, the phosphorus being volatilised and recovered.

Personal Notes

DR. CARL SULZER SCHMID, a Swiss national councillor and a director of Sulzer Bros., has died at Winterthur, aged 69.

MR. JAMES CROSBIE SMITH, for 51 years with Kelvin, Bottomley and Baird, Ltd., died at Mount Florida, Glasgow, on October 24, in his 81st year.

MR. R. H. STEIN, managing director of Honeywill and Stein, Ltd., has been appointed a member of the board of British Industrial Solvents, Ltd.

MR. JAMES CROMBIE, of Haymount, Bearsden, Dumbartonshire, chairman of the Cromessol Co., Ltd., manufacturing chemists, Glasgow, left personal estate valued at £12,700.

MR. EDWARD A. W. EVERITT, for many years employed at the Kenvil plant of the Hercules Powder Co., and credited with the development of cordite, has died, aged 63, at Dover, New Jersey.

MR. ROBERT WESTWATER, B.Sc., A.M.I.Min.E., has been appointed to the mining staff of the Imperial Chemical Industries, Ltd., at Nobel's Explosives Factory, Stevenston. Mr. Westwater won the Mavor and Coulson Travelling Scholarship in 1933, and only recently returned to this country, after visiting the principal coalfields in Europe, the United States, and Canada.

HER MAJESTY THE QUEEN and the Duchess of York have acceded to the request of Lord Derby, the president of the British Textiles Exhibition, to name two new colours in which British dress fabrics will be displayed by manufacturers at the textile section of the British Industries Fair in February. The colour to be chosen by the Queen will be named "Jubilee," and that chosen by the Duchess of York will be named "Margaret Rose."

MR. ALBERT F. SULZER has been elected vice-president in charge of Kodak Park, the Eastman Kodak Co.'s largest plant, of which he formerly was manager. Dr. C. E. Kenneth Mees, who was director of research and development, has been elected a vice-president in charge of that department. Mr. Herman C. Sievers, who had been general sales manager, has been elected vice-president in charge of sales and advertisement, succeeding the late Mr. Lewis B. Jones.

DR. S. G. BARKER, who has resigned his post as director of research to the Wool Industries Research Association, is at present on his way to India. He has been invited to organise a branch of textile research at Calcutta. For upwards of eight years, while he has been at Torridon, Leeds, Dr. Barker has been one of the best known of those who are trying to improve trade processes by providing the link between industry and scientific experiment. Under his supervision the research workers at Torridon have conducted investigation into new methods for the benefit of the British wool textile trade. At the 1931 International Wool Federation Conference at Basle, Herr Schoenbach, the German chairman of the Conference, warmly complimented Dr. Barker on the results of the investigations at Torridon.

MR. J. HARPER HUNTER, sales manager for the Anglo-American Oil Co.'s Northern Ireland Division, has retired owing to continued ill-health. Mr. M. C. Higginson, assistant sales manager, has been appointed to succeed him.

Patents and Trade Marks

New Law in Italy

A NEW law with regard to patents and trade marks in Italy has now been published in the Official Gazette and will come into force within six months at a date to be specified shortly. The duration of Italian patents will be extended to 18 years from the filing date. Patents still in force will enjoy such extension. No importation patents will be granted. Every anticipation of the invention, in Italy or abroad, will be considered as invalidating a patent.

Processes for the manufacturing of medicaments will be patentable, but not the medicaments themselves. Otherwise the patent granted for a process will cover the product obtained with the said process. The Patent Office will examine the patent applications. This examination will be limited for the present to formal matters and to the unity of the invention. The Patent Office may ask for the division of the application. An examination of the novelty is provided for, but it will be initiated when the Patent Office has the necessary organisation, *viz.*, possibly some five years later. Patents examined and accepted will be announced in the Official Journal of the Patent Office.

Against the granting of a patent, the opposition of third persons will be possible. Such an opposition has to be filed within 60 days from the above publication. Filing fees will be reduced. The print fees and the first annuity will be payable within 60 days from the acception date. Extension of six months from the filing month anniversary is provided for the payment of annuities, with fines. Patents for which after June 1, 1928, an annuity has been paid within six months from the filing month anniversary and not accepted according to the present law, may be restored if the payment is completed according to the new law, within three months from its coming into force.

The duration of trade marks has been restricted to 10 years from the filing date. They are renewable for same period within six months from the lapsing. Trade marks already nine years old at the coming into force date of the new law, can be renewed within one year from such date. Against the granting of a trade mark registration deed the opposition of third persons on the ground of novelty will be possible within 60 days from the publication of the acceptation. Opposition is also possible, against the validity for Italy of an international trade mark registration, within 180 days from the publication of the trade mark in "Les Marques Internationales" of Berne.

Conversions from Oil to Coal Firing

Some Noteworthy Examples

THAT "fuel oil for steam raising and central heating is a very expensive luxury" was the main theme of an address given at the Manchester College of Technology on Tuesday, by Mr. H. L. Pirie, chief engineer of the Coal Utilisation Council. Mr. Pirie gave three examples—of a hospital, a laundry, and a dairy—where coal and oil had been tested in the same boiler plant on a strictly comparable basis. The results, expressed in terms of the cost of evaporating 1,000 lb. of water, showed a saving of over 61 per cent. in the case of the hospital and the laundry, and of over 36 per cent. in that of the dairy. In the latter the coal was of a higher quality, smokeless, and hand fired. The cost was also affected by the distance from the railway station and the cost of transport.

Giving some particulars of recent conversions from liquid to solid fuel the speaker mentioned the Grosvenor House Hotel, a large London hospital, which was saving £1,300 a year as a result of using solid fuel, J. and P. Coats, Ltd., Paisley, the Watford Model Laundry (saving £30 a week), Horlick's Malted Milk Co. (saving £3,600 a year), George Kemp, Ltd. (saving £1,826 per annum), United Dairies, Ltd., and Pinchin Johnson and Co.

Referring to smoke prevention Mr. Pirie said that the idea of underfeed firing had been in use in England for many years. It ensured that the fire would always burn with a glowing surface, the raw coal being fed from underneath. This resulted in the maximum radiant heat being transmitted to the boiler heating surface and also prevented the formation of smoke because the volatile matter, as it was distilled from the "green" coal, was burned in passing through the incandescent zone above. Sometimes solid fuel was not the most convenient form in which to use coal. In the metallurgical industries, for example, gas or fluid fuels were for certain processes essential. Producer gas was increasingly used. A useful conversion from oil to producer gas took place at the United Glass Bottle Co.'s works at St. Helens.

Mr. Pirie reminded his audience that the Chancellor of the Exchequer said that one of his reasons for imposing the tax on oil was that he "thought it was in the interests of the country that the trend from coal towards oil should, if possible, be arrested." When users of fuel were induced to look and see if there was a difference between coal and oil, they found in many cases—perhaps as time went on they would find more—that they had been mistaken in supposing that oil was better or cheaper for their purpose than coal or its derivatives.

Chemistry in Commerce

First of Thirty-Two Weekly Parts

"CHEMISTRY in Commerce" is the title of a new work produced on decidedly novel lines, to be completed in about thirty-two weekly parts, published by George Newnes, Ltd. (price 1s. per part). Mr. Edward Molloy is the general editor and Mr. M. D. Curwen is advisory editor. The complete work will cover the complete range of modern chemistry, embracing such varied subjects as gas manufacture, waterworks practice, heavy chemicals, bleaching and dyeing, milk distribution, sugar refining, brewing and distilling, food preservation, meat extraction, bakery and confectionery, cocoa and chocolate, margarine and glue manufacture, tanning, paints, varnishes and enamels, glass manufacture, metallurgy, medicinal chemicals and drugs, photographic materials, paper making, ink manufacture, petroleum refining, perfumes and essences, indiarubber, flour milling and laundry work.

The editors enlisted the co-operation of some of the leading manufacturers concerned in the industries mentioned. They were fortunate in securing their permission for their chief chemists to contribute the articles dealing respectively with their own industries. The general plan of each series of articles is as follows: First, a brief outline of the manufacturing processes involved, and then, details as to the routine control tests and analyses as actually carried out in the works laboratory. Permission was obtained for photographers to visit each works laboratory, to take a series of pictures showing the exact manipulative methods and the sequence of operations as practised in the works laboratory, whilst each test was being carried out. In this way the editors obtained from each industry the essential practical details which form part of the everyday routine in works laboratories in that particular industry.

