

The Chemical Age

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Notes and Comments

Cardiff and Swansea Reflections

DESPITE a decrease in the attendances, the fifty-third annual meeting of the Society of Chemical Industry in South Wales last week was a decided success, both technically and socially, and the sister towns of Cardiff and Swansea may congratulate themselves upon the warmth of the reception they accorded to the members of the Society and the wealth of memories they were able to take home with them at the end of the well-conducted programme of no fewer than twenty-seven events. The works visits were so varied in their appeal to individual tastes that it would be invidious to single out any for special mention, but among the technical sessions the outstanding event was Sir Harry McGowan's Messel Memorial Lecture on the Thursday afternoon, while the most memorable of the social events were the Swansea civic luncheon on the Wednesday and the Society's annual dinner on the Thursday. There is an astonishing amount of civic rivalry between the two towns, and the people of Swansea made no secret of the fact that they envied Cardiff the privilege of entertaining the Society for its principal gatherings. Their jealousy, however, found expression in the unusually cordial hospitality with which they entertained the visitors at the civic luncheon and the emphasis with which the speakers pointed out that Swansea was really a more chemically minded town than Cardiff. So far as the Society's own local officials were concerned there was the utmost harmony, and although Dr. E. A. Rudge, of Cardiff, received the major credit, Mr. G. Madel, of Swansea, was equally energetic, not only in supporting the Cardiff programme, but in perfecting the Swansea side of the week's arrangements.

Sports Cars and Bed Bugs

SIR HARRY MCGOWAN'S Messel Memorial Lecture on "The Uneven Front of Research" was a remarkable discourse which, on account of its departure from conventional lines, gained for the Society of Chemical Industry an exceptional degree of publicity in the local as well as the national Press. The Messel Medal, presented every two years in memory of Rudolph Messel, who left half his fortune to the Society, is awarded for distinction in science, literature, public affairs or industry, or in recognition of conspicuous service to the Society, and on both of the last two grounds no better choice could have been made than to present the 1934 Medal to the chairman and managing director of Imperial Chemical Industries,

Ltd., who was the jubilee president of the Society in 1931.

Cookery, travel, noise, speed, building materials, fresh air and the incidence of road accidents were a few of the commonplace topics which came within Sir Harry McGowan's review of the need for more thorough research, and he might have left us wondering how we manage to exist under our present antiquated circumstances if he had not given us much more serious food for thought in his statement that four million people in London are living to-day within the possibilities of attack from the bed bug! Nor is the danger circumscribed by social status, for anyone living in any house at any rent, is liable to become a victim. The particular type of insect Sir Harry had in mind can be exterminated by the employment of building materials which do not permit of cracks and crevices, but his discourse prompts us to reflect that there are other objects of terror, loosely defined in the dictionary under the same common name, that are not capable of being dealt with so easily. Sir Harry might well have proceeded to prescribe remedies for some of them, or to suggest lines of research to that end. It is one of the rules of the Society that the Messel Lecture is not discussed—openly at any rate—but Sir Harry McGowan's lecture certainly provided ideal material for informal discussion during the remainder of the week.

The Youngest Subject Group

FOR thirteen years the Chemical Engineering Group was the only specialised subject group of the Society of Chemical Industry, but within the past three years three new groups have been established—the Food Group, formed in 1931 and now numbering 250 members, the Plastics Group, formed in 1932, with a rapidly growing membership which has just reached 140, and the Road and Building Materials Group, formed as a result of a conference on road materials organised by the Chemical Engineering and Plastics Groups and the London Section last November. The need for this group has been demonstrated in the rapid enrolment of members, and it promises to be one of the largest divisions of the Society. The group featured for the first time in the annual meeting programme at Cardiff last week, when it held a meeting to hear Major S. Evans read Colonel C. H. Bressey's paper on "Fifteen Years of Progress in Road Construction." Members of the Institution of Municipal and County Engineers were invited to attend and participate in the

meeting, with the result that the session was one of the best attended during the whole week, notwithstanding the fact that it was almost at the end of the programme. Mr. G. H. Whitaker, City Engineer and Surveyor of Cardiff, contributed a valuable paper in which he related his experiences in road construction in and around Cardiff, and the discussion which ensued showed the essentially chemical nature of the problems that confront the road constructor in these days of heavy and speedy traffic.

A Fatality and its Lesson

A FEW months ago, in a factory, a fatal scalding accident occurred, due to a combination of circumstances which may serve to point a moral. A Cornish boiler is installed, mainly for heating purposes, working at a low pressure. The accident occurred early in the morning, about the time for starting the day's work, and pressure was nearly at blowing-off point. The water was high in the glass, and the steam space was very small. A number of men were sitting in a little cabin adjoining the boiler, the only way out being past the boiler front. At this moment a workman came into the stokehold with a large quantity of inflammable waste material, paper and cardboard, which he proceeded to burn in the furnace. This resulted in a sudden generation of steam, and the lifting of the safety valve. Owing to the conditions, the boiler primed violently, and large quantities of boiling water were discharged into the stokehold, which became an inferno of steam and hot water. The men in the cabin, owing to the small size of the exit, had to escape one at a time, and all but one did so, being painfully but not dangerously scalded. The last man unfortunately stumbled and fell into the boiling water on the floor, and was fatally scalded.

It may be said that it is easy to be wise after the event; but, as pointed out by "Concord," the trade organ of the Liverpool Borax Co., Ltd., two features certainly stand out. One is the danger of having a very high water level when the steam space is limited. In the present case the result was disastrous; but to a less extent, the tendency to prime may be very objectionable where steam is used for process work or power. The other point is the inadvisability of allowing promiscuous or casual interference with the working of a steam boiler.

The Petroleum Bill

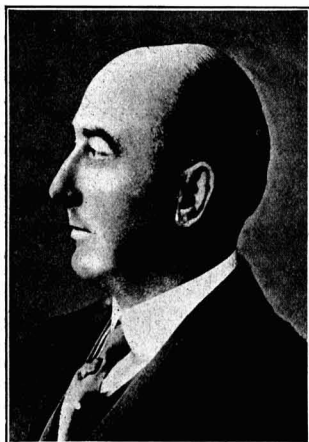
THE progress of the debate in the House of Commons upon the Search for Oil Bill fully confirms our previous opinion that this is a Bill which has been introduced as the result of a vague feeling that oil is so greatly in the public eye just now that someone may possibly search and (surprisingly) search successfully, and that it is just as well that the rights of landowner and discoverer should be delimited in advance. In view of the pressure upon Parliament to pass important legislation—not being politicians we refuse to define what is meant by "important" in this instance—we feel that the present measure is a waste of time. If there were any real likelihood that oil in paying quantities exists in this country the position would be very different. We agree with Mr. Runciman that the country is in urgent need of home sources of petroleum or other fuel oil; there is no longer any need to shirk

the possibility of another war on the ground that to talk of war is to induce it. It is also true that the present system of mineral rights hampers search and development if there should be petroleum in this country. It has been admitted in the House that the Government have not consulted any of the learned Societies before drafting their Bill. There is an imposing array of technical men of international reputation in the country whose advice would have been freely available. Mr. Runciman asked rhetorically what were the bodies to whom some of his opponents suggested he should have applied for advice. "They included the Geological Society of London, the Institute of Fuel, the Institute of Mining Engineers, the Institute of Mining and Metallurgy." A member added also the Institute of Petroleum Technologists. To which Mr. Runciman replied "that so far as he knew they had consulted none of them. The Government have many ways of getting information, but they did not think it necessary to go to these technical societies. . ."

The Peril from Politicians

THIS, to our mind, is a grave exposure of the perils of Government by politicians. Politicians appear to have no knowledge of industrial realities; they rely for their information upon people with as little knowledge as themselves and so the blind lead the blind. What is the use of the existence of bodies of experts in the country if those whose business it is to guide the affairs of the country in the interests, not of party but of the people do not take steps to obtain the best advice? We raise this question not out of any particular opposition to the present Bill insofar as its avowed objects are concerned, but as an important general principle. Civil servants, whether they reside in Teddington, Westminster, Kensington, or Greenwich, are not practical business men. They may be scientific experts; they may be highly educated in their particular spheres; but very few of them have ever held high executive or administrative positions in industry. We have the very greatest admiration for the numerous Government servants who do our research work for us, and who advise us upon matters of scientific and technical fact. But we feel very strongly that the Government should confirm their opinions on every possible occasion by asking the co-operation of those in daily touch with practical realities.

It is an advantage ostensibly to be gained by the Petroleum Bill that in the event of petroleum being discovered development will be controlled. We quote from "The Times" report of Mr. Runciman's speech in the debate: "No doubt many members had seen what had happened in the United States of America, where uncontrolled development had led to the disfigurement of long stretches of territory and to the most amazing anomalies and confusion of private rights. Only recently one of the most important of the younger men engaged in oil in America, told him after reading the discussions in the House that he had come to the conclusion that we were far wiser and more full of foresight than the people in his own country." It would have been well if Governments of 100 years ago could also have controlled the development of industry—but it was necessary to make mistakes to discover wisdom.



Sir Harry McGowan,
Messel Medallist,
1934.

The Uneven Front of Research

Sir Harry McGowan Gives a Wide Review

The presentation of the Messel Memorial Medal of the Society of Chemical Industry took place on July 19 in the Sir William Reardon Smith Lecture Theatre of the National Museum of Wales, Cardiff. The medallist this year is Sir Harry McGowan, chairman and managing director of Imperial Chemical Industries, Ltd.

DR. J. T. DUNN (President), in making the presentation, mentioned that the Messel Medal was awarded every two years and commemorated one of the most distinguished members of the Society. Rudolph Messel was a great technologist and might be said to have been the father of what could be called catalytic technology. Rudolph Messel was also a great servant of the Society. For many years he was its hon. secretary and he went through the presidential chair in 1911-12 and again in 1914. Until his death he served the Society continuously and very ably, but his interest in the Society did not cease with his death, because he left the Society half his fortune and the Society decided to commemorate that fact and to keep the memory of Rudolph Messel green in a way which it was believed would have met with the approval of Messel himself, by awarding a medal every two years. The Society had also indicated the breadth and universality of Messel's sympathies by deciding that the medal should be given to someone who was distinguished either in science, in literature, in public affairs or in industry, or who had rendered conspicuous service to the Society.

Distinction in Industry

The first recipient of the medal, Professor H. E. Armstrong, together with Professor Milliken and Sir William Pope—later recipients—were men who were distinguished in science. Lord Balfour was a man distinguished both in literature and in public affairs, whilst Lord Brotherton and the present recipient—Sir Harry McGowan—were men distinguished in industry. Sir Harry McGowan's ability and breadth of outlook enabled him in Nobel's Company to rise immediately to the highest administrative position. Since that time, he was known for his work in conjunction with Sir Alfred Mond—later Lord Melchett—in the tremendous effort to institute Imperial Chemical Industries, Ltd., and since the lamented death of the first Lord Melchett, Sir Harry had borne the burden of the continuance of the successful carrying out of that great undertaking. Personally he felt there was nobody at the present time to whom the medal could more appropriately be awarded or whose acceptance of the medal would be welcomed more sincerely than by Messel himself could he be present to see it awarded.

In handing the medal to Sir Harry McGowan, the president said he did so with the best wishes of the members of the Society and the hope that he would be spared for many years to exercise his great gifts to the advantage and benefit of the whole community. Finally, the president mentioned that a telegram had been received from the first recipient of the medal and that great doyen of chemical science in this country, Professor H. E. Armstrong, congratulating the Society on again, metaphorically speaking, placing a wreath on the tomb of Rudolph Messel.

Sir HARRY MCGOWAN, before giving his Messel Lecture, said: "I would not be human if I were not deeply touched,

as I am, by the honour conferred upon me in being presented with the Messel Medal and by the all too-flattering references to my deserving of that honour. I am not immodest enough to believe that this is a personal honour; I look upon it as a recognition of my company's work in industry in this country. However that may be, this recognition of our work will only act as an additional incentive to still greater effort in the future. When I think of my distinguished predecessors—the recipients of this medal—in the past, I am deeply flattered and there is more in my thanks for this honour than mere formality."

In the course of his lecture, Sir Harry had many interesting observations to make upon the irregular progress which research is making in various fields of human activity. He said that anyone taking a bird's-eye view of science and industry would see that research had been prosecuted with far greater vigour in some directions than others. That was the reason for the title of his address. If science were divided into the four main branches of mathematics, physics, chemistry and biology, these would cover more or less the whole of technical procedure. It would be admitted that mathematics were implicit in physics. It was not possible to be a first-class physicist without being a first-class mathematician. Physics was the life-blood of several great industries, notably the electrical and wireless industry, which was so bound up with this science and so obviously part of it that it was not difficult to see why the electrical industries had always spent so much money on research.

The Chemistry of Cookery

The main branches of the chemical industry, continued Sir Harry, were so inseparably bound up with ordinary chemical theory and practice that it was only natural that chemical manufacturers should have undertaken intensive research. Indeed, the industry was so intimately connected with the science of chemistry that it was not easy to separate academic from industrial research. It is when we come to some of the more general operations of life which do not have an academic or industrial background that we are at once struck with the empirical state of knowledge existing therein. Cookery, for instance, still remains a traditional art. It has not yet seriously been considered from the engineering point of view. The chemistry of cookery is practically untouched. At the present moment there is not much possibility of a serious attack being made on the reformation of cooking; nevertheless, within the next 50 years we may see a revolution in the ordinary household methods of handling food.

The inequality of the progress of research in one industry and another was not unnatural. In some industries, research was a profession; in others, where science was one stage removed from practice, there was less immediate demand for research.

It was recognised on all hands that railways and self-

propelled vehicles had revolutionised the world, a development with which physics and chemistry were obviously closely connected. We were rather too apt nowadays to congratulate ourselves on the speed we had attained. But did any of the modern trains, although they pulled bigger loads, touch the speeds attained in the famous railway races of 40 years ago? If anyone wanted to go really fast, he would build a tube, run his train in a vacuum and attain any speed he liked within reason. Speed and accessibility, however, had brought with them some disturbing factors. Every week about 150 people were killed and several thousand injured on our roads. Had anyone ever tried to correlate the incidence of accidents with the height of the driver's eyes above ground level? There were certain well-known makes of cars in which, because of the long high bonnet and the headlamps, the driver could only see the road about thirty yards in front of him. Sir Harry hinted at a much closer scientific inquiry into accidents than at present existed.

An Accident Research Department

"Would it be too much," he asked, "to suggest an Accident Research Department, which besides inquiring more closely than at present into the causes of accidents, would bend its energies towards designing a new and possibly, for the moment, weird looking car right away from conventional lines, to the end that a rational scientific self-propelled vehicle might be produced which would tend to lessen the present high rate of casualties?"

With the development of the traction industry had come an enormous increase in noise, which inevitably meant a degeneration in the nervous and mental health of the population. Notwithstanding that it was within the power of motor-car designers to evolve an almost completely silent internal combustion engine, nights in our great cities were a torture to many sleepers because of the continual roar of so-called "sports" cars. This was a form of public nuisance for which there was no justification.

The building industry was another example where much excellent work had already been done, but much more remained to do. Many new building materials were coming within reach, new methods of making light, cheap and sound-proof internal partitions, and plastics and metals to assist in them. Research leading to lighter and stronger building materials, to greater standardisation and therefore to decreased time and cost of construction, must mean the provision of more houses in a given time and at a price within the limit of the purses of the lowest members of society.

Danger of Bed Bugs

One of the results of new materials and processes in building would be houses which would not be liable to harbour that loathsome insect, the bed bug, which in these enlightened days was so little talked about that many people were unaware of its existence. "I am credibly informed," said Sir Harry, "that no less than four million people in London are living to-day within the possibilities of attack from these insects. It is not difficult to see why the creatures have not received greater publicity, for there exists the queer idea that they are in some way associated with social status. This is not so, for anyone, living in any house at any rent, is liable to become a victim. The whole problem in getting rid of bugs is to avoid cracks and crevices of any kind, whether in the furniture, floors or walls. If you can utilise materials which are not liable to crack, this age-long pest is bound in time to disappear."

