The Chemical Age

A Weekly Journal Devoted to Industrial and Engineering Chemistry

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The Chemical Age

A Weekly Journal Devoted to Industrial and Engineering Chemistry

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The Implacable Offensive of Science

IT was fully expected that when peace broke in upon us the problems that would face a tired and harassed world would be just as great as those of the war, although different in character. This expectation has undoubtedly been fulfilled up to the hilt. There has been a change in the outlook of the civilised world during the last thirty years or so which has placed a gulf between 1914 and 1945 as wide as those covering many centuries before the industrial revolution. This change has been brought about by the application of science to human industry and to human affairs. It is perhaps not altogether true to place the whole emphasis on science, however. Education must accept its share. "Soap and education" as Mark Twain said, "are not so sudden as a massacre: but they are more deadly."

One result of the industrial application of science has been that everyone to-day is using, as the commonplaces of existence, services and goods of a kind undreamed of by even the most wealthy not many years ago. The great mass of people have become fully aware that they can have many things which their fathers and grandfathers were content not to expect and for which they did not even hope in their wildest dreams. With this change there has come an awakening consciousness of the power to get still more of the amenities of life, and determination to do so is expressed in many ways. Education has accelerated this movement. No longer are great masses of people ignorant and, being ignorant, prepared to continue as little more than the slaves of their employers.

Conditions of industrial life in the early Victorian years were frequently hard and often little better than slavery. Nevertheless, it must not be forgotten that it was the age of family businesses and that although there were the hard-hearted there were also many who regarded themselves as the fathers of the little community which depended for its livelihood on the success of their business. This spirit has lingered on in a certain number of industrial concerns to-day. Those concerns are the happiest in our whole industrial organisation. It is a spirit which is inevitably lost to some extent in great undertakings employing thousands of men and women. The fact that it has largely disappeared is another of the influences which have made for social change. It is

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inevitable that the attitude of a worker should be different, when he is dealing with a senior partner who knew his employees' parents, his wife's family and many of his domestic circumstances, from his feelings towards an impersonal board of management. It is well said, in a favourite film now showing in London: "You cannot marry Consolidated Chemical Industries."

Science marches on. In its march it is no respecter of persons. Success can be won only by the efficient. "The efficient" are those who employ science in their business, who keep abreast of the discoveries of science, and who take advantage of the opportunities brought by those discoveries. Any industry that desires to progress—or even to retain its position—must take fully into account these considerations of social progress, and of scientific progress. It is necessary that there should be concord and agreement between employers and employed, and if the old family spirit of many of the Victorian businesses has to die out, it must be replaced by team work. Team work is not quite the same thing as that which it has replaced. In a team everyone pulls his weight; but it is not enough only to do one's best. If a player is not good enough he is "dropped" in favour of one who is better; if an employee is not good enough he suffers the same fate. One consequence of the implacable march of science is that every one, from the highest to the lowest, who is engaged in industry must be sufficiently trained to be sure of earning a living.

Old traditions have often been a fetter on progress and frequently must be abandoned to meet new conditions. Every industry has to face a future in which only efficiency will enable it to discharge to the full its economic purpose and its social function. Tradition may be out of date in its effect on organisation, or very possibly it retards progress by its effect on industrial methods. Whichever may be the case, every industry can be sure of one thing: technical progress and the advance of industrial organisation will not stand still whatever happens in this country. The cotton industry, for example, is among the oldest and most traditional of industries. A committee has recently reported upon this industry that many of its traditions must be changed fundamentally in order that it may meet what the report terms "the implacable offensive of science."

America is faced with strikes on a scale seldom experienced in any country. There is there an offensive of labour which is clearly an offshoot of the advances in science and technology of the last few years. The social, educational, and scientific movements to which we have here called attention have run their course to such an extent that labour instead of being the servant of the employer, is now determined to be the master. We have heard of a Trade Union leader before the General Election in this country boasting to a friend that after the election Britain would be ruled by the Trade Unions. What will be the upshot of the struggle—for struggle it is—we do not know.

There is essential need to establish the belief that (in the words of the Evershed report on the cotton industry) "the providers of capital and the management on the one hand, and the operative on the other, are not serving distinct and opposing interests, but are together concerned to promote the wealth and efficiency of industry." This is a principle which we must do our best to establish for the future in this country and in all industries. The working parties which Sir Stafford Cripps is setting up are a step in that direction. We are seeing before our eyes a process of socialisation in Great Britain. This socialisation is not a revolution. It is the natural evolution arising from the industrialisation of the country and from the increasingly high standard of education of the great masses of people. There is a place for management and there is a place for labour. Management must be, and must remain, the captain of the ship. That, however, does not prevent the captain from taking the crew, to some extent, into his confidence. In America it is declared that the Unions "are demanding a virtual surrender of the vital and essential functions of management." Quite obviously that is going too far. One of the tasks that lies before us is to harness the social and economic forces that are at work towards the greater efficiency of industry.

NOTES AND COMMENTS

Reasonably Happy

WHATEVER grumbles, legitimate or otherwise, we may feel compelled to express, we have at all events one important ground for satisfaction, and one which gives us a great deal of genuine pleasure. At last, after six year-ends of apologetic congratulation, we can wish our readers a Happy Christmas and a Prosperous New Year without any mental reservation Admitted we all still have "a long row to hoe", but we can at least get on with the job without any extraneous interference, and with no anxiety about the life and limb of our sons, brothers, and colleagues. There will be plenty of other interference, of course, but that will be of a sort that industry can deal with by wise combined action. The British Chemical Industry can be trusted to look after itself now that its principal objective is, once again, the maintenance of its activities in a sound and healthy commercial condition. Editorially speaking, we have been greatly cheered by the number of inquiries about British chemicals and British chemical plant that have been arriving in increasing volume from abroad, and really the best Christmas card that we have received was from a firm of chemical manufacturers in the Netherlands. This was not intended as such, but it offers a most heartening example of the triumph of humanity over man-made adversity. The firm in question had their factory in one of the most severely devastated towns in Holland. Now, not only have they rebuilt, but they are seeking to refit with British chemical plant, where formerly they turned to Germany. So that really, even to-day, there seems to be some hope for prosperity in the New Year.

Phthalic Anhydride

IT would be difficult to find a better example of the versatility of modern organic chemical manufacture than in the remarkable variety of uses to which that invaluable material, phthalic anhydride, may be put. Some idea of this chemical's vicissitudes may be gleaned from the chairman's speech at the recent annual general meeting of British Celanese, Ltd. The company had developed a process on a large scale for manufacturing phthalic anhydride to use in their own plastic products. War needs demanded raw materials for the manufacture of dimethyl phthalate as an insect repellent, and the company's production of the anhydride was turned over to the manufacture of this essential war chemical, and at the same time considerably increased. The use of dimethyl phthalate (D.M.P.) to fight the malaria-carrying mosquito proved of the greatest benefit to the forces in the Middle and Far Eastern campaigns—a far cry from the original intention to use the phthalic anhydride as a basis for plastics. Incidentally, as we noted last week, there would be no harm in extending the "extremely promising industry" of phthalic anhydride manufacture in some of the coal-producing areas of the country. At present the naphthalene from the coal tars is being largely transhipped to works outside these areas, and although there are certain difficulties involved in the nature of patent rights and production agreements, the project is worthy of consideration.

Chemicals from Clothes Rationing

SOME other interesting facts concerning chemical production emerge from the British Celanese report, illustrating (for example) how clothes rationing had a directly beneficial effect on the war effort. Ordinarily, the company uses cellulose acetate in the manufacture of yarns and fabrics, but the Government ordered the quantity available for such purposes to be severely cut, and most of it was, instead, employed in the preparation of moulding powders and plastics required for warlike purposes. Similarly, additional quantities of such materials as acetone (for cordite manufacture), acetic acid, and acetic anhydride were made, the last two being used largely for pharmaceutical materials. A particularly urgent demand for acetanilide arose at one period of the war, and in this case the product was employed in the manufacture of sulphanilamides. The company's well-known plastic products were put to important war-time uses, such as aircraft windows, eyepieces

for gas-masks, etc., and a glass-substitute material, called "Celanet," was manufactured to supply roof-lights for factories, hutments, etc. The military uses of the company's range of textile products are too numerous to detail here; but enough has been said to justify a continuance, indeed an extension, of the company's policy of intensive research and development work. And that applies to the chemical industries in general.

Muddled Minds

WE recently received a statement from the Institute of British Photographers, whose examiners express grave concern at the poor standard of clear thinking and writing disclosed at their recent Intermediate Examinations. "Many candidates," it is complained, "did not know how to say or write what they really meant. In fact, their efforts could literally appear to mean just the opposite of what they should have said." Similar indictments could be made by a considerable number of other examining bodies. The examining board of the Institution of Gas Engineers, for example, had to protest this year against "long and rambling answers," and frequent inability to lay out an answer simply and clearly. It is impossible to dismiss the matter as merely a social consequence of the war. We fear there is no doubt that the root of the trouble lies much deeper, that is, in the present system of British education, and in particular, in the sphere of ever-widening technical education.

Education in Ideas

NEITHER special committees nor conferences, convened *ad hoc*, will effect much change, because their attention is focussed, in the main, on the higher strata of learning; and it is rather in the field of education for the million that speedy improvement is vital. The passing of the Education Act and measures connected with it will undoubtedly bring about certain improvements, but there should be no illusion regarding early results. It is not merely a question of the availability of finance, teachers and buildings; it is a question that is interlinked with the development and structure of our society. For technical education *à l'outrance*, together with a fair amount of general half-education, may easily provide the ground for that type of radical scepticism which nearly led to the return of the Dark Ages in Europe. Unless the development of technological learning can be synchronised with a modicum (at least) of humanistic and moral instruction, the dominance of loose thinking and claptrap (already a power in the land) will be assured and the fruits of victory will quite conceivably be squandered.

Parliamentary Topics

China Clay Industry

IN the House of Commons last week Mr. King asked the President of the Board of Trade whether he had any proposals to make in order to improve conditions in the china clay industry.

Mr. Ellis Smith said they had asked a small committee, consisting of Professor W. R. Jones, chairman; Mr. Percy Harris, Mr. J. H. Bennetts and Mr. T. K. Rees, secretary, to advise us on the subject with the following terms of reference: "To inquire into the factors affecting the efficiency of the production of china clay and to report upon the methods which should be adopted to increase production to a degree sufficient to meet the probable post-war requirements at home and abroad." The committee is beginning its work at once.

Mr. King, while expressing his thanks for the statement, also asked whether, in view of the fact that this step was taken without consultation with either the Union or the management, it would be possible to discuss widening the terms of reference and personnel of that committee.

Mr. Smith said that all the interests in the china clay industry would be consulted.

Synthesis of Penicillin

Mr. J. Lewis asked the Lord President of the Council by whom penicillin had been synthesised; and what was the structural formula.

The Lord President of the Council: A practical process for synthesising penicillin has not yet been evolved. I understand that the British workers associated with the Medical Research Council, and their American collaborators, propose to publish available information at an early date.

Mr. Lewis: Is my right hon. Friend aware that penicillin has already been synthesised by the *Daily Express*?

Mr. Morrison: I would not be a bit surprised.

Science and Industrial Planning

British Association's Conference

AT a conference on "Scientific Research and Industrial Planning," recently organised in London by the British Association for the Advancement of Science, the Lord President of the Council, Mr. Herbert Morrison, the chairman of the session on Planned Research, said that there must be independence between Government and science as well as independence also of industry—but not too much: rugged individualism must be reconciled with partnership. Scientists were the most individual of God's creatures and must, like eggs, be handled with care. He dismissed the attitude prevalent in the past, that the Government should give, and science should come cap in hand to the Government: instead, Government should demand and science require and assert. By closer association with the Government, science would have a social purpose and would share and speed the drive for social advancement. In facing, together with the Government, the tremendous economic and social problems of the peace, it would find an inspiration quite as great as it had found in war.

In the past, this country had suffered from a lack of boldness rather than ability, and in future, there must be a development of whole industries on the widest scale. To this end, firms should be research minded, but not in a narrow and selfish sense, appraising results by the marketable value of output. Due attention must also be paid to the production of scientific personnel. Concluding, the Lord President said that there would be a master plan for scientists and experts of every kind, and national problems and public needs would be the guides and targets of the community.

