The
Chemical Age

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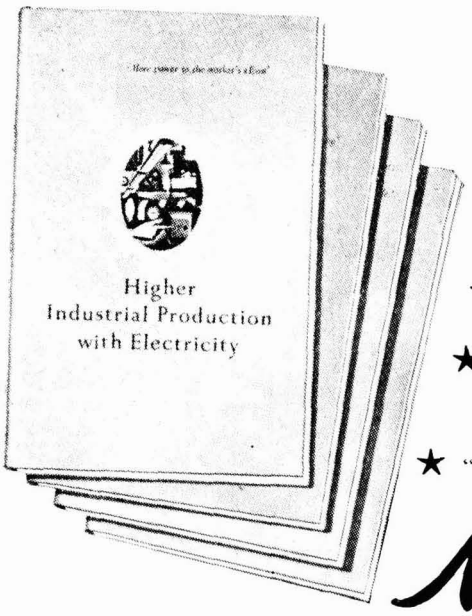

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The
Chemical Age

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Scientific Policy

THOSE who believe that the rôle of science in industry can be expanded by political action might well spend the small sum of ninepence on *Hansard* (Commons) for 20 July. Disillusion is usually purchased more dearly. The 6th Annual Report of the Advisory Council on Scientific Policy deserved much better. If it could not have been followed by a brilliant debate, at least a discussion of some solidity might have acknowledged the supreme importance of this subject. Instead, the House wandered discursively from one man's prejudices to another's platitudes. After three hours one member began his own contribution by saying that everybody seemed to have been disappointed with everybody else's performance in the debate so far. Unfortunately this half-time interjection of home-truth led to little improvement and we can only assume that our elected representatives are tired men urgently in need of the summer recess, and that science is a particularly elusive subject to grasp on a Monday.

The development of our national resources in science is an urgent subject that should be raised above the clangour of party polemics. In the past two years, report after report has come from our State-sponsored or State-aided research organisations, revealing that small financial economies were retarding necessary expansion and restricting current activities. Two days after the debate such a Report (that of the DSIR's Chemistry Research Board for 1952) said that 'we are of the opinion that the scientific staff complement is still too small in relation to the programme and we hope that, when circumstances permit, additional staff will be provided to speed up the researches now in progress.'

Most of the country's educational resources are now wholly or for the major part State-controlled. It is well known that qualified scientists are not entering the teaching profession in anything like a sufficient number to replace losses. It is possible for conjurers to produce rabbits from empty hats but it will not be possible for grammar and secondary schools to produce entrants for universities' science courses without men to teach chemistry and other kindred

subjects. That, failing urgent and vigorous State action, is the stark prospect of the future, and in about 10 years' time we shall be facing it grimly enough. Some speakers in the debate thought that our plans for higher technological education might have been bolder—with a near-future target of more than one large technological centre. But of what use is it to expand facilities for post-school education in science and technology when facilities in the schools are being yearly eroded?

New research and the production of scientists for the future are relatively long-term aspects of industrial science. It remains all too true that British industry is slow to apply scientific knowledge that already is available and one of the primary reasons for this is the failure of so many managements to give executive powers to scientists. The potentialities of science are dismissed by men who are unfitted to appreciate them, or even unconsidered because they remain unknown. Here, perhaps, we are getting away from the principal interests of this Journal and its readers for such charges cannot be made against the chemical industry, which has long had to be scientifically progressive or die on its feet; on the other hand, who can doubt that the demand for the chemical industry's products and services would not be far heavier if applications of modern science were more swiftly developed in most other industries? Several speakers in the Commons debate showed a sound appreciation of this well-established weakness in British industry. There was considerable support for the opinion expressed in the Advisory Council's Report—that scientists are increasingly needed in board-rooms.

There is little doubt that technical changes in any industry are initially dear. They call for further investment. It has been the policy of the present Government to increase the cost of capital, to halt the flow of cheap money. Have we gone too far in the direction of investment austerity? Would it be practicable to have specially reduced rates of interest on loans that are exclusively required for technological development? Restrictions may check inflationary pressure, but complete economic collapse—with inflation and unemployment together—is the greater risk in the end. Old plant and old processes must be steadily replaced. In 1951 we invested £70 per man-unit of employed labour on new plant and industry in our manufacturing industries; the comparable figure for the United States was £250. Here, certainly, is a potent means of State influence in expanding industry's use of modern science and technology. It is high time that it was given closer attention.