What did we really know about fresh air? Air conditioning had revolutionised ventilation, but we had not yet reached the stage when we could get a tonic value out of a breath of air such as one got on arriving at the sea after a hard day's work. As science progressed, we should be able to have air of the quality usually associated with the sea in our offices and in our homes.

Although the biological industries—fishing, agriculture and the like—presented problems of a far greater complexity and difficulty than those confronting the average chemist and physicist, the amount of work being done in biology was far smaller than that done in the comparatively simple sciences. For example, a good deal of empirical knowledge existed regarding the breeding of animals, but the whole matter was still for practical purposes a mystery. We were making a good deal of progress regarding food

and vitamins, but comparatively speaking our efforts were still on a small scale. The consequences of a really intimate knowledge of food values on the future of the human race were incalculable.

The metallurgical industries too, had not received anything like the intensive consideration they deserved. The theoretical strength of metals like steel was far below that which could be attained in practice.

"We are at present living in a system which is largely voluntary," said Sir Harry. Distinguished speakers who addressed research associations were frequently preaching to the already converted, whilst equally frequently the bulk of the trades concerned remained without the fold. Why should not the State go to an industry and say they insisted that the industry should spend more money in the investigation of the facts underlying the processes employed? Could not this be done through a Central Advisory Board conceived on a far wider basis than anything at present existing? If the industry was in anything like a prosperous condition it should look after itself, but if it was down and out the State should step in. The Board should be perfectly prepared to lose money in some directions, provided that their original ideas showed a reasonable chance of success.

A Torch Bearer of Research

Dr. E. F. ARMSTRONG, F.R.S., proposing a vote of thanks to Sir Harry McGowan for his lecture, said that Sir Harry, in the past, had been known as a leader of men, as a great industrialist, as one who had devoted time to the cultivation of proper relations between capital and labour, as a very human person, and in many other aspects had been known and respected, but on the present occasion they saw him and honoured him in a new light, *viz.*, as a torch bearer, as a disciple of the need and necessity and importance and significance of research. The lecture had shown that research was not merely something in the test tube but the investigation of every aspect of human effort, so to speak, from getting up in the morning until long past going to bed at night.

It was the consideration and study of every aspect of life from the fundamental point of view; were we doing things in the way they could be done best and should we not study scientifically in order to see if something could be done better? Therein lay the secret of the success of Sir Harry himself and the success of his great firm. What Sir Harry had said was the simple truth and it should go out as a message far beyond the walls of that lecture theatre.

Worthy of a Larger Audience

He personally would have wished that the lecture theatre was filled with the industrialists of South Wales, with the civic authorities and the trade union leaders and perhaps, also, teachers, because they would have learned the meaning and possibilities which might arise out of research, defined in the clear and lucid manner in which Sir Harry McGowan had defined it. Unhappily, the main industry of South Wales was to-day on an ebbing tide. Coal and the carrying of coal were industries which seemed to be out of fashion and the problem in South Wales was how to make the tide flow again. If the results of research were allowed to flow into the river the tide would turn and then, perhaps, South Wales would, perhaps, be able not only to resuscitate the coal industry but to develop new industries—and there were thousands of new industries waiting to be developed based on research. In the solution of that problem, as the lecturer had indicated, there was need for the work of more than the chemist and the inventor. The industrialist must be receptive and the civic authorities must be sympathetic, whilst the leaders of the men must realise that it was to their benefit that everybody should put their shoulders to the wheel.

The vote of thanks was accorded with hearty enthusiasm and the meeting closed.

INSECTICIDES and like products are manufactured in Soviet Russia by the chemical trust known as Asoviakhim, the head office of which is in Moscow. It is able to produce considerable quantities of these products, enough, it is said, to meet the local requirements.

The Society of Chemical Industry

Speeches at the Fifty-third Annual Dinner at Cardiff

Dr. J. T. DUNN completed his year of office as president of the Society of Chemical Industry when he presided over an assembly of just over two hundred members and guests at the fifty-third annual dinner, held at the City Hall, Cardiff, on July 19. Among the company were the Lady Mayoress of Cardiff (Mrs. A. E. Gough), Lord and Lady Raglan, Alderman E. Harris (Mayor of Swansea) and Mrs. Harris, Captain James Griffiths (deputy Lord Mayor of Cardiff) and Mrs. Griffiths, Mrs. J. T. Dunn, Dr. and Mrs. E. F. Armstrong, Mr. and Mrs. W. A. S. Calder, Dr. F. H. Carr, Dr. and Mrs. R. H. Pickard, Principal C. Coles (Cardiff Technical College), Professor F. G. Donnan, Professor H. Freundlich, Mr. and Mrs. C. S. Garland, Dr. L. H. Lampitt, Sir Harry McGowan, Mr. R. D. Whitmore (Canadian Section), Professor G. R. Clemo, Mr. and Mrs. J. W. Craggs and Dr. and Mrs. William Cullen.

Lord RAGLAN proposed the toast of the Society of Chemical Industry and remarked that, so far as he knew, he had never before seen an industrial chemist. He had formed the opinion that they were not merely very intelligent, but also very kindly people. He believed that in the minds of the general public industrial chemistry was regarded as something sinister. Its exponents, it seemed to be believed, spent most of their time either in inventing poison gases calculated to destroy the entire inhabitants of London or Paris in a few minutes, or in perfecting processes for extracting butter-scotch from old razor blades, and thereby throwing the regular makers of butter-scotch out of employment. It was surprising to him how many educated people there were who did not realise that inventions and discoveries, of whatever kind, were part of the general progress of human knowledge, and that to restrict progress in a particular direction was not merely undesirable, but quite impossible. Science could not be divided up into watertight compartments, and it often happened in all branches that what was discovered was quite different from what was sought. For example, the discovery of aniline dyes arose from an attempt to make quinine.

Recognition of Evils

Nor could the discoverer know to what use his discovery would be put. Chloroform might be used by doctors or by kidnappers; poison gas might be used to kill men, but it might also be used to kill locusts, and thereby save large areas from famine. It was the duty of every scientist to follow his researches wherever they might lead him, secure in the knowledge that no fact could be immoral. Science itself had been supposed to be immoral, or at least unmoral, but that was not really so. Science recognised various evils, among them one which, although it was seldom recognised as such, was really one of the worst evils which afflicted humanity—waste of time. It was a waste of time to employ a man on a monotonous task which could more efficiently be performed by a machine. All unskilled labour, in so far as it did not afford needed air and exercise, was a waste of time, and in the civilisation of the future unskilled labour would be unpaid labour. It was also a waste of time to cultivate elaborately land which had not been properly manured. In these and in many other ways chemistry and the other exact sciences were bringing about continual advances.

Those who had had the advantage of a scientific training, should set an example to those who had not, by using the methods of science not merely in the laboratory, but outside it as well. Scientific methods were just as necessary out of the laboratory as in it if the world was to be pulled out of the mess into which it had got, and it was for the scientists to apply them, for politicians could not do so. Lord Raglan concluded by paying a tribute to chemical science. It might claim to be the queen of sciences. That title had been claimed by mathematics, but mathematics was not really a science at all. A science must be based on a body of facts, but in mathematics there were no facts: merely formulae. Far from being the queen of sciences, she was merely a lady-in-waiting.

The PRESIDENT, in responding to the toast, said that, whatever might be said of the Society as a body, as individuals a good many of them must plead guilty to the accusation which Lord Raglan had brought against them. Many of them might do a great deal more than they did in enlightening the general public, their friends and their neighbours, as to what science really was. The Society was an association which might well have good wishes extended to it, because in the past fifty years it had done a great deal for the world and was continuing to do, and would continue to do a great deal more. A society like that, which existed for the purpose of binding together, as it did to a great extent, those who were interested in chemistry, and particularly industrial chemistry, was serving a useful purpose. It had done much to put industry on a more scientific basis than that on which it rested before the Society came into being.

The Open Coal Fire

Mr. C. S. GARLAND proposed the toast of the guests. They were exceedingly proud as a Society, he said, of the industry they represented. There was no industry, certainly in the British Empire and he believed in the whole world, which was so widely recognised. Under the leadership of Sir Harry McGowan, the Society's Messel Medallist for 1934, there had been founded in this country a chemical organisation which stood in the forefront of the world. It was their basic industry in peace and war, and the great war had brought about a radical change in the whole attitude towards chemists and chemistry. Chemists had interested themselves in assisting that oldest and most sorely tried industry—the coal industry. He was not going to venture on any controversial matter, but he held the view that, especially in a place like South Wales where King Coal was monarch, there was something more in life than mere utility, and he defied anyone to see in the radiator of a central heating system the same inspiration as there was in a roaring coal fire on a winter's evening. Among the guests he specially mentioned the presence of Lord and Lady Raglan, Principal Coles, Professor Freundlich, Professor G. T. Morgan and Sir Harry McGowan.

Captain JAMES GRIFFITHS, deputy Lord Mayor of Cardiff, responded to the toast, and said the members of the Society held the destiny of humanity in their hands. They had turned the waste places of the earth into a paradise, and they had turned paradise into a wilderness. In coming to South Wales for their annual meeting they had come to a good place, and he hoped the Society would long prosper.

The Chemist Comes into His Own

Mr. G. D. SHEPHERD, president of the National Chamber of Trade, who also responded, said the developments that took place in the early part of the last century were more or less mechanical, but in recent years the chemist had come into his own, and latterly they had seen remarkable progress in artificial silks, rubber, the manufacture of moulded products, etc., all of which were based largely on the work of the industrial chemist. In that area they were largely concerned with low temperature carbonisation, and they were depending tremendously upon the work undertaken by the industrial chemist. Any restoration of prosperity in the coal area must depend to a great extent upon the members of the Society of Chemical Industry.

Alderman EDWIN THOMPSON, president-elect, proposed the toast of the president, and said he could not remember hearing Dr. Dunn say an unkind word about anybody, and what was more, he did not believe he had ever thought an unkind thought. There had been no time worse than the past decade and it was reasonably safe to assume that better times were coming.

Dr. DUNN, responding, said he had been touched during his year of office by the help and friendliness and good fellowship which had been extended to him by every member of the Society. It had been his privilege to visit every section of the Society with one exception.

Plasticity, the Servant of Industry

SOME interesting points were raised in the discussion on Professor Freundlich's paper, "Plasticity, the Servant of Industry," which was read before the Plastics Group of the Society of Chemical Industry at Cardiff, on July 19, as reported in *THE CHEMICAL AGE*, July 21.

Mr. W. C. WAGHORNE (president, British Plastics Federation) said he was chiefly interested in fabrication of certain of the synthetic resin materials and it had been borne in upon him in listening to the lecture that most materials with which the plastics industry came into daily contact could be classified as "plastics." In the plastics industry and the moulding of synthetic resin materials the plasticity of metals for the purpose of making moulds was of great importance. Recently attempts had been made to shape such materials as mild steel by pressure for the purpose of such moulds and a fair amount of success had been achieved, but a good deal of trouble had been encountered and he felt convinced that investigation into the plasticity of various steels would enable a more suitable steel to be produced for this process. With regard to the importance of studying various fillers which could be incorporated with synthetic resins, generally speaking only two or three fillers were used in connection with commercial synthetic resin materials to-day, but if the industry was to expand, other fillers would sooner or later have to be used. Whilst the companies concerned with this problem were doing very excellent work he felt they had not explored this subject at all fully because, speaking as a moulder, he had found that whenever they had departed from the usual range of fillers they had produced materials which had not the plasticity of those generally in use.

Internal Stress

Mr. F. SPROXTON suggested that in a place where the normal temperature was very much hotter, some of the materials now classed as thermo-plastics would apparently be plastics, and the main difference between them and other colloidal plastics would disappear. It would be interesting to know whether there was a range of low temperature within which the clays would behave as non-isothermal plastics. One factor in relaxation was time. A plastic body subjected to stress needs time to come to a new equilibrium. If it were a non-isothermal plastic and was cooling during relaxation, its plasticity might disappear before equilibrium was reached. The body was then in a state of internal stress but it did not seem to have been settled whether this strained condition could be permanent or not. If the plasticity of the body really dropped to zero on cooling, presumably the condition would be permanent.

Dr. L. A. JORDAN said Dr. Freundlich had left them in no doubt as to the industrial interest in the subject of plasticity. Unfortunately owing to the paucity, indeed, the absolute lack of quantitative information until quite recent times on this matter, there had been a great deal of loose thinking and loose talking about it. Everybody had shared in these offences and he personally considered that this meeting would long be remembered because of the authoritative statement that had been made with regard to it by such a master of the subject. Thixotropy was an aspect of plasticity upon which Professor Freundlich had started studies which had been followed up in other directions. It was a matter of very great importance in connection with paints, varnishes, and printing inks and was a very serious matter for those who had to translate these properties into terms of industrial use. Paint was also a plastic material but he was a little worried as to whether paints were really thixotropic. It had been found that it was the simple combination of oil and pigment which was definitely thixotropic, but as soon as one came to the complicated systems necessary in making enamels, the thixotropic condition became less and less developed.

The meeting was followed by a luncheon at the Connaught Rooms, Cardiff, arranged by the Plastics Group.

Mr. W. C. WAGHORNE, president of the British Plastics Federation, proposing "The Society of Chemical Industry and the Plastics Group," said he had been connected with

The Discussion on Professor Freundlich's Recent Paper

the plastics industry since his school days. When he started he was concerned with fabricating bitumen, pitch and asbestos compounds and some progress was made by hit or miss methods. In those days they had no use for the chemist or research worker; indeed, they were suspicious of these people as even some manufacturers were to-day. His own early work was on the manufacture of a fire-proof composition consisting of asbestos and fillers mixed with coal tars which was moulded and would not soften under heat.

Value of Research

One day the firm had brought to its notice what was claimed to be a better fire-proof composition and the manager and directors suggested that it was time that a research chemist was engaged. As a pig-headed young fellow he himself was all against this, but a specimen of this material was sent out for examination, and the report was that it was a mixture of asbestos and some pitch-like binder. This at once gave him the opportunity of pointing out how useless the chemist was because it was already known in the works that the substance consisted of asbestos and a pitch-like binder, but they wanted to know what was the composition of the pitch. That, however, was in the early days of the industry and since then his experience had been such that he could pay a sincere tribute to the research work that was being carried out and to the great value it had been in eliminating hit or miss methods and enabling the plastics industry to expand in the remarkable manner it had done from the time when it had only a limited market, and that in the electrical industry. The present position of the moulded plastics industry was due entirely to research work and in this connection it was extremely pleasing to see Sir Harry McGowan present, because his company had done a great deal of work of that nature. Imperial Chemical Industries, Ltd., had entered the plastics industry and Sir Harry McGowan himself had helped tremendously.

The PRESIDENT said that the members of the Society and of the Group were really toasting themselves and he felt bound to say that they deserved it.

Tribute to Mr. Austin Lowe

Mr. H. V. POTTER, chairman of the Group, after thanking Mr. Waghorne for the manner in which he had proposed the toast, also expressed his satisfaction at the presence of Sir Harry McGowan. He wished to take this last opportunity as chairman of the Plastics Group of thanking the members of the committee who had backed him up so heartily and sincerely in a task which had not been at times an easy one, and especially did he thank Dr. Jordan for his assistance, together with Mr. Gibson and Mr. Sproxtton. Last but not least his thanks were due to the hon. secretary, Mr. Austin Lowe, who had had so much responsibility thrown upon him in organising the activities of this Group.