Plea for Justice and Reason

An eloquent plea for the revival of the spirit of reason and justice was made by Professor M. Polanyi, who spoke on "A Social Message of Pure Science." In this speech, the contents of which deserve to be read and contemplated by the largest possible number, he criticised the materialistic philosophy which maintained that the purpose of scientific thought is at bottom always practical, and that science, which pursued knowledge for its own sake in a world full of misery, was selfish and immoral. This, he said, was the chisel of scepticism driven by the hammer of social conscience. The most vital service scientists owe to the world to-day is to restore scientific ideas which have fallen into discredit under the influence of the modern philosophical movement. Scientists must reassert that the essence of science is the love of knowledge and that the utility of knowledge does not primarily concern them. Further, respect for all scholarship and the re-establishment of academic independence were vital. You cannot serve both God and Mammon; both truth and material welfare.

After having spoken of the debt of the world to the universities in those European countries occupied by Germany, which have not allowed themselves to be bamboozled or terrorised into compromising their standards, Professor Polanyi said that scientists must demand the revival of international scientific life, as part of the restoration of reason and civilised human intercourse. In the struggle for our civilisation, science occupies a sector in the front line, and the movement which is undermining the position of pure science is assailing our civilisation. These forces will have to be fought, for the easy wisdom of the modern sceptic has cost us already too dearly. The spirit of science must be vindicated against those who believe to-day that only violence can achieve results that are worth while. The only hope for Europe and the world lies in a solution by reason and justice, and no triumphs of applied science can help us.

The Rôle of Atomic Energy

The bearing of atomic energy on fundamental research was the subject of a paper presented by Professor C. D. Ellis, who said that we were at the beginning of a period of nuclear chemistry, comparable with that of industrial chemistry, one effect of which would be the availability of radio-active materials of all atomic weights. Our present knowledge of the subject was sufficient to permit practical developments of immense value to the community, for instance, in power stations.

Sir Edward Appleton said, in an address on "The Planning of Science," that the scientist should have no privileged position as a citizen. The public was now aware of the social consequences of science, and young scientists, who came to discuss their problems with him, were to-day more concerned with the usefulness of their work than with their salaries. In academic research, planning should extend only to money matters, otherwise the less planning the better. Moreover, scientists must not expect to dictate, as a "dictatorship of scientists would be as bad as any other dictatorship."

Dr. C. F. Goodeve, who spoke on the "Planning of Research," maintained that planning of pure research was out of the question, but the proper planning of ap-

plied research was essential; to this he added his views on the importance and conduct of team work.

The economic aspects of research and the human factor were the subject of the second day of the conference. Mr. F. E. Smith said that those industries or professions which had made the biggest relative effort on research had been the most successful and stable. Coal mining, with its related problem of distribution, gives a clear example of the difficulties which arise when research and scientific method have been neglected on both the technical and human side. What a difference might have been effected in this industry if, for the past 50 years, one per cent. of its turnover had been spent on research and scientific development!

"Sleeping Partners"

A great lack of spirit of adventure in British industry was complained of by Professor M. L. E. Oliphant, who, speaking of the position of applied science, declared that we had too many sleeping partners and moribund directors, who, once a year, totter up to a directors' meeting—probably in London, far away from the centre of production—and insist that £500,000, which the technical manager suggests should be devoted to research and new equipment, could not be provided, as it would entail a lower dividend and a less advantageous market value for the shares.

Professor P. Sargant Florence stressed the need to pay more attention to those scientists working on problems of production and management. An article, evolved or developed in the laboratory by scientific methods, often goes to the factory for mass production, where it is handled by "rule of thumb, tradition and hand-to-mouth devices." Both as regards technical matters, and the organisation of British industry, we had to catch up with other countries.

The contribution which industrial psychologists could make to industrial reconstruction was emphasised by Mr. Alec Rogers. They should concern themselves with three problems: vocational guidance and personnel selection, methods of training, and design and lay-out of equipment. It was now time to apply the experience gained in the Services to civilian problems. There were only about 30 classified industrial psychologists among the Fellows and Associates of the British Psychological Society, and if industrial psychology was to make a contribution to industrial reconstruction, that number must be increased appreciably. In this respect we are sadly lagging behind the United States, where only two years ago 400 psychologists were working for the U.S. Navy.

New British Standards

Production Control

THE British Standards Institution has just issued a new specification for the Application of Production Control (B.S. 1100: Part 3). This is the third and last of the series dealing with production control. The other parts have referred to the "Principles of Production Control" (Part 1), and "Production Control in the Small Factory" (Part 2). The present booklet is written from the general viewpoint of a concern dealing with batch production, *i.e.*, where repetition orders occur but not with sufficient regularity, certainty, or quantity to call for mass production. Both machining and assembly are envisaged. This type of organisation has the most complex problems to handle and is, perhaps, the one most commonly found in urgent need of the assistance of production control. The new specification is not a textbook, but aims at presenting in a concise form the considerations involved in the application of control.

The presentation which is now completed must be taken as a co-ordinated series of sign-posts which, it is hoped, will indicate the direction in which particular objectives should be sought, and not as a scheme for actual application over any one case as a whole.

Although the preparation of these booklets was started during the war, their value to industry is not lessened because war-time conditions no longer prevail, as it remains a national duty as well as a matter of individual satisfaction to see what can be done, by each in his own sphere, to increase the productivity of his plant by skilful and intelligent application of production control (price 2s. 6d.).

Quality Control

A reprint of the Guide for Quality Control and Control Chart Method of Analysing Data (B.S. 1008-1943) is also now available. This document is a reproduction of the American Standards Z.1.1. and Z.1.2. A general description of the control chart is given, and detailed instructions in its use are set out. Formulæ and tables for application of the control and method of analysis are given and examples added. Copies can be obtained from the Institution, 28 Victoria Street, London, S.W.1 (price 3s. 6d.).

At the reopening of the Sorbonne last Saturday the degree of doctor *honoris causa* in the University of Paris was conferred on 32 men from 12 countries. These included Sir Henry Dale, Sir Robert Robinson, Sir F. Gowland Hopkins, Sir Alexander Fleming, and Professor C. R. Harington.

Modern Welding for Maintenance

Aids to the Chemical Industry

by C. W. BRETT, M.Inst.W.*

A FEW weeks ago the writer visited a manufacturing plant, where various metals that are notoriously difficult to handle have to be machined. Those responsible for this work were justly proud of their achievements. Some of the most obstinate problems, it was claimed, had arisen in meeting the needs of chemical production. While the success obtained is of no mean order, other branches of engineering, notably scientific welding, have had even more exacting obstacles to surmount. Imagine the problem of welding an alloy having such a substantial magnesium content that it is highly inflammable in the form of swarf or filings. Yet such work is being undertaken as a matter of daily routine without risk and so perfectly as to pass the most exacting tests.

When manufacture is largely a chemical undertaking, it is not only that problems of corrosion or something similarly insidious are much to the fore, but maintenance needs are equally insistent, so much so, indeed, that any safe reduction that can be made in this direction is a valuable aid toward lowering the cost of the product. Even more important is the necessity for uniformity in the material produced, for quite often the question of maintenance has a vital bearing upon this aspect.

These are only a few of the reasons why the progress made with scientific welding during recent years is of paramount importance to the chemical industry. At the same time, the opportunities extend beyond the field of repair to the supply of all types of metal equipment. Much of the latter is of a special nature, which makes the production of plant on a repetition basis largely impracticable, except in the case of the smaller items. This implies, as a rule, a high cost, but this can be substantially reduced if steel plate is made to take the place of castings. This form of fabrication, when combined with welding, is not only less costly in actual price than castings, but both lighter and stronger. It is only when cast items are produced in sufficient quantities to absorb the cost of patterns easily that this method becomes cheaper.

Turning from the general to the particular an illustration is provided by the attention needed by distilling plant, boiling vats and metal containers. The old method for dealing with weak places used to be by patches riveted in position. Scientific welding offers two alternatives. First, the cutting out of the defective area and butt-welding a new and accurately shaped section in place; the repair is invisible and leaves a perfectly clean surface both inside and out, affording a striking contrast to riveting, which is not stronger, and creates ledges. The second method consists in applying new metal to the faulty places until the original thickness is restored. Either course is rapid, inexpensive and permanent. Mechanical repairs are mostly temporary and have, therefore, nothing in common with welding.

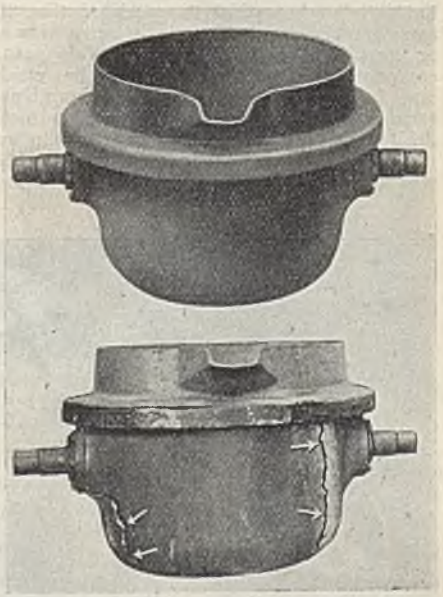


Fig. 1. A large cast-iron pan. Below, the two vertical cracks continued into a horizontal crack extending right across the bottom. Above, the same pan after repair; within a few days a first-class repair was made by scientific welding, and guaranteed.

Those who are well qualified to judge are of the opinion that the possibility of welding one metal to another (although their characteristics may be fundamentally different) is an opportunity of which the potentialities have by no means been grasped fully by industry. Nowadays, even aluminium and steel can be united by welding. Tests to destruction cause the failure of the weaker of the two parent metals sooner than that of the material within the area of homo-

* Managing Director, Barimar, Ltd.

geneous union, and prove that a true weld results.

It would, however, be incorrect to give the impression that welding can be undertaken by anyone who has the outfit necessary to do the work, but only a superficial knowledge of the technique. Long experience, high skill, and supervision by metallurgical chemists are essential to the achievement of consistently dependable results.

All forms of breakage can be dealt with, but it is not so widely appreciated that the same methods apply equally in cases of wear or corrosion. Reconditioning of this nature comprises a large part of welding, but cracks and fractures generally provide more spectacular material. The thickness of the metal dealt with is at present far greater than was the case a few years ago. Gear wheels, from which teeth have been broken away and lost, are restored to appearance and dependability that are equal to new, and often better. Boilers required for factory heating, power and process purposes, are best repaired by scientific welding. As in the case of pans and containers, thin places can be restored to their original strength, or new sections be fitted in position. Inaccessibility is sometimes an obstacle, but it is overcome, in the case of a defective flue or plate, by applying the new metal on the outside. Work of this nature carried out on boilers has the full approval of insurance companies undertaking this class of cover. A point of interest is that the bulk or weight of the item concerned makes transport to the shops of the welding engineers impracticable. In such cases it is usual to deal with the repairs on the site. Skilled operators are available both

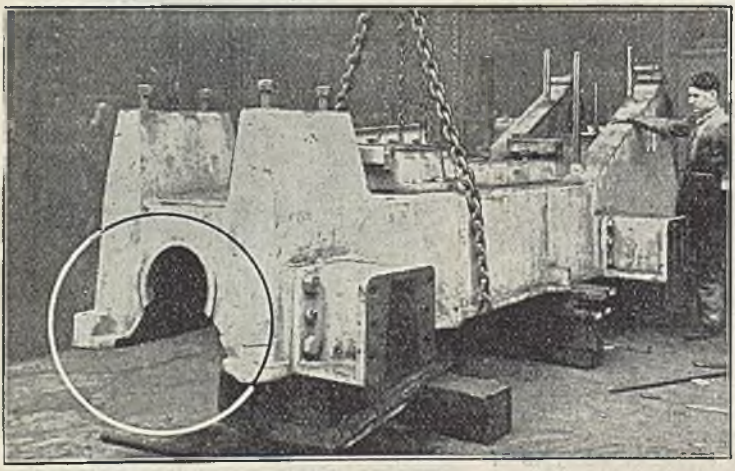


Fig. 2. Bedplate of ammonia compressor which formed part of a large refrigerating plant. The damage shown was done in transit.