To the young chemist this comprehensive and yet detailed survey will provide an education in itself. To the busy chemist it will afford a reliable source of reference, more particularly on those industries which lie outside the scope of his everyday work. Most important of all, the work has been written by practical chemists and it has been illustrated by photographs taken in works laboratories all over the country. It therefore possesses two qualities which will commend it to every reader, namely, an entirely *practical* and *authentic* survey of the subject.

Part 1, issued on October 27, contained an article on "Synthetic Ammonia," by M. D. Curwen, "Sugar Refining," by H. C. S. De Whalley, "The Chemistry and Pharmacy of Vegetable Drugs," by Noel L. Allport, "Electroplating Practice," by S. Wernick, "Principles of Analysis of Drugs and Chemicals," by T. Tustin Cocking, shorter articles on milk and milk products, electrostatic precipitation, testing of transparent wrapping papers, and synthetic waxes from naphthalene. An introductory article on the founders of chemistry, written by J. F. Stirling, includes portraits of Perkin, Tennant, Haber, von Baeyer, Ramsay, Chance, Messel, Levinstein, de Chardonnet Pasteur, Leverhulme, Muspratt, Gossage, Weldon, Mond, and Wellcome, with brief biographies.

Alleged Passing Off

Untertaking Given till Trial of Action

IN the Chancery Division, on Tuesday, Mr. Justice Crossman had again before him the motion by Palmolive-Colgate-Peet, Ltd., against Ophir Soap Works, Samuel Kitter and Eric James Clarke for an injunction to restrain alleged passing off. Harry Green, Ltd., who were alleged to be the manufacturers of the soap, were joined as defendants, but plaintiffs were not moving against them.

Plaintiffs' case was that a number of lorries left London with people distributing soap in cartons, which bore the words "Palm & Olive." These people went to districts in the home counties, calling at house to house and saying, "This is palm olive soap and if you buy one carton, one is given away as an advertisement." It was further alleged that sometimes it was said that the soap was Colgates. An undertaking had been given by the defendants, other than Harry Green, Ltd., in the terms of the notice of motion.

Mr. Bray, for the plaintiffs, read evidence of householders to whom it was alleged it was offered. Some of the people said they were assured it was "genuine palmolive soap." The cartons were marked "palm & olive soap."

Mr. Holroyd Pearce, for the defendants, read an affidavit by Samuel Kitter, who stated that he carried on business as a vendor of soap from door to door. One soap he sold was in no way similar to the plaintiffs' in price or carton or any other way. The colour was different and it was sold in bars and was for household and scrubbing purposes. There was, Mr. Kitter said, not the slightest resemblance between his soap and that of plaintiffs. He denied that the representations alleged by plaintiffs were ever made by his canvassers, he having questioned each one.

Eric James Clarke made a similar affidavit, and affidavits were made by the canvassers.

Mr. Pearce said he had a number of affidavits from people who were perfectly satisfied with the soap they purchased.

Counsels said defendant's soap was a household soap and not a toilet soap as the plaintiffs' was.

His lordship had suggested that the parties might come to an arrangement pending the trial of the action.

Mr. Pearce said, without making any admissions, the defendants were prepared to give an undertaking not to sell, pending the trial of the action, soap in the cartons of which complaint was made, without the addition of a slip with the words "Palm and Olive," and not to permit their canvassers making the representations that it was the plaintiffs' soap.

Plaintiffs accepted this undertaking and no order was made on the motion.

Continental Chemical Notes

Germany

A COSMETIC PREPARATION FOR THE SKIN described in a recent patent comprises a mixture of colloidal silicic acid and freshly precipitated aluminium hydroxide to which a trace of active carbon is added (German Pat. 601,475).

THE BRAUNKOHLEN BENZINE CO. has been formed in Berlin for the production of motor spirit and lubricating oil from brown coal. Among its founders are several brown coal works, the German Dye Trust and the Mid-German Steel Works.

Russia

BORATE DEPOSITS RECENTLY DISCOVERED in West Kasakstan are provisionally believed to contain a minimum content of 10 per boron oxide.

THE CARBIDE PLANT of the Czernoretsche Chemical Works has fulfilled its production programme for the current year and it is therefore intended to produce an additional 2,000 tons of carbide.

THE RUSSIAN POTASH INDUSTRY reports the discovery of a rich stratum, at a depth of 245 metres, in the Solikamsk district. Salts extracted from the surface layer are believed to be appreciably better in quality than those obtained from existing potash mines in the same district. The latter were producing 3,000 tons per day at the beginning of the year. Special attention is to be devotel to exploitation of by-products from the deposits now under examination, and a plant for magnesium metal production is under construction with this object in view.

Norway

THE WHALING CONCERN, Africa, whose headquarters are at Türnsberg, has sold in advance its entire yield of blubber for the season 1934-1935. About 36,000 barrels have been disposed of at £9 per ton.

Poland

AN OCHRE DEPOSIT RECENTLY DISCOVERED in the vicinity of Deutsch-Libau will be exploited by the newly-founded concern, "Moravokov."

MANUFACTURE OF PEROXIDES is to be commenced by the firm of V. Loupal, in Alt-Kolan, which enjoys the advantage of cheap electric power.

THALLIUM SULPHATE AND CHLORIDE are now being manufactured and marketed in Poland by the firm of Slaskie Kopalnie i Cynkownie in their works at Kattowitz-Ligota.

France

DEPARAFFINATION OF PETROLEUM by extraction with trichlorethylene is being practised on a large scale at the Port Jérome refinery. The daily capacity of the plant is 500 to 600 barrels.

IMITATION MARBLE IS PRODUCED, according to a recently patented method, by pouring into moulds a paste comprising magnesia, calcium sulphate, powdered marble, colouring matter and magnesium chloride solution, together with a little magnesium oleate or stearate. The mass sets hard in 24 to 36 hours according to the temperature (French Pat. 768,156).

Far Eastern Chemical Notes

Manchuria

SOYA BEAN OIL PRODUCTION by the alcohol extraction method will be the main activity of the newly founded Dairen Daizu Kogyo K.K. with a capital of 1.5 million yen and works in Dairen.

AN ESTIMATED SOYA BEAN YIELD of 4.5 million short tons is announced for this year as compared with the 1933 figure of 5.07 million short tons. Owing to very keen demand from various quarters the exports are expected to increase by 1 million to 4 million short tons.

Japan

BARIUM HYDROXIDE MANUFACTURE has been commenced by the Sakai Kagaku Kogyo K.K. with a monthly output of 10 tons.

THE NEW CAUSTIC SODA PLANT of the Tsurumi Soda Co., which applies the mercury process, has been started up with a monthly output of 200 tons.

CARBON BISULPHIDE MANUFACTURERS are benefiting from the activity in the Japanese rayon industry. In addition to seven leading concerns engaged in its production (a full list of which appears in the "Chemische Industrie" of October 27), two rayon-producing firms are themselves entering the field.

JAPANESE MANUFACTURERS OF FORMALDEHYDE are extending their plants with a view to entering the export market. Increased activity likewise prevails in respect of acetone and butyl alcohol. The Koli K.K., of Osaka, has been granted a state subvention in order to increase the output of these solvents. Methanol is now being produced at the rate of 18,000 tons per annum at the new factory of the Tokio Methanol K.K.

THE LEADING ELECTROCHEMICAL CONCERN, Chuo Denki Kogyo K.K. is now producing graphite at the rate of 200 tons per month. Other products of the same concern are low-carbon ferromanganese and metallic manganese. Another producer of low carbon alloys is the Chichibu Denki Kogyo K.K. which recently increased its output of low-carbon ferrochrome from 1,200 tons up to 3,500. This company is now enlarging its plant for metallic chromium and ferromolybdenum.

News from the Allied Industries

Distilling

THE DISTILLERS CO. announce that negotiations for a new contract with the National Distillers Products Corporation are pending, but that it is probable that no final decision will be reached until the end of November. It is understood that the contract between the Distillers Co. and National Distillers was broken by mutual consent.