Dr. L. A. JORDAN said he hoped the South Wales Section would accept the apology of the Plastics Group for venturing to take part in this annual meeting of the Society. At the same time he asked the South Wales Section to accept as its thanks the marvellous lecture that had been given to the Plastics Group by Professor Freundlich. For the benefit of those who were not present at that lecture he would say that it was a long time since he had heard such continuous and sustained applause at a scientific lecture as that which greeted Professor Freundlich, and he hoped the South Wales Section would take their reward for the trouble the Plastics Group had been in the fact that it had participated in a very notable occasion. Dr. Jordan also thanked the officials of University College for the use of the building and those who had been concerned with the meeting arrangements.

Chemistry in Modern Road Construction

Road and Building Materials Group Session

THE Road and Building Materials Group held a meeting in the Technical College, Cardiff, on July 20, when problems associated with road construction and research were discussed. The chair was taken by Professor R. G. H. Clements, chairman of the Group, and the meeting was opened by Major S. Evans who read a memorandum prepared by Colonel C. H. Bressley, Chief Technical Officer to the Ministry of Transport, who was unable to be present personally. This was a general review of the manner in which methods of road construction in this country had developed during the past fifteen years.

On the motion of the chairman, seconded by Mr. F. M. Potter, a vote of thanks was accorded to Major Evans, Mr. Potter remarking that road development was of great importance to the chemical industry and also to the coal industry in the matter of carbonisation and development of by-products, as well as in the utilisation of the product of the petroleum industry.

A paper was then presented by Mr. G. H. Whitaker, city engineer and surveyor to the Cardiff Corporation, on "Modern Roadways." This dealt with the engineering and general aspects of road construction preference being expressed for concrete roads over tar macadam, asphalt and other methods of construction. It was pointed out that concrete roads in and around Cardiff had been in operation for many years under heavy traffic conditions without costing anything for maintenance.

Points from the Discussion

Major F. G. TURNER, Engineer-in-Charge of Experimental Research Work, Ministry of Transport, said that four years ago a number of surfaces—tar and bituminous—were laid down on the Kingston By-Pass where the carriage-way was 30 ft. wide and carried 6,000 to 7,000 vehicles per day with an estimated total weight of 13,000 to 14,000 tons, the average speed being very high. At the end of four years these road surfaces had cost nothing for repairs and this indicated that there were specifications which could be worked to using tar and bituminous construction which would carry very heavy traffic satisfactorily. Economies could be effected in road construction if the information in the possession of chemists could be brought, in a simple form, to the notice of gangers and workmen who, for the most part, were dealing with materials of which they had no knowledge of the chemical and physical characteristics.

Mr. S. A. BENNETT spoke of the manner in which the services of chemists were now being sought by road engineers and mentioned a recent case in which his own committee had instructed him to take the advice of a chemist with regard to a certain bitumen material which he himself had thought contained too low a percentage of bitumen, whilst he had also considered that the penetration point at certain temperatures was not correct.

Mr. WEST, engineer, Newport, Mon., Corporation, referred to suggestions made from time to time for incorporating asphalt in tar for road surfacing and added that he had been told by some chemists that asphalt and tar would not combine chemically. Whilst in some cases such a mixture appeared to be satisfactory, in others the tar and bitumen had separated out and given trouble.

Some Useful Hints from Iraq

Mr. F. L. BASSETT, chief chemist, Iraq Government, Baghdad, gave some interesting details of what is being done there in road construction where, he said, it was impossible, for financial reasons, to import such materials as coal tar or pitch. That was actually done seven years ago but it cost between £15 and £20 per ton to get the material to Baghdad. Iraq, on the other hand, was a country with enormous sources in natural bitumen and asphaltic petroleum and it had been a matter for surprise to him that so little had been done with these resources hitherto. About five years ago the Public Works Department asked the Chemical

Department to investigate the natural bitumens and any other materials that were available for surfacing roads. There were available large quantities of material ranging from $\frac{1}{2}$ in. gravel to fine sand and fine gravel and the problem was to use this material in conjunction with comparatively inexpensive bitumen carpets from bitumen obtained in the country and sand. It was found that the natural bitumens suitable for mixing with sand were limited in supply and the places where they were obtainable were very largely inaccessible for development on a large scale. The next step, therefore, was to investigate the petroleum available in Iraq, although none of the sources were very near Baghdad. There was, however, an area of some 200 miles north of Baghdad on the Tigris where a fine asphaltic crude oil was found. This supply belonged to the British Oil Development Co. but was of little use to them as petroleum exploiters because the material actually gave 55 per cent. of residue having a softening point at 55° to 60° C. Thus whilst it was of little use from the point of view of petroleum supplies it was an ideal material for the road engineer. Experiments were therefore carried out with various mixes of this hot bitumen and sand.

An Extremely Cheap Method

About two years ago, Mr. Bassett said, he had the great advantage to meet Mr. Llewellyn, of the Shell-Mex Asphalt Department, Cairo, who came over to Iraq to inquire into the question of surfacing roads and aerodromes for the British Air Force and it was found that they were working along parallel lines. With the advantage of his big organisation, however, Mr. Llewellyn had been able to go much farther and had already been responsible for putting down a considerable length of roads using a similar material in Egypt and Palestine, using residual bitumen made by the Shell Co. at Suez, cut back with 30 per cent. of kerosene. In Iraq he himself had found it an advantage to use a rather less proportion of crude and he had also used rather different end points. There were, however, still a number of points to be settled as regards setting properties, etc. Nevertheless, the trials so far had indicated that this material provided an extremely cheap method of making roads, and not merely surfacing roads. It could be laid on the bare ground after it had been scarified, levelled and rolled. There was an area 800 miles across from Syria to Iraq which required roads and there was no need for cuttings, embankments, bridges or anything of the kind. Moreover, flooding was not at all a common feature and it had been shown that taking the bitumen at £4 per ton and using the best aggregate that could be obtained locally, which did not cost more than 1s. to 1s. 6d. per ton delivered, it was possible to lay roads quite suitable for the traffic to be dealt with for £500 per kilometre, all-in. The traffic consolidated the mass and the consolidation went on simultaneously with the evaporation of the solvent so that the hardening began on the surface and extended gradually downwards. This mixture of bitumen and sand or gravel was a plastic mixture which immediately roughened as soon as the traffic came on to it and if it did not roughen it was immediately known that there was something wrong with the mix. Only pneumatic tyres were allowed on these roads. Finally, Mr. Bassett remarked that Mr. Llewellyn would shortly be publishing an important contribution on this subject.

A NEW company with a capital of 100,000 Egyptian pounds has been established with a view to putting into effect the plan drawn up some time ago by the Egyptian Department of Commerce and Industry and consisting of the construction of a sulphuric acid plant, and the erection of a factory for the manufacture of superphosphates from Egyptian natural phosphates. These two plants will be installed in the desert, near Suez. The new company is affiliated with the Banque Misr, a semi-governmental institution, which takes an active interest in the development of local industries.

The Institute of Chemistry Examinations

Examiners Report Some Disappointments

SIXTY-FIVE candidates sat for the April-May examinations of the Institute of Chemistry, and thirty-two passed. The numbers in the various sections were as follows:—

	No. Examined.	No. Passed.
<i>For the Associateship—General Chemistry</i> ..	43	22
<i>For the Fellowship—</i>		
Inorganic chemistry	1	1
Inorganic chemistry, with special reference to metallography	1	1
Organic chemistry, with special reference to the chemistry of oils and fats, excluding mineral and essential oils ..	2	2
Biochemistry	1	0
Biochemistry, with special reference to physiological chemistry and bacteriology	1	0
Chemistry, including microscopy, of food and drugs, and of water	11	4
Industrial chemistry, with special reference to pharmaceutical chemicals, drugs and pharmaceutical products ..	1	0
<i>Special Examinations—</i>		
The chemistry and biology of water supply	1	1
General analytical chemistry	2	0
The chemistry of oils, paints and varnishes	1	1
	65	32

In their report, an abstract of which has just been published in the Institute's Journal, the examiners state that the work of the candidates in the inorganic chemistry section of the examination for the associateship in general chemistry was distinctly better than usual. In the written papers all the questions were attempted, but some curious preferences appeared. A question on catalysis was attempted by almost every candidate and often done fairly well, but few attempted a question on gas analysis, and of these only a few gave good answers to it. Some good and interesting accounts of research work were given. In the afternoon paper, questions of a historical character were less often chosen and not so well done as the rest. The practical work was well done by the better candidates, but it is disappointing that so many of those who are already engaged in chemical work should not be able to obtain more accurate results, and should fail, as they often do, to work out their results in a simple, workmanlike fashion. Much more attention should be given by candidates to acquiring direct and simple methods of calculation. In particular, volumetric calculations should be carried out as far as possible in terms of normality. It is bad practice to carry out the main body of a volumetric calculation in weights of reacting substances.

Organic Chemistry

The written work in organic chemistry of many candidates was, on the whole, disappointing. Candidates should realise that the minimum standard required is equivalent to a good honours degree. A knowledge of *very* recent work is not required, but answers should show an adequate knowledge of classical organic chemistry. In far too many cases it was obvious that candidates had read little more than an elementary textbook of the subject and fell far short of the standard required. Perhaps this is best brought out by the number of answers which gave, as the methods of preparing aromatic aldehydes and ketones, the oxidation of alcohols, the reduction of acids and the distillation of calcium salts. The Gattermann methods, the Reimer-Tiemann, the Friedel-Craft reactions and the methods depending on the controlled oxidation of the methyl group were seldom mentioned. Again, many of the essays on the keto-enol tautomerism were confined to little more than a statement that the phenomenon existed in ethylacetoacetate with no reference to Knorr's or Kurt Meyer's work, or to the fact that compounds existed in which the proportion of enol varied from 0 to 100 per cent. The answers to a question asking for details of two

simple preparations often showed little acquaintance with the experimental method. Many candidates were ignorant of how to work up the product in the Skraup synthesis of quinoline, some crystallised the quinoline; several treated chloroacetic acid with potassium cyanide in the preparation of ethyl malonate. Many did not know how to prepare thionyl chloride, and several confused it with sulphuryl chloride. Several candidates suggested that silver oxide is prepared by precipitation with ammonia and others by the ignition of silver carbonate or oxalate. In one or two cases the calligraphy and English were very poor. Examples of the association of work with individual chemists were often unfortunate; Fischer, Kiliani and Haworth were sometimes confused.

Practical organic exercises were, generally speaking, quite well done, but the examiners point out a serious deficiency in the training of many of the candidates. One preparation set was not to be found in any of the usual books of organic preparations, and a surprisingly large number of candidates had no idea how to obtain any information about the method, being quite unacquainted with Richter or Beilstein, which were available in the examination room. Such candidates cannot well be regarded as being trained chemists. Where these books are not available in college libraries, as they should be, teachers should endeavour to explain their use.

The microscope is a valuable instrument to chemists, and some candidates would have avoided error had they used it instead of depending on the melting-point of the osazones to identify the sugar. Several candidates failed to recognise that one of the identifications contained un-ionisable bromine as well as ionisable chlorine, although they isolated the bromoaniline.

Examination for the Fellowship

In the theoretical papers on the chemistry (including microscopy) of food and drugs and of water, almost every candidate appeared to have a satisfactory knowledge of a systematic procedure for the microscopic examination of the various types of vegetable drug and was familiar with the diagnostic characters presented by them. The majority also were aware of the present technique for the detection and determination of extraneous water in milk, did justice to the theory of freezing-point depression, and were familiar with the Hortvet apparatus. A question on the estimation of tin and copper in canned goods, and one on the determination of fat in ice cream, drew several unsatisfactory replies, especially in view of the fact that the candidates are presumed, of necessity, to have had considerable laboratory experience in the examination of such materials. Widely divergent views were expressed on the sewage effluent problem, and, while certain candidates fairly justified the non-putrefactive nature of the effluent, few criticised it in relation to the sewage from which it purported to be derived—in other words, noticed that the samples were not comparable! With few exceptions, there was no mention of the specific rôle played by enzymes in cheese production. It was further disappointing to have, in most cases, scanty replies to the question respecting our indebtedness to outstanding men who did so much to further the work of the public analyst.

Practical work on cheese (involving examination of the separated fat) was, on the whole, fairly well performed, and the opinions expressed were generally in keeping with existing requirements. The physical and analytical constants of the almond oil provided were determined in a satisfactory manner, although the adulterant (apricot-kernel oil) was entirely missed by one or two of the candidates. In certain cases, the results on the cream of tartar, the sweets and the water were erratic, and showed a lack of experience and an incapacity to search out the critical determinations for purposes of subsequent interpretations. The straightforward quantitative work was quite sound, but conclusions, often drawn from insufficient data, were sometimes very wide of the mark.



An interesting assembly of steam piping that would be difficult and expensive to duplicate without the use of welding is illustrated. Such pipework is present in many modern factories.

This article gives some useful hints upon the welding of pipe-work. It is reprinted by permission from "Oxy-Acetylene Tips" which is published by the Linde Air Products Corporation, New York, a unit of the Union Carbide and Carbon Corporation.

Industrial Pipe Welding Practice

BECAUSE of a number of factors, such as personnel, time limit of construction, working conditions, and size of the job, oxy-acetylene fabrication and erection practices of industrial piping vary considerably. There are, however, two main types of erection practice largely used to-day into which most jobs can be classified, namely, shop fabrication, where a large proportion of the piping is welded in units in a shop and carried to the job for erection; and fabrication on the job, where the pipe is delivered directly to the job and all work carried out on location. Choice of method will be governed, of course, by the special considerations and circumstances surrounding each job.

Workshop Fabrication

Erection can often be simplified on large jobs by fabricating as many pipe units as possible in the shop and delivering these units to the job. Branch connections, headers and specials are much more easily and readily fabricated in the shop. This means that when the fabricated piping is taken to the job, tie-welds are all that are necessary. For this type of work accurate measurements should be taken from the job for the shop fabrication, and to eliminate any necessity for the insertion of short extra pieces where short measurements have been made, a certain amount of overlap should be allowed at important tie-in joints. Where flanges on a fabricated section are to connect up to equipment whose exact location is not yet fixed, the flanges may simply be tack-welded to the section for ready adjustment in erection.

Undoubtedly past experience of any contractor in this line of work will be a determining factor in the decision of just how to go about erection of a pipe job. Contractors who have had little experience in this line of work will obviously draw upon the experience of others for assistance in estimating and planning for erection. The recent experience of a contractor may be of some assistance to those contemplating similar work. The original intention was to install a completely screwed and flanged system, but it was pointed out that a very attractive saving would result both to the contractor and to the building owners if a welded installation

American Methods Are Efficient and Economical

were made. The job was sketched off to welding dimensions from the blueprints and work started. Each individual pipe section was made up in a field shop conveniently located near the job, each section numbered in the same manner as structural steel items are numbered for erection, delivered to the right part of the building, hoisted into place and then welded. For this particular job this method proved to be eminently satisfactory because practically two-thirds of all of the welding was done in the shop on the bench and the only welds in place were the necessary tie-in welds. The entire job was welded into place by one welder. As fast as the various sections were rigged into place by the steam-fitters, they were tied-in, thereby cutting labour costs to a minimum.

In making up the elbows throughout the job a standard radius was used for the various diameters of pipe in order to give uniformity throughout. All of the pipe was standard wrought iron and welded with high test steel welding rod in order to assure strong permanent joints. One particularly interesting feature of this installation was the use made of a special pipe cutting and bevelling machine. Through its use the originally estimated cost of the job was considerably reduced. This was a machine recently developed, which, when attached to the pipe, both cut and bevelled the pipe with one cut for any given contour. For instance, with this machine the contractor could both cut the end of a 3 in. branch, and the hole into which the branch would fit for, say, a 6 in. header, so that a perfect fit ready for welding would result. This could be done with any combination of sizes or angles. It insured absolutely accurate cuts and also gave a workmanlike appearance to the finished job.

On all diameter pipe 4 in. and above, four-piece elbows were fabricated. This was done to satisfy the desire for a joint which would conform closely to a smooth radius turn.