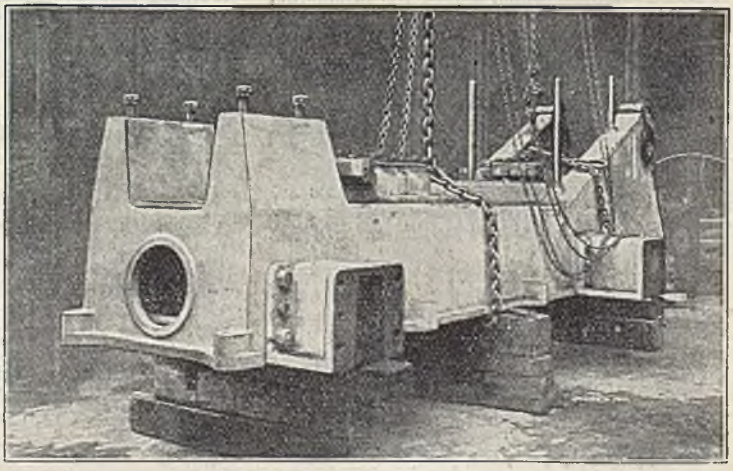
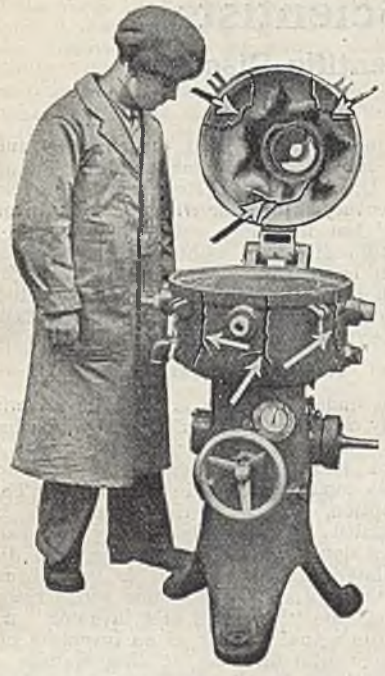


Fig. 3. Instead of waiting at least three months for a new casting, at heavy cost, the damage was repaired by scientific welding in less than a week, and the saving in cost ran into a big figure.



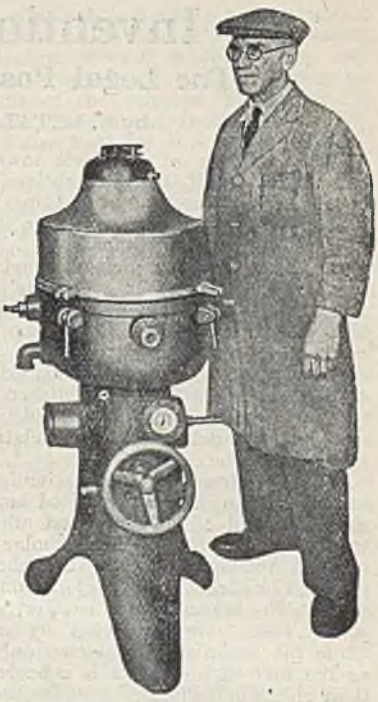


Fig. 4 (left). A high-speed separator that sustained multiple breakages—cracks in the cast-iron bowl, and cracks and dents in the aluminium cover. Some 1200 gallons of liquid passed through this separator in an hour.

Fig. 5 (right). To the scientific welding engineer this repair presented no difficulty. In addition to welding the cracks, the dents in the cover were also removed, and when the machine had been thoroughly cleaned and the cover re-polished it was indistinguishable from new, and just as efficient.

day and night to deal with emergency requirements.

Apart from the most moderate cost of the finest modern welding, it is desirable to emphasise the speed with which the work can be completed. Welding specialists are often asked to do machining, should this be necessary after the welding is completed. This practice is preferred by both parties as it ensures a perfect job with no divided responsibility. The word " perfect " is used advisedly for nothing but work entirely free from blemish, which alone can pass an X-ray examination.

RAYON IN FINLAND

As a result of two wars against the Soviet Union, Finland lost its first rayon plant, the Kuitu O/Y, formed in 1936 with Swiss participation. However, a new establishment, the Säteri O/Y has been founded at Valkeakoski, south-east of Tammerfors by the same group that owned the Kuitu O/Y. The plant produces rayon as well as artificial wool. According to recent reports, a second rayon plant, the Suomen Kuituteollisuus O/Y (Finnish Fibre Industries, Ltd.) is to erect a plant near Gamla Karleby. Although ample raw materials for rayon production are available in the country the fruition of this project will depend on the import of special machinery and equipment.

SCOTTISH BARYTES

Indications point to the revival, before long, of the barytes industry which flourished at Dundrennan, Kirkcudbrightshire, many years ago. W. & T. Shaw & Simpson, Caldbeck, Cumberland, have sunk a 90-ft. shaft on the farm of Barlocco, on the Auchencairn estate of Mr. John M'Kie, M.P., and it is hoped soon to produce large quantities of good-quality barytes. The samples already taken compare well with those from other Scottish veins.

Inventions of Scientists*

The Legal Position of Scientific Discovery

by S. MITTLER, A.F.R.Ae.S., A.M.I.Mech.E.

THE attitude of scientists towards the protection of their inventions or discoveries by Letters Patent or Copyright may be summed up as follows, under the heading of four "temperaments."

(1) *The Idealist*: Science ought to be free; it is against the scientists' code of honour to seek financial advantage from their discoveries. Results of experimental research or those arrived at by theoretical reasoning ought to be published as soon as they are scientifically established in order to enable other scientists to build their own work without delay on the foundations laid by their predecessors.

(2) *The Pessimist*: The scientist is the forgotten man, the disinherited son; he is too far ahead of his time, and others reap where he has sown. The scholar is condemned to poverty while the shopkeeper grows rich from the exploitation of his work. The musician, the painter, the playwright, etc., are protected by copyright while the scientist is protected only as far as the text of his books is concerned, not their scientific content.

(3) *The Realist*: The scientist has to work for the future but to live in the present, so he has to make the best of the existing provisions. Self-denial does not promote science, for a scientist who has financial worries cannot concentrate on his research or theoretical work, and funds are necessary for equipment and expenses.

(4) *The Progressive*: "Science" includes also the science of promoting science. Existing legal provisions ought to be reviewed in order to get the best possible conditions for independent scientific work from which the progress of science as such, its application to the problems of daily life, the scientist and the public at large would benefit alike.

While admiring the Idealist and pitying the Pessimist, we shall be at issue with both of them when setting forth in brief the existing provisions for the Realist and putting forward some suggestions for the Progressive.

The Current Position

Patents are granted for "inventions" and these are defined, in Section 93 of the Patents and Designs Act, 1907-42, as "any manner of new manufacture . . . within section six of the Statute of Monopolies . . ." of 1623 (21, Jac. 1, c. 3). Now scientific discoveries are no "manner of new manufacture" and therefore no suitable subject matter for Letters Patent. The U.S. Patent System uses the term "discovery" together with that of "invention," but this does not include a purely scientific discovery either. Some foreign patent laws, such as the Austrian and the Czechoslovakian Patents Acts, exclude "scientific theorems and principles as such" expressly from protection by Letters Patent.

The Nature of Discovery

The underlying idea is that the scientist merely discovers a law of nature which had always been in existence, independent of human knowledge, whereas the inventor creates something new in his mind. This conception, shared, curiously enough, by materialists and platonists, is by no means beyond doubt or criticism, as we shall discuss later. In any case it is inconsistent with the British patent system which recognises as the "true and first inventor" not only the actual deviser of an invention but also one who finds an existing manner of manufacture abroad and is the first one to introduce it into this country. Both meanings of the Latin word *invenire* are therefore included in the legal term of *inventor*, namely: to devise, and to run into something. If Letters Patent reward the enterprise of somebody who appropriates something he has found ready-made by somebody else abroad and no creative act of his mind is expected from him, then there is no reason to exclude the man who discovers something that, even if it existed before, had been hidden from human knowledge.

Now the materialistic view that matter is the only true reality and that its laws of motion, or, in more modern terms, of the behaviour of energy quanta or electrical fields, etc., exist independently from the by-product of some complicated biochemical processes—called "mind"—in the cells of the human brain, is not accepted by philosophy. Neither are the concepts of universal truth, moral order or beauty, sublime and aloof from any human mind conceiving them, shared by the philosophically-minded scientist. A third philosophical view, namely, that the human mind is the only reality of which we have first-hand knowledge and that everything we can perceive, think or know can be done so only in terms of the human mind agrees better with the naive view of common sense that, to all practical purposes, something of which nobody knows might just as well not exist at all. A gold nugget in the depth

* *cf.* MITTLER, "Inventions of Employees," *Chem. Age*, 1945, 52, 567.

of the earth has no effect on human affairs until it has been dug up. The scientist who discovers a law of nature does not merely "dis-cover," *i.e.*, uncover something existing, but enriches the knowledge of the human mind and its potential power over matter: he creates something new, as far as man is concerned, and that is the only point that matters.

Protection by Common Law

Fortunately, patent practice is kinder to the scientist than the system on which it is founded: if the discoverer of a new principle gives at least one practical example, embodiment or application of it, he is entitled to patent protection not only for the special embodiment, etc., described but for all other possible embodiments, etc., of the new principle. The leading case in this country is THE HOUSEHILL CO. v. NEILSON (1843), 1, Webster's Patent Cases 673.*

Thus a scientist who looks for advice from his "colleagues of the other Faculty" need not leave the harvesting of the fruits of his labour to somebody else. On the other hand, his conscience need not be burdened by questions of scientific etiquette; as a patentee he is entirely free to grant licences free of charge to anybody who applies to him for that benefit and whom he considers worthy of it for the sake of Science, while drawing royalties from the commercial exploitation of his discovery.

Scientific Experiments

Bona fide experimenting with an invention patented to somebody else does not constitute infringement of the patent anyway, according to Common Law. The leading case here is FREARSON v. LOE (9 Chancery Div., 48).†

Scientific Publications

"Reading of a paper . . . before a learned society or the publication of the paper in the society's transactions, shall not prejudice the right of the inventor to apply for and obtain a patent in respect of the invention or the validity of any patent granted on the application, provided that . . . the person reading such paper or permitting such publication, gives the Comptroller (of the Patent Office) the prescribed notice of his intention to do so and . . . the application for a patent is made before or within six months from the date of . . . the reading or publication of such paper." Thus, consideration is given to the professional requirements of the scientist by Section 45 (I) of the Patents and Designs Act, 1907-1942 (*see* also Rule III of S. R. & O., 1939, No. 858).

The complaint that scientific discoveries are mostly so far ahead of their industrial application that a patent taken out for them would have its maximum period of sixteen years expired before commercial exploitation had become possible is met by Section 18 of the same Act, which provides for a possible extension of the term of a patent "with regard to the nature and merits of the invention in relation to the public, to the profits made by the patentee as such, and to all the circumstances of the case. . . If it appears that the patentee has been inadequately remunerated by his patent, the Court may by order extend the term of the patent for a further term not exceeding five years, or in exceptional cases, ten *years*. . . ."‡

Obviously, important scientific discoveries capable of practical application, and the scientists taking out patents for them, are the objects and persons worthy of the benefit of this Section.

Suggestions for Improvements

From the foregoing it will have become clear that for a scientist to take out a patent need not constitute a sin against the spirit of Science, and that, on the other hand, the scientist is not quite so much a "Cinderella" as he is sometimes believed to be. Undoubtedly, however, the ever-increasing importance of science, the rapidity of pure science becoming applied science in our days, makes development of the legal provisions essential.

For example, the extension of the term of a patent as mentioned above can at present be obtained only by a complicated and expensive legal proceding in Court. The recommendations of the First Interim Report of the Departmental Committee (Cmd. 6618, April, 1945)§ are so far limited to the simplification of procedure for patentees who have suffered loss or damage by reason of hostilities. It would perhaps be desirable to extend comparable facilities to pioneer patents that were far ahead of their time.

Present endeavours in the U.S.A. to find an up-to-date definition of "invention" deserve to be watched critically but with a readiness to derive suggestions from them for a modification of the historically venerable but undoubtedly outdated definition of

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* For the judge's direction to the jury, *see* "Terrell on Patents," where other similar decisions constituting case law under Common Law are to be found.