Iron and Steel

FIRTH-VICKERS STAINLESS STEELS, LTD., has been registered as a private company, with a capital of £900,000. The objects are to acquire and amalgamate certain departments of the businesses of Thomas Firth and John Brown, Ltd., and the English Steel Corporation, Ltd., and to carry on the business of manufacturers and dealers in austenitic, stainless, heat-resisting and acid-resisting steels.

Fertilisers

FISON, PACKARD AND PRENTICE, LTD., fertiliser manufacturers and maltsters, held their 40th annual general meeting at Ipswich on October 26. Reviewing the year, Mr. F. G. C. Fison, the chairman, said the company took advantage of the conditions in the money market to make an issue of £250,000 4½ per cent. debentures, and thereby raised the additional money required for the financing of the new factory at Ipswich and other developments, and at the same time consolidated their existing 4¼ per cent. and 6 per cent. debentures. This transaction was a great success. The new factory on the Deep Water Quay at Ipswich came into operation at the beginning of 1934, and the company has been very satisfied with the new granular superphosphate they are producing there. Production costs are very satisfactory and in accordance with the estimates which were made. During the financial year under review the new factory was working for about six months, and produced just over 20,000 tons of granular superphosphate. During the present year the company will be producing something over 50,000 tons. Since the close of the financial year, sales for the autumn of 1934 show an increase over the autumn of 1933. The trading profit was £101,992.

Weekly Prices of British Chemical Products

Review of Current Market Conditions

SATISFACTORY business has been transacted during the week, most general chemicals being in good demand. Prices have remained practically unchanged, except in the case of nitrogen fertilisers, where the seasonal increases have taken effect as from November 1. Unless otherwise stated the prices below cover fair quantities net and naked at sellers' works.

LONDON.—There is still a good general demand for chemicals in the London market, and prices remain steady. The prices of coal tar products are firm, although the market is somewhat inactive.

MANCHESTER.—Somewhat quiet conditions have been reported in respect of chemicals on the Manchester market during the past week. The recent expansion in the volume of interest shown in contracts has not yet been reflected to any material extent in actual business, although, perhaps, it is rather early to expect any substantial development in this direction. Although new bookings this week have, for the most part, been on an early delivery basis and perhaps not too plentiful, there has been no apparent falling away up to the present in the quantities covered by deliveries, the alkalis, many of the potash compounds, and the heavy acid materials moving fairly satisfactorily. Prospects in the dyeing and finishing trades are not conducive to any substantial improvement in the demand for chemicals, but in most other respects the local market is disposed to take a reasonably cheerful view of the outlook over the next month or two.

SCOTLAND.—Business in the Scottish heavy chemical market appears to be falling off to a slight extent, with the exception that numerous inquiries are being received for contracts over the year 1935.

Price Changes

General Chemicals.—ACID, CITRIC (Manchester), 10¼d. to 10½d. per lb.; ACID, FORMIC (London), £40 to £45 per ton; ACID, TARTARIC (Manchester), 1s. 0½d. per lb.

Coal Tar Products.—ACID, CRESYLIC (London, 98/100%, 1s. 4d. per gal.; dark, 95/97%, 1s.

All other prices remain unchanged.

General Chemicals

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

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

ACID, BORIC.—Commercial granulated, £25 10s. per ton; crystal, £26 10s.; powdered, £27 10s.; extra finely powdered, £29 10s. packed in 1-cwt. bags, carriage paid home to buyers' premises within the United Kingdom in 1-ton lots.

ACID, CHROMIC.—10½d. per lb., less 2½%, d/d U.K.

ACID, CITRIC.—10¾d. per lb. less 5%. MANCHESTER: 10½d. to 10¼d.

ACID, CRESYLIC.—97/99%, 1s. 8d. to 1s. 9d. per gal.; 98/100%, 2s. to 2s. 2d.

ACID, FORMIC.—LONDON: £40 to £45 per ton.

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

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

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

ACID, OXALIC.—LONDON: £47 17s. 6d. to £57 10s. per ton, according to packages and position. SCOTLAND: 98/100%, £48 to £50 ex store. MANCHESTER: £48 10s. to £53 ex store.

ACID, SULPHURIC.—SCOTLAND: 144° quality, £3 12s. 6d.; 168°, £7; dearsenicated, 20s. per ton extra.

ACID, TARTARIC.—LONDON: 1s. per lb. SCOTLAND: B.P. crystals, 11d., carriage paid. MANCHESTER: 1s. 0½d.

ALUM.—SCOTLAND: Lump potash, £8 10s. per ton ex store.

ALUMINA SULPHATE.—LONDON: £7 10s. to £8 per ton. SCOTLAND: £7 to £8 ex store.

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

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

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

AMMONIUM CARBONATE. SCOTLAND: Lump, £30 per ton; powdered, £33, in 5-cwt. casks d/d buyers' premises U.K.

AMMONIUM CHLORIDE.—£37 to £45 per ton, carriage paid. LONDON: Fine white crystals, £18 to £19. (See also Salammoniac.)

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

ANTIMONY OXIDE.—SCOTLAND: Spot, £26 per ton, c.i.f. U.K. ports.

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

ARSENIC.—LONDON: £16 10s. per ton c.i.f. main U.K. ports for imported material; Cornish nominal, £22 10s. f.o.r mines. SCOTLAND: White powdered, £23 ex wharf. MANCHESTER: White powdered Cornish, £22, ex store.

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

BARIUM CHLORIDE.—£11 per ton. SCOTLAND: £10 10s.

BARYTES.—£6 10s. to £8 per ton.

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

BLEACHING POWDER.—Spot, 35/37%, £7 19s. per ton d/d station in casks, special terms for contract. SCOTLAND: £8 in 5/6 cwt. casks for contracts over 1934/1935.

BORAX, COMMERCIAL.—Granulated, £14 10s. per ton; crystal, £15 10s.; powdered, £16; finely powdered, £17; packed in 1-cwt. bags, carriage paid home to buyer's premises within the United Kingdom in 1-ton lots.

CADMIUM SULPHIDE.—2s. 5d. to 2s. 9d.

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

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

CARBON BLACK.—3 7/8d. to 5d. per lb. LONDON: 4½d. to 5d.

CARBON TETRACHLORIDE.—SCOTLAND: £41 to £43 per ton, drums extra.

CHROMIUM OXIDE.—10¾d. per lb., according to quantity d/d U.K.; green, 1s. 2d. per lb.

CHROMETAN.—Crystals, 3¼d. per lb.; liquor, £19 10s. per ton d/d.

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

CREAM OF TARTAR.—LONDON: £4 2s. 6d. per cwt. SCOTLAND: £4 2s. less 2½ per cent.

DINITROTOLUENE.—66/68° C., 9d. per lb.

DIPHENYLGUANIDINE.—2s. 2d. per lb.

FORMALDEHYDE.—LONDON: £26 per ton. SCOTLAND: 40%, £25 to £28 ex store.

IODINE.—Resumblimed B.P., 6s. 3d. to 8s. 4d. per lb.

LAMPBLACK.—£45 to £48 per ton.

LEAD ACETATE.—LONDON: White, £34 10s. per ton; brown, £1 per ton less. SCOTLAND: White crystals, £33 to £35; brown, £1 per ton less. MANCHESTER: White, £34; brown, £32 10s.

LEAD, NITRATE.—£28 per ton.

LEAD, RED.—SCOTLAND: £24 to £26 per ton less 2½%; d/d buyer's works.

LEAD, WHITE.—SCOTLAND: £39 per ton, carriage paid. LONDON: £37 10s.

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

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

METHYLATED SPIRIT.—61 O.P. Industrial, 1s. 6d. to 2s. 1d. per gal. Pyridinised industrial, 1s. 8d. to 2s. 3d. Mineralised, 2s. 7d. to 3s. 1d. 64 O.P. 1d. extra in all cases. Prices according to quantities. SCOTLAND: Industrial 64 O.P., 1s. 9d. to 2s. 4d.

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

NICKEL SULPHATE.—£49 per ton d/d.

PHENOL.—8¼d. to 8¾d. per lb. without engagement.

POTASH, CAUSTIC.—LONDON: £42 per ton. MANCHESTER: £38.