On Other Pages

The annual subscription to THE CHEMICAL AGE is 42s. Single copies, 1s.: post paid, 1s. 3d. SCOTTISH OFFICE: 116 Hope Street, Glasgow (Central 3954/5). MIDLANDS OFFICE: Daimler House, Paradise Street, Birmingham (Midland 0784/5). LEEDS OFFICE: Martins Bank Chambers, Park Row, Leeds, 1 (Leeds 22601). THE CHEMICAL AGE offices are closed on Saturdays in accordance with the adoption of the five-day week by Benn Brothers Limited.

Notes & Comments

Antibiotics & Pork

A NEW British publication, 'Antibiotics in Pig Food' (Agricultural Research Council, Report No. 13, HMSO, 1s. 6d. net, pp. 20), provides a most useful summary of the 1952 experiments in this country using aureomycin and penicillin as pig-food supplements. Properly controlled tests were conducted at six different centres, and two basic diets were studied—one based on vegetable protein only, the other on vegetable protein plus fish meal. Altogether 512 fattening pigs were involved. Both antibiotic additives led to improvements in the rate of live weight gain and in food conversion efficiency. The increase in weight gain was about 10 per cent with pigs on the diet including animal protein (the fish meal) and about 14 per cent where the diet was reliant only upon vegetable sources of protein. This is a significant finding. In America where antibiotic additives are now successfully established, the basis of animal feeding is vegetarian, and it has been considered somewhat dubious whether useful responses would be shown here where animal protein is commonly used in part. This query has been removed. Indeed, it is concluded from last year's research that both antibiotics improve the efficiency of food conversion by between 6 and 7 per cent irrespective of type of protein. In most of the experiments vitamin B_{12} was also added to the diet as it is assumed that an adequate supply must be present to obtain benefits from antibiotic additions; however, the tests were not designed to show whether this vitamin's addition is in fact essential.

Question Still Open

IT is still an open question whether commercial pig fatteners will be able to benefit from these antibiotic effects. Practical results in specific conditions must pass the final verdict, and this will depend upon the value of the actual increase in growth-rate shown and the cost of the antibiotic additions. One thing, however, is certain—antibiotics as diet supplements do speed up fattening and progressive pig farmers should investigate the full possibilities under their own conditions. In the United States, antibiotic supplements for pig and poultry foods have already built up an important market.

More Decisive Victories

IT is regrettable that so much more is written about DDT as an insecticide in agriculture than about its far more decisive victories in public health. In crop protection DDT has shown certain limitations; certainly it has not completely justified the early claims that were made with somewhat imprudent exaggeration. It is when DDT can be applied to breeding centres of disease-carrying insects that it serves mankind so remarkably. In Italy in 1945 there were 400,000 cases of malaria with 380 deaths: in 1951 there were only 390 cases and no deaths in the entire period of 1950-52! The single change in the period between 1945 and 1950 was the introduction of DDT to control the malaria-carrying mosquito. The control of the blowfly as a carrier of food poisoning organisms in populated centres may well become a similar example of DDT triumph.

Only One Doubt

AS Dr. J. M. Barnes has said in a recent World Health Organisation Monograph (1953, No. 16): 'The prevalence of flies, together with imperfect sanitation, may bring a serious incidence of infantile diarrhoea, typhoid fever, and other enteric diseases. . . . The control of flies by hygienic methods is extremely difficult and expensive to achieve.' The only doubt that is expressible about the DDT method is the possibility that resistance to this potent insecticide might be evolved by the blowfly. If so, it may prove necessary at some future date to change from DDT to one of the more toxic organophosphorus materials; or possibly BHC, though also a chlorinated hydrocarbon type, might be alternated with DDT.