† Jessel, Master of the Rolls, held: ". . . no doubt if a man makes things merely by way of *bona fide* experiment, and not with the intention of selling and making use of the thing so made for the purpose of which a patent has been granted, but with a view to improving upon the invention, the subject of the patent, or with a view of seeing whether an improvement can be made or not, that is not an invasion of the exclusive rights granted by the patent. Patent rights were never granted to prevent persons of ingenuity exercising their talents in a fair way . . . ."

‡ No renewal fees are due for the extended term of a patent.

§ *See* "Swan Committee's Report," *Chem. Age*, 1945, 53. 54.

the Statute of Monopolies of 1623 ("manner of new manufacture"), so as to include also scientific discoveries.

Other suggestions may be drawn from the Copyright Act, 1911, which protects a scientific publication as an " original literary . . . work " by reserving " the sole right to produce or reproduce the work or any substantial part thereof in any material form whatsoever " which includes also any translation of it (Section 1). The scientific content, however, is not covered by copyright. Now an extension of copyright to the scientific content might perhaps be possible on the following lines: the discoverer of a new scientific principle would have the choice between (a) taking out a patent for it, provided it is capable of practical application, and thus enjoying protection for a term of sixteen (or possibly 21 or 26) years, and (b) submitting his original scientific publication to a register kept, say, at the Royal Society.

If industrial development leads, within the lifetime of the author of such scientific publication, or within fifty years after his death, to commercial exploitation of a discovery not patented by the discoverer, then he or his heirs, or a professional institution on his behalf, should have the right to apply for the transfer of the publication to the Comptroller of the Patent Office, to a tribunal or to the Court with a view to determining what scope the discovery would have had if it had been patented.

No monopoly rights *ex post facto* could be granted, but royalties for the use of the discovery could be assessed by a procedure similar to that in operation under Section 24 of the Patents Act, for Licences of Right. Such royalties would have to be substantially lower than those awarded to a patentee for licences of right, but should yield a fair amount, enough for saving a scientist disabled by old age or by illness, or his heirs, from want, or to provide funds for the promotion of science by granting bursaries for students, for research equipment, publications, and the like.

Sodium Hydride Descaling

New Process for Canada

A NEW process for descaling metals, developed in secrecy during the war, has just been announced, and is expected to have a far-reaching effect on the steel and metal industries in the peace years ahead, reports a correspondent in Montreal. Years of laboratory research and mill experience were required to develop the process. Utilising sodium hydride, it is, in a sense, an alkaline pickling bath which requires no electric current, thus offering many advantages over the usual acid pickling for alloy steels, particularly the stainless steels. These advantages include a shorter time for descaling, the elimination of the possibility of pitting the metal through careless practice, and the saving of 2 to 3 per cent. of the steel which may be lost through the action of acid.

The scale, reduced by the sodium hydride dissolved in fused caustic, is virtually blasted from the surface of the metal by the generation of steam as the hot metal is quenched in water. Only a few seconds' dip in acid to brighten the surface remains to be done. In addition to its use on alloy and stainless steels, the sodium hydride bath is effective on plain carbon steels and on nickel, cobalt and copper.

The process is being introduced into Canada by Canadian Industries, Ltd., and according to that company's chemical division, it will be licensed for general use on a royalty-free basis. It was developed in the United States by E. I. du Pont de Nemours & Co.

Antioxidants for Fats

Rapid Methods for Evaluating Stability

A COMPARISON was made of stability values and protection factors as determined by three widely-used rapid methods, the active-oxygen, the oxygen-absorption, and the oven-test methods. In most instances there was fair agreement between the results by the active-oxygen and oxygen-absorption methods, as indicated by protection factors. In general, use of dry air instead of moist air in the active-oxygen method resulted in little significant difference in the stability values, although in some preparations differences were found that may be significant. Use of dry oxygen in the active-oxygen method gave results comparable with those obtained by the oxygen-absorption method. In experiments in which an oven test was also used, the protection factors in most cases were in general agreement with the other two methods.

The synergistic antioxidant effect of acidic compounds with phenolic antioxidants was most pronounced when lard of low stability was used. Likewise, the protection factors were disproportionately greater when antioxidants were added to lard of low stability. The results indicate that comparison of antioxidants by means of protection factors is valid only when the same substrate is used. Protection factors so obtained help to evaluate the order of effectiveness of various antioxidants but do not yield a strict quantitative comparison of the protective power of the antioxidants when appplied to other substrates.—(Riemenschneider *et al.*, *Oil and Soap*, July, 1945.)

Zinc and Sulphuric Acid

The Imperial Smelting Corporation at War

INCREASED production of zinc and sulphuric acid during the war was the main theme of the chairman's speech at the annual meeting of the Imperial Smelting Corporation, held in London on December 20. Zinc furnaces were extended at Avonmouth, idle furnaces at Seaton Carew and Bloxwich were restarted, and a peak production of 75,650 tons of zinc was achieved in the year ending June 30, 1942. Subsequent periods showed outputs not far short of this figure. Sulphuric acid capacity was increased by extensive alterations to the Swansea Vale plant and idle plant at Newport was brought into operation.

Peak Production

The peak production was reached in the year under review, when over 239,000 tons of acid were made. The availability of large quantities of sulphuric acid enabled National Fertilisers to turn out record tonnages of superphosphates, which played such an important part in increasing food production in the United Kingdom.

The operations of the zinc and sulphuric acid plants depend on the supply of concentrated zinc ores, which are derived almost entirely from overseas. Thanks to the Royal and Merchant Navies these supplies continued to arrive throughout the whole period of the war. Steps had, however, been taken to accumulate large stocks of concentrates at the works prior to the outbreak of the war, an act of foresight which brought relief to our hard-pressed shipping.

In the zinc group new or enlarged plants for the production of refined metal, alloys, and zinc dust were constructed. These comprised the enlargement of the refluxer plant, for producing high purity zinc, from 30 to 40 tons per day refined metal capacity, the new alloying units at both Avonmouth and Bloxwich, and the new air-blown zinc dust plant erected and operated at Avonmouth on behalf of the Government. The most striking advance was in the production of alloys for zinc base die-casting, which in the year ending June 30, 1943, reached the peak total of 53,736 tons. This compares with an annual output of 5000 to 6000 tons prior to the outbreak of war. Zinc dust, with a peak of over 10,000 tons in 1943-44, was well over ten times the pre-war figure. The Seaton Carew works produced large quantities of roasted zinc ores for the electro-galvanising industry.

Cadmium and Cuprinol

The production of cadmium metal was largely increased and reached the record figure of 207 tons this year. Cuprinol, an Imperial Smelting Corporation product for preserving timber and fabrics, became of particular importance in treating equipment for use under tropical conditions in the Far East.

The wholly-owned subsidiary, Orr's Zinc White, Ltd., which manufactures lithopone, zinc sulphide, and bleached white barytes, has been extremely busy, although, unfortunately, the zinc sulphide and high-strength lithopone plants had to be closed down and all the manpower concentrated on the production of standard lithopone.

During the war the Corporation branched out into the manufacture of hydrofluoric acid and aluminium fluoride, the latter used in the production of aluminium. On behalf of the Ministry of Supply a new plant for the production of chlorosulphonic acid mixture was built and operated, the material being required for military and naval smoke screens.

Enemy Damage

An extensive though relatively unimportant amount of damage was done by enemy action to the plants of the smelting group. The aluminium sulphate plant was completely destroyed and damage was caused in the pottery, filter house, fitters' shop, carpenters' shop, refluxer and metal store building, acid plant, and Cuprinol building.

The improvement in the war situation during the year 1944-45 caused a reduction in the demand for zinc metal and in consequence the zinc distillation sections at the Seaton Carew and Bloxwich works were suspended at the beginning of 1945. In addition, the Ministry of Supply zinc dust and chlorosulphonic acid mixture plants on the Avonmouth site were closed down. On the other hand, the main zinc-producing plants at Avonmouth and Swansea Vale have continued operations at increased efficiencies, and record outputs of sulphuric acid, cadmium metal, and hydrofluoric acid were obtained.

Viscount Leverhulme presided, on Friday last week, at the centenary festival dinner of the Royal Commercial Travellers' Schools, held at the Connaught Rooms, London, and it was announced during the evening that the centenary appeal had yielded the fine sum of £49,176, the President's own list totalling nearly £13,000. Since the foundation of the schools in 1845, 4700 boys and girls have been admitted, and there are 234 now in residence. Many trades are represented in the schools, including oil and drysalters by eight scholars, paint and varnish by seven, and soap and perfumery by ten.

A CHEMIST'S BOOKSHELF

DEEP DRAWING AND PRESSING OF ALUMINIUM ALLOYS. Bulletin No. 10 of the Aluminium Development Association, Birmingham. Pp. 40. 1s.

Because the increasing demand for quantity output of shaped components in aluminium and aluminium alloys has given rise to considerable developments in mechanical mass production methods, the latest Technical Information Bulletin, just issued by the A.D.A., could not have appeared at a more favourable moment. It deals specifically with power press processes and the accompanying tools.

The preparation of the material, blanking and shearing methods, blanking tool materials, their design and correct clearances, and methods adopted for piercing and perforating form the first section, followed by a description of both deep drawing methods, and of various presses.

The properties of aluminium alloys affecting deep drawing are discussed, and general rules laid down. Tools, tool materials and lubricants are also dealt with, and a number of representative examples are illustrated and described, giving tables of die dimensions and number of draws required. Press forming is treated similarly and comprehensively, with instructions how to deal with springback, and a means of calculating the relative formability of different alloys from their stress-strain curves. Various bending and flanging methods, such as forming shallow bends with rolls; forming sections by means of the press brake; and flanging by modern machine methods are also included. A chapter on coining and embossing, a select bibliography, and 32 photographs and diagrams round the Bulletin off.

Technical Reports from Germany

Copies now on Sale

IN addition to the reports on German chemical works made available by the Association of British Chemical Manufacturers, a number of reports have now been issued through the Stationery Office. These are available at the central public libraries in all the chief industrial centres of Great Britain and Northern Ireland, and in London at the Guildhall Library, the Science Museum Library, and the central public libraries of Southwark, Westminster, Croydon, Hendon, and Tottenham, and the Middlesex County Library, Hounslow.

The collection of this intelligence was orginally carried out under an Anglo-American organisation, known as the Combined Intelligence Objectives Sub-Committee (CIOS). Since the disappearance of the Combined Command on the Continent the work has been continued under separate British and American organisations, but the principle of pooling all the information collected has been maintained. Already a considerable amount of scientific and technical information has been obtained, particularly in the field of chemicals, dyestuffs, rubbers, plastics, petroleum, synthetic oil and metallurgy.

It is the Government's policy to put this information at the disposal of industry as soon as possible. Similar arrangements for publication are being made in the United States by the Office of the Publication Board of the Department of Commerce, Washington. Reports as they are published will be distributed to the chief public libraries, to universities and professional institutions, and to the trade associations concerned. A limited number of copies will also be on public sale and may be ordered from the Sales Offices of H.M. Stationery Office.

The following reports of chemical and metallurgical interest are now available. Postage is normally 1d. (2d. on reports priced at 2s. 6d.).

CIOS X—14 and *XII*—23. *The N.V. Organon Pharmaceutical Factory at Oss, Holland*: Synthetic hormones, plasma substitutes, vitamins, penicillin, sulpha drugs, etc. (2s. 6d.).

CIOS XII—21. *Steel Making in Belgium and Luxembourg during German Occupation*, etc. (2s. 6d.).

CIOS XIX—5. *I.G., Dormagen*: Manufacture of cuprammonium, rayon and staple fibre, cellulose acetate, etc. (1s. 6d.).

CIOS XX—6. *Burbach Eisenhütte, Saarbrücken*: Description of steel works, including recovery of vanadium (1s.).

CIOS XX—11. *I.G., Höchst*: Manufacture of organic chemicals (1s.).

CIOS XXI—2. *I.G., Leverkusen*: Manufacture and impregnation of gas-mask charcoal (6d.).

CIOS XXII—3. *Röchling'sche Eisen and Stahlwerke G.m.b.H.*; Steel works at Völklingen, near Thionville, Saar (2s. 6d.).

CIOS XXII—4. *Aluminium Woerwerke, Erbtwerke Grevenbroich*: Electrolytic production of aluminium from bauxite, recovery of aluminium from dross scrap (1s.).

CIOS XXII—11. *Synthetic Mica Process, Ostheim* (6d.; *see* p. 598).