POTASSIUM BICHROMATE.—Crystals and Granular, 5d. per lb. net d/d U.K. Discount according to quantity. Ground 5¼d. LONDON: 5d. per lb. with usual discounts for contracts. SCOTLAND: 5d. d/d U.K. or c.i.f. Irish Ports. MANCHESTER: 5d.

POTASSIUM CHLORATE.—LONDON: £37 to £40 per ton. SCOTLAND: 99 3/100%, powder, £37. MANCHESTER: £37 10s.

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

POTASSIUM IODIDE.—B.P., 5s. 2d. per lb.

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

POTASSIUM PERMANGANATE.—LONDON: 9¾d. per lb. SCOTLAND: B.P. crystals, 9d. MANCHESTER: B.P., 10d.

POTASSIUM PRUSSIATE.—LONDON: 8½d. to 8¾d. per lb. SCOTLAND: Yellow spot, 8¼d. ex store. MANCHESTER: Yellow, 8½d.
SALAMMONIAC.—First lump spot, £41 17s. 6d. per ton d/d in barrels.
SODA ASH.—58% spot, £5 15s. per ton f.o.r. in bags.
SODA, CAUSTIC.—Solid 76/77° spot, £13 17s. 6d. per ton d/d station. SCOTLAND: Powdered 98/99%, £17 10s. in drums, £18 5s. in casks, Solid 76/77°, £14 10s. in drums; 70/73%, £14 12s. 6d., carriage paid buyer's station, minimum 4-ton lots; contracts 10s. per ton less. MANCHESTER: £13 5s. to £14 contracts.
SODA CRYSTALS.—Spot, £5 to £5 5s. per ton d/d station or ex depot in 2-cwt. bags.
SODIUM ACETATE.—£22 per ton. LONDON: £23.
SODIUM BICARBONATE.—Refined spot, £10 10s. per ton d/d station in bags. SCOTLAND. Refined recrystallised £10 15s. ex quay or station. MANCHESTER: £10 10s.
SODIUM BICHROMATE.—Crystals cake and powder 4d. per lb. net d/d U.K. discount according to quantity. Anhydrous, 5d. per lb. LONDON: 4d. per lb. net for spot lots and 4d. per lb. with discounts for contract quantities. SCOTLAND: 4d. delivered buyer's premises with concession for contracts.
SODIUM BISULPHITE POWDER.—60/62%, £18 10s. per ton d/d 1-cwt. iron drums for home trade.
SODIUM CARBONATE (SODA CRYSTALS).—SCOTLAND: £5 to £5 5s. per ton ex quay or station. Powdered or pea quality 7s. 6d. per ton extra. Light Soda Ash £7 ex quay, min. 4-ton lots with reductions for contracts.
SODIUM CHLORATE.—£32 per ton.
SODIUM CHROMATE.—4d. per lb. d/d U.K.
SODIUM HYPOSULPHITE.—SCOTLAND: Large crystals English manufacture, £9 5s. per ton ex stations, min. 4-ton lots. Pea crystals, £14 10s. ex station, 4-ton lots. MANCHESTER: Commercial, £10 5s.; photographic, £15.
SODIUM META SILICATE.—£16 per ton, d/d U.K. in cwt. bags.
SODIUM IODIDE.—B.P., 6s. per lb.
SODIUM NITRITE.—LONDON. Spot, £18 to £20 per ton d/d station in drums.
SODIUM PERBORATE.—LONDON: *10d. per lb.*
SODIUM PHOSPHATE.—£13 per ton.
SODIUM PRUSSIATE.—LONDON: 5d. to 5½d. per lb. SCOTLAND: 5s. to 5¾d. ex store. MANCHESTER: 4¾d. to 5¼d.
SULPHUR.—£9 15s. to £10 per ton. SCOTLAND: £8 to £9.
SODIUM SILICATE.—140° Tw. Spot £8 per ton. SCOTLAND: £8 10s.
SODIUM SULPHATE (GLAUBER SALTS).—£4 2s. 6d. per ton d/d SCOTLAND: English material £3 15s.
SODIUM SULPHATE (SALT CAKE).—Unground spot, £3 15s. per ton d/d station in bulk. SCOTLAND: Ground quality, £3 5s. per ton d/d. MANCHESTER. £3 5s.
SODIUM SULPHIDE.—Solid 60/62% Spot, £10 15s. per ton d/d in drums; crystals 30/32%, £8 per ton d/d in casks. SCOTLAND: For home consumption, Solid 60/62%, £10 5s.; broken 60/62%, £11 5s.; crystals, 30/32%, £8 2s. 6d., d/d buyer's works on contract, min. 4-ton lots. Spot solid 5s. per ton extra. Crystals, 2s. 6d. per ton extra. MANCHESTER: Concentrated solid, 60/62%, £11; commercial, £8 2s. 6d.
SODIUM SULPHITE.—Pea crystals spot, £13 10s. per ton d/d station in kegs. Commercial spot, £9 10s. d/d station in bags.
SULPHATE OF COPPER.—MANCHESTER: £14 5s. per ton f.o.b.
SULPHUR CHLORIDE.—5d. to 7d. per lb., according to quality.
SULPHUR PRECIP.—B.P. £55 to £60 per ton according to quantity. *Commercial, £50 to £55.*
VERMILION.—Pale or deep, 3s. 11d. to 4s. 1d. per lb.
ZINC CHLORIDE.—SCOTLAND: British material, 98%, £18 10s. per ton f.o.b. U.K. ports.
ZINC SULPHATE.—LONDON: £12 per ton. SCOTLAND: £10 10s.
ZINC SULPHIDE.—11d. to 1s. per lb.

Coal Tar Products

ACID, CARBOLIC.—Crystals, 8¼d. to 8¾d. per lb.; crude, 60's, to 2s. 2¼d. per gal. MANCHESTER: Crystals, 7½d. per lb.; crude, 1s. 10d. to 1s. 11d. per gal. SCOTLAND: 60's, 2s. 6d. to 2s. 7d.
ACID, CRESYLIC.—90/100%, 1s. 8d. to 2s. 3d. per gal.; pale 98%, 1s. 6d. to 1s. 7d.; according to specification. LONDON: 98/100%, 1s. 4d.; dark, 95/97%, 1s. SCOTLAND: Pale, 99/100%, 1s. 3d. to 1s. 4d.; dark, 97/99%, 1s. to 1s. 1d.; high boiling acid, 2s. 6d. to 3s.
BENZOL.—At works, crude, 9d. to 9¼d. per gal.; standard motor, 1s. 3½d. to 1s. 4d.; 90%, 1s. 4d. to 1s. 4½d.; pure, 1s. 7½d. to 1s. 8d. LONDON: Motor, 1s. 6¼d. SCOTLAND: Motor, 1s. 6¾d.
CREOSOTE.—B.S.I. Specification standard, 4d. to 4¼d. per gal. f.o.r. Home, 3¾d. d/d. LONDON: 3¾d. f.o.r. North; 4d. London. MANCHESTER: 3d. to 4d. SCOTLAND: Specification oils, 4d.; washed oil, 4¼d. to 4¾d.; light, 4¼d.; heavy, 4¼d. to 4¼d.
NAPHTHA.—Solvent, 90/160%, 1s. 6d. to 1s. 7d. per gal.; 95/160%, 1s. 7d.; 99%, 11d. to 1s. 1d. LONDON: Solvent, 1s. 3¼d. to 1s. 4d.; heavy, 11d. to 1s. 0¼d. f.o.r. SCOTLAND: 90/160% 1s. 3d. to 1s. 3½d.; 90/190%, 11d. to 1s. 2d.
NAPHTHALENE.—Purified crystals, £10 per ton in bags. LONDON: Fire lighter quality, £3 to £3 10s.; 74/76 quality, £4 to £4 10s.; 76/78 quality, £5 10s. to £6. SCOTLAND: 40s. to 50s.; whizzed, 70s. to 75s.
PITCH.—LONDON: 50s. to 51s. per ton f.o.b. East Coast port.
PYRIDINE.—90/140, 7s. to 8s. 6d. per gal.; 90/180, 2s. 3d.
TOLUOL.—90%, 1s. 10d. to 1s. 11d. per gal.; pure, 2s. 2d. to 2s. 3d.
XYLOL.—Commercial, 1s. 11d. to 2s. per gal.; pure, 2s. 1d. to 2s. 2d.