In Switzerland

'THE Swiss chemical industry is in a position of exceptional strength.' So runs a quotation from *Chemical and Engineering News* (1953, **31**, [26], 2697) in a short survey of Switzerland's current chemical activity. Yet the recent recession in demand for dyes, fine chemicals, cosmetics, and plastics—all of them chemical products depending to some extent at least upon luxury demand—is said to have hit the Swiss industry more severely than other European chemical industries. Up-to-date equipment, heavy proportionate expenditure upon research, and the expansion of manufacturing interests abroad, are the three factors that have built up Swiss prospects so firmly. Not even a sharp set-back in exports has reduced the profits of the four leading firms. One of these companies in 1952 spent a little over 20 per cent of its gross earnings on research! Another has invested rather more than its average annual gross earnings in foreign manufacturing developments during the past four years. From our own point of view, these signs of vigour and foresight must be seen as highly competitive moves. Yet are many British companies in a position to do likewise? Even the inducement of improved taxation relief for research expenditure seems insufficient to encourage as high a ploughing-back rate as 20 per cent of gross earnings. Nor would it prove easy to invest British capital abroad at the Swiss pace, however sound a case was submitted for Treasury approval. But no doubt in ten years' time, or even sooner, critical reports will ask why in this or that chemical field we have been outdistanced by the Swiss.

Gifts to Leeds University

Gifts acknowledged at a recent meeting of the Court of Leeds University included the following:—from Courtaulds Limited, £600 for research in the Department of Textile Industries and £250 for research in the Department of Colour Chemistry and Dyeing; from the DSIR, £1,500 for the Department of Inorganic and Physical Chemistry for crystallographic computations on the electronic computer at Manchester University.

Air Pollution Inquiry

REPLYING to questions addressed to the Minister of Housing and Local Government in the House of Commons last week, regarding the setting-up of a committee to inquire into the problem of air pollution, Mr. Ernest Marples, Parliamentary Secretary to the Ministry of Housing and Local Government, said such a committee had been formed with terms of reference as follows:—'To examine the nature, causes and effects of air pollution, and the efficacy of present preventive measures; to consider what further preventive measures are practicable; and to make recommendations.'

He added that they had been fortunate in securing the services of Sir Hugh Beaver, M.Inst.C.E., M.I.Chem.E., as chairman. Other members of the committee include Sir Roger Duncalfe, chairman, British Glues and Chemicals Limited; Dr. G. E. Foxwell, president, Institute of Fuel; Dr. R. Lessing, Fellow, Institute of Fuel; Mr. G. Nonhebel, I.C.I.; and Mr. C. J. Regan, Chemist in Chief, London County Council.

Sulphuric Acid Supplies

IN the House of Commons last week Dr. Barnett Stross asked the Minister of Supply the proportion of sulphuric acid manufactured in Britain from materials produced locally.

Sir A. Salter replied that at present 30 per cent of the sulphuric acid in this country was made from home-produced materials.

Dr. Stross asked the Minister whether he agreed that that figure was inadequate if any outside sources of sulphur were to fail. Could the Minister say what action had been taken to find alternative sources from other countries, particularly in the Commonwealth, and what was being done to make this country independent?

Sir A. Salter replied that the use of anhydrite, to take one example, would be multiplied about three times within a few years, when certain plans were completed. He did not think they could hope to be independent in any case. In general they had to aim rather at assuring alternative sources of supply, as a supplement to home production, rather than autarky.

The Society of Chemical Industry

72nd Annual Meeting at Nottingham

THE Society of Chemical Industry held its 72nd annual meeting on 20-25 July at Nottingham, the hosts being the Nottingham Section of the Society. It was a week of addresses, lectures, social functions, visits to works and laboratories and to various places of interest in and around Nottingham. The meetings were held in the University of Nottingham, where the members and their ladies assembled on Monday evening, 20 July, and were received by Mr. L. Anderson, M.Sc., F.R.I.C. (a past chairman of the section and a director of Boots Pure Drug Co., Ltd.), and Mrs. Anderson.

Mr. Francis J. Curtis, B.A., vice-president of the Monsanto Chemical Company in the USA, whose period of office as president of the Society ended at the conclusion of the week's meetings, proved an able and popular spokesman and leader. There were quite a number of visitors from the USA and from other countries.

It was hoped that Lord Trent, the Chancellor of the University, would have attended many of the functions, but unfortunately he was prevented from doing so by illness.

On Tuesday morning, 21 July, in the Great Hall of the University, the visitors were welcomed on behalf of the City by the Lord Mayor (Councillor Christopher Coffey) and on behalf of the University by Professor B. L. Hallward, the Vice-Chancellor.

Loyal Greetings

The following telegram was sent to Her Majesty the Queen:—'The president, council and members of the Society of Chemical Industry, gathered together under Your Majesty's patronage at their 72nd annual meeting in Nottingham, send loyal greetings with their earnest wish that Your Majesty may long continue to encourage them in their efforts to further the successful application of chemistry to industry.'