CIOS XXII—16. *I.G., Elberfeld and Leverkusen*: Plastics: di-*iso*cyanates and polyurethanes, ethyl cellulose, benzyl cellulose, acetyl cellulose (1s.).

CIOS XXII—18. *I.G., Leverkusen*: Production of hydrazine hydrate (1s.).

CIOS XXII—19. *I.G., Leuna*: Manufacture of organic compounds (1s.).

CIOS XXII—20. *I.G. Bunawerk, Schkopau*: Manufacture of Buna and other organic chemicals (1s. 6d.).

CIOS XXIII—8. *Dessauer Werke für Zucker, Chemische Industrie, Dessau*: Extraction of ethyl alcohol and lignite from wood by refinement of the Bergius and Scholler (Munich) processes (6d.).

BIOS 46. *Feldmühle Papier und Zellstoff Werke A.G., Reisholz-Werke, Düsseldorf*: Manufacture of groundwood pulp and newsprint (6d.).

BIOS 47a. *Haindliche Papierfabrik, Schöngau, Bavaria*: Manufacture of newsprint and groundwood (6d.).

BIOS 49a. *Aschaffenburger Zellstoff A.G., Aschaffenburg*: Manufacture of sulphite pulp from spruce and utilisation of waste sulphite liquor (1s.).

BIOS 48. *Feldmühle Papier und Zellstoff Werke A.G., Arnsberg, Westphalia*: Manufacture of patent coated board (6d.).

BIOS 52. *Zellstoff-fabrik Waldhof, Mannheim-Waldhof*: Manufacture of sulphite pulp from spruce and utilisation of waste sulphite liquor (1s.).

German Insulating Material

Overcoming the Mica Shortage

BECAUSE of the shortage of mica for use as a general insulation material, the Robert Bosch Co. have developed a substitute material which they claim is superior in every way to mica and one which they plan to continue to use even though mica should again become available. The trade name for this material is "Glashartgewebe" and it consists of several layers of impregnated glass fibre which have been bonded together under heat and pressure.

The glass fabric is purchased from textile mills on the following specification. The thread thickness may vary from 0.015 to 0.022 mm. in diameter. The weave must have between 19 and 21 threads per centimetre and the warp must have between 15 and 17 threads per cm. The finished fabric must weigh between 125 and 135 gm. per sq. m. and must have an alkali content of between 6 to 9 per cent. Samples of each lot of material purchased are given a heat test, which consists of heating the material to a temperature of 450°C. for a period of 10 min. The loss in weight of the sample must be between 3.5 and 4.5 per cent. This test is to determine whether or not too much oil has been used in the sheen process. Too much oil will prevent impregnation of the fabric.

Impregnating the Glass Fabric

The impregnation solution is prepared by mixing the following materials until a homogeneous mixture is obtained: Resinol K2 (not fully polymerised) 53.30 per cent. by weight; alcohol (CR), 23.35 per cent.; osmose kaolin (made by electrolytic deposition of kaolin in water), 23.35 per cent.

The glass fabric is impregnated in a vertical-type machine run at a speed of 1 m. per min. The amount of impregnating material used per unit length is controlled by passing it through adjustable pressure rolls. The material travels about 14 m. in the oven. It enters the oven at room temperature and reaches a maximum temperature of 120°C. at the top of the oven. It then cools down to room temperature by the time it emerges from the bottom of the oven. Approximately 42 kg. of the impregnating material is required per 100 m. of the fabric. Alcohol is recovered.

Cutting and Folding

The impregnated material is then cut into strips 1500 by 95 mm. This is folded into three thicknesses lengthwise and then moulded under heat and pressure, providing a moulded piece of fibre 500 by 95 mm. That is the largest piece of material which can be moulded to satisfy the close limits in thickness required for insulating strips between commutator segments. The moulded material is next baked in an oven at a temperature of 210°C. for 4 hrs, to remove all the solvent and is then in its final form. Special nickel-plated platens are used. They are machined very flat. Three strips of material are moulded at a time. The moulding press is closed slowly at first but the final 2 cm. are put through at a relatively fast speed of 1 m. per sec. This is necessary because the material is not thermoplastic and to obtain uniform thickness the excess impregnating material must be displaced mechanically.

The material is subjected to a pressure of

350 kg./sq. cm. at a temperature of 160°C. for a period of 5 min. No cooling cycle of the press is required since the material does not change in dimension when removed from the press hot.

This material can be exposed to a continuous temperature of 250°C. and temporarily to 320°C. It is non-hygroscopic, showing no change in either weight or dimensions when exposed to a relative humidity of 100 per cent., and a temperature of 21°C. for 24 hrs. Thickness can be held to 0.055 ±0.00001 mm. The material is tested for electrical breakdown at 1000 volts, but will stand many times that voltage. There is no information available on the insulation resistance of the material or the effect of humidity on insulation resistance.

Any manufacturer making phenol fibre could produce this material after a relatively small investment.

Synthetic Mica

Since the above report was received, further information has come to hand concerning the Germans' manner of dealing with the shortage of natural mica. This is in the form of a CIOS report (*see* p. 596) on a synthetic mica process carried out at Ostheim, in Thuringia, and developed by the KWI Ceramics Institute (Forschungsgemeinschaft für Keramik, Glastechnik, und Emailtechnik), evacuated from Berlin in 1943, under its director, Dr. A. Dietzel. Research on the problem started in 1941 and was completed early in March this year. The process developed is an improvement on the Siemens-Halske method developed in 1918-19.

The best synthetic mica produced by the new method is as good as natural mica, and the mica blocks obtained carry the same cleavage characteristics as natural mica. The best composition is as follows:

	% *by wt.*
SiO_2	35-39
$(Al, Fe, Cr, V)_2O_3$	11-12
(Mg, Fe, Mn, Zn)O	29-35
$(Na, K)_2SiF_6$	11-13
(Na, K)F	6- 7

The principal work was to determine the exact composition which gave the best mica and the exact means of producing large sheets of mica. To get larger sheets many ideas were tried. Supersonic waves as a means of control were of no value. Steam for heating, as a means of introducing water molecules such as occur in natural mica, was not satisfactory, although the use of steam for this purpose has been patented. The basic means for getting larger blocks of mica was the careful control of the cooling of the melt, especially in the critical range 1270-1230°C., and the introduction of a magnetic field at right angles to the vertical axis of the crucible.

The development of the new process is so recent that it has not been applied in industry. In the laboratory, using 100 to 200 gram melts, the best samples contained mica blocks 3¼ in. in size. Commercially blocks 6-12 in. in size would be practicable. Theoretically, even larger sheets than this are possible, being limited primarily by the size of the crucible. Commercial one-ton batches in single crucibles are believed entirely feasible and estimate of cost of a 100-ton per month plant is two million marks minimum.

Types of Crucible

Composition of the mix is very important, but high-quality technical raw materials were sufficiently pure in development work. The crucible is also very important, as with ordinary crucibles too many nuclei are obtained, and, therefore, small crystals. Graphite crucibles were used in development. Platinum crucibles would be satisfactory, although the cost of large platinum crucibles would, of course, be very high and after a few batches the platinum surface would probably roughen and the mica would stick. There was no sticking in the graphite crucible. The laboratory graphite crucible used had 2-3 mm. walls, and it was estimated that a one-ton graphite crucible should have 5-8 cm. walls. Life of laboratory crucibles was about six batches and commercial graphite crucibles should have a life of 10 to 15 batches. The larger crucible would also be advantageous, in that cooling would be slower and the slower the rate of cooling, the larger the crystals. Slow cooling rate is important only in the range 1270-1230°C.; below this temperature, cooling can be rapid.

Experimentally, electric heating was used. Commercially, either a gas-heated furnace (like a glass-making furnace) or electric heating would be preferred.

Constant temperature throughout the furnace is most important, to obtain which, in a batch, a tubular furnace is recommended. In an electric furnace corundum resistance tubes were preferred. A reducing atmosphere (CO) was used to protect the graphite crucible. The CO came from the coal used in the furnace jacket. The coal also acts as a resistance medium. A magnetic field is needed for crystallisation in large sheets. If a magnetic field is not used and only the temperature drop is controlled large flat sheets are not obtained.

To introduce fluorine into the melt, cryolite from the Heyl Goerlitz factory was used. Siemens and Halske had process trouble, due to loss of fluorine, and Dietzel overcame this by sealing the process crucible in a bath of fluorides, thus avoiding evaporation, and also providing a seal for vapour. Siemens and Halske used K_2SiF_6 as a source of fluorine and did not use cryolite.

Air Pollution

The Leicester Survey of the D.S.I.R.

THE report of the Leicester Air Pollution Survey, published on Thursday last week, contains many interesting facts about the smoke menace in our industrial cities. Although there are no startling conclusions, the report will be a guide to municipal authorities attempting to make towns cleaner.

The Survey was undertaken by the D.S.I.R. to find the answer to many questions: How much pollution is there in a town and how is it distributed? Where and when is it produced? How much is produced by domestic buildings and how much by industrial undertakings? How far does it spread? By how much does it vary at different times of the year, at week-ends, by day and night, and why does it vary? How constituent is very fine solid matter, such as is it removed? Can it be prevented?

Three Kinds of Pollution

The pollution in the air consists of three constituents. There is the relatively coarse solid matter, such as ash, soot, and grit, which is usually deposited fairly near its place of origin. This is the dirt that settles on everything inside industrial towns and is that most commonly encountered. Another constituent is very fine solid matter, such as smoke, which remains in the air for a considerable time. This is the material that causes haze over towns and can be seen deposited on walls near ventilators or at cracks in ill-fitting window frames. The third constituent is sulphur dioxide which is given off by impurities in coal and can best be removed by better washing of the coal at the collieries.

Domestic grates are the worst offenders in air pollution. A ton of coal burned in a private house produces more than twice as much smoke as the same amount of coal burned in a factory. As smoke abatement by-laws are enforced and inventions for consumption of smoke are applied to factory furnaces, so the proportion of the smoke and dirt in the air made by domestic grates will increase.

The report states that the only cure for air pollution is to forbid the burning of bituminous coal. That would mean a revolution which would throw our industrial and social life into turmoil. It therefore recommends the reduction of smoke stage by stage. It is worthy of note that London produces a smaller proportion of smoke per head of population than other big industrial cities. The reason for this is that so many private houses in London are heated by smokeless fuels. Cardiff is the cleanest town, largely because low-volatile coal is burned in private houses. Stoke is the dirtiest, probably because its industrial concerns produce a disproportionate amount of smoke.

The amount of smoke at the centre of towns was found to be proportional to the square root of the population. As a result it is possible to look at the plans of a whole new town and predict the amount of smoke there will be at the centre.

Why Leicester?

Although Leicester is surrounded by a broad agricultural belt, between 10 and 40 per cent. of the total smoke pollution at the centre of Leicester comes from other industrial areas. This shows that smoke abatement will have to be tackled as a national problem as well as in municipalities if it is to be properly overcome.

As little as ½ gram of smoke per cubic metre of air is sufficient to blot out vision. This means that on an average day in Leicester visibility is limited by smoke alone to less than 1300 yards, irrespective of the effect of fog or rain droplets. On the smokiest days its distance is reduced to 200 yards. The bad effect this must have on air transport is easily seen and is an added incentive to mastering of the problem.

An instrument for measuring the ultra-violet rays received was specially devised for the survey. The beneficial effect of ultra-violet radiance on health is now generally recognised and it was found that at least 30 per cent. was cut out by smoke during the winter months.

Wind does very little to reduce the concentration of pollution in the air over a town. It was found that in Leicester the highest concentration was only moved about half a mile by a strong wind. Turbulence is the greatest factor in dispersion, for this causes the smoke to mix with the clean air upwards and downwards as well as side to side.

Much has been already done to limit the omission of smoke from industrial chimneys by means of by-laws and smoke inspectors of local authorities. A war invention for preventing smoke from funnels of ships in convoy can also be applied to factories and has the added advantage of lessening fuel consumption. The main problem is to change over in domestic fires to smokeless fuels such as anthracite or other low-volatile coals, coke, electricity or gas.

A useful development envisaged in the report is smoke-forecasting. If warnings were given of impending high concentrations of smoke in urban areas, they would be of benefit to all sections of the community.