Intermediates and Dyes

ACID, BENZOIC, 1914 B.P. (ex Toluol).—1s. 9¾d. per lb.
ACID, GAMMA.—Spot, 4s. per lb. 100% d/d buyer's works.
ACID, H.—Spot, 2s. 4¼d. per lb. 100% d/d buyer's works.
ACID NAPHTHIONIC.—1s. 8d. per lb.
ACID, NEVILLE AND WINTHER.—Spot, 3s. per lb. 100%.
ACID, SULPHANILIC.—Spot, 8d. per lb. 100% d/d buyer's works.
ANILINE OIL.—Spot, 8d. per lb., drums extra, d/d buyer's works.
ANILINE SALTS.—Spot, 8d. per lb. d/d buyer's works, casks free.
BENZALDEHYDE.—Spot, 1s. 8d. per lb., packages extra.
BENZIDINE BASE.—Spot, 2s. 5d. per lb., 100% d/d buyer's works.
BENZIDINE HCL.—2s. 5d. per lb.
p CRESOL 34-5° C.—2s. per lb. in ton lots.
m-CRESOL 98/100%.—2s. 3d. per lb. in ton lots.
DICHLORANILINE.—1s. 11¼d. to 2s. 3d. per lb.
DIMETHYLANILINE.—Spot, 1s. 6d. per lb., package extra.
DINITROBENZENE.—8d. per lb.
DINITRCTOLUENE.—48/50° C., 9d. per lb.; 66/68° C., 01¼d.
DINITROCHLORBENZENE, SOLID.—£72 per ton.
DIPHENYLAMINE.—Spot, 2s. per lb., d/d buyer's works.
α-NAPHTHOL.—Spot, 2s. 4d. per lb., d/d buyer's works.
β-NAPHTHOL.—Spot, £78 15s. per ton in paper bags.
α-NAPHTHYLAMINE.—Spot, 11¼d. per lb., d/d buyer's works.
β-NAPHTHYLAMINE.—Spot, 2s. 9d. per lb., d/d buyer's works.
o-NITRANILINE.—3ss. 11d. per lb.
m-NITRANILINE.—Spot, 2s. 7d. per lb., d/d buyer's works.
p-NITRANILINE.—Spot, 1s. 8d. per lb., d/d buyer's works.
NITROBENZENE.—Spot, 4¾d. to 5d. per lb.; 5-cwt. lots, drums extra.
NITRONAPHTHALENE.—9d. per lb.; P.G., 1s. 0¼d. per lb.
SODIUM NAPHTHIONATE.—Spot, 1s. 9d. per lb.
o-TOLUIDINE.—5¼d. to 11d. per lb.
p-TOLUIDINE.—1s. 11d. per lb.

Nitrogen Fertilisers

SULPHATE OF AMMONIA.—Nov., £6 19s.; Dec., £7; Jan., 1935, £8 2s.; Feb., £7 3s. 6d.; Mar./June, £7 5s.
CYANAMIDE.—Nov., £6 18s. 9d.; Dec., £7; Jan., 1935, £7 1s. 3d.; Feb., £7 2s. 6d.; Mar., £7 3s. 9d.; Apr./June, £7 5s.
NITRATE OF SODA.—£7 12s. 6d. per ton for delivery to June, 1935.
NITRO-CHALK.—£7 5s. per ton to June, 1935.
CONCENTRATED COMPLETE FERTILISERS.—£10 5s. to £10 17s. 6d. per ton according to percentage of constituents.
NITROGEN PHOSPHATE FERTILISERS.—£10 5s. to £13 15s. per ton.

Latest Oil Prices

LONDON, Oct. 31.—LINSEED OIL was easy. Spot, £18 10s. (small quantities 30s. extra); Dec., £17; Jan.-April, £17 2s. 6d.; May-Aug., £17 10s., naked. SOYA BEAN OIL was quiet. Oriental (bulk), Oct.-Nov. shipment, £11 5s. per ton. RAPE OIL was inactive. Crude extracted, £27; technical refined, £28 10s., naked, ex wharf. COTTON OIL was firm. Egyptian *crude, £15 10s.; refined common edible, £18; deodorised,* £19 10s., naked, ex mill (small lots 30s. extra). TURPENTINE was steady. American, spot, 45s. 3d. per cwt.

HULL.—LINSEED OIL, spot, quoted £17 15s. per ton; Oct., Nov.-Dec., and Jan.-April, £17 5s.; May-Aug., £17 10s., naked. COTTON OIL, Egyptian, crude, spot, £16; edible, refined, spot, £17 15s.; technical, spot, £17 15s.; deodorised, £19 15s. naked. PALM KERNEL OIL, crude, f.m.q., spot, £14, naked. GROUNDNUT OIL, extracted, spot, £23 10s.; deodorised, £27 10s. RAPE OIL, extracted, spot, £26; refined, £27 10s. SOYA OIL, extracted, spot, £15 10s.; deodorised, £18 10s. per ton. COD OIL (industrial), 25s. per cwt. CASTOR OIL, pharmaceutical, 36s. 6d.; first, 31s. 6d.; second, 28s. 6d. per cwt. TURPENTINE, American, spot, 47s. 3d. per cwt.

Chemical Trade Inquiries

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

Canada.—A firm of engineers, distributors, and contractors at Toronto desire to represent United Kingdom manufacturers of air conditioning, industrial and automatic temperature controls; humidifiers for textile plant; dehumidification equipment, throughout the Dominion, the agency basis being by agreement according to the class of goods concerned. (Ref. No. 378.)

Inventions in the Chemical Industry

Patent Specifications and Applications

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

Complete Specifications Open to Public Inspection

AZO DYESTUFFS and derivatives thereof, manufacture and application.—Compagnie Nationale de Matieres Colorantes et Manufactures de Produits Chimiques du Nord Reunies Etablissements Kuhlmann. April 19, 1933. 161/34.

CONDENSING ZINC VAPOUR.—New Jersey Zinc Co. April 17, 1933. 9207/34.

CHROMIFEROUS DYESTUFFS, manufacture.—Soc. of Chemical Industry in Basle. April 21, 1933. 11558/34.

CHROMIFEROUS DYESTUFFS, manufacture.—Soc. of Chemical Industry in Basle. April 21, 1933. 11829/34.

SINTERED MAGNESIA and refractory materials containing the same, manufacture.—K. Konopicky. April 19, 1933. 11845/34.

PROTECTIVE COATINGS, testing.—I. G. Farbenindustrie. April 19, 1933. 11849/34.

METHYLAMINE MIXTURES, distillation.—E. I. du Pont de Nemours and Co. April 19, 1933. 11857/34.

RAW WOOL, treatment.—Deutsche Hydrierwerke A.-G. April 19, 1933. 11861/34.

VINYL DERIVATIVES, production.—Kodak, Ltd. April 19, 1933. 11882/34.

DYEING LEATHER.—Soc. of Chemical Industry in Basle. April 22, 1933. 11966/34.

MIXED ESTERS of polyhydric alcohols and of carbohydrates, production.—E. I. du Pont de Nemours and Co. April 20, 1933. 11995/34.

LEADED AMMONIUM CHLORIDE CRYSTALS, manufacture.—Gresselli Chemical Co. April 20, 1933. 11996/34.

ANÆSTHETIC AGENTS, manufacture of stable preparations.—I. G. Farbenindustrie. April 22, 1933. 12206/34.

NON-GELATINOUS BLASTING EXPLOSIVES, production.—E. I. du Pont de Nemours and Co. April 21, 1933. 12228/34.

Specifications Accepted with Dates of Application

VULCANISATION of rubber or like materials.—A. L. Hock, A. Kirkham, H. Spence and P. Spance and Sons, Ltd. Jan. 12, 1933. 418,201.

DIBENZANTHRONE AND ISODIBENZANTHRONE DYESTUFFS, manufacture.—Imperial Chemical Industries, Ltd. (E. I. du Pont de Nemours and Co.). Jan. 14, 1933. 418,202.

WEED-KILLING PREPARATIONS, manufacture and production.—J. Y. Johnson (I. G. Farbenindustrie). Feb. 10, 1933. 418,061.