When the job was completely covered with insulation it was interesting to note that it was impossible to tell whether a segmented fitting or a smooth radius elbow had been used. The contractor who covered the piping with insulation estimated that there was a 30 per cent. saving on labour over the ordinary screwed and flanged type of installation. This is not unusual as it has been universally found on welded jobs that ease of insulating the pipe is greatly increased as is the appearance of the finished job.

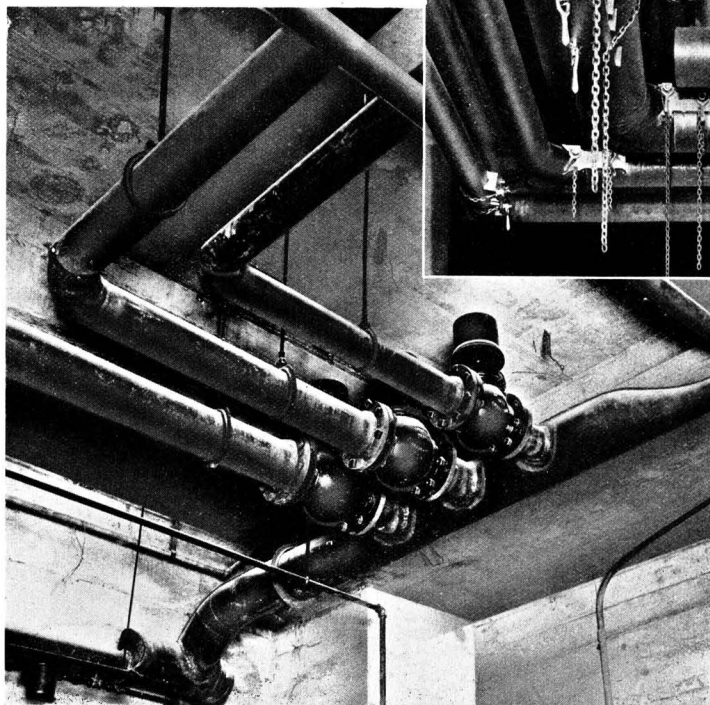
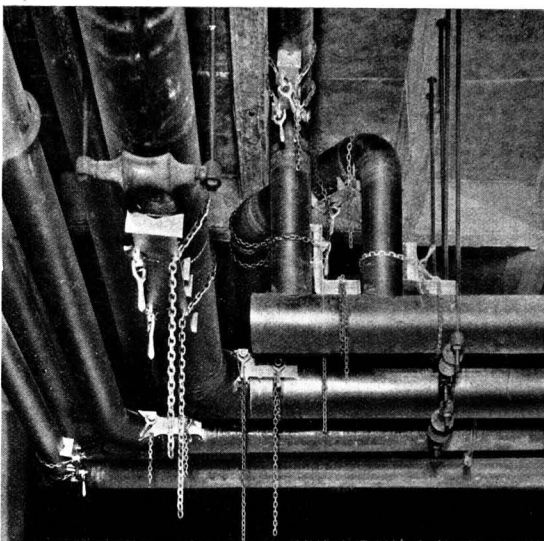
Careful attention was given to the laying out of details. The use of the angle cutting machine also contributed, as it was possible to make all fittings uniform and to exact degree. As the entire system was laid out to assure adequate drainage, it was possible, when making up a 90-degree elbow, for instance, to give the necessary degree of pitch only on the last mitre cut. This simplified the fabrication of these elbows and turns considerably. All expansion joints were fabricated by welding. On the final tests no leaks developed, and under steam pressure where the pipe led from one room to another, no evidence of pipe movement was noted, showing that the system was laid out properly, the expansion joints in the proper place, and movement correctly taken care of.

Fabrication of all piping on the job, ordinarily in the same location where the particular pipe unit is to be installed, is quite practical where the piping is fairly simple or when it is inconvenient to bring in fabricated sections. There are

two general plans for doing this. The unit sections can be fabricated and welded in the most convenient location on the erection premises, generally on the floor or the ground. The sections are then raised into position and tie-in welds are made. If this is done the amount of scaffolding required is reduced to a minimum and most of the welding is carried out where less labour and materials are required. This is in reality but a slight deviation from the practice of shop fabrication, just discussed, but because the work is done on the premises it is mentioned in this division of the article. Alternatively as much welding as possible can be done in position; only those welds that would be extremely awkward or impossible of execution in position are made before erection.

This method has been found particularly advantageous where welding elbows and other pre-fabricated fittings are employed. Only line joints are required in erecting mains and risers and the only necessary cutting is in preparing lengths of pipe to size. Except for a secondary main or riser of considerable importance, the making of branch connections is left for the welder making tie-in or position welds. The increased expense of welding in position brought about by using this plan is balanced by the more efficient functioning of the erection crew. This crew places the piping in position with but little preliminary welding or cutting and their work is completed after the joints are either tack-welded

The use of clamps enabled the steam fitters to assemble this job completely and leave it ready for the welder who thereby encountered few difficulties.



Here a special machine was utilised for cutting all segments of bends and reducers to exact size, shape and bevel ready for the welding operation. By this means a workmanlike appearance was obtained in the finished assembly.

or clamped. Then the welders follow behind with nothing to do but make the welds.

Welded construction makes the work of steam fitting much easier. The steam fitter who has had special training in welding does practically all of the welding on the jobs, welding all the mains, most of the turns, all headers and tee connections and a considerable number of risers. He also cuts angle iron hangers and clamps for both plumbing and heating work and makes up anchors and pipe stands. A considerable part of his time is spent on this class of work during the first part of every job. When no work has been laid out and erected ahead of him, he works with the other steam fitters preparing pipe and fittings for erection.

The piping on the job should be erected so that the body of the steamfitting crew can work practically independently of the man doing the welding. In preference to tack-welding, the contractor makes use of pipe clamps which are designed to hold all sections in exact position ready for welding. A device that is fast and accurate and gives good fits without trimming is used for laying out holes and saddles. This also assists in making an economical weld. By this means no templates or patterns are required for the headers or the branches. The main header is centre-lined quickly by the use of a centre finder with which the exact opposite

sides of the pipe could be marked. A straight angle iron is then laid on the pipe at these points and the centre line drawn with soapstone. The centre of the hole to be cut is centre punched and the hole marked out. Saddle patterns are laid out in a similar manner, but the pipe is centre lined on both sides and two marks are made. One of the accompanying illustrations shows a header erected in its permanent position, solidly clamped, and ready for the welder. It can be seen that the large valves and piping are held in their final position by means of these clamps. Nothing on the header is tack-welded.

Considerable thought should be given to the installation of risers, particularly if speedy erection is desired. By starting at the bottom and adding one length of pipe at a time until the top or an offset is reached, it will be found to be a simple matter. The bottom length should be set on a lubricated bearing plate or on a plate turning on ball or roller bearings so that the riser can be turned to suit the convenience of the welder. For this method one welder will be sufficient for carrying out the work. If clamps are used, however, the turning of the riser will not be necessary. Clamps are particularly useful for joint alignment. Since correct spacing of the joint is specially important for making horizontal welds this phase should be given careful attention.

Purity of Bathing and Drinking Water

An Outfit for Determining Free Chlorine

It is common knowledge that during the last few years there has been a large increase in the number of swimming pools throughout the country, and their use has become a popular vogue. The obvious necessity for keeping the water "sweet" has led to the adoption of various chlorination processes, but it seems that frequently the operation is conducted in a somewhat haphazard manner, and an excessive amount of chlorine in the water has resulted in painful conditions of the eyes, nose, mouth and throat. A pamphlet which has just been issued by the British Drug Houses Ltd., describes an outfit and a new reagent for the accurate determination of residual chlorine in water which has been purified by chlorination. One of the advantages of the outfit is that it can be operated by a swimming bath attendant without difficulty.

The amount of chlorine necessary to purify water varies according to the number of bathers using it and the interval between each treatment. It is absolutely essential that a correct excess of chlorine should be used, and thus it becomes necessary to test the water after each addition of the chlorinating agent in order to ensure that the latter is present in the proper excess. This must be not less than 0.2 part and not more than 0.5 part per million parts of water. Such water will be practically free from bacterial contamination and from unpleasant odour and it will not affect the eyes in any way.

Careful Distribution Essential

The sterilisation of water may be effected either by direct use of chlorine gas or by the addition of sodium hypochlorite solution to the water. In either case, the amount necessary to purify the water must be found by trial; it must be carefully distributed through the water and sufficient must be added to ensure that the excess of chlorine lies between the limits already mentioned.

The new test which has been introduced by the British Drug Houses Ltd., depends on the colour produced on mixing measured quantities of the water with a special reagent known as Chlorotex Reagent B.D.H. If the water contains no free chlorine, a white milkiness but no colour is produced; if the free chlorine amounts to 0.2 part per million, a pink colour develops. With 0.3 and 0.4 part of chlorine per million, deeper pink colours are produced and with 0.5 part of chlorine per million of water, the colour becomes red. With 0.6 part of chlorine per million of water, the colour is purple, while with 0.8 or 1 part of chlorine per million

parts of water the colour is violet or blue. Thus by simply mixing measured quantities of the reagent and the water under test, the amount of free chlorine is indicated directly by the colour of the resulting mixture in accordance with the following table:—

<i>Colour produced.</i>	<i>Free Chlorine parts per million parts of water.</i>	<i>Indication.</i>
White and milky	None	} Water insufficiently chlorinated.
Faintly pink and slightly milky	0.1	
Pink	0.2	} Water sterile and suitable for use.
Red	0.5	
Purple	0.6	} Too much chlorine present.
Violet	0.8	
Blue	1.0	

Green and brown colours indicate a chlorine content exceeding 1 part per million.

For successful chlorination, it is necessary to add sufficient of the chlorinating agent so that when the water is tested by Chlorotex Reagent a pink to red solution is produced. If the colour be purple, violet or blue, then too much chlorine has been added; if the mixture is colourless and milky or only faintly pink, insufficient chlorine has been used.

The B.D.H. Chlorotex Outfit provides everything necessary for rapid determinations of the amount of free chlorine in water. It comprises a 100 c.c. bottle of Chlorotex Reagent, two cylindrical measures, a graduated pipette, a stirring rod, and a colour chart indicating the amount of chlorine corresponding to each colour.

Sulphur Deposits in Turkey

As part of the Turkish "Five-Year Programme," it is planned to develop the sulphur deposits of Isparta and Smyrna. Data to formulate a sound or accurate idea as to the value of these deposits is not available. A concession for the development and exploitation of these deposits, held by a foreign company for many years, has been annulled as a result of non-execution of conditions by the company. It is understood that development and exploitation of these deposits will be under the auspices and control of the Sumer Bank and the Ish Bank. An initial expenditure of approximately 150,000 Turkish pounds is contemplated.

New German Technical Books

Reviewed by Dr. Felix Singer

TRADE ASSOCIATION OF THE CHEMICAL INDUSTRY (Berufsgenossenschaft der Chemischen Industrie): Regulations for the Prevention of Accidents (Unfallverhütungsvorschriften), from April 1, 1934. Berlin: Carl Heymann.

THE large edition of "Regulations for the Prevention of Accidents" is primarily intended, according to the editress of the Trade Association of the German Chemical Industry, for German conditions and German legislation. Nevertheless, such a work, founded on the abundant experience of the large German chemical industry, must call forth a general interest. Viewed from this aspect, these "Regulations" possess a general material significance.

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THE RATIONALISATION OF CHEMICAL-TECHNICAL PRODUCTION (Die rationelle Gestaltung der chemisch-technischen Produktion). By Dr. phil., Dr. rer. pol. Hans Hoppmann, Leuna, near Merseburg. Berlin: Verlag Chemie G.m.b.H.

THE author of this interesting contribution to technical economy, a chemist as well as a political economist, is connected with the biggest nitrogen works in Germany. This short description of his personality leads to a critique of his delineation of "The Rationalisation of Chemical-Technical Production." He attempts, in a relatively short work of 140 pages, to give a survey of chemical-technical problems. He is quite conscious that it cannot be a question of a handbook of chemical technology. Very outspoken is the political intention of the author to combat the reproach that the rationalisation of a process of production attacks the interests of national economy. He represents that the rational position of a chemical-technical process is not likely to free manpower. Hoppmann means to refute the reproach that rationalisation is one of the chief causes of unemployment. He first describes rationalisation in general, then rationalisation of chemical-technical production as regards the consumer (rationalisation of consumption) as well as regards the operative. In this latter respect the planning and rational hypothesis of a chemical process is as interesting as his description of rationalisation in the chemical plants. A long closing chapter deals with rationalisation in a constructive sense. "The chemical industry," states the author, "must proceed on the road to rationalisation of its production, not only in its own interests, but also in the interest of the whole of national economy."

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PROGRESS OF CHEMICAL APPARATUS (Fortschritte des chemischen Apparatesens): Electric Kilns. By Adolf Braeuer and Josef Reitsstötter. Leipzig: Akademische Verlagsgesellschaft m.b.H.

THE joint authors of this work, who are so well known through their "Progress of Chemical Apparatus," have now edited a separate work in which they deal with electric industrial kilns and the engineering and mechanical contrivances which go with them. As it cannot be decided from the start in the case of many kilns whether they are suitable for more than purely technical purposes, the editors have aimed at absolute completeness in this work. For this reason kilns in particular have been used for the working up of metal, for here chemical questions play an increasing rôle. In the classification and arrangement of the very extensive material, electric features are placed in the foreground. Bräuer and Reitsstötter have described, in co-operation with several colleagues, especially with H. Alterthum, of Berlin, all kinds of electric kilns. In this chapter are also the essential accessories of the kilns in so far as they are necessary for electrical equipment. In a second main chapter the mechanical appliances are dealt with, which are partly of a special nature and which refer to a special type of kiln. In a third part the purpose of the kiln is the standard principle of classification whereby an attempt is made to apply a classification in place of a mere list, in order to maintain relationship and give a survey. Especially interesting is the complement of German patents by foreign patents, and British and North American patents are rendered with the utmost completeness. This work is as careful as it is excellent, and will be of service to everyone interested.

Road and Rail Transport

Scheme to Reduce Distribution Costs

PRIOR to January 1, 1934, the charges made by the railway companies for the carriage of goods and merchandise were fixed on a ton mile basis according to distance and class of goods carried. The railway companies were bound by law "to make equal charges to all persons in like circumstances" and "to accord no undue preference to any person, company or description of traffic." Hitherto the Government has adopted the policy of fostering the smaller trader, recognising that in his prosperity lay the prosperity of the country as a whole.

The Road and Rail Traffic Act of 1933 indicated a change in that policy in relation to transport charges which are, of course, a vital factor in the well-being of any trader. Now railway companies may, subject to the consent of the Railway Rates Tribunal, make "agreed charges" for the carriage of goods. They are thus able to quote "flat" or "composite" rates to a trader, calculated on some basis other than that of a charge per ton mile.

A number of such "agreed charges" have already been applied for and granted and take the form of a flat rate per ton irrespective of distance. In one instance the flat rate granted is a small percentage of the purchase price of the goods to be carried. In these new facilities lies a very real danger to the small trader—a danger which is not yet fully appreciated by the majority of traders. Formerly all rates had to be made on a ton mile basis.

The Right to Object

THE saving in transport costs based on a flat rate compared with a ton mile rate is in many instances so considerable as to convert a profitable transaction into a serious loss to the small trader. Provisions are contained in the Act for a trader whose business is detrimentally affected to object to the Railway Rates Tribunal against the making of an agreed charge or for the fixing of a charge in his favour.

The Traders' Defence Association has been formed to protect traders whose business will suffer as a result of the new powers in relation to railway rates which have been conferred upon the railway companies under Part II of the Road and Rail Traffic Act 1933. The Association, with its legal, accountancy and railway rating experts will undertake this work on behalf of its members in consideration of an annual subscription of one guinea.