Road Tar Research

Association's New Trade Mark

AT the recent informal luncheon of the British Road Tar Association, marking the first return to the pre-war custom of a luncheon on the day of the annual general meeting, the chairman, Mr. J. Davidson Pratt, explained that the decision *not* to hold a luncheon this year was made before the end of the Japanese war, so that the function, as eventually arranged, was necessarily informal. Next year they hoped to resume the custom of inviting representatives of Government departments, and allied industries, as well as of the technical Press.

Speaking of what the Association had achieved during the war, the chairman stated that it was a great testimony to those who had been responsible for our roads, and to the methods and materials of construction used, that in spite of almost negligible maintenance and very heavy military traffic during the past six years, they were still in astoundingly good shape. In some remarkable instances, tar had been the binder used —both as carpets and as surface dressing. For many years the Association had co-operated with the D.S.I.R. on a 50/50 basis in the conduct of fundamental researches into the properties of road tar and the best methods of employing it in road construction and maintenance. This was additional to the large amount of research which is continually in progress in the laboratories of the main tar distillers in this country.

Increased Contribution

The Association, the chairman said, decided over a year ago practically to double its financial contribution to this work, in order that it might play its full part in the rehabilitation of our road system. These investigations are being carried out in the Road Research Laboratory at Harmondsworth and are yielding results of great practical importance. Research into fundamentals must of necessity take time to come to fruition, but we are now getting to know and understand the why and wherefore of good tar binders and the basic factors underlying the design of good road surface. As the acid test is what happens on the roads, the laboratory results are continually being checked by road experiments. The work is supervised by a technical departmental committee, ensuring that the practical as well as the theoretical aspects of the subject are kept in view. This research work has contributed to the improved British Standard Specifications for road tar and for tarmacadam and can be confidently expected to yield still greater dividends.

In order to give the user a cast-iron guarantee of quality for tar, the Association has adopted a Certification Trade Mark which it intends to use at the beginning of next year's road season in March. The Association's scheme of control is so rigorous that it has been approved by the British Standards Institution, and sanction has been obtained for users of the British Road Tar Association mark to use also the British Standards Certification Trade Mark. This involves a regular system for testing all supplies of road tar by the maker before they leave his works. In addition, periodic visits and check tests will be made by the Association's representatives to ensure that the standards of quality are maintained.

Planned Maintenance

Manchester Chemical Engineers' Meeting

AT the meeting, on December 8, of the North-Western branch of the Institution of Chemical Engineers (Mr. J. McKillop in the chair), Mr. F. P. Lett read a paper on "Planned Maintenance in a Chemical Works." The objectives of planned or scheduled maintenance, he said, are freedom from breakdown of the plant, retaining it at its initial efficiency, reducing the cost of maintenance, and increasing in the length of time during which the plant is manufacturing chemicals.

The system outlined by the speaker was as follows: Whole sections of plant are cleaned, inspected to determine the necessary repairs and a schedule prepared for labour and for costs, followed by the execution of the overhaul to a definite programme of work. This programme is made for each section of plant to be overhauled in its turn during a period of one year. The regular periods between the overhauls for each section are determined by previous experience of repairs on that section, records being kept of all maintenance work. A maintenance schedule, consisting of all items of plant divided into manufacturing units, is compiled; the general nature of the repairs and their frequency is noted. Such a scheme reduces the number of repairs required at short notice, although perfection in this respect is not the aim; the inspection enables replacement orders for new plant to be made before the old plant becomes unfit for further use.

Details of the staff of tradesmen and labourers under the maintenance engineer were also given, keen powers of observation for inspection personnel, and ability to write reports being necessary for all the foremen and tradesmen. In conclusion, various forms and methods of following the progress of the work were detailed for particular sections of plant. A lively discussion followed, and the author was accorded a hearty vote of thanks by a large audience.

Protective Products

Further Technical Notes Issued

SINCE our reference to their first bulletin last May (THE CHEMICAL AGE, 52, p. 441), the Association of Manufacturers of Bituminous Protective Products has not slackened its efforts, and a second bulletin has just been issued, under the date November, 1945. Owing to the extreme stringency of the staff situation, it is reported that there had to be a certain falling-off in the actual number of experiments carried out in many laboratories, and progress at full speed must await the return of improved conditions. At the same time, members are reminded of the debt of gratitude they owe to those firms who readily place their laboratory resources at the disposal of the Association's Technical Sub-committee.

Viscometer Types

Surprising difficulties in the calibration and standardisation of efflux viscometers have been met and vigorous efforts are being made to overcome them. Much discussion has been devoted to the choice of the best type of efflux viscometer, and it would appear that for bituminous paints pure and simple, some type of oil viscometer, possibly the Redwood II or the B.R.T.A. instrument would present many advantages. There is, however, a good deal to be said for the eventual adoption of a viscometer which would be likely to commend itself to the paint industry as a whole. In this connection, the Ford Cup No. 4 would appear to have some supporters. It is proposed shortly to compile a brief appreciation of the situation.

As previously indicated, a deputation from the Technical Sub-committee had the privilege of an interview with the Aeronautical Inspection Department on the subject of Air Ministry Specification No. 573568/A. The shortcomings of this specification were readily conceded and it was hoped that action would be taken to improve the weak points. The question of the inclusion of the Ford Cup No. 4 Viscometer in this specification was discussed and the A.I.D. officers took cognisance of the Sub-commitee's views on this matter.

Coatings for Iron and Steel

The Iron and Steel Institute has an extensive programme of field tests in hand to establish the performance of a wide range of protective coatings. They now wish to include bituminous and tar-base preparations in their schedule of field tests and felt that the Association was the appropriate body to whom recourse should be had for suggestions. In this connection a representative of the Technical Sub-committee has been asked (and has agreed) to join the British Standards Institution Committee 1S/28, dealing with anti-corrosive treatments of metal sections used in building operations.

Terminology

The Panel of the Technical Sub-committee constituted to deal with the nomenclature of bituminous and tarry materials has made considerable progress, and a draft statement of its findings is under review. A strictly practical attitude has been adopted; the terms and definitions to be preferred are those in actual use in the industry as far as these are logical and mutually compatible and the view is taken that no attempt should be made to impose artificial restrictions of meaning on terms which already have well-understood significance in the industry. Quite recently it has been learned that the Institute of Petroleum is itself concerned with a review of the situation of terminology and steps have already been taken to establish contact and interchange of information.

ECONOMIC BOILERS

National Economy Stoves, Cross Street, Neston, Cheshire, are the sole patentees, inventors and manufacturers of the Rowlandson central heating boiler. It is claimed that this boiler is more efficient than any other boiler using solid fuel. "Noco" fuel (reconditioned fuel) produced from waste, and sold at 8d. per gallon, ex works, may be burned, but creosote, fuel oil or paraffin, are also suitable fuels. Minimum feed consumption per burner is 2 pints per hour, and maximum feed 4 pints. Two gallons of waste oil burned in the Rowlandson boiler do the work of 1 cwt. of coal burned in an ordinary stove, it is stated.

All the heat generated by the burner passes up the flue pipe in which are six water tubes. It is actually the interior and exterior of the flue pipe that provide the medium for the heating of the water. Consequently, within a few minutes of lighting the burner the water in the water tubes is boiling and circulation to the radiators or pipe line is commenced. The high efficiency obtained is due to the patent burner in conjunction with the construction of the boiler.

A fuel tank is supplied with each boiler. The feed from the fuel tank to the oil-feed pipe is effected by means of a patent control, which permits of the flow of oil required. If desired, the feed can be thermostatically controlled. Apart from under a minute to light the burner, two or three moments to fill the fuel tank and five minutes to clean the burner daily, the boiler requires no attention.

Some of the advantages are: Central heating with continuous hot water for domestic purposes, no stoking and removal of ashes, the small space occupied, and the negligible installation cost.

Personal Notes

DR. E. G. V. PERCIVAL was elected chairman of the Edinburgh and East of Scotland section of the Royal Institute of Chemistry at their annual meeting on December 14.

MR. A. W. SCOTT and MR. R. H. COLLIS have been appointed to the board of directors of Shawinigan, Ltd., Marlow House, Lloyd's Avenue, London, E.C.3.

MR. KNOWLES EDGE, of Lytham, Lancs., and of Wm. Edge & Sons, Ltd., chemical manufacturers, Bolton, has been elected to Bolton Town Council in a by-election in the Halliwell Ward.

MR. J. C. BROADBENT, chief chemist, and MR. H. BOOTHROYD, technical and sales manager, have been appointed directors of James Robinson & Co., Ltd., aniline dye manufacturers, Huddersfield.

PROFESSOR MEREDITH G. EVANS, Professor of Inorganic and Physical Chemistry in Leeds University, is visiting Holland to lecture under the auspices of the British Council.

MR. A. P. YOUNG, O.B.E., formerly manager of the Rugby works of British Thomson-Houston, Ltd., has agreed to assist the Royal Society for the Prevention of Accidents by joining the society's staff, on a part-time basis, as industrial relations officer.

MR. L. BOON, who has been secretary of Genatosan for 22 years, has been appointed director and general manager, and DR. G. G. DYSON, who for some years has been chief chemist and technical manager, has been appointed a director.

MR. J. STEWART COOK, a well-known figure in the London Section of the B.A.C., has been chosen as "Prime Minister" (Labour) in the Hampstead Parliament, which is resuming its sessions on January 9, after suspension throughout the war. Mr. Cook was Labour candidate for the Henley division of Oxfordshire in the General Election.

Obituary

MR. HENRY NOEL NEGRETTI, senior partner in the famous firm of Negretti and Zambra, died in London on December 11, aged 63. He had been head of the firm since 1921, and is succeeded by his brother Mr. Paul Ernest Negretti. Other partners are Mr. P. A. Negretti and Mr. P. N. Negretti, both of whom have recently returned from the Forces; they were elected in their absence in 1942. There is no longer a Zambra in the firm, the last partner of that name, Mr. M. W. Zambra, having retired in 1935. It is interesting to recall that the firm began making scientific instruments in 1850, the first Negretti of English fame having been a native of Como, a glass-blower by trade, who, like so many of his compatriots, took refuge in England from political oppression in the early 19th century. He entered into partnership with J. W. Zambra, who was born in England of mixed Italian and English parentage.

DR. EDWARD FRANKLAND ARMSTRONG, D.Sc., LL.D., Ph.D., F.R.S., F.R.I.C., M.I.Chem.E., who died in London on December 14, aged 67, after an operation,

Dr. E. F. Armstrong.

was an outstanding figure among British chemists, and had served during the war as Scientific Adviser to the Ministry of Home Security. His death is a severe loss to British chemistry in its widest aspects, both academic and industrial, for he combined in himself the capacities of the skilled laboratory worker with those of the practical industrial chemist.

He inherited from his father, the celebrated Professor H. E. Armstrong, F.R.S., a keen interest in scientific education in its broadest sense, and some of his best work was devoted to that cause. He himself was educated at St. Dunstan's College, Catford —a pioneer in serious scientific education in England—and afterwards worked with Emil Fischer and van 't Hoff. His early published works dealt mainly with the chemistry of sugars; a treatise on the glycosides saw several editions and revisions, but his research work as a whole covered a wide field in organic and physical chemistry.

Latterly he had figured with increasing prominence in the industrial world. He was a director of William Gossage & Sons, Widnes, in 1915-20 and of Joseph Crosfield & Sons, Warrington, in 1915-25, during which period he worked with Hilditch on the catalytic hydrogenation of oils and fats. In 1925-28 he was with the British Dyestuffs Corporation and later he took his place on the board of the South Metropolitan, South Suburban (1938) and Commercial Gas Companies (1937).

As might have been expected, he received many academic distinctions, and united them with posts of high industrial responsi-

bility. He became F.R.I.C. in 1918 and F.R.S. in 1920, and was awarded the Medal of the Society of Chemical Industry in 1935. He was president of the Society of Chemical Industry in 1922-24, chairman of the British Association of Chemists in 1926; chairman of the British Standards Institution in 1934-35 and 1937-38, and president of the A.B.C.M. in 1935. He was also a governor of the Imperial College of Science, and he devoted much energy to the interests of the Royal Society of Arts, being treasurer in 1938-43 and president from 1943 until last July, when he accepted the post of chairman of the Council.

His pen was always at the service of chemistry and the chemical industry. THE CHEMICAL AGE was one among many journals which had the honour of receiving contributions from his hand. Equally vigorous were his lectures and discourses, culminating in his celebrated presidential address this year to the Royal Society of Arts—"Chemistry in the Service of Man"—in which he expressed his complete philosophy of the function of chemistry in the world of to-day.