INVERTASE PREPARATIONS.—Standard Brands, Inc. June 21, 1932. 418,211.

CARBOXYLIC ACID ARYLIDES, manufacture and production.—J. Y. Johnson (I. G. Farbenindustrie). April 10, 1933. 417,936.

PLASTIC MATERIALS, production.—H. Dreyfus. April 11, 1933. 417,937.

ORGANIC COMPOUNDS, polymerisation.—Triplex Safety Glass Co., Ltd., L. V. D. Scorah, and J. Wilson. April 12, 1933. 417,999.

RUBBER DERIVATIVES, manufacture.—I. G. Farbenindustrie. April 15-16, 1932. 418068-9.

SYNTHETIC RESINS in liquids, dispersion.—H. W. Hutton. April 19, 1933. 417,948.

SULPHONATED HALOGEN DERIVATIVES of aliphatic alcohols, products containing.—Chemische Fabrik Stockhau Sen et Cie. April 19, 1932. 418,139.

COMPLEX METAL COMPOUNDS of ortho-hydroxyazo dystuffs, manufacture and production.—J. Y. Johnson (I. G. Farbenindustrie). April 20, 1933. 418,143.

CHLORINATED ORGANIC SUBSTANCES, compositions comprising.—I. G. Farbenindustrie. April 22, 1932. 418,230.

ADSORBENT CUPRENE, production.—Sir R. H. Davis and Dr. L. A. Levy. April 22, 1933. 418,005.

FILTERING MEDIA for separating smokes, dusts, and the like from gases and vapours.—Sir R. H. Davis and Dr. L. A. Levy. April 22, 1933. 418,006.

ANTI-FOULING PAINTS and compositions.—W. W. Groves (A. C. Holzapfel). May 5, 1933. 418,153.

VIOLET SULPHUR DYESTUFFS, manufacture.—A. Carpmael (I. G. Farbenindustrie). May 5, 1933. 417,957.

DIAZO COMPOUNDS, manufacture.—Kalle and Co., A.-G. May 23, 1932. 418,011.

PRODUCING REACTION between fluids.—South Metropolitan Gas Co. and H. Stanier. May 22, 1933. 418,235.

SENSITISING SILVER HALIDE EMULSION LAYERS, process.—I. G. Farbenindustrie. June 7, 1932. 418,157.

PAINTS, LACQUERS, and the like, production.—W. B. Wiegand. Sept. 23, 1932. 418,080.

PURE CARBON DIOXIDE and pure sulphur dioxide, production. F. Leroy. Sept. 26, 1933. 418,255.

EMULSIFYING DETERGENT AND WETTING AGENTS.—Resinous Products and Chemical Co. June 17, 1933. 418, 247.

CHARCOAL, production.—A. Pay and A. R. Clements. Oct. 31, 1933. 418,048.

ANIMAL OR CELLULOSIC FIBRES, printing.—Soc. of Chemical Industry in Basle. Nov. 24, 1932. 418,262.

CARBOXYLIC ACID CHLORIDES, manufacture.—W. W. Groves (Monsanto Chemical Co.). Dec. 19, 1933. 418,162.

MASSES CONTAINING METALS in a state of fine dispersion, manufacture and production.—I. G. Farbenindustrie. Jan. 27, 1933. 418,096.

TITANIUM COMPOUNDS, production.—Titan Co., Inc. Feb. 24, 1933. 418,269.

EXTRACTING FATS AND OILS from animal and vegetable material, process and device.—A. Nyrop. March 9, 1934. 418,107.

VAT DYESTUFFS, manufacture.—I. G. Farbenindustrie. March 9, 1933. 417,980.

Applications for Patents

(October 18 to 24 inclusive).

CHEMICAL SUBSTANCES.—C. E. H. Bawn, Imperial Chemical Industries, Ltd., and M. Polanyi. 30542.

CORBONIC ACID GAS from water, removal.—F. P. Candy. 29773.

CHLOROBUTADIENE POLYMERISATION PRODUCTS, etc.—W. H. Carothers. A. M. Collins, and E. I. du Pont de Nemours and Co. 29887.

SOLID MATER from paper, etc., mill effluent, recovering.—Davey, Paxman and Co. (Colchester), Ltd. 30005.

OIL DISPENSER.—F. B. Dehn (Aro Equipment Corporation). 30305.

PRESS AND FILTER.—F. B. Dehn (Mutual Citrus Products Co.). 30301.

HYDROCARBONS, reduction.—E. I. du Pont de Nemours and Co. (United States, Oct. 20, '33.) 30250.

TREATMENT AND RECOVERY of valuable products in sea water, etc.—C. J. Greenstreet. 30015.

AMINOPYRENE-SULPHONIC ACID, manufacture.—W. W. Groves and I. G. Farbenindustrie. (Feb. 26.) 30106.

PERYLENE, manufacture.—W. W. Groves (Germany, Nov. 2, '33.) 30108, 30109.

ARTIFICIAL MATERIALS from polymerisation products, manufacture.—W. W. Groves (Deutsche Celluloid-Fabrik). 30105.

DIARYLAMINES, manufacture.—W. W. Groves and I. G. Farbenindustrie. 30385.

VAT DYESTUFFS.—W. W. Groves. 30529.

ACTIVE CARBON, manufacture.—O. Heller. (Czecho-Slovakia, Oct. 25, '33.) 30550.

DYESTUFFS, manufacture.—I. G. Farbenindustrie. (Germany, Oct. 19, '33.) 30044.

CONDENSATION PRODUCTS, manufacture.—I. G. Farbenindustrie. (Germany, Oct. 21, '33.) 30045.

MONOAZO DYESTUFFS, manufacture.—Imperial Chemical Industries, Ltd., and A. H. Knight. 30019.

DRYING CROPS.—Imperial Chemical Inndustries, Ltd. 30020.

ANTHRAQUINONE DERIVATIVES, manufacture.—Imperial Chemical Industries, Ltd., and C. Shaw. 30021.

DEGREASING APPARATUS.—Imperial Chemical Industries, Ltd. 30399.

CHLORINATED RUBBER, manufacture.—Imperial Chemical Industries, Ltd., W. D. Spencer and S. Steele. 30400.

ORGANIC COMPOUNDS.—Imperial Chemical Industries, Ltd., and M. Polanyi. 30543.

TREATMENT WITH HYDROGENATING GASES of distillable carbonaceous materials.—International Hydrogenation Patents Co., Ltd. (Germany, Nov. 24, '33.) 30332.

DESTRUCTIVE HYDROGENATION of solid carbonaceous materials. International Hydrogenation Patents Co., Ltd. (Germany, Oct. 26, '33.) 30333.

PHOSPHATIDE COMPOSITIONS, production.—B. A. Rewald. 30248.

ALCOHOLS FROM GERMINAL GLAND HORMONES, manufacture.—Schering-Kahlbaum A.-G. (Germany, Oct. 21, '33). 30297. (Germany, May 25). 30298.

POLYMERISATION OF METHACRYLONITRILE.—L. V. D. Scorah, J. Wilson and Triplex Safety Glass Co., Ltd. (April 12, '33.) 30148, 30149, 30150.

PLYMERISATION OF ORGANIC COMPOUNDS.—L. V. D. Scorah and J. Wilson. (April 12, '33.) 30290.

HYDROGENATION OF TAR OILS.—South Metropolitan Gas Co. and H. Stanier. 30386.

From Week to Week

THE NATIONAL COKE AND OIL CO. is to lay down a coal distillation plant in the Glasgow area at a cost of £35,000.

IT IS STATED that scientists are engaged experimenting with a new chemical compound discovered in sea deposits in the Irish Sea. There is a possibility that developments may provide employment for many workers either in Widnes or Liverpool.

AT THE FIRST MEETING of the winter session of the Cornish Institute of Engineers, held at the Camborne School of Mines, Mr. A. Jovy, of Redruth, delivered a lecture on Cornish pitwork, ancient and modern. Mr. Jovy dealt with Cornish pumping installations dating from the time when Richard Trevithick first adopted the plunger pole to the present time.

THE HOME SECRETARY announces that on October 22 he made a further scheme under the Workmen's Compensation Acts, dealing with the payment of compensation for silicosis, the effect of which is to extend the Various Industries (Silicosis) Scheme, 1931, to cover employment in any operation underground in a coalmine. The Order applies to workmen employed in any such operation at any time on or after the date of the Order.