Under the same Act a system of licensing of goods vehicles is introduced and the Association for a small subscription based on the number of vehicles in a fleet and the type of licence required will deal with members' licensing difficulties through its locally appointed solicitors. It is only through organisation that an effective barrier can be placed against the trade of the country falling into the hands of the few who will acquire monopolies. Although the initial object of the Association is to deal with the agreed charges question, believing that this constitutes the greatest potential danger to small traders at the present time, it does not propose to limit its activities to these matters in the future, but will deal with all problems affecting the smaller trader from time to time as these arise. Traders interested should address their inquiries to the Secretary, Traders' Defence Association, 37 St. Nicholas Street, Bristol.

Dyestuffs (Import Regulation) Acts

Dyestuffs Advisory Licensing Committee

THE Board of Trade have appointed the following gentlemen to be a committee to advise them with respect to the granting of licences under the Dyestuffs (Import Regulation) Acts, 1920 to 1934:—Independent Members: Mr. R. Waddington (chairman), Professor A. Lapworth, D.Sc., F.R.S., Mr. G. H. Nisbett. Dyestuff Makers: Major L. B. Holliday, Mr. D. R. Mackay, Mr. W. J. U. Woolcock. Dyestuff Users: Mr. P. Caldwell, Mr. S. T. Kinsman, Mr. N. G. McCulloch, Sir Henry Sutcliffe Smith, Mr. C. M. Whittaker. Mr. F. W. Hammond has been appointed secretary to the Committee.

Letters to the Editor

Motor Fuel Proprietary, Ltd.

SIR.—In view of the many inquiries received from shareholders by the board, caused, no doubt, by rumours and violent fluctuations in the share market, the directors again wish to assure the shareholders that in their opinion the company own a most valuable process, results from which greatly surpass those of any known process. In their opinion when the undertaking is commercialised it will prove of the greatest national importance.

Although it is no duty of the board to advise as to the share market, in view of the many inquiries they have received on this subject, they can only state that they hope the genuine shareholders will not be induced to part with their holdings on rumours—or on fluctuations which the directors are in no way able to control.—Yours faithfully,

GEO. W. ASKEW,
Secretary,
Motor Fuel Proprietary, Ltd.

14 St. Mary Axe,
London, E.C.3.

The Distillers Co., Ltd.

Increased Trade in Industrial Spirit

THE fifty-seventh annual general meeting of The Distillers Co., Ltd., was held at Edinburgh on July 20.

The outstanding feature of the report was the recommendation of the directors to restore the cut in the dividend, which was reduced two years ago to 17½ per cent. and has now been brought back to 20 per cent., the rate paid in each of the seven preceding years.

Mr. William H. Ross, chairman of the company, who presided, said the most productive increase in business last year was in the domain of industrial spirits. For the year ended March 31, 1933, the total trade of the country in industrial spirits for all purposes was 22,160,000 proof gallons, while for the year ended March 31, 1934, the trade had reached a total of 32,860,000 proof gallons, or an increase of over ten million proof gallons. Had such an increase been recorded on the potable side of the company's business, they would have looked for a much more substantial increase in profits, for the margin of profit on industrial spirits is much smaller than that of spirits for beverage purposes. A considerable proportion of this new business arises from the manufacture at Hull of solvents by the subsidiary company, British Industrial Solvents, Ltd. Another new outlet recently opened up is in the sale of a new motor fuel known as Cleveland Discol, which has been placed on the market by the Cleveland Petroleum Products Co., of London. Although the Distillers Co. have no interest in the profits of that concern, they have given them the right to use the trade mark "Discol" in return for the exclusive contract from them for the alcohol contained in the mixture.

Other important branches of the company's trade were those in yeast and malt extract, the turnover in which has been fully maintained in spite of severe competition at home and from the Continent. This is due in large measure to the very high standard of quality which is maintained through the zealous co-operation of the works department and research laboratories.

For a number of years the subsidiary company, Honeywill and Stein, Ltd., which is mainly engaged in general chemical and industrial development work, acted as agents for the sale in this country of a Canadian-produced plaster board called "Gyproc" and other products. These met with such a degree of success that the Distillers Co. were encouraged to enter into an agreement with Gypsum, Lime and Alabastine, Canada, Ltd., to incorporate a new company to meet the growing demand for this material by manufacturing it in this country. They have accordingly taken a 60 per cent. interest in this new company, Gyproc Products, Ltd., the remaining 40 per cent. being held by Canadian friends. Production on a substantial scale has now begun at the new factory at Rochester, and, having great confidence in the superiority of their product, the company look forward to a growing and profitable business.

Death of Professor R. M. Caven

An Authority on the Phase Rule

PROFESSOR ROBERT MARTIN CAVEN, of the Royal Technical College, Glasgow, died on July 16, at 41 Fernleigh Road, Newlands, Glasgow, following a brief illness. He attended the College up to the middle of June and had completed his course of lectures before he was compelled to take to his bed. Under the superannuation scheme of the College he was due to retire next year.

When he was appointed to the Chair of Inorganic and Analytical Chemistry in the Technical College in 1920, Professor Caven relinquished the post of Principal of Darlington Technical College and immediately drew attention to himself and his work by his attractive manner of lecturing. He was in great demand as a speaker at the various meetings of the Chemical Society, both of the local section, of which he was chairman, and also of the national body, on which he served as a member of the Council. Early this year he delivered a lecture on Joseph Priestley to the members of the London Section. Since his student days at London University, where he graduated Doctor of Science, he had interested himself in research work in the application of the phase rule, and during his work in Glasgow he had made valuable contributions to scientific literature in this connection.

Professor Caven, who was 64 years of age, is survived by his wife and one daughter.

Lawn Tennis Tournament

Draw for the Doubles Semi-Finals

As a number of competitors in the fourth annual CHEMICAL AGE Lawn Tennis Tournament are taking their holidays shortly, the draw for the semi-finals of the doubles has been made this week in order to facilitate the playing of the matches without any unnecessary delay. Details of the draw are as follows:

Marcus, A. S., & Trigg, G. H.
Bovril, Ltd., 148-166, Old Street,
London, E.C.1. (Clerkenwell 1202.)

Copp, C. G., & Hayman, R. D.
Doulton & Co., Ltd., Lambeth,
S.E.1. (Reliance 1241.)

Speakman, W., & Chaloner, S. E.
Monsanto Chemical Works, Ltd.,
Rusbon, North Wales. (Rusbon 3.)

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

Prosser, V. J., & Baxter, A.
John Haig & Co., Ltd., Kinnaird
House, 2, Pall Mall East, London.
(Whitehall 1040.)

The third round match between Copp and Hayman (Doulton and Co., Ltd.) and Chaloner and Speakman (Monsanto Chemical Works, Ltd.) will be played to-day (Saturday). The semi-finals should be arranged as soon as possible, so that we may publish the results by the end of August.

In the third round of the singles, S. E. Chaloner (Monsanto Chemical Works, Ltd., Rusbon) has received a walk-over as his opponent, R. F. Porter (Howards and Sons, Ltd.), has scratched. A. Baxter (United Yeast Co., Ltd.) has beaten G. F. Hammond (Williams, Hounslow, Ltd.) by 6-1, 6-3. There is still one third round match to be played, and the survivors of the third round will proceed immediately with their fourth round matches, as set out in THE CHEMICAL AGE of July 7. We hope to publish particulars of the draw for the singles semi-finals next week.

A New Chemical Cleanser

A NEW chemical cleanser, known as "Woggo," has been placed on the market by the Pyrophosphate and Cream Powder Co., Ltd. It is an ideal degreasing and cleansing material for all delicate metals such as aluminium, duraluminium, brass, copper, steel, zinc, tin, etc. It is non-poisonous, non-inflammable and non-explosive, and does not affect the skin. The cleansing properties are claimed to be unsurpassable. It instantaneously dissolves grease, oil, fat, etc., and makes the surface of the metals ready to take lacquer or enamel. A solution of "Woggo" is very useful for cleaning greasy and dirty inaccessible metal parts.

British Overseas Chemical Trade in June

Notable Increase in Exports for Past Six Months

The Board of Trade returns for the month ended June 30, show that exports of chemicals, drugs, dyes and colours were valued at £1,713,693, an increase of £46,493, as compared with June, 1933. Imports were valued at £879,549, an increase of £87,712. Re-exports were £41,175. For the six months ended June 30, exports reached a total value of £9,737,372, as compared with £9,066,381 for the corresponding period of 1933, representing an increase of £670,991.

Imports

	Quantities.		Value.			Quantities.		Value.	
	Month ended June 30, 1933.	Month ended June 30, 1934.	Month ended June 30, 1933.	Month ended June 30, 1934.		Month ended June 30, 1933.	Month ended June 30, 1934.	Month ended June 30, 1933.	Month ended June 30, 1934.
Acids—					Ointments and liniments				
Acetic .. cwt.	14,770	12,957	23,834	24,019	.. cwt.	52	15	3,447	621
Boric (boracic) ..	2,363	3,014	2,169	2,917	Proprietary medicines, not elsewhere specified	—	—	21,032	31,888
Citric ..	2,381	1,790	7,372	5,111	value	—	—	40,617	42,176
Tartaric ..	4,550	2,750	17,302	11,536	Other manufactured sorts	—	—	42,623	38,274
All other sorts .. value	—	—	9,242	10,830	value	—	—	79,179	121,159
Calcium carbide .. cwt.	70,875	75,348	36,612	38,355	Raw or simply prepared	—	—	18,226	12,286
Potassium compounds—					value	—	—	11,223	11,354
Caustic and lyes	10,643	8,906	13,201	9,372	Finished dyestuffs (coal tar) .. cwt.	3,411	4,625	11,255	15,569
Chloride (muriate) ..	16,500	29,939	9,002	12,894	Extracts for tanning—				
Kainite and other mineral potassium fertiliser salts .. cwt.	900	4,339	131	666	Chestnut .. cwt.	26,255	18,014	18,826	12,286
Nitrate (saltpetre) ..	6,288	2,851	5,558	3,376	Quebracho ..	19,059	18,968	11,223	11,354
Sulphate ..	4,640	3,100	2,560	1,467	All other sorts ..	14,296	22,249	11,255	15,569
All other compounds ..	9,564	8,698	14,364	14,544	All other dyes and dye-stuffs, etc. .. cwt.	5,553	5,685	13,478	14,088
Sodium compounds—					Painters' colours and materials—				
Carbonate, including crystals, ash and bicarbonate .. cwt.	30,909	15,314	9,552	4,850	White lead, basic carbonate .. cwt.	6,986	7,994	8,577	9,242
Chromate and bichromate .. cwt.	3,634	4,562	5,295	6,616	Lithopone ..	18,563	24,933	13,551	17,099
Cyanide ..	—	1,855	—	4,230	Ochres and earth colours				
Nitrate ..	100	3,218	29	922	.. cwt.	27,151	33,383	9,464	11,071
All other compounds ..	37,951	19,659	25,084	15,101	Bronze powders ..	5,621	1,795	18,878	11,430
Other chemical manufactures .. value	—	—	227,157	239,431	Carbon blacks ..	29,439	44,828	35,639	68,497
Drugs, medicines, etc.—					Other pigments and extenders, dry .. cwt.	28,031	28,193	8,590	8,772
Quinine and quinine salts	62,900	111,944	4,560	9,133	All other descriptions ..	10,132	17,717	22,577	34,270
Medicinal oils .. cwt.	4,731	2,179	10,833	7,476	Total .. value	—	—	782,837	879,549

Exports

Acids—					All other descriptions				
Citric .. cwt.	4,481	3,991	14,939	13,319	value	—	—	172,199	192,177
All other sorts .. value	—	—	18,682	23,194	Drugs, medicines and medicinal preparations—				
Aluminium compounds					Quinine and quinine salts				
Ammonium sulphate .. tons	1,351	2,221	8,186	19,059	.. ozs.	102,270	80,973	10,243	9,399
Other ammonium compounds .. tons	22,216	23,269	127,892	131,750	Proprietary medicines				
Bleaching powder (chloride of lime) .. cwt.	676	1,243	11,306	16,325	value	—	—	91,380	83,092
Tar oil, creosote oil, etc. gal.	2,791,337	3,051,062	39,088	59,413	All other descriptions ..	—	—	110,628	129,747
Other coal tar products					Dyes and dyestuffs and extracts for dyeing and tanning—				
value	—	—	30,858	28,523	Alizarine and indigo (synthetic) .. cwt.	1,428	3,476	9,802	15,679
Copper, sulphate of .. tons	13,275	6,241	194,967	84,383	Other finished dyestuffs (coal tar) .. cwt.	4,630	5,822	57,090	76,292
Disinfectants, insecticides					All other descriptions ..	18,367	16,816	21,271	22,685
.. cwt.	29,297	31,980	67,553	65,061	Painters' colours and materials—				
Glycerine ..	13,490	35,032	24,173	66,720	Ochres and earth colours				
Lead compounds ..	12,091	10,762	15,049	13,591	.. cwt.	20,267	15,448	21,200	13,368
Magnesium compounds					Other pigments and extenders, dry .. cwt.	17,351	15,803	17,088	22,280
.. tons	389	432	9,383	10,607	White lead ..	4,195	5,779	8,247	10,918
Potassium compounds					Paints and painters' enamels, prepared cwt.	35,908	43,598	94,049	111,463
.. cwt.	7,003	6,735	14,096	14,219	Varnish and lacquer gal.	73,125	83,897	29,004	34,085
Salt (sodium chloride) tons	19,449	15,795	51,795	39,123	All other descriptions				
Sodium compounds—					.. cwt.	35,447	26,900	72,512	58,762
Carbonate, including crystals, ash and bicarbonate .. cwt.	328,685	444,489	87,791	107,857	Total .. value	—	—	1,667,200	1,713,693
Caustic soda ..	140,528	171,190	91,531	105,181					
Other sodium compounds									
.. cwt.	152,802	154,942	101,675	98,982					
Zinc oxide .. tons	1,387	1,048	26,879	20,437					

Re-Exports

Chemical manufactures and products .. value	—	—	624,430	16,594	Dyes and dyestuffs and extracts for dyeing and tanning .. cwt.	828	1,089	1,128	1,828
Drugs, medicines and medicinal preparations—					Painters' colours and materials .. cwt.	332	324	561	604
Manufactured or prepared .. value	—	—	36,664	9,411	Total .. value	—	—	672,846	41,175
Raw or simply prepared value	—	—	10,063	12,738					

Points from Manufacturers' Literature

Advantages of Plug Cock Valves

OF THE MANY TYPES OF VALVES employed to control the transportation of fluids, none has merited longer, wider or more consistent popularity than the old tapered plug cock. One of the main advantages of the plug cock is that no part of its machined surfaces is exposed to the line fluid when the valve is fully opened. Another advantage is that it has only one moving part, the plug, and this requires no more than a quarter-turn to open or close the valve. Quickness of operation is thus assured. This is sometimes of the utmost importance, notably in process work or in valves used for fire-control. The absence of pockets into which sediment or scale can settle is another good feature as the danger of closure being prevented at critical moments is thus eliminated. The plug valve is thus seen to offer very great advantages in its simplicity, quickness of operation, smooth stream-line passage through the plug and natural resistance to erosion and corrosion. Some information on the advantages gained by making plug-cock valves of Monel metal is given in Publication No. MH7, issued by Henry Wiggin and Co., Ltd.

Screening by Vibration

SCREENING, SIEVING OR GRADING—for size or for the removal of extraneous matter—is an important process in the preparation of many materials, but no form of screening has proved so widely applicable to modern requirements as that of screening by vibration. In comparison with rotary screens which never use more than one-third of the screening surface at a time, every square inch of the screening surface of a vibratory screen is in action. This is clearly demonstrated by the illustrations which are given in a brochure issued by Pegson, Ltd., which also show a further advantage over screens of the rotary type, for on a vibratory screen a rapid stratification of the material occurs immediately the material flows on to the screen deck, the coarser material being forced to the top, whilst the finer material hugs the screen cloth and is forced through the mesh by the weight of the coarser material. In rotary screens the stone slides round the cylinder, with the coarser material "blinding" the apertures so that the finer material is only screened after it has percolated through the mass of coarse material. Pegson vibratory screens are compact and self-contained; they may be introduced into existing circuits without interfering with the general plant layout, or they may be installed as units in entirely new structures.