The reply was received:—

'Please convey to the council and members of the Society of Chemical Industry, assembled at their annual meeting, the sincere thanks of the Queen for their message of loyal greetings and good wishes, which Her Majesty, as Patron of the meeting, greatly appreciates.' (Private Secretary).

The annual general meeting followed, and messages of greeting were read from many absent members in this country and overseas.

In addition to the messages received from the USA, Dr. Emil Ott, the chairman of the Membership Committee of the Society's American Section, personally conveyed the section's greetings, and said its members were proud to be represented by Mr. Frank Curtis, the president of the Society. He spoke of the activities of the Section and said that at its meetings it emphasised the broader managerial aspects as well as the technical aspects of chemical industry, and stressed leadership. Its membership was still growing and it was pleasing to note the reaction of the invited members, for membership was essentially by invitation; most of them felt honoured to be invited to join.

Council's Report

The annual report of the council for 1952 was presented by the hon. secretary, Dr. E. B. Hughes. He said that for half the calendar year the Society was under the presidency of Dr. John Rogers, and for the other half under Mr. Frank Curtis. It was a great honour to have had those gentlemen at the head, and it bore testimony to the Society's usefulness.

A committee under the chairmanship of Dr. Rogers was concerned with the problem of providing adequate headquarters which would be worthy of the Society and of its usefulness to industry. Mr. Curtis also had the interests of the Society always at heart, and one particular interest of his was a committee working under the chairmanship of Sir Eric Rideal to effect some re-organisation in the Society's affairs, which was natural in view of its growth.

Dr. L. A. Jordon had served as chairman of the council during the president's absence from this country, and Dr. Hughes said he was sure that Dr. Jordon had found as much pleasure in that service as did the members of council in having him in the chair.

The report of the Publications Committee

was referred to as satisfactory, as were the reports of the sections and groups of the Society; Dr. Hughes commented on the quality of their meetings and the success and value of their work generally.

The annual report and the accounts were adopted.

The officers and members of Council for 1953-54 were elected as follows:—

President: Sir William Ogg.

Hon. treasurer: Mr. Julian M. Leonard.

Hon. foreign secretary: Dr. L. H. Lampitt.

Hon. secretary for home affairs: Dr. E. B. Hughes.

Hon. publications secretary: Mr. F. P. Dunn.

Past presidents: Mr. Francis J. Curtis, Dr. John Rogers and Mr. Stanley Robson.

Vice-presidents: Mr. A. Marsden, Dr. W. H. J. Vernon, Dr. A. C. Monkhouse, Mr. H. Greville Smith, Dr. R. T. Colgate and Mr. E. L. Streatfeild.

Members of Council: Messrs. H. K Cameron, J. A. Oriel, W. E. K. Piercy, G. Dring, F. A. Greene, R. A. E. Galley, A. W. Marsden, E. W. Muddiman, H. Burton, B. P. Hill and W. D. Scott.

Presidential Address

The president delivered his presidential address, which he entitled 'Science as Culture.' In it he discussed culture, science and the scientific method, changes in scientific education, science as mental training and made the point that there was no really hard and fast line between the sciences and arts. It might be said that there was a little art in science and a little science in art.

He began with the statement 'Modern liberal education is a failure. It has ceased to be liberal and tends to be fossil.' That statement, he said, sounded strange to scientific ears, which had long become accustomed to the eternal criticism of scientific education for its so-called lack of liberal studies. Education in every age must choose for the man of culture those things most important for that age. Liberal education had failed to meet the challenge by ignoring the most potent force of this modern age, namely, science. In that it had been partially abetted by scientific education which, because it was thrust out, had taken the point of view that it was only interested in teaching science to scientists, leaving the ordinary man of culture nowhere to go. Liberal education had been equally culpable in leaving out of its purview anything but the barest smattering of science.

We should revise our practices in scientific education, which were mostly keyed to specialists. We needed an echelon of scientific generalists who did not follow the usual method of teaching subject after subject as though they were not related. We must also persuade the embryo business man, lawyer and statesman of his need to study science as culture, as well as make available to him the means of satisfying it.