THERE WILL BE TWO NOBEL PRIZES awarded in chemistry this year, the prize of 1933 having been reserved. Among the candidates mentioned for the chemistry prizes are Mr. Lewis and Mr. Urey, both of the United States, who carried on studies of the isotopes of hydrogen and so-called "heavy" water; the Swiss vitamin scientist, M. Paul Karrer; and the Danish albumen expert, Mr. Soerensen.

THE CHOICE OF A METAL suitable for equipment handling synthetic resins is largely determined by the effect of the metal on the clarity and colour of the product. "Plastic Products" recently published some comparative tests with phenol formaldehyde. From the standpoint of colour and clarity, pure nickel was rated next to glass and superior to an aluminium-silicon alloy, pure aluminium and 18/8 chromium-nickel-iron alloy in the order named.

A COURSE OF THREE LECTURES on "The Colloid Chemistry of India-Rubber" will be given at University College, London, by Professor H. Freundlich, at 5.30 p.m. on Fridays, November 16, 23 and 30. The first lecture will be devoted to the nature of latex particles and the stability of latex; the second lecture to the colloidal aspects of the technical use of latex; the third lecture to india rubber as a gel containing long-chain molecules. At the first lecture the chair will be taken by Professor F. G. Donnan, F.R.S., a professor of chemistry in the University. These lectures, which will be illustrated with lantern slides, are addressed to students of the University and to others interested in the subject. Admission is free, without ticket.

FOR SOME YEARS the Wool Industries Research Association has been conducting experiments in the use of substitutes for tar for marking sheep, and certain of the fluids produced have given satisfactory results from the farmer's point of view both at home and overseas. The fluid recommended for use in this country has been tested both in the field in respect of its permanence on the sheep and in relation to the completeness with which it can be removed by scouring during the processing of manufacture. Farmers in Wales and in Hampshire who have tried it have reported that the marking fluid fulfils their requirements for permanence and for legibility after the elapse of a season.

SPEAKING AS PRESIDENT AT THE LUNCHEON which followed the annual meeting of the British Cast Iron Research Association, held in London on October 31, Major F. A. Freeth, research manager of Imperial Chemical Industries, Ltd., said that a revised grant offer received from the Government made it possible for the Association during the next five years to build up an income of £20,000 per annum, nearly double its present income. They aimed at raising an additional £1,000 this year in the form of subscriptions from British foundries eligible for membership, and a further £900 per annum for each of the succeeding four years. Sir Clement Hindley asked users of cast iron to support the Association, since they ultimately shared in the benefits. He referred to the recent application of cast iron as a material for the construction of blocks for road surfaces, and said that the three mile roadway of the recently opened Mersey Tunnel was laid in this way. He also urged that the support of foundries in the Overseas Dominions should be more systematically sought.

THE GOVERNING BODY OF HULME HALL, University of Manchester, has awarded a research studentship to Dr. G. F. Rohner, assistant to the professor of physical chemistry, Basle University.

THE DEPARTMENT OF NATIONAL REVENUE, CANADA, announce that by Order in Council (P.C. 2474), dated October 11, butyl alcohol, until December 31, 1934, will be free of customs duties under the British preferential tariff, intermediate tariff, and general tariff.

THE ROYAL SOCIETY OF ARTS will hold their inaugural meeting of the 181st session and presentation of the medals awarded during the session 1933-34, on Wednesday, November 7, at 8.30 p.m., when an address on "Arts and Commerce Promoted" will be delivered by Mr. John A. Milne, chairman of the Council of the Society.

IN THE COMPANIES COURT, Chancery Division, on Monday, Mr. Justice Eve had before him a petition for the compulsory winding-up of Grosvenor Chemical Co., Ltd. Counsel for the petitioners said a settlement had been arrived at on terms endorsed on counsel's briefs. They therefore asked that the petition should be dismissed without costs. His lordship: No order on the petition or as to costs.

CHEMICAL RESEARCH has been started under the auspices of the Punjab University, with the funds laid at its disposal by Steel Brothers, managing agents of the Indo-Burma and Attock Oil Co. The amount will be offered in five equal instalments of Rs.30,000 for five years. An important feature of the scheme is that any results of a patenable nature will be exploited by Steel Brothers, and Dr. Bhatnagar, of the University, and the profits will be shared between the parties concerned in equal proportion.

THE NATIONAL UNION OF GENERAL AND MUNICIPAL WORKERS has accepted the offer of the Chemical Employers' Association to establish a base rate of 1s. 0$\frac{3}{4}$d. an hour for day labourers and 1s. 2$\frac{1}{8}$d. for shift workers, and a 5 per cent. increase for piece workers, with proportionate increases to women and youths. The advances will not affect the chemical workers employed by Imperial Chemical Industries, Ltd., who already receive the stated rates of pay.

JAMES GRAY, aged 36, an employee at the Mond Nickel Works, Clydach, South Wales, was found dead at his home last week. The bodies of his wife and two daughters were also found in the house. At the inquest the jury found that he had killed his wife and two children and had committed suicide while of unsound mind. Before going to Clydach, Gray was employed by Imperial Chemical Industries, Ltd., and went to India with other workmen to erect a number of acid plants.

THE FEDERATION OF WHOLESALE FRESH MEAT TRADERS of Great Britain and Ireland, whose headquarters are in Liverpool, have received a letter from the British Association of Chemical Manufacturers on the subject of import duties on insulin. Subsequently, in a talk with representatives of the Federation, a spokesman of the Chemical Manufacturers' Association pointed out that in dressing of beasts there must be a wastage of valuable materials. Means should be devised whereby these could be reclaimed and converted into marketable commercial products.

THE GOVERNING BODIES of the Institution of Gas Engineers, the National Gas Council of Great Britain and Ireland, the British Commercial Gas Association, and the Society of British Gas Industries have formed, without alteration of their respective constitutions and work, the British Gas Federation, with the object of furthering the interests and welfare of the gas industry. Lord Macmillan has been elected president. The inaugural dinner will be held at Grosvenor House, Park Lane, W.1, on November 5, at 7 p.m.

FRANCE IS ESTABLISHING WORKS for the manufacture of petrol from coal. The plan has been sanctioned by M. Marquet, Minister of Labour. The works will be built in the North of France, in the Lievin-Angres District. Synthetic petrol will be obtained by means of a special treatment of coal. The expenditure involved is stated to be some 40,000,000f. In 1933 France imported petroleum to the value of 1,301,500,000f. With the exception of experimental wells in Morocco, none of the French colonies produces petroleum.

THE IMPORT DUTIES ADVISORY COMMITTEE has received applications for the addition to the free list of wax (carnauba, candellila, montan, and crude ozokerite); waste and scrap rubber; and solid natural resins, but not including gum resins and amber. The last heading is in substitution for the heading announced by the committee on June 13 last. Representations should be addressed in writing to the Secretary, Import Duties Advisory Committee, Caxton House (West Block), Tothill Street, Westminster, London, S.W.1, not later than November 24, 1934.

ADDRESSING THE STUDENTS at University College, Nottingham, on the occasion of the annual prize distribution on October 27, Lord Trent, chairman of Boots Pure Drug Co., Ltd., appealed to them to cultivate a zest for knowledge for its own sake and because knowledge meant power. A university career, he said, was often regarded superficially as the coping stone of one's education; in later life they came to realise that it was only the foundation-stone. Its success was to be judged by the extent to which it had made them greedy for knowledge throughout the rest of their lives.

Forthcoming Events

LONDON.

Nov. 5.—Society of Chemical Industry (London Section). "Spontaneous Oxidation in Coal and Some Other Materials." Dr. J. S. Haldane, and Dr. R. H. Makgill. 8 p.m. Burlington House, London.

Nov. 7.—Institution of Chemical Engineers (Graduates and Students Section). "Emulsions." F. A. Cooper.

Nov. 7.—Society of Glass Technology (London Section). Visit to the Research Laboratories of the General Electric Co., Ltd., Wembley. 7.30 p.m.

Nov. 7.—Society of Public Analysts. Discussion on "Quantitative Spectroscopy and its Analytical Application," opened by Dr. J. J. Fox. 8 p.m. Burlington House, Piccadilly, London.