Air Filtration with Viscous Type Filters

AIR FILTRATION IS ADOPTED COMMERCIALY for two main reasons. It may be needed to remove the large quantities of dust which otherwise would be carried into mechanically ventilated buildings causing damage to products of manufacture. On the other hand it may be very necessary to remove spores and bacteria which in the manufacture of pharmaceutical products would be a serious danger, and in the manufacture of food products would involve extensive loss by the damage from mould and bacterial decomposition. In the viscous air filters which are described in a booklet (No. 1375) recently issued by The Sturtevant Engineering Co., Ltd., corrugated plates coated with a non-drying oil present a large surface on to which the dust is impinged at each change of direction of the air through the filter. There is no appreciable rise in resistance as the filter becomes dirty, and in average conditions the cells will require cleaning and re-dipping every 8 to 10 weeks. By providing a proportionate number of spare cells, cleaning and re-dipping can be carried out without putting the plant out of service. Experience has shown that in large installations the handling question is important, because if handling is troublesome the cleaning of the filter may be neglected. With this in view the Sturtevant cell, whilst leaving nothing to be desired as regards filtration efficiency, is claimed to be a really practical proposition for handling.

The Choice of Air Compressors

THE MANY USES FOR COMPRESSED AIR render an efficient and continuous supply a matter of prime importance to almost every industry. In these circumstances, the choice of suitable plant is a matter necessitating careful consideration of the many factors involved. For instance, when continuous operation is necessary reliability will be of supreme importance. On the other hand, it is impossible to ignore the overall commercial efficiency of the plant proposed, as inefficient equipment will obviously be a permanent charge on production costs. In considering new plant it will therefore be necessary to review the capital cost in relation to the running and maintenance costs and to keep in mind the loss of time and production due to possible breakdown or the frequent adjustment and replacement of valves, etc. The saving in capital cost by the installation of cheaper equipment is more often than not negated by the increased maintenance charges and the inconvenience involved by the occasional stoppages to which such plant is at all times liable. These points are emphasised in a brochure (No. T.233) on rotary air compressors and vacuum pumps, which has been issued by Daniel Adamson and Co., Ltd. It is stated that in the case of reciprocating compressors it is usual to offer single-stage machines for pressures up to 100 lb. per square inch and even higher, and for quite small outputs this may be justifiable on the score of convenience and cost, but it should be borne in mind that two-stage compression is more efficient and the saving in power is considerable. Further, single-stage compression to high pressures introduces an element of danger consequent upon the high air temperature obtained coupled with the use of unsuitable lubricating oil, and explosions due to this cause are not so infrequent as they should be. For pressures above 60 lb. per square inch two-stage compression is always recommended.

International Gas Conference

British Arrangements

THE second International Gas Conference of the International Gas Union will be held in Zurich, under the presidency of Herr Fritz Escher, from September 1 to 4. The conference will be attended by gas engineers, administrators and scientists from all parts of the world and will be opened by addresses of welcome from members of the Swiss Government and the Zurich municipality. The papers and the reports by member-nations of the Union to be submitted and discussed comparatively survey different aspects of gas manufacture, distribution and utilisation as practised throughout the world, the subjects including research, coal evaluation, carbonising, plant guarantees, carcassing, appliance testing, industrial, hotel and domestic uses of gas, and gas charges.

A large and representative British delegation is being arranged by the Institution of Gas Engineers, which convened the first International Gas Conference in London in 1931, when the International Gas Union was inaugurated in the presence of 1,500 delegates from 23 nations. After the conference the British delegates will visit Lugano, Lucerne, Interlaken, Jungfrauoch, Berne and Basle, the journey to and from Switzerland being made by many delegates by air.

British delegates may travel to and from Switzerland by one of twelve official itineraries, which comprise all travel and hotel arrangements throughout. Such itineraries have been arranged by the Institution of Gas Engineers through the official travel agents, Thomas Cook and Son, Ltd. The headquarters in Zurich of the British delegation will be at the Hotel Baur au Lac, where delegates adopting one of the official itineraries will be resident. The Headquarters and Information Bureau of the International Gas Union during the Conference will be at the Swiss Federal Polytechnic.

Delegates should register before next Tuesday, July 31. It is estimated that 500 delegates from the several member-nations of the Union will be present. Further particulars can be obtained from Mr. J. R. W. Alexander, secretary of the Institution of Gas Engineers, 28 Grosvenor Gardens, London, S.W.1.

Continental Chemical Notes

A FIRM AT PESTORP, Sweden, is reported to be erecting a propyl alcohol factory with the aid of a Government subsidy.

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A BAKU MESSAGE REPORTS the projected construction of a plant for extracting 200 tons of ceresine per annum from petroleum solids following the satisfactory outcome of trials.

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FOLLOWING ON THE HEAVY DUTY imposed by the Swiss Government upon imported blank film, the I.G. Farben-industry are sponsoring the erection of a film making plant at Bühler in Eastern Switzerland.

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COMPULSORY ADMIXTURE of alcohol with motor spirit has been introduced in Austria, the proportion amounting to 2 per cent. of alcohol (not less than 99.5 per cent. strength) in the case of imported benzine and to 3.75 per cent. for home-produced benzine.

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BY CATALYTIC REACTION of phenol vapour with ammonia at 10 atmospheres, up to 90 per cent. yields of aniline and other primary aromatic amines are obtained. The process, according to the current issue of "Chem.-Zeitung," originates from the Kaiser Wilhelm Institute for Coal Research.

A GOOD PYRETHRUM FLOWER HARVEST is reported from Jugoslavia and the flowers show a qualitative improvement of 15 per cent. over last year's.

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CONTRARY TO EARLIER REPORTS, sodium salicylate is not being manufactured in Bulgaria, nor are any plans to that end under consideration.

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AUSSIG VEREIN, the leading Czecho-Slovakian chemical concern, concluded the previous year with a trading profit of 83.4 million kronen. A ten per cent. dividend is distributed from the net profit of 6.1 million kronen.

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BY ARRANGEMENT between the four leading Polish producers, the price of calcium carbide has been raised by no less than 100 per cent., a measure which is expected to be opposed by the coal mines who are the chief customers.

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REDUCED DEMAND FOR ZINC WHITE is responsible for the closing down of the Eysden (Holland) factory of the Maastrichter Zinkwit-Mij. As the indications are that the main works at Maastricht will also cease operations in the near future, the question of Government aid is under consideration.

News from the Allied Industries

Sugar

AN INTERNATIONAL CONFERENCE comprising the signatories of the Chadbourne sugar plan will be held in Brussels on July 31. It will discuss matters arising out of the conference held in London on May 10, particularly regarding the allocation of sugar quotas to each member country. The battle for increased quota allocations is expected to be brisk, but may be solved by extending the Chadbourne agreement until 1938, when a new world conference can be summoned.

Rubber

ONE OF THE LARGEST MERSEYSIDE FIRES for many years occurred on July 21 at the works of the North Western Rubber Co., Hawthorne Road, Litherland, near Liverpool. The fire originated in a scrap yard where thousands of old motor-car tyres and inner tubes were stored. The highly inflammable material blazed fiercely, and the flames leaped nearly 100 feet into the air. The works overlook the Leeds-Liverpool Canal. The rubber works, storeroom and part of the vulcanising mill were badly damaged.

Tanning

DISTURBED CONTINENTAL CONDITIONS are making their influence felt on trade in the tanning industry. The exports of sole leather bends for the first four months of the year showed a 10 per cent. increase, but the exports of sole leather offal have diminished. The Irish Free State continues to be our best customer, taking about 70 per cent. of the sole leather exports. Sole leather tanning is quiet and prices show a weakening tendency. One and three-quarter million tanned goat and sheep skins were down in the first sale catalogue issued in connection with the last public sales. The Indian tanners are reported to be restricting input in the hope of raising prices. The chrome tanning industry still continues to be in a very healthy condition. Glaced kid tanners are on full production but are somewhat handicapped by accumulations of low-grade selections for which there is little demand. Calf tanners are busy but there is a slight lull in the chrome side trade. The manufacturers of formaldehyde tanned sheep fleashes are very busy and are working to capacity. Chamois leather dressers and carriers are becoming alarmed at the prospect of a shortage of cod oil in view of the remarkable increase in its use as a source of vitamins. Hardened and filtered whale oils are being used and there has been a very cheap supply of Japanese fish oil.

Tinplate

CONSUMPTION OF TIN IN THE WORLD'S TINPLATE INDUSTRY, according to the July Bulletin of the Hague Office of the International Tin Research and Development Council, reached the highest figure recorded at 55,000 tons for the year ending May, 1934, being 5,000 tons more than in 1929 and 2,800 tons more than in the peak year of 1933. Tin consumed by the automobile industry amounted to 3,590 tons in 1933 and 5,700 tons in 1934. The world total consumption of tin during the 12 months under review shows an increase of 27 per cent. over the preceding year.

Margarine

THE DUTCH GOVERNMENT has decided to equalise the excise duties on fats and vegetable oils. Hitherto there has been a duty of 35 cents per kilo on fats, while vegetable oils have been free of duty. It has now been decided to impose an excise duty of 24 cents per kilo on vegetable oil and to reduce the duty on fats from 35 to 24 cents. The new duty on oils is to become operative at once, while the reduction in the duty on fats will only take effect as from August 6. The effect of these adjustments will be to increase the cost of raw materials for the production of soap and margarine.

Artificial Silk

COURTAULDS, LTD., announce an interim dividend on the £24,000,000 ordinary share capital of 1½ per cent., free of tax, payable August 11, to shareholders registered this week. This payment is the same as a year ago.

THE ARTIFICIAL SILK WORKS of Tomaszow, Poland, held an extraordinary meeting on July 19, when a resolution to modify the provisions of the deed of covenant was unanimously agreed to. Mr. Paul Lindenberg, who presided, said that under the present deed the holders of the English certificates could not change their certificates into Polish certificates before July 1, 1938. It had since been found to be desirable that the holders of the English certificates should have the right to exchange into Polish certificates when they desired, and one of the largest holders, the Tomaszow family, having bought a number of English certificates, had expressed the wish to exchange those English certificates into Polish certificates. In order to enable them to do so, it was necessary to make certain alterations in the trust deed.

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

SULPHONATION PRODUCTS from mineral oils, tar oils, or the like rich in sulphur, production.—E. A. Wernicke. Jan. 11, 1933. 186/34.

CONDENSATION PRODUCTS from unsaturated oils.—Soc. of Chemical Industry in Basle. Jan. 11, 1933. 815/34.

SOLUBLE PHOSPHATE FERTILISER, producing.—Bayerische Stickstoff-Werke A.-G. Jan. 11, 1933. 893/34.

SYNTHETIC RESINS and method of production thereof.—E. I. du Pont de Nemours and Co. Jan. 13, 1933. 975/34.

CONDENSATION OF VINYL ALCOHOL, production of articles.—Kodak, Ltd. Jan. 11, 1933. 1144/34.

DIAMINOALCOHOLS of the aromatic series, production.—Chemische Fabriken Dr. J. Wiernik and Co. A.-G. Jan. 12, 1933. 1171/34.

UN SULPHONATED AZO DYE STUFFS, manufacture.—Soc. of Chemical Industry in Basle. Jan. 16, 1933. 1198/34.

VALUABLE LIQUID HYDROCARBONS by the heat treatment of liquid hydrocarbons containing unsaturated compounds in the presence of hydrogenating gases, production.—International Hydrogenation Patents Co., Ltd. Jan. 13, 1933. 1373/34.

ACID SAFRANINE DYE STUFFS, manufacture.—I. G. Farbenindustrie. Jan. 14, 1933. 1500/34.

SAFRANINE DYE STUFFS, manufacture.—I. G. Farbenindustrie. Jan. 14, 1933. 1501/34.

SENSITISING DYES, method for the manufacture.—Kodak, Ltd. Jan. 16, 1933. 1575/34.

Specifications Accepted with Dates of Application

DYE STUFFS and intermediates thereof, manufacture.—Kodak, Ltd., Dr. F. M. Hamer, and N. I. Fisher. Jan. 9, 1933. 413,300.

COATING OF ARTICLES with rhodium.—W. W. Triggs (Baker and Co., Inc.). Jan. 12, 1933. 413,342.

METHOD OF USING BY-PRODUCTS from the carbonating of saccharine juices.—M. Ernotte. Jan. 13, 1932. 413,322.

SULPHURIC ESTERS of leuco compounds of vat dyes, manufacture and production.—J. Y. Johnson (I. G. Farbenindustrie). Jan. 13, 1933. 413,344.

RESINOUS CONDENSATION PRODUCTS, manufacture and production.—J. Y. Johnson (I. G. Farbenindustrie). Jan. 13, 1933. 413,345.

PHOSPHATIC MATERIALS from bones and the like, manufacture.—Chemical and Metallurgical Corporation, Ltd., and J. W. Crabtree. Jan. 13, 1933. 413,346.

COPPER ALLOYS.—H. W. Brownson, M. Cook, H. J. Miller, and Imperial Chemical Industries, Ltd. Jan. 13, 1933. 413,333.

CHROMIC HYDROXIDE and anthraquinone, manufacture.—I. G. Farbenindustrie. Jan. 20, 1932. 413,366.

CELLULOSE ESTERS of artificial products, such as artificial silk, films, plastic masses, intermediate layers for safety glass, lacquers, and the like, manufacture.—C. F. Boehring and Soehne Ges. Jan. 20, 1932. 413,368.

NITROARSANILIC ACID, manufacture.—D. Gardner. Feb. 21, 1933. 413,417.

MUSCLE ADENYLIC ACID, manufacture.—I. G. Farbenindustrie. March 12, 1932. 413,430.

CONDENSATION PRODUCTS from urea or thiourea of derivatives thereof, manufacture.—Soc. of Chemical Industry in Basle. Dec. 1, 1932. 413,439.

EMULSIFYING, cleansing, wetting, or softening agents, manufacture.—I. G. Farbenindustrie. April 20, 1932. 413,457.

PURIFICATION OF LIQUID HYDROCARBONS with liquid sulphur dioxide or mixtures thereof.—Edelmann Ges. May 4, 1932. 413,465.

AZO DYE STUFFS, process for the manufacture.—I. G. Farbenindustrie. June 10, 1932. 413,481.

ARSENO COMPOUNDS, manufacture.—I. G. Farbenindustrie. Aug. 6, 1932. 413,497.

4-AMINODIPHENYLAMINE DERIVATIVES, manufacture.—I. G. Farbenindustrie. Aug. 31, 1932. 413,513.

SYNTHETIC PRODUCTION of compounds, process and apparatus.—R. W. James (Atmospheric Nitrogen Corporation). Sept. 2, 1933. 413,517.

BARBITURIC ACIDS, manufacture.—Dr. A. Wacker Ges. für Elektro-Chemische Industrie Ges. Sept. 21, 1932. 413,522.

USED LUBRICATING OIL, process for purifying and regenerating. M. G. Levi, A. Mariotto and I. Ciarocchi. Nov. 26, 1932. 413,537.

HALOGEN DERIVATIVES of rubber or like substances, production. Metallges A.-G. Dec. 2, 1932. 413,559.

MONOAZO DYE STUFFS, manufacture.—J. R. Geigy A.-G. Jan. 23, 1933. 413,588.

ESTERS OF FATTY AROMATIC ACIDS with amino-alcohols and process for obtaining the same.—F. Hoffmann La Roche and Co., A.-G. July 6, 1933. 413,599.

Applications for Patents

(July 12 to 18 inclusive).

IMPREGNATING FIBROUS MATERIALS with resins of aminoaldehyde series.—Allgemeine Elektrizitäts Ges. (Germany, July 27, '33.) 20841.