MR. JOHN TAYLOR, C.B.E., who died at Birkdale, Lancs., on December 13, aged 84, had been, until his retirement in 1942, joint managing director and vice-chairman of Mather & Platt, Ltd., the Manchester engineers. A native of Bolton, he joined the Chemical Fire Engine Company while still a young man, and later became a partner in the firm of Dowson and Taylor, fire engineers, of Bolton. He developed an automatic sprinkler fire-extinguisher, and combined it with a fire-alarm valve which is still standard throughout the world. He also developed an automatic sprinkler for putting out blazing oil. When Mather & Platt absorbed Dowson and Taylor in 1899, Mr. Taylor was one of the directors of the new limited company. Subsequently, he devoted himself particularly to the electrical side of the business, and during the war of 1914-18 he took a large part in co-ordinating the efforts of local engineering works engaged in the production of munitions.

Improved Pectic Compounds

Greater Gelling Power Obtained

ACCORDING to claims made in a recently granted U.S. patent, pectinic acid of superior viscosity, and therefore superior gelling power, can be obtained in far shorter time and under excellent control by using the enzyme pectase. Following adjustment of the methoxy content of apple pomace extract to the desired per cent., the extract was adjusted to *p*H 6.5, tomato juice serum added, and as acidity developed, the *p*H was maintained at approximately 6.5 with sodium hydroxide. After addition of the proper amount of sodium hydroxide, *p*H was dropped to 4.0 by the addition of hydrochloric acid. The mixture was then heated, cooled, and the pectic acid precipitated out with either acetone or ethanol.

Gelling powers of pectic compounds in general depend to a great extent on molecular weight, or degree of aggregation, of the compound. Conventional methods for removal of methoxy groups from pectin largely destroy this aggregation and hence yield products of low gelling power. (*U.S. Chemical News*, July, 1945).

Slate from a Tin Mine

War-Time Cornish Discovery

SPEAKING at the monthly meeting of the Royal Cornwall Geological Society at Penzance, Mr. J. P. R. Polkinhorne referred to the State mining at Redmoor near Callington.

After detailing the early history of the mine, which was worked for lead and tin ores until 1894, he noted that unsuccessful efforts were made by the Government during the late war to work the mine for tin and wolfram.

A remarkable deposit of slate was, however, discovered, and this, when mixed with bitumen, formed an excellent material for making landing stops or runways for airfields, and several hundred tons were sent to France and Germany. The mixture was so efficient that within five or six hours after the capture of a town a runway could be constructed to enable aeroplanes to land.

Demand for Scots Chemicals

Survey of Inquiries

THE Edinburgh Chamber of Commerce has issued an interesting survey of the volume of inquiries which have been received from export traders and from foreign buyers asking for Scottish manufactured goods, including a very wide range of chemical products. The Chamber is prepared to give data on the subject to firms interested in servicing these markets.

Included in the requests are the following: Aniline colours, animal oils, asphalt, heavy and industrial chemicals, pharmaceuticals, textile chemicals, chemical plant, fish oils, white oxide of zinc and lithopone. Queries have emanated from Egypt, Eastern Canada, Spain, the United States, Mexico, Colombia, Brazil, Greece, Sweden, and Near-East countries, including Palestine, Syria, and the Lebanon.

General News——From Week to Week

L. Lambert & Co., Ltd., of Uxbridge, announce that their new address is 4 Percy Street, London, W.1.

Would-be chemical engineers will find interest in No. 19 in the series *Careers for Men and Women* (H.M.S.O.; 6d.), which is just published, and covers Mining, Gas and Chemical Engineering, and also Fuel Technology, including coal and oil. Full details are given of the conditions of election to the Institution concerned with each subject.

A report that the soils of the North of Scotland are still deficient in lime and phosphate is given by the Macaulay Institute for Soil Research, Aberdeen, which also suggests the use of potash for land being returned to grass. Short-term use of peat, fortified by artificial manures, has been adopted on an experimental basis and found to be satisfactory.

Three brothers, Bob, Tom and Harry Elliott, all of whom have completed 50 years' service with Boots Pure Drug Company and all of whom have risen from errand boys to managers of important sections, have been entertained to dinner at Nottingham by Lord Trent, the chairman of Boots Pure Drug Company, and other members of the Board.

A new edition—the 48th—of the *Soap Makers' Directory* has just been issued and is obtainable from the Editor, 21 City Road, London, E.C.1, price 3s. 6d. (3s. 10d. post free), or from Simpkin Marshall, Ltd., E.C.4. It contains complete lists of the makers of soap and of candles in Great Britain and Ireland, together with classified lists of the various types of soap and candles.

The Marchwiel Royal Ordnance factory, near Wrexham, is to become part of a trading estate, and an agreement in principle has been reached with the Ministry of Supply for the removal of the explosive plant. All trace of highly dangerous explosives has to be removed, and the present buildings and earthworks substantially modified. A number of firms are already interested in the project and in the chemical plant which is already there.

The weekly average production of steel ingots and castings amounted to 247,700 tons last month, compared with 243,100 in October and 231,600 for the first half of this year; the November average is equal to an annual rate of 12,878,000 compared with 12,043,000 for the first six months. The November weekly average for pig iron production was 150,000 tons compared with 133,900 in the first half of the year, while the annual rates work out at 7,800,000 tons (6,963,000 tons).

During his recent visit to Scotland, Sir Stafford Cripps opened the new Board of Trade factory at Dundee, which is to be jointly occupied by BX Plastics, Ltd., and its subsidiary, the Expanded Rubber Co., Ltd.—a step towards the diversification of local industry, which had hitherto, he said, concentrated too exclusively on the jute trade.

A new clause in the National Insurance (Industrial Injuries) Bill, increasing the weekly disablement pension by 11s. 3d., or 25 per cent. of the basic rate of 45s., in cases of special hardship, provided that the increase did not bring the compensation above the 45s. rate, was agreed to when the Standing Committee resumed consideration of the measure in the House of Commons last week.

The employment of ex-miners who have been the victims of silicosis is the subject of a White Paper that is to be issued shortly. Sir Philip Warter (Controller-General of Factory and Storage Premises) has announced that ten factories will be built very soon and let to firms engaged in light industries in South Wales, in order to induce them to employ large numbers of sufferers from silicosis.

The inaugural meeting of the Ipswich, Colchester and District Industrial Safety Group was attended by representatives of over 30 firms, and was addressed by Mr. C. Conway Plumbe, H.M. Superintending Inspector of Factories. Mr. J. B. Webster and Mr. N. Pemberton, both of Cranes, Ltd., were elected chairman and hon. secretary respectively. Mr. G. W. Tice, of BX Plastics, Ltd., was elected hon. treasurer.

The F.B.I. is expecting a visit, on January 14, from a delegation of the Central Industrial Committee of Belgium, under the leadership of their president, M. van der Rest. He will be accompanied by M. Delbaere, the president of the Flemish Economic Union, and by M. Gérard, director of the Industrial Committee. The delegation will also include representatives of the textile, iron and steel, coal, chemical and engineering industries.

A wide expansion of technical education was forecast last Saturday by Mr. D. R. Hardman, Parliamentary Secretary to the Ministry of Education, addressing the Northern Counties' Technical Examinations Council at Darlington. He declared it was his Ministry's intention, by developing technical secondary schools, to encourage more young people to be fitted for skilled occupations and for accepting responsibility in industry.

In a speech in Edinburgh, at the dinner celebrating the 160th anniversary of the Edinburgh Chamber of Commerce, Sir Stafford Cripps spoke on the question of full employment in Scotland. Urging the adoption of new industries, he mentioned (among other developments) " two I.C.I. schemes at Grangemouth," which, with a new tobacco factory, would involve the expenditure of nearly £2,000,000 on buildings.

Foreign News

A natural gas well in the Saratov area of Soviet Russia has yielded helium.

Ten thousand empty mercury flasks will be supplied by this country to the Italian mercury industry.

The Braunkohle und Benzin A.G. has resumed the production of synthetic petrol on a small scale.

Restrictions on the sale of penicillin in Chile have been removed and the product can now be sold by retailers upon presentation of a prescription.

The processing of bauxite, to produce calcined ore, which will be sold to abrasive manufacturers, is planned by a United States company operating in Surinam.

The Swedish Government has recently appointed a committee of experts (including Professor Siegbahn) to study questions connected with atomic energy.

In Switzerland, restrictions on the production, distribution and use of copper compounds and copper-containing fungicides have been removed.

Drilling for oil continues in Chile, where a sum of 24,000,000 pesos has been set aside for next year for this purpose. Drilling has started at Mina Rica and at Springhill, Tierra del Fuego.

A contract for 55,000 tons of semi-finished steel products has been awarded by the French Government, through the French Purchasing Mission, at present in the United States, to the Henry J. Kaiser steel plant at Fontana, California. The tonnage will be shipped in billets to be reprocessed into finished materials in France.

The Swiss Society of Chemical Industry (*Schweizerische Gesellschaft für Chemische Industrie*) held its 65th annual general meeting on December 8, the president, Dr. C. Koechlin, in the chair. After the president had been confirmed in office for the year 1946, Dr. Faber and Dr. Ensslin gave a report on their recent tour through Great Britain and the United States, undertaken on behalf of the commercial section of the Federal Department of National Economy and the Department of War Economy. The seat of the Society is to be transferred from Berne to Zurich in the spring.

Forthcoming Events

January 1. Electrodepositors' Technical Society (Birmingham Section). James Watt Memorial Institute, Great Charles Street, Birmingham, 6.30 p.m. Mr. L. Mable: "Polishing Methods and Technique."

January 2. Institute of Fuel. Institution of Electrical Engineers, Savoy Place, Victoria Embankment, London, W.C.2, 6 p.m. Major W. Gregson: " Waste Heat Boilers."

January 3. Royal Institute of Chemistry. (Belfast and District Section). Queen's University, 3 p.m. Dr. W. Haughton Crowe and Dr. T. C. Shaw: "Christmas Crackers." (Lecture and demonstration for school children).

January 3. Association for Scientific Photography. Theatre of the British Council, 6 Hanover Street, London, W.1, 6.15 p.m. Dr. A. J. Holland: " Glass and Photography."

January 3. Royal Institute of Chemistry (Cardiff and District and South Wales Sections). Mining and Technical Institute, Bridgend, 6.15 p.m. Dr. H. T. Emeléus: " Some Chemical Aspects of Recent Work on Atomic Fission."

January 7. Society of Chemical Industry (London Section). Rooms of The Chemical Society, Burlington House, Piccadilly, London, W.1, 6.15 p.m. Mr. A. Speedy: " Carbon Blacks—their Manufacture and Use in Industry."

January 8. Scottish Engineering Students' Association. Institution of Engineers and Shipbuilders, Glasgow, 7.15 p.m. Miss Helen Towers: " The Selection of Steels for Industrial Uses."

January 8. Royal Institute of Chemistry (Huddersfield Section). Field's Café, Huddersfield, 7.30 p.m. Mr. R. K. Dickie: "The English Oilfields."

January 8. Hull Chemical and Engineering Society. Regal Room, Regal Cinema, Ferensway, Hull, 7.30 p.m. Mr. J. W. Bull: " Machines for the Tensile-testing of Materials." (Presidential Address.)

January 9. Society of Chemical Industry (Microbiological Panel, Food Group) and **Society for Applied Bacteriology.** Chemical Society's Rooms, Burlington House, Piccadilly, London, W.1, 2.15 p.m. Dr. A. T. R. Mattick, and Miss E. R. Hiscox: " Some Observations on Heat-Resistance of Micro-Organisms "; Dr. C. L. Hannay: " Some Problems in the Bacteriology of Rivers," and Mr. A. J. Musgrave: " Mould Growth on Leather."

January 10. Institute of Welding. County Technical College, Stoke Park, Guildford, 7.30 p.m. Mr. C. G. Bainbridge: " Application of Welding to Agricultural Machinery."

January 10. Society of Chemical Industry (Plastics Group) and **Faraday Society.** Institution of Mechanical Engineers, Storey's Gate, London, S.W.1, 2.30 p.m. Dr. G. B. B. M. Sutherland: "The Infra-Red Examination of Plastics."