More of the Humanities

University advisory committees suggested that education should include more of the humanities. Just as often a committee was faced with complete agreement from the members of the university faculty and then was politely asked where they should insert those studies in an already overcrowded programme.

Nevertheless, he could look back over 25 years and see definite progress being made in that regard in practically all our institutions of higher learning. At least we must admit that the scientific faculties were responsive to criticism and were willing to do as much as could be done. However, they must distinguish between those studies which were necessary and those which were in a sense luxuries. Since there was no absolute answer, there was room for many hours of pleasant debate in the future.

The advocacy of science as culture as well as a speciality was not meant in any way to disparage the value of the humanities. His point was that science was not a thing apart, but as much one of the humanities as any other subject of human endeavour and, for the time being, it was one of the very dominant ones. Certainly we must agree that a man of culture must know something of the past, if only to understand the present and the other dominant feature of our time, the conflict of political ideologies. It was well to know literature and the arts. A man could know something of science and not be a scientist.

It all came down to values, to judgment of what it takes to follow best the pursuit of happiness, by which the president meant the greatest development of activity for the good of which a man was capable. For some, that ideal called for specialisation, and they must follow. For most it called

for the greatest knowledge and understanding of the problems and activities of their time. The culture of today was vastly conditioned by and influenced by science, and the modern man who was ignorant of science could no longer be considered the man of culture.

The members and their ladies were the guests of the Nottingham Section at luncheon in the Astoria Ballroom, Nottingham, on Tuesday. Mr. L. Anderson presided.

In the afternoon there was an informal reception and 'At Home' at the university, where they were welcomed by the Vice-Chancellor and Mrs. Hallward. And in the evening there was a civic reception in the modern and spacious Council House in the city. They were received by the Lord Mayor and Lady Mayoress, the Sheriff (Mr. W. J. Cox) and Mrs. Cox. There was dancing, and provision was made also for those who wished to play whist or bridge; the many features of the Council House, including the Council Chamber, were open to inspection and buffet refreshments were provided.

The Society's Medal for 1953 was presented on Wednesday morning, 22 July, to Dr. L. A. Jordon, C.B.E., the Director of the Paint Research Station. The presentation was made by the president, who congratulated and thanked him for his great services to the Society and to science and industry.

It was appropriate that the presentation was made in the University at Nottingham, for Dr. Jordon recalled that it was as a member of the Nottingham Section that he had become a member of the Society 34 years ago.

'Speaking of Science'

He then delivered an address, under the title 'Speaking of Science,' in which he commented upon the role of science in contemporary society. He discussed the scientific theme in history and the influence of science in modern times. In the course of it he said that apart from increasing the sum total of knowledge, no discovery meant much today or indeed had it done so at any time until it had been applied to something, i.e., not until an art had been invented to go with it did it influence the routine of life or the ideas of people. As examples, radio, television, and synthetic fibres were arts or inventions resting upon scientific discoveries of fundamental character. Sometimes that influence could be very profound or it could even be immeasurable in its effects.

If one thing were certain from analysis of the situation in the world today, and the particular problems arising from the intrusion of modern science into world affairs, it was that the determining factor lay in the attitude of mind of people who must learn that it was no longer possible to confine science to those purely material things which made life more comfortable. The truth was that the biggest political problems of the day were at bottom the outcome of scientific development. Science would go on producing new ideas. Politics, economics, national affairs and the like with their interweaving would continue to use them for good or ill —and it was all in the hands of man.

There was beauty in science not only because it stemmed from natural things, but in the quality of intellectual experience which it gave; and he liked it.

He also discussed the place of science in education. The address was thoughtful and thought-provoking.

Strategic Implications

Dr. E. R. Trotman, who proposed the thanks of the meeting to Dr. Jordon, said that inevitably we were all very much concerned with the tactics of science; but it was good that occasionally our thoughts should return to the strategic implications, and the meeting was grateful to Dr. Jordon for his great service in directing attention to the long range implications of human activity as it appeared to use today. He had reminded the meeting that 17th century chemistry, though feeble as a science, was strong in industrial craftsmanship. The members of the Society were proud of that and they had perhaps a special function to cherish — creative chemical industrial craftsmanship.