INDIGOID DYE STUFF, manufacture.—A. G. Bloxam (Soc. of Chemical Industry in Basle). 21016.

MERCURY COMPOUNDS CONTAINING NITROGEN, manufacture.—A. Carpmal (I. G. Farbenindustrie). 20623.

UNSYMMETRICAL VAT DYE STUFFS, manufacture.—A. Carpmal (I. G. Farbenindustrie). 20946.

AZO DYE STUFFS, manufacture.—A. Carpmal (I. G. Farbenindustrie). 20947.

INDIGOID VAT DYE STUFFS, manufacture.—A. Carpmal (I. G. Farbenindustrie). 21040.

COLOURED MATERIALS comprising regenerated cellulose, manufacture.—A. Carpmal (I. G. Farbenindustrie). 21041.

TRI-SUBSTITUTED QUINADINES, manufacture.—J. M. Connolly and G. M. Dyson. 21020.

HYDRATION OF OLEFINES.—Distillers Co., Ltd., J. B. Dymock, H. M. Stanley and W. P. Joshua. 21057.

AZO DYES, manufacture.—E. I. du Pont de Nemours and Co. (United States, July 12, '33.) 20502.

HEAVY HYDROGEN in hydrogen containing substances, production and concentration.—A. Farkas, E. K. Rideal, and L. Farkas. 20619.

HYDROGEN, production.—N. H. Freeman. 20932.

HYDROGENATING OILS.—N. H. Freeman. 20933.

CELLULOSE ACETATE, etc., manufacture.—W. W. Groves (I. G. Farbenindustrie). 20769.

RECOVERY OF CARBON BISULPHIDE, etc.—W. H. Hoffert. (March 6, '33.) 20760.

STABLE DIAZO-SALT PREPARATIONS, manufacture.—I. G. Farbenindustrie. (Germany, July 13, '33.) 20587.

METAL OXIDES colloidally soluble in water, manufacture.—I. G. Farbenindustrie. (Germany, July 15, '33.) 20793.

METAL OXIDES colloidally soluble in water, manufacture.—I. G. Farbenindustrie. (Germany, March 29, '33.) 20794.

SODA LYE, Glauber salt, etc., production.—I. G. Farbenindustrie. (Germany, Aug. 19, '33.) 20812.

ACID DYE STUFFS.—Imperial Chemical Industries, Ltd., F. Lodge and C. H. Lumsden. 20507.

DYE STUFF INTERMEDIATE, manufacture.—Imperial Chemical Industries, Ltd., M. Mendoza and F. L. Rose. 20640.

COLOURING ACETATE ARTIFICIAL SILK, process.—Imperial Chemical Industries, Ltd. and A. H. Knight. 20641.

MONOAZO DYE STUFFS, manufacture.—Imperial Chemical Industries, Ltd., and A. H. Knight. 20642.

ANTHRAQUINONE DERIVATIVES, manufacture.—Imperial Chemical Industries, Ltd., C. Shaw and F. Lodge. 20824.

HIGH MOLECULAR HYDROCARBONS particularly lubricating oils from solid carbonaceous substances, production.—International Hydrogenation Patents Co., Ltd. (Germany, Aug. 15, '33.) 20536.

AZO DYE STUFFS, manufacture.—J. Y. Johnson (I. G. Farbenindustrie). 20589.

VAT DYE STUFFS of the anthraquinone series, manufacture.—J. Y. Johnson (I. G. Farbenindustrie). 20590.

PHOSPHATIC FERTILISERS, production.—Kali Chemie A.-G. (Germany, Aug. 29, '33.) 20811.

ARSENATES, manufacture.—M. Moskovits. (Hungary, July 12, '33.) 20470.

OIL AND SOLVENT RESISTANT MATERIAL, production.—A. E. T. Neale and D. F. Twiss. 20559.

PRODUCING PRECIPITATES.—New Jersey Zinc Co. (United States, Dec. 15, '33.) 20635.

ZINC-SULPHIDE PIGMENT, manufacture.—New Jersey Zinc Co. (United States, Dec. 15, '33.) 20837.

BLUE DYE STUFFS, manufacture.—Soc. of Chemical Industry in Basle. (Switzerland, July 27, '33.) 20900.

COMPOSITE PIGMENTS containing titanium, preparation.—Titan Co., Inc. (Germany, July 18, '33.) 20969.

INCREASING FLUIDITY of coal tar pitch.—Dr. A. Wacker Ges. für Elektrochemische Industrie Ges. (Germany, July 13, '33.) 20466.

Weekly Prices of British Chemical Products

Review of Current Market Conditions

There has been general activity in most sections of the chemical market during the week, quoted prices remaining steady. Formic and oxalic acids show the most demand among the industrial chemicals, business continuing good in formaldehyde; competi-

tion, however, is very keen. Steady improvement continues in the acetic acid market. Little activity is shown in lithopone, barium chloride, sodium acetate and sodium chlorate, but most other products show moderate demand. Arsenic is unsteady, there being keen competition. Coal tar is quiet, no improvement being anticipated before September. Prices generally remain steady. Business in cresote oil continues good, cresylic acid and pyridine being fairly active. Heavy solvent naphtha, toluol, xylol, and coal tar pitch show very little inquiry, and the demand for refined tar is far below the supply. Quotations in pharmaceutical chemicals remain unchanged, business being fair. Improvement is shown in the acetanilide and metol markets, while benzoic acid, citric acid, and tartaric acid are in good demand. Little interest is evinced in citronella, and amidopyrim and salol are dull. In the essential oil markets steady activity is shown, the best inquiry being for cananga, lemongrass and peppermint.

LONDON.—There has been quite a good demand for chemicals generally during the current week with prices firm and steady.

The majority of coal tar products are scarce. Prices remain very firm, with a tendency to rise.

MANCHESTER.—Business in chemical products on this market during the past week has continued on relatively quiet lines so

far as new commitments are concerned, though it is reported that users are not hesitating to renew contracts as they expire, and that several have been booked this week extending up to the end of the year. A satisfactory feature of the general situation is that deliveries into consumption are being maintained on a comparatively good scale, the only noticeable falling off being in connection with those districts

which are virtually shut down for the annual holidays, several East Lancashire towns, for example, being closed this week. Chemical traders express themselves as satisfied with the volume of business on the home markets during the first half of the year, and the general feeling is that the improvement compared with a year ago will be maintained, though no appreciable headway is being made in the textile trades. The price position keeps very stable in both light and heavy products. In the by-products market, however, there are still indications of reaction.

SCOTLAND.—There is little of importance to report in the Scottish heavy chemical market, as the Scottish holidays are still having their dulling effect.

Price Changes

Manchester.—TARTARIC ACID, 1s. 0½d. per lb.; SODIUM SULPHIDE, commercial, £8 2s. 6d. per ton; SULPHATE OF COPPER, £14 5s. per ton f.o.b.; CARBOLIC ACID, crystals, 7½d. to 8d. per lb.; crude, 1s. 1½d. per gal.

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.—9d. per lb. less 5%.

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

ACID, FORMIC.—LONDON: £43 10s. 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, according to district and quality. 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: £49 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, 1½d., 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 BICARBONATE.—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 Salammonic.) AMMONIUM CHLORIDE (MURIATE).—SCOTLAND: British dog tooth

crystals, £32 to £35 per ton carriage paid according to quantity. (See also Salammonic.)

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. c.i.f. main U.K. ports for imported material; Cornish nominal, £22 10s. f.o.r. mimes. SCOTLAND: White powdered, £23 ex wharf. MANCHESTER: White powdered Cornish, £21 ex store.

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

BARIUM CHLORIDE.—£11 per ton.

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. 7d. to 2s. 1½d.

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

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

CARBON BLACK.—3½d. to 5d. per lb. LONDON: 4½d. to 5d.

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

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

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

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

CREAM OF TARTAR.—LONDON: £4 2s. 6d. per cwt.

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

DIPHENYLGUANIDINE.—2s. 2d. per lb.

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

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, £31 10s.

LEAD, NITRATE.—£28 per ton.

LEAD, RED.—SCOTLAND: £25 10s. to £28 per ton; d/d buyer's works.

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

LITHOPONE.—30%, £17 10s. to £18 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.—8½d. to 9d. per lb. without engagement.

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

POTASSIUM BICROMATE.—Crystals and Granular, 5d. per lb. net d/d U.K. Discount according to quantity. Ground 5½d. 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: 9¼/100%, powder, £37. MANCHESTER: £38.

POTASSIUM CHROMATE.—6½d. per lb. d/d U.K.

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

POTASSIUM PERSULPHATE.—LONDON: 9½d. per lb. SCOTLAND: B.P. crystals, 9d. MANCHESTER: Commercial, 8½d.; B.P., 9½d.

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

RUPRON (MINERAL RUBBER).—£15 10s. per ton.

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 BICROMATE.—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, £15 ex station, 4-ton lots. MANCHESTER: Commercial, £9 5s.; photographic, £15.

SODIUM META SILICATE.—£16 per ton, d/d U.K. in cwt. bags.

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

SODIUM PEROBATE.—LONDON: 10d. per lb.

SODIUM PHOSPHATE.—£13 per ton.

SODIUM PRUSSIAN.—LONDON: 5d. to 5½d. per lb. SCOTLAND: 5d. to 5½d. ex store. MANCHESTER: 4¾d. to 5½d.

SULPHUR.—£9 15s. to £10 per ton.

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

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

SODIUM SULPHATE (SALT CAKE).—Unground spot, £3 15s. per ton d/d station in bulk. SCOTLAND: Ground quality, £3 5s. per ton d/d. MANCHESTER: £3 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. to £14 10s. 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 AND SCOTLAND: £12 per ton.

ZINC SULPHIDE.—11d. to 1s. per lb.

Coal Tar Products

ACID, CARBOLIC.—Crystals, 8½d. to 8¾d. per lb.; crude, 60's, to 2s. 2½d. per gal. MANCHESTER: Crystals, 7½d. to 8d. per lb.; crude, 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. 6d.; dark, 95/97%, 1s. 3d. 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 9½d. per gal.; standard motor, 1s. 3½d. to 1s. 4d.; 90%, 1s. 4d. to 1s. 4½d.; pure, 1s. 7½d. to 1s. 8d. LONDON: Motor, 1s. 6½d. SCOTLAND: Motor, 1s. 6½d.

CREOSOTE.—B.S.I. Specification standard, 4d. to 4½d. per gal. f.o.r. Home, 3½d. d/d. LONDON: 3½d. f.o.r. North; 4d. London. MANCHESTER: 3½d. to 4½d. SCOTLAND: Specification oils, 4d.; washed oil, 4½d. to 4¾d.; light, 4½d.; heavy, 4½d. to 4¾d.

NAPHTHA.—Solvent, 90/160%, 1s. 6d. to 1s. 7d. per gal.; 95/160%, 1s. 7d. to 1s. 8d.; 99%, 11d. to 1s. 1d. LONDON: Solvent, 1s. 3½d. to 1s. 4d.; heavy, 11d. to 1s. 0½d. f.o.r. SCOTLAND: 90/160%, 1s. 3d. to 1s. 3½d.; 90/190%, 11d. to 1s. 2d.

NAPHTHALENE.—Purified crystals, £3 15s. 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.; whited, 70s. to 75s.

PITCH.—LONDON: £3 to £3 15s. per ton f.o.b. East Coast port for next season's delivery.

PYRIDINE.—90/140, 7s. 6d. to 9s. per gal.; 90/180, 2s. 3d. per gal.

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

XYLOL.—Commercial, 2s. 2d. per gal.; pure 2s. 4d.

Intermediates and Dyes

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

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

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

ACID NAPHTHONIC.—1s. 8d. per lb.

ACID, NEVILLE AND WINTNER.—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. 11½d. to 2s. 3d. per lb.

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

DINITROBENZENE.—8d. per lb.

DINITROTOLUENE.—48/50° C., 9d. per lb.; 66/68° C., 0½d.

DINITROCHLOROBENZENE, SOLID.—£72 per ton.

DIPHENYLAMINE.—Spot, 2s. 4d. 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.

β-NAPHTHYLAMINE.—Spot, 11½d. per lb., d/d buyer's works.

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

o-NITRANILINE.—3s. 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, 4½d. per lb.; 5-cwt. lots, drums extra.

NITRONAPHTHALENE P.G.—1s. 0½d. per lb.

NITROGEN NAPHTHONATE.—Spot, 1s. 9d. per lb.

o-TOLUIDINE.—3½d. per lb.

p-TOLUIDINE.—1s. 11d. per lb.

Nitrogen Fertilisers

The following prices for the chief nitrogen fertilisers apply for all prompt business:—

SULPHATE OF AMMONIA.—Home: £7 5s. per ton delivered in 6-ton lots to farmer's nearest station. Export: Nominal, £5 17s. 6d. per ton f.o.b. U.K. ports in single bags.

CYANAMIDE.—£7 5s. per ton carriage paid to any railway station in Great Britain in lots of 4 tons and over.

NITRATE OF SODA.—£7 18s. 6d. per ton delivered in 6-ton lots to farmer's nearest station.

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

CONCENTRATED COMPLETE FERTILISERS.—£10 15s. to £11 6s. per ton according to percentage of constituents.

NITROGEN PHOSPHATE FERTILISERS.—£10 5s. to £13 15s. per ton according to percentage of constituents.

Latest Oil Prices

LONDON, July 25.—LINSEED OIL was steady. Spot, £22 (small quantities, 30s. extra); Aug., £20 10s.; Sept.-Dec., £21; Jan.-April, £20 15s., naked. SOYA BEAN OIL was firmer. Oriental (bulk), July-Aug. shipment, £13 15s. per ton. RAPE OIL was quiet. Crude extracted, £23; technical refined, £23 10s., naked, ex wharf. COTTON OIL was steady. Egyptian, crude,

£12 10s.; refined common edible, £15 10s.; deodorised, £17, naked, ex mill (small lots, 30s. extra). TURPENTINE was firmer. American, spot, 42s. 3d. per cwt.

HULL.—LINSEED OIL, spot, quoted £21 10s. per ton; July-Aug., £20 17s. 6d.; Sept.-Dec. also £20 17s. 6d.; and Jan.-April, £20 12s. 6d., naked. COTTON OIL, Egyptian, crude, spot, £12 10s.; edible, refined, spot, £14 10s.; technical, spot, £14

10s.; deodorised, £16 10s., naked. PALM KERNEL OIL, crude, f.m.q., spot, £14 10s., naked. GROUNDNUT OIL, extracted, spot, £19; deodorised, £23. RAPE OIL, extracted, spot, £26; refined, £27 10s. SOYA OIL, extracted, spot, £15; deodorised, £18 per ton. COD OIL, industrial, 25s. per cwt. CASTOR OIL, pharmaceutical, 36s.; first, 31s.; second, 28s. per cwt. TURPENTINE, American, spot, 44s. 3d. per cwt.

From Week to Week

MR. GEO. H. SERGEANT, of 27/28 Fetter Lane, E.C.4, ceased to act as Receiver and/or Manager of Arnold and Co. (Sales), Ltd., on July 10.

THE DEATH at the age of 69 occurred suddenly last week in the Alexandria Works of the United Turkey Red Co., Ltd., of Mr. John McCallum, of Bonhill.

DR. T. HOWARD BUTLER, managing director of William Butler and Co., Ltd. (Bristol), has recently been appointed a Justice of the Peace for the City of Bristol.

IT IS ANNOUNCED that the agreement which the European synthetic and Chilean nitrate producers arranged in Paris, at the end of last week, will only remain in force until June, 1935. If the synthetic "Cartel" which is due to lapse at that time, can be re-formed and is willing to reopen negotiations, it is anticipated that the agreement will be renewed.

AT A MEETING of the Board of the Institute of Physics held on July 24, the following were elected to membership: Fellows: L. G. Carpenter, B.Sc., H. L. Green, M.A., and L. C. Verman, M.Sc., Ph.D.; Associates: H. G. Crone, B.Sc., T. K. Henthorne, M.A., M.Sc., J. G. Martindale, B.Sc., L. Starbuck, B.Sc., and W. R. Thomas, M.Sc.; Students: W. F. Floyd, B.Sc., and A. E. Sarson.