January 11. Society of Chemical Industry (Birmingham Section). Chamber of Commerce, Birmingham, 6.30 p.m. Dr. F. J. Llewelyn: "Electro-statics in Industry."

January 11. British Association of Chemists (St. Helens Section). Y.M.C.A. Buildings, St. Helens, 7.30 p.m. Mr. F. Moult: "Hormones."

January 11. Institute of Welding. James Watt Memorial Institute, Great Charles Street, Birmingham, 7 p.m. Mr. R. W. Ayres: "Developments in the Technique and Use of Resistance Welding."

January 11. Institution of Chemical Engineers (North-Western Branch). Conference Hall, Manchester Town Hall: 2 p.m., Civic welcome to members by the Lord Mayor; 2.30 p.m., Dr. C. J. T. Cronshaw: "Chemical Engineering Research" (followed by a buffet tea). Midland Hotel, Manchester, 7 p.m.-1 a.m., reception, dinner and dance. Application for tickets for the dinner and dance should be made before January 1 to the hon. organising secretaries, 49 Kiln Lane, St. Helens, Lancs.

January 16. Royal Institute of Chemistry (Belfast and District Section). Physics Lecture Room, Royal Academical Institution, 7.30 p.m. Mr. D. Lindsay Keir: "The Influence of Science on Civilisation."

January 16. Institute of Fuel (Midland Section). James Watt Memorial Institute, Birmingham, 2.30 p.m. Mr. R. Scott: "Some Aspects of Tar Distillation."

Company News

Anti-Attrition Metal Co., Ltd., has declared a first and final ordinary dividend of 15 per cent. (same).

Egyptian Salt & Soda Co., Ltd., is paying a first and final ordinary dividend of 17.3 per cent. (23¾ per cent.).

Chrome Chemicals (Pty.), Ltd., of Johannesburg, have changed their name to Plascon Paint & Chemical Industries (Pty.), Ltd.

The Yorkshire Dyeing & Proofing Co., Ltd., report a net profit, to June 30, of £23,734 (£27,559). The dividend is again 10 per cent.

Apex (Trinidad) Oilfields, Ltd., for the year ended September 30, record a net profit of £351,681 (£293,516). Final dividend is 17½ per cent., making 30 per cent. (same).

English Clays Lovering Pochin & Co., Ltd., report a profit, for the year to September 30, of £134,399 (£94,227). An ordinary dividend of 3½ per cent. (2½ per cent.) has been declared.

The Distillers' Co., Ltd., is paying an interim ordinary dividend of 7½ per cent. (6¼ per cent.). It is stated that this does not necessarily indicate that the full rate of dividend for the year will also be increased.

Internationale Gesellschaft für chemische Unternehmungen, A.G. (I. G. Chemie), Basle, will soon convene an extraordinary general meeting to make a revision in the articles of association, to change the company's name, and to convert bearer shares into name shares.

New Companies Registered

Dyes and Chemicals, Ltd. (401,935).—Private company. Capital £1000 in £1 shares. Manufacturers of and dealers in dyes, colours, chemicals, etc. Directors: G. P. Jones, 37 Arnos Grove, N.14; N. S. Richardson.

Horta & Ward, Ltd. (402,036).—Private company. Capital £10,000 in £1 shares. Objects: To carry on the business of manufacturers of and dealers in chemicals, disinfectants, vaccines, etc. Subscribers: A. M. Horta, 1 Melina Court, Grove End Road, N.W.8; L. E. Ward.

Stern Pure Chemicals, Ltd. (402,062).—Private company. Capital £1000 in £1 shares. Manufacturers of and dealers in chemicals, gases, drugs, oils, colours, etc. Subscribers: F. T. Smith, J. Semuin. Registered office: c/o Pawley and Malyon, 22 Charing Cross Road, London, W.C.2.

Technical Detergents, Ltd. (401,751).—Private company. Capital, £100 in £1 shares. Manufacturers of and wholesale dealers in chemicals, gases and disinfectants of every description, dyes, fertilisers, plastics, oils, soaps, etc. Subscribers: C. A. Newbery; Florence G. Pettigrew. Registered office: 13 Princes Street, Cavendish Square, W.1.

Rosebury Cellulosing Company, Ltd. (402,052).—Private company. Capital £1000 in 1000 shares of £1 each. Manufacturers of and dealers in cellulose, paint, varnish, enamel, polish, lacquer, shellac, pigments, oils, colours, etc. Directors: J. L. Lutwyche, Joan Lutwyche. Registered office: 39-41 Swan House, 133-6 Oxford Street, London, W.1.

Zutt Products, Ltd. (401,768).—Private company. Capital, £1000 in £1 shares. Manufacturers of and dealers in cleansers and polishes, pulverisers and grinders of raw

materials, emery powder, soaps, paints, dyes, pigments, fertilisers, chemicals, etc Directors: W. B. Lewis; M. J. McClosky. Registered office: 24 School Lane, Didsbury, Manchester.

Insecticide Activated Products, Ltd. (401,795). — Private company. Capital, £30,000 in 15,000 redeemable preference shares of £1 and 300,000 ordinary shares of 1s. Manufacturers of and dealers in insecticides, germicides, etc. Subscribers: Miss R. O. Dellow, 98 Penwortham Road, Streatham, S.W.16; D. W. Kneller. Solicitors: Ashurst, Morris, Crisp & Co., London, E.C.

Commercial Intelligence

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

Mortgages and Charges

(Note.—The Companies Consolidation Act of 908 provides that every Mortgage or Charge, as described therein, shall be registered within 21 days after its creation, otherwise it shall be void against the liquidator and any creditor. The Act also provides that every company shall, in making its Annual Summary, specify the total amount of debt due from the company in respect of all Mortgages or Charges. The following Mortgages and Charges have been so registered. In each case the total debt, as specified in the last available Annual Summary, is also given—marked with an *— followed by the date of the Summary, but such total may have been reduced.)

BRITISH COLOUR COUNCIL, LTD., London, W. (M., 22/12/45.) November 23, charge, to Barclays Bank, Ltd., securing all moneys due or to become due to the Bank; charged on agreement for lease of 13 Portman Square, W. *Nil. October 18, 1944.

PHOTOMICROGRAPHY, LTD., London, S.W. (M., 22/12/45.) November 1, £500 4 per cent. debenture to L. Wright, London; general charge.

Chemical and Allied Stocks and Shares

AS was to be expected, holiday influences further restricted Stock Exchange business, and prices in most sections have eased as a result. Sentiment reflected a disposition to await the outcome of the conference of Foreign Ministers in Moscow. British Funds were firmer and inclined to move higher following the withdrawal of the "tap" issues; but nationalisation uncertainties and conflicting market views as to the basis of "fair compensation" for shareholders were unsettling influences and buyers generally appeared to be adopting a waiting attitude.

Imperial Chemical at 39s. 7½d. were little changed on balance, Lever & Unilever eased to 48s., and Turner & Newall at 80s. 3d. xd have lost a little further ground since the announcement of the unchanged dividend. British Plaster Board remained active around 33s. Dunlop Rubber at 51s. 6d. were moderately lower in accordance with the prevailing tendency; but in other directions, the units of the Distillers Co. have been steady at 117s. 3d. xd. on the higher interim dividend, although the latter was accompanied by the warning that it should not necessarily be regarded as indicating a higher total for the year. Imperial Smelting at 14s. 6d. were unaffected by the financial results and unchanged 4 per cent. dividend. Allied Ironfounders became steadier at 54s. 9d., at which the yield is 4½ per cent. on the basis of last year's 12½ per cent. dividend, which was 8 per cent. below the rate actually earned. Guest Keen attracted buyers and strengthened to 41s. 1½d., Tube Investments firmed up to £5⅝ on further consideration of the results and annual statement and Stewarts & Lloyds at 56s. 3d. attracted rather more attention on market talk of increased dividend possibilities. Dorman Long were 25s. 9d. and the preferred ordinary better at 46s. 9d. Ruston & Hornsby rallied to 54s. 6d. on attention drawn to the company's widespread interests. United Steel at 24s. 3d. were also better, and there was selective buying of a number of other iron and steel shares. It was pointed out that yields are attractive and that there seem reasonable scope for dividends being maintained. In a number of instances, it is being contended that moderately higher payments may be forthcoming, the assumption being that it is no longer necessary to make allocations to special reserves established to provide against war-time contingencies. Textiles were less firm and generally movements did not exceed more than a few pence. Bradford Dyers were 26s. 3d., Fine Spinners 24s. 4½d., Calico Printers 20s. 4½d., Courtoulds 54s. 4½d., and British Celanese 34s. 9d. Colliery shares were dull earlier in the week pending full details of the Coal Nationalisation Bill.

Boots Drug were little changed at 55s. 6d., B. Laporte 83s., Burt Boulton 27s., while British Drug Houses remained active, but eased slightly to 48s. 6d. British Glues were 12s. 9d. and in other directions, De La Rue eased to £10 3/16. General Refractories became firmer at 16s. 10½d., and Amalgamated Metal were 17s. Sangers 5s. shares at 31s. received more attention on current market views of the dividend outlook. Beechams deferred at 21s. 3d. were little changed., but Griffiths Hughes receded to 47s. 6d. Timothy Whites were 44s. Gas Light & Coke eased to 20s. 6d. Wall Paper Manufacturers deferred held their recent rise to 43s. and on further consideration of the results, Lewis Berger rallied to 123s. 1½d. after an earlier decline to 120s. Goodlass Wall were 24s. 7½d., and paint shares gener-

ally kept steady on encouraging views of the outlook for the industry. British Paints Holdings changed hands up to 46s. 9d. Oils were inclined to lose ground, both Shell and Burmah Oil fluctuating, while Anglo-Iranian at 98s. 9d. were affected by the latest developments in Persia.

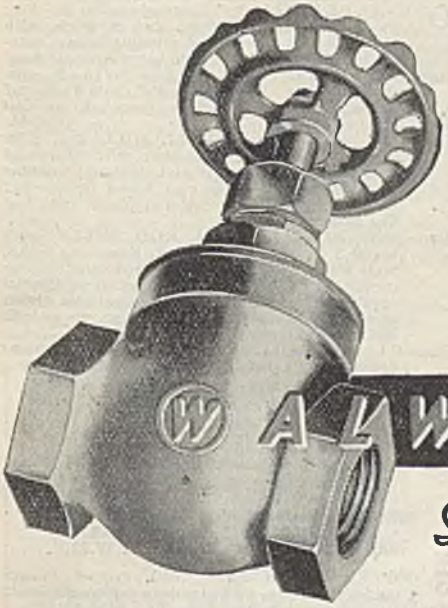
British Chemical Prices

Market Reports

A FAIR movement of supplies of general chemicals has been reported during the past week on the London general chemicals market, and fresh inquiry has been on a moderate scale covering a fairly wide range. There are no important price changes to record and the tone of the market remains firm. Among the soda products, nitrate of soda, bicarbonate of soda, soda ash and sulphate of soda are in steady demand, while there is a persistent call for supplies of yellow prussiate of soda and chlorate of soda, with both items in limited supply. Conditions in the potash section remain unaltered and pressure for supplies of caustic potash continues. Permanganate of potash is in good demand, with values well held, and a fair trade is passing in acid phosphate of potash. In other directions the lead oxides are receiving a steady inquiry and formaldehyde is a good market. Hydrogen peroxide is moving steadily and there is a good call for supplies of glycerine. A fair trade is passing in white powdered arsenic. In the coal-tar products section a steady trade has been passing in pitch for both home and export account, and all grades of creosote oil are moving into consumption in good quantities. Carbolic acid is in steady request and there is a moderate demand for cresylic acid. All grades of naphthalene are in short supply, while the pyridines are steady.

MANCHESTER.—Generally satisfactory trading conditions have been reported this week on the Manchester chemical market, with Lancashire and West Riding textile manufacturers taking steady deliveries of a wide range of heavy products, while good quantities are being absorbed by the rubber manufacturing and other using industries. Fresh inquiries from the home trade have been in the market and shippers have also been displaying continued interest. Trade in fertiliser materials is proceeding on quietly steady lines, with seasonally active conditions reported in one or two sections. Most of the tar products are in good demand, especially creosote oil, carbolic acid and the benzols. A fair amount of export business is being transacted.

GLASGOW.—There is no change to report in business on the Scottish heavy chemical trade during the past week. Home business remains steady. Prices keep firm. Export inquiries continue to improve.



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