The Society's annual dinner was held in the Astoria ballroom on Wednesday evening, when many distinguished guests were entertained. Among them were the Lord Mayor and Lady Mayoress, the Sheriff and his lady, Sir Gerald Kelly (the President of the Royal Academy), the Vice-Chancellor and Mrs. Haalward and many other representatives of the University and the technical college, representatives of local industries, who had helped so much by providing facilities for visits to their works, and of kindred societies and institutions.

Sir Gerald Kelly proposed the health of the Society in a very entertaining speech.

He spoke of the advice and help he had received from Dr. Jordon for many years concerning pigments, colours, etc. Perhaps he was invited to propose the toast, he said, because he was one of the last exponents of representational art. The art of tomorrow was problematical; nobody knew how many noses, how many eyes! He was like a wandering ichthyosaurus, out of touch with his generation, or rather, the generation which was about to come. He belonged to a comfortable age when chemistry was known as 'stinks.'

The president responded. He spoke of the prosperous condition of the Society, and said that perhaps it was not always realised how much it meant to America. He urged that the Society must follow the industrial chemist wherever he went; he had long since gone out of the laboratory and into production, sales, research and management. He was educated and trained to analyse problems and to arrive at proper solutions; he could go anywhere, for he had the right kind of mental equipment, he had the discipline, he had had to think hard and there was not a problem he could not tackle.

Dr. L. H. Lampitt, the Hon. Foreign Secretary of the Society and a past president, proposed 'The City and University of Nottingham,' which, he said, were two parts of an entity, building together for the good of education. It was the industrialists who were responsible for the formation of the civic universities — Mason of Birmingham, Owens of Manchester, Boot of Nottingham; their largesse, their vision of the future, had made it possible to start those universities.

Nottingham's Debt to Chemists

The Lord Mayor, in his response, said Nottingham owed much to its chemists; so many of its trades and businesses were dependent on their technical advice, and he thanked each and every one of them for the valuable contribution they were making to the prosperity and well-being of the community. He had noted the emphasis which the Society placed on research, both individual and collective; he urged that we should spare no effort in research and experiment and that we should be more adventurous in the field of applied science. Far too often in the past the commercial application of the discoveries of our scientists had been left to other people; he believed there was a vast reserve of native talent in this country and we should not hesitate to use it.

The Vice-Chancellor responded on behalf of the university and he stressed the importance of applied science to the universities. They were concerned, he said, that from the grammar schools and public schools too large a proportion of the best brains were thinking of posts in pure science, and the applied sciences, such as agriculture and engineering, were not getting their fair share of the best talent. We had to achieve a better spread.

More Research Fellowships

He pleaded for more research fellowships, valuable fellowships of £500 or £600 a year, to keep a proportion of very able men, not for long, but two years, to continue post-graduate work for the Ph.D. or to come back to do post-graduate work after a period with industry. There was not enough of them. In America the ratio of post-graduates was one in six or one in five, whereas here the proportion was very much lower. At the University Council meeting that day he was delighted to hear the announcement of a very generous foundation fellowship by Messrs. Boot for post-graduate posts, and he thanked the Company very much indeed.

Asking industry to be more economical in its use of scientists, he said tales were told too often of able men being put into research laboratories and left to stagnate. He asked the chemical industry, which clearly needed a large number of chemistry experts, to consider the proper niches for non-chemists and non-physicists and to take a due proportion of both.

The toast to the guests was proposed by Mr. L. Anderson; and Mr. F. L. Goodall, the president of the Society of Dyers and Colourists responded.

After dinner the retiring president, Mr. Curtis, formally invested Sir William Ogg, his successor, with the presidential chain and insignia. Sir William described himself as a simple farmer, and said it was really the agricultural industry that the Society was honouring, because there were very close ties between chemical industry and agriculture. He spoke of some of the many things which had been done for agriculture by the chemical industry.

It would be a very hard job to follow Frank Curtis; but one of the delights of his office was that he had made a new friend in him.

Continued on page 226

Chemistry Research 1952

Expansion & Continued Valuable Work at Teddington

ALTHOUGH the 1952 report of the Chemical Research Laboratory makes the usual plea for an increase in staff, it is a pleasure, in these days of considerably restricted research expenditure, to learn that increased accommodation is now available at the Laboratory. New radiochemical and microbiological laboratories have meant that several projects, previously held up owing to cramped conditions, have now been started, notably the construction of a mass spectrometer and an apparatus for the study of corrosion by hot flue gases.