THE MOND NICKEL CO., LTD., is reported to be closing down the copper sulphate plants at its Clydach (Swansea Valley) works. It is stated that during the past few years the disposal, at an economic price, of such quantities of copper sulphate as are indicated has become increasingly difficult—mainly on account of the ever-increasing duty and quota restrictions imposed on its importation into the countries concerned.

FOR THE ELEVENTH TIME the China Clay Workers' Band at St. Dennis secured the Royal trophy at the annual West of England Bandsmen's Festival, held at Bugle, near St. Austell, last week. For many years the firm of H. D. Pochin and Co., Ltd., had taken a great interest in the St. Dennis Band, as many of the men were employees at their works. Lord Aberconway is president of the band. Mr. H. Stanley Pochin, J.P., is a keen supporter and Mr. R. Hooper, J.P., works manager, is chairman.

RECENT ORDERS received by International Combustion, Ltd., Grinding, Screening and Filtering Division, include a No. 3 Raymond Impax pulveriser for grinding bituminous coal, for firing metallurgical furnaces; No. 00 Raymond screen pulveriser for small scale grinding of dry distemper; I.C. grinder for kieselguhr; 3 ft. diam. Raymond air separating plant and 3 ft. 6 in. diam. dust collector for the separation of quartz powders, and 4 ft. 6 in. diam. Andrews deslimmer to deal with sand.

IN THE COMPANIES COURT, Chancery Division, on Monday, Mr. Justice Crossman had before him a petition for compulsory winding-up of Amalgamated Chemists, Ltd. Mr. Sykes, for the petitioning creditors said this was a judgment debt for £714. There was a negative list. The company had now paid £200 on account of the debt and costs and had made arrangements for getting security for the balance. He asked that the petition should be dismissed without costs. His Lordship made an order accordingly.

INTERNATIONAL COMBUSTION, LTD., has been registered as a public company, with a capital of £501,698 in 150,000 6 per cent. cumulative preference and 351,698 ordinary shares of £1. The objects are to acquire the undertakings of International Combustion, Ltd., the Underfeed Stoker Co., Ltd., Combustion Steam Generator, Ltd., Mining and Industrial Equipment, Ltd., Combustion Engineering, Ltd., and the Detrick Arch, Ltd. The directors are:—Geo. R. T. Taylor (chairman, International Combustion, Underfeed Stoker, director L.M.S. Railway and Vickers); Bernhard H. Binder, C.A. (chairman, Inveresk Paper Co.); Noel Hayward Docker (director International Combustion, Pinchin Johnson and Co.); Leslie William Farrow, C.A. (director, International Combustion, deputy-chairman, Wiggins, Teape and Co., 1919); Frank Hodges (director, International Combustion, Securities Management Trust, member Central Electricity Board); Lt.-Col. Sir Wyndham Raymond Portal, Bt. (director of International Combustion, Wiggins, Teape and Co., 1919); Geo. Clemens Usher (director International Combustion, Underfeed Stoker). So long as Barclays Nominees (Lombard Street), Ltd., hold not less than 90 per cent. of the ordinary shares, they may appoint one director.

MR. A. W. FERKIN, of Greenford Green, Greenford, Middlesex, left estate of the gross value of £128,873, net personally £10,030.

MR. W. G. WHIFFEN, of Wimbledon Common, chairman and managing director of Whiffen and Sons, Ltd., and chairman of the St. Amand Manufacturing Co., Ltd., and of Staniform, Ltd., who died on April 28 last, left £219,328.

THE LANDO SOAP CO., LTD., Pembrey Works, Burry Port, Carmarthenshire, has increased its nominal capital by the addition of £1,000 in £1 ordinary shares beyond the registered capital of £1,500.

LOW TEMPERATURE CARBONISATION, LTD., announces that, in accordance with the conditions of the recent issue of ordinary shares, the last day for lodging renounced allotment letters for registration is July 31. Such letters should be sent to the Transfer Office, Basilton House, 7 Moorgate, E.C.2.

THE NOMINAL CAPITAL of the Sanitas Trust, Ltd., 10 Ironmonger Lane, E.C., has been increased by the addition of £44,000 beyond the registered capital of £500,000. The additional capital is divided into 5,000 10 per cent. cumulative preference shares of £1 and 780,000 ordinary shares of 1s.

HONORARY FELLOWSHIP OF THE TEXTILE INSTITUTE has been awarded to Mr. C. F. Topham, of Courtaulds, Ltd., Coventry, in recognition of his services to the textile industry, particularly with regard to his invention of the rotating spinning box in connection with the production of viscose artificial silk.

THE APPLICATION of Leonard Victor Augustus Hutchison, Albert Road, Whitefield, Lancs., chemical manufacturer, for his discharge from bankruptcy was heard at the Court House, Bolton, on July 18. The receiving order had been made in 1927. Debtor said that he was now employed as a traveller. The Judge granted the discharge subject to five months' suspension.

A SLIGHT EXPLOSION occurred at the Royal Naval Cordite factory at Holton Heath (Dorset) on Monday. It appears that two men were cutting a lead pipe which had been used in the making of nitro-glycerine, and that a small head of nitro-glycerine had been left in the pipe after cleaning and exploded. One of the men, J. H. Mitchell, was severely injured and died later, and the other escaped with slight abrasions.

THE ARRIVAL OF THE FIRST CARGO of whale oil to be stored in the breakwater depot at Brixham, belonging to the Anglo-American Oil Co., is anticipated shortly. It will be discharged by the whale oil ships of the Salvesen Co., Ltd., of Leith. Fifty men have been given work to make preparations for the storage of the oil, and are now actively engaged in cleaning the tanks and laying new pipe lines from the landing stage to the tanks.

THE INDUSTRIAL ALCOHOL BILL which is intended to make provision for the production and sale of industrial alcohol by the Irish Free State, was introduced in the Dail last week. The text of the Bill has not yet been issued, although it is known that the sum of £102,000 has been allocated from Government funds for its provisions. The Dail reassembles on August 1, and it is expected that the text will be issued during the present week.

DR. JOHN AUGUSTUS VOELCKER, who has been consulting chemist to the Royal Agricultural Society of England since 1885, celebrated his golden wedding anniversary on July 24. In 1889 Dr. Voelcker was sent to India to report on how Indian agricultural methods could be improved scientifically, and in 1893 he presented his report. That was the last that he heard of it officially until he was awarded, thirty-five years later—in this year's Birthday Honours—a Companionship of the Order of the Indian Empire.

THE DIRECTORS OF BENN BROTHERS, LTD., publishers of THE CHEMICAL AGE and other trade and technical journals, recommend the payment of the following final dividends, less tax, for the year ended June 30, 1934: 3 per cent. on preference shares, which with the interim dividend of 3 per cent. paid in February, makes 6 per cent. for the year; 10 per cent. on ordinary shares, which with the interim dividend of 5 per cent. paid in February, makes 15 per cent. for the year; and 2s. per share on the deferred shares, which with the interim dividend of 1s. per share paid in February, makes 3s. for the year.

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 August 18, 1934.

Texcrete. 551,120. Class 1. Chemical substances for use in spraying concrete, porcelain and earthenware for the purpose of producing a glazed surface. Arthur Fredrik Echberg, Lincoln House, 296-302 High Holborn, London, W.C.1. May 15, 1934.

Kronos. 551,457. Class 1. Paints for ships and pastes formed of pigments with oils, or with other vehicles to be used in the preparation of paints for ships. British Titan Products Co., Ltd., Billingham. May 28, 1934.

Durosteel. 551,552. Class 1. Paints, enamels (in the nature of paints) and varnishes. British Thomson-Houston Co., Ltd., Crown House, Aldwych, London, W.C.2. May 30, 1934.

Sylkor. 550,411. Class 4. Oils for finishing textile fabrics in the course of manufacture. Ellis Jones & Co. (Stockport), Ltd., Tiviot Colour Works, Manchester Road, Stockport. April 17, 1934.

Yorbit. 551,723. Class 4. Bitumen, raw or partly prepared, for use in manufactures. The Yorkshire Tar Distillers, Ltd., Quebec House, Quebec Street, Leeds, 1. June 6, 1934.

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 manufacturers' agent in Montreal desires to obtain the representation of United Kingdom producers of pigment colours, presumably on a commission basis, throughout the Dominion. (Ref. No. 75.)

Siam.—The Acting Consul-General at Bangkok reports that the Stores Department of the Royal State Railways, Siam, is calling for tenders (No. P. 239—21/9/1934), to be presented in Bangkok by September 21, 1934, for the supply of 600 kgs. of red lead powder. (Ref. B.Y. 7851.)

Egypt.—The Commercial Secretary to the Residency, Egypt, reports that the Egyptian Government Assay Office is calling for tenders, to be presented in Cairo by September 18, 1934, for the supply of chemicals and assaying appliances. (Ref. F.Y. 2087.)

Company News

Nor-Rust Liquid Lead.—The report for period July 1, 1932, to August 31, 1933, states that G. H. Smith, J. C. Miners, A. Rikly and J. Aitken have resigned from the board and Mr. C. F. L. Clarke, former chairman, has rejoined the board. Profit and loss account shows a net loss of £10,064; deducting credit balance brought forward £27, this leaves a debit balance of £10,038.

New G. and S. Processes Syndicate.—The accounts from incorporation to March 31, 1934, show that £1,983 was expended in experimental research and general administration expenses. Mr. Charles Henry Field resigned from board and Mr. Lewis Goodin Spire Hebbis was appointed.

National Drug Industries.—The report for year ended March 31, 1934, states that the volume of business has steadily increased and profit, after trade charges, directors' fees and doubtful debts, amounts to £7,212 (increase of £1,935 over thirteen months period). After charging interest on debenture loan, there is a balance of £4,266, which, with £646 brought forward, gives total of £4,913. The directors recommend a dividend of 6 per cent. preference shares to March 31, and that £2,724 be carried forward. They do not recommend dividend on ordinary shares as it is necessary to conserve resources.

New Companies Registered

Henry Hill (Dewsbury), Ltd.—Registered July 19. Nominal capital £3,000 in £1 shares (2,000 ordinary and 1,000 6 per cent. cumulative preference). Oil extractors, oil merchants, chemical, manure and shoddy manufacturers and waste dealers, etc. Subscribers: Wm. Whittington, 49 Parkland Drive, Meanwood, Leeds, 6, and F. H. Sterry.

Stannum, Ltd.—Registered July 19. Nominal capital £1,000 in £1 shares. Merchants, agents, brokers and factors for the purchase or sale of metals, metallic ores, metal residues, scrap minerals, chemicals and by-products. Subscribers: Mrs. Florence Oliver, 3 South Close, Village Way, Rayners Lane, Pinner, and C. Harris.

Springbok Match Manufacturing Co., Ltd., 107 Newington Causeway, S.E.1.—Registered July 19. Nominal capital £15,000 in £1 shares. To adopt an agreement with Alfons de Liguori and Walter Southwick, and to carry on the business of match manufacturers and dealers, etc. Directors: Alfons de Liguori and Walter Southwick, both of New Hanover, Natal, S. Africa.

Chatham and District Ice and Cold Storage Co., Ltd., 14 St. Mary Axe, E.C.3.—Registered July 19. Nominal capital £100 in £1 shares. Manufacturers of ice and dealers in ice, soda, salt and chemicals, etc. Subscribers: L. Richardson, Holborn Wharf, Midway Street, Chatham, Kent, and H. J. Burgess.

Burtol Cleaners, Ltd.—Registered on July 17. Nominal capital of £250,000 in 5s. shares. To acquire the undertaking, goodwill and assets of Burtol British Patents, Ltd., including the registered trade mark "Burtol," and to carry on the business of dyers and cleaners, chemists, laundry proprietors, mechanical and electrical engineers, manufacturers of ice and dealers in chemicals and chemical substances, etc. Subscribers: Sydney A. Sharpe, Glen Lyn, The Park, Great Bookham, Surrey, and J. Barnes.

Voluntary Liquidation

Affairs of Thawpitt (1932), Ltd.

The statutory meeting of the creditors of Thawpitt (1932), Ltd., 155 Marlborough Road, Holloway, chemical dry cleaning manufacturers, was held on July 20. Capt. Thorpe, a director of the company, presided, and said that the shareholders had previously passed a resolution nominating Mr. J. U. C. King, of Oscar Berry, Froude & Co., as liquidator. A statement of affairs was submitted as at June 20, the date of the appointment of a receiver for the debenture holders, which disclosed liabilities of £5,886, of which £3,634 was due to the trade and there were loans and salaries amounting to £2,252. There were also loans on debentures totalling £2,047, and there was a contingent liability under a contract amounting to £640, but that was not expected to rank. The assets totalled £2,308, from which had to be deducted preferential claims of £148, and debentures for £2,047, leaving net assets of £113, or a deficiency of £5,773. There were also investments in a subsidiary company at cost of £5,000, but they were not expected to produce anything under a realisation, and doubtful and bad book debts were shown at £15,306.

The company was originally registered as Thawpitt, Ltd., in 1927, and the present company was incorporated in 1932, and took over the old concern. The old shareholders were given the right to apply for partly paid up shares in the new company. The authorised capital was £50,000 and the issued capital amounted to £33,643 14s., divided into 673,874 shares of 1s. each. Answering a question, the chairman said he was a debenture holder for £617 13s. 10d., and Sangers, Ltd., were debenture holders for £1,429 5s. 6d., and they had appointed Mr. King as receiver.

A creditor proposed that Mr. E. Finlayson, of Poultry, London, E.C., should be appointed liquidator of the company, and that proposition was seconded. On being put to the vote, however, a resolution was passed by a large majority that the matter should be left in the hands of Mr. King, as liquidator. A committee was also appointed, consisting of representatives of three of the creditors.

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FILTER PRESS, Dehne, 17 C.I. Plates 24 in. x 24 in. and Frames, with Pump 2½ in. plunger, nearly new condition. C. F. DAVIS, LTD., Hatcham Road, Old Kent Road, S.E.15. New Cross 1147.

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PATENTS obtained, trade marks and designs registered, at home and abroad.—GEE AND CO. (Patent and Trade Mark advisers to THE CHEMICAL AGE), 51-52 Chancery Lane, London. W.C.2. Telephone: Holborn 1525. Established 1905.

REGINALD W. BARKER & CO. (Estab. 1886.) Patent and Trade Mark Agents, 56 Ludgate Hill, London, E.C.4. Booklets sent gratis. Phone: City 5140.

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THE Owners of Patent No. 276,313 are desirous of arranging by way of licence or otherwise on reasonable terms for the commercial development in Great Britain of this invention which relates to a process for the production of alkali hydride.—For particulars address H. Douglas Elkington, 20 to 23 Holborn, London, E.C.1.

THE Proprietor of British Letters Patent No. 252,110, dated 18th May, 1925, for: "Process for Obtaining Tricalcium Saccharate Rich in Sugar and Poor in Lime and of a Very High Degree of Purity," is desirous of disposing of the patent rights or of negotiating for the granting of licences to work thereunder. All inquiries should be addressed to MEWBURN, ELLIS AND CO., 70-72 Chancery Lane, London, W.C.2.

THE Owners of Patent No. 357,721 are desirous of arranging by way of licence or otherwise on reasonable terms for the commercial development in Great Britain of this invention which relates to a process for introducing active oxygen into organic compounds.—For particulars address H. Douglas Elkington, 20 to 23 Holborn, London, E.C.1.

THE Owners of Patent No. 355,016 are desirous of arranging by way of licence or otherwise on reasonable terms for the commercial development in Great Britain of this invention which relates to a process for preparing hydrogen peroxide-phosphate compounds.—For particulars address H. Douglas Elkington, 20 to 23 Holborn, London, E.C.1.

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