Nov. 8.—Institute of Metals (London Section). "Recent Trends and Future Developments in Metallurgical Research." H. Moore. 8 p.m. Royal School of Mines, South Kensington, London.

Nov. 8.—Oil and Colour Chemists Association. "Polymerisation of Organic Substances and their ability to form Colloids." H. F. Freundlich. 30 Russell Square, London.

Nov. 9.—Chemical Engineering Group. "Modern Cast Irons for Chemical Engineering Plant. J. G. Pearce. Burlington House, London.

Nov. 9.—Institute of Fuel. "The Loeffler System; Its Place in the Sphere of Power Generation with Steam at High-Pressure and High-Temperature." S. McEwen. 6 p.m. Institution of Mechanical Engineers, St. James's Park, London.

BANGOR (NORTH WALES).

Nov. 9.—The Chemical Society. "Science and the Oil Industry." W. H. Cadman. 6 p.m. Physics Lecture Theatre of the University College, Bangor.

BIRMINGHAM.

Nov. 5.—The Chemical Society. "The Development of Chemical Kinetics." C. N. Hinshelwood. 5 p.m. University, Edgbaston, Birmingham.

Nov. 6.—Society of Chemical Industry (Birmingham and Midland Section). "Industrial Gas Masks." "The Role of the Chemist in the Defence of the Civil Population against Gas." J. Davidson Pratt. 7.30 p.m. University Building, Edmund Street, Birmingham.

HUDDERSFIELD.

Nov. 9.—Institute of Chemistry (Huddersfield Section). "Some Films of the Oil Industry." Dr. A. E. Dunstan.

LIVERPOOL.

Nov. 8.—Institute of Chemistry (Liverpool and North Western Section). "Some Chemical Aspects of Modern Biological Products." R. F. Corran. 7.30 p.m. Constitutional Club, India Building, Water Street, Liverpool.

MANCHESTER.

Nov. 7.—Oil and Colour Chemists' Association (Manchester Section). Joint meeting with the Incorporated Institute of British Decorators. Discussion on Present-Day Painting Materials. 7 p.m. College of Technology, Manchester.

Nov. 9 and 10.—The Chemical Society. Discussion on "Applications of X-Rays and Spectroscopy to the Elucidation of Chemical Structure." 2 p.m. November 10, at 10 a.m. Chemistry Lecture Theatre of the University, Manchester.

SHEFFIELD.

Nov. 9.—Institute of Metals (Sheffield Section). "The Flow of Metals in the Extrusion Process." C. E. Pearson. 7.30 p.m. Non-Ferrous Section of the Applied Science Department of the University, St. George's Square, Sheffield.

SWANSEA.

Nov. 9.—Society of Chemical Industry (South Wales Section). "Food Control from the Chemical Aspect." Dr. L. H. Lampitt. 7 p.m. Thomas' Cafe, High Street, Swansea.

TROWBRIDGE AND WORKINGTON.

Nov. 7.—Institution of the Rubber Industry (West of England Section). "Development in Modern Rubber Machinery." F. Siddall. Town Hall, Trowbridge.

Nov. 9.—West Cumberland Society of Chemists and Engineers. "The Progress of Science." A. G. Hock. 7 p.m. Workington.

Company News

Wm. Cory & Son.—An interim dividend of 5 per cent., less tax, has been declared, payable on December 1.

Broken Hill South.—A dividend at the rate of 1s. 6d. per share, payable in Melbourne on October 15, has been declared. Three dividends have already been paid so far this year, totalling 22½ per cent., and a total of 20 per cent. was paid for last year.

New Companies Registered

Charles Bingham & Co., Ltd.—Registered as a "private" company on October 12. Nominal capital £50,000. Manufacturers of all products and apparatus and plant relating to the industrial, experimental and commercial exploitation of carbide of calcium, and all or any industrial gases, and chemical or electro-chemical processes, etc. Directors: Chas. H. Bingham, jnr., Ambrose P. Baker and others to be appointed by the subscribers. Solicitors: J. L. M. Benest, 7-9 Church Street, Reigate, Surrey.

G.P.K. Chemicals, Ltd., 5-11 Theobalds Road, W.C.1.—Registered October 29. Nominal capital £100. Manufacturers of and dealers in chemicals, gases, drugs, medicines, plaster of Paris, gypsum, etc. Directors: Chas. C. Pribik, Ralph H. Kenyon, and Cecil Godfrey.

National Fertilisers, Ltd.—Registered as a "private" company on October 26. Nominal capital £350,000. To acquire a part of the undertakings of Fison, Packard & Prentice, Ltd., and the Basic Slag & Phosphate Companies, Ltd., and to manufacture, sell and distribute fertilisers of all kinds, and chemicals and substances used in connection therewith, etc. A subscriber: Henry V. Casson, Tutnall Cottage, Amersham, Bucks.

Parexcel, Ltd.—Registered October 27. Nominal capital £10,000. To manufacture and deal in bricks, asphalt, bitumen, paint and other building materials; and to carry on the business of timber dealers, miners, quarriers, manufacturers of and dealers in metals, ores and mineral substances, manufacturing chemists, manufacturers and producers of and dealers in sulphuric and other acids, alkalis and chemicals and chemical substances, natural and artificial fertilisers, manures, etc. A subscriber: R. Le Mesurier, 7 Hanover Square, W.1.

The Belvedere Chemical Co., Ltd., Westinghouse Road, Trafford Park, Manchester.—Registered as a "private" company on October 10. Nominal capital £50,005. To carry on business as producers and manufacturers of and dealers in chemicals, minerals and vegetable gums, and all preparations, solutions, treatments and articles of every kind made therefrom or which may be conveniently made or sold in connection therewith, manufacturers of or dealers in chemical plant or machinery, etc. A subscriber: F. N. Pickett, 147 Grosvenor Road, S.W.

New Chemical Trade Marks

Compiled from official sources by Gee and Co., patent and trade mark agents, Staple House, 51 and 52 Chancery Lane, London, W.C.2.

Opposition to the registration of the following trade marks can be lodged up to November 10, 1934.

Glydote. 552,933. Class 1. Chemical substances used in manufactures, photography or philosophical research, and anti-corrosives. British Dyestuffs Corporation, Ltd., Imperial Chemical House, Millbank, London, S.W.1. July 27, 1934.

Abron. 553,159. Class 1. Chemical substances for steeping, colouring and brightening textile fabrics and leather in the course of manufacture. H. Th. Böhme Akt.-Ges., 29 Moritzstrasse, Chemnitz, Saxony, Germany. August 8, 1934.

Opposition to the registration of the following trade marks can be lodged up to November 24, 1934.

Galvene. B546,794. Class 1. Chemical substances used in the pickling or acid cleaning of metals. British Dyestuffs Corporation, Ltd., Imperial Chemical House, Millbank, London, S.W.1. December 5, 1933.

Pylumin. 553,928. Class 1. Chemical substances for use in treating aluminium for the purpose of preventing corrosion. The Pyrene Co., Ltd., Great West Road, Brentford, Middlesex. September 11, 1934.

Invictumen. 553,410. Class 4. Raw, or partly prepared, vegetable, animal, and mineral substances used in manufactures, but not including oleine and not including any goods of a like kind to oleine. Thomas Hill-Jones, Ltd., Invicta Works, Bow Common Lane, London, E.3. August 18, 1934.

Pirrobor. 551,688. Class 1. Anhydrous crystalline sodium tetraborate for use in manufactures. American Potash & Chemical Corporation (a Corporation organised and existing under the laws of the State of Delaware), 70 Pine Street, City, County and State of New York, United States of America. June 4, 1934.

Ferramic. 553,951. Class 1. Chemical substances used in manufactures, photography, or philosophical research, and anti-corrosives, but not including chemical compounds used to remove sulphur from molten metals and not including any goods of a like kind to these excluded goods. Ferramic Industries, Ltd., 21 Lime Street, London, E.C.3. September 12, 1934.

Supranol. 543,425. Class 4. Dyes (not for mineral and not for toilet purposes). I. G. Farbenindustrie, Grüneburgplatz, Frankfort-on-Main, Germany. July 29, 1933. (By Consent).