The interruption of work caused by the change-over of laboratories was kept to a minimum, and the considerable progress made by all sections is manifest in the large number of papers (54) which have been submitted for publication during the year.

The six main lines of research at present in progress are:—study of corrosion of metals under immersed, atmospheric and underground conditions; analysis and concentration of radioactive ores and minerals; extraction and purification of less common elements from wastes or low grade ores, and researches on analytical methods; purification of organic compounds and precise determination of their physical constants, and synthesis of compounds containing isotopic carbon; investigations of ion-exchange resins, their properties and use; and the study of sulphate-reducing bacteria and their application to the microbiological production of sulphur.

Accelerated Test Methods

A wide variety of work has been carried out by the Corrosion of Metals Group, who are developing accelerated methods of test. In further investigation of the corrosion of mild steel in conditions of rapid movement, it has been shown that the effect of increasing the speed of rotation is complex, the result being affected by the concentration of the solution, the temperature and the period of test.

While the general tendency of increased speed is to increase corrosion rates (less markedly at 15° and much more so at 30°), in some conditions a substantial increase of speed has relatively little effect. In 0.1 N and 0.5 N NaCl solution at 25° or 30°, the corrosion rate increases considerably over the range 200-1,500 r.p.m. In artificial sea-water the corrosion rate increases only slowly at 25° over the range 200-1,000 r.p.m., with little increase between 1,000 and 1,500 r.p.m. This is explained as being due to the restraining influence of the Mg and Ca compounds deposited on both the anodic and cathodic areas of the steel.

In artificial sea-water the influence of temperature appears to be complex. The corrosion rate in 7-day tests was less at 25° than at 15°, but tests at 30° gave a higher rate than at 15°.

Novel Protective Coatings

Recently, novel temporary protective coatings have been developed. These are based on the incorporation of corrosion inhibitors in thixotropic suspensions of inorganic earths; although soft and easily removed when no longer required, these coatings do not flow from the protected surfaces on storage. Radioactive techniques are being used to elucidate the mechanism of corrosion inhibition by potassium chromate containing Cr-51 and sodium benzoate containing C-14; the results indicate that the former is more firmly held by the metallic surface.

A clay soil in which the expected attack on buried pipes had not occurred was examined bacteriologically and the presence of a species of *Actinomyces* toxic to sulphate-reducing bacteria was revealed—an observa- that may have practical implications.

A still more striking example was that of a water-logged clay soil, believed to be the site of ancient tanneries, in which iron articles of estimated ages up to 2,000 years were found to be excellently preserved. Samples of the soil examined in the laboratory were found to be toxic towards sulphate-reducing bacteria because of the presence of tannates; investigations showed that the activity of the organisms, on which corrosion under such conditions depends, is suppressed by as little as 0.01 per cent tannic acid.

Another discovery made by the Corrosion Group was that a suspension of sulphur in distilled water rapidly corrodes mild steel.

The effect of a 20 per cent solution was greater than that of 3 per cent hydrochloric acid. The discovery has been applied to developing a method for etching mild steel which has advantages over the use of acids. A patent for this process has been applied for (BP Application No. 31098/52).

Other work includes kinetic, electron diffraction and optical examination of oxide films on metal surfaces; studies in the mechanism of atmospheric corrosion; and study of the oxidation of metals at elevated temperatures.

Germanium Purification Patent

The work of the Inorganic Group on germanium and gallium has been largely confined to clearing up certain points in the purification of germanium, and an application has been made for a patent to cover the process. The dioxide produced has been analysed for arsenic by the radiometric method and shown to contain 0.005 p.p.m. The boron content has been estimated to be less than 0.15 p.p.m.

Work on the production of phosphate fertilisers has continued, most attention being given to processes which do not need sulphuric acid. The production of dicalcium phosphate from nitric acid attack on phosphate rock was investigated. A superphosphate fertiliser made with nitric acid normally contains monocalcium phosphate and calcium nitrate, both of which are water soluble. The calcium nitrate, being deliquescent, gives rise to caking problems, and it is preferable to remove it. This is most easily achieved by converting the soluble monocalcium phosphate into insoluble dicalcium phosphate, when the calcium nitrate can be leached out. Another advantage is that during manufacture nitric acid is regenerated for further attack on the rock:—

$$Ca_3(PO_4)_2 + 4HNO_3 \rightarrow Ca(H_2PO_4)_2 + 2Ca(NO_3)_2$$

$$Ca(H_2PO_4)_2 + Ca(NO_3)_2 \rightarrow 2CaHPO_4 + 2HNO_3$$

Processes for recovering the nitrate value of the calcium nitrate as ammonium or potassium nitrate have also been examined. Although insoluble in water, dicalcium phosphate is still a good fertiliser.

A special investigation was made on behalf of the Directorate of Colonial Geological Surveys of the action of sulphuric acid on a Uganda apatite. It is hoped to use this material for the manufacture of phosphoric acid and phosphates, but it also contains pyrochlore, a valuable niobium mineral. It was desired to know whether the sulphuric acid would attack the pyrochlore, since, in the absence of such attack, the pyrochlore could be recovered. The mineral was not appreciably attacked under the conditions employed, but it was also found that the apatite was more resistant itself than are the more common phosphate rocks. The rate of attack varied considerably with acid strength, and useful data on optimum conditions have been obtained.

Of particular practical interest is the development of an ion-exchange process for the recovery of gold and other metals from cyanide solutions used in the extraction of gold from ores. This has arisen from the work of the Radiochemical Group on analysis and recovery of valuable metals from minerals, and should have practical possibilities in industry.

A chromatographic method has been developed for the separation and determination of niobium and tantalum. Three new items of equipment have been designed and constructed for radiochemical investigation. The first is for determining automatically the life of ion-exchange resins on continuous recycling with different solutions; the second is for scanning filter strips on which chromatographic separation of metallic salts containing radioactive tracers has been effected; and the third is a counter in which scintillations are amplified in a photomultiplier valve.

Organic Substances

Much of the work of the Organic Group has been concerned with the purification, standardisation and characterisation of substances to be supplied as standards. Among others, a number of pure individual *n*-paraffins, xylenes, and pyridine carboxylic acids were prepared.

Vapour pressure, UV and IR absorption spectra, and phase equilibria have been studied for a number of organic substances.

Isotopically-labelled compounds are of great importance, and the overall radiochemical yield of C-14 labelled benzene has been increased to 75 per cent. From C-14 carbon dioxide, *cyclo*pentane carboxylic acid has been obtained in 96 per cent yield and converted to *cyclo*pentyl carbinol in 96.5 per cent yield. Dehydrogenation

furnishes a crude product containing benzene and methyl *cyclo*pentane and the benzene has been separated almost quantitatively by a sulphonation-desulphonation procedure.

An improved method for separating the products of carbonate-formate exchange has been examined. The estimation of naphthalene in coal tar fractions has been made by the use of labelled naphthalene in dilution experiments.

Methyl *cyclo*hexane

Methyl *cyclo*hexane labelled with C-14 in the side-chain has been prepared by orthodox methods from *cyclo*hexanone *via* methyl *cyclo*hexanol and methyl *cyclo*hexene. The product contained less than 1 per cent of either ethyl *cyclo*pentane or of dimethyl *cyclo*pentanes. When it was treated with water-promoted $AlCl_3$ at 100° for 8½ hours the product contained about 4 per cent of ethyl *cyclo*pentane and 5-10 per cent of dimethyl *cyclo*pentanes, but the distribution of C-14 had become about 99 per cent random between the side chain and all the ring positions in the methyl *cyclo*hexane.

This was proved by dehydrogenation to toluene, oxidation to benzoic acid, transformation to aniline and CO_2, followed by combustion of the aniline as acetanilide to CO_2, and measurement of the specific activity of the two samples of CO_2. Migration of isotopic carbon into the ring clearly occurs through the establishment of an equilibrium between methyl *cyclo*hexane and dimethyl *cyclopentane* and becomes fully random through methyl group migrations. The process offers an easy route to the preparation of ring-labelled toluene.

Work is still in a preliminary stage in a study of the mechanism of the Kolbe-Schmitt reaction. When a mixture of sodium and potassium phenoxides was carboxylated appreciable amounts of 4-hydroxy *iso*phthalic acid were formed. This acid, together with a proportion of 6-hydroxy-1:3:5-benzene tricarboxylic acid, resulted when a mixture of sodium and potassium salicylates was heated to 350° *in vacuo*.

4-Hydroxy-*iso*phthalic acid is present to a small extent in commercially-produced salicylic acid, and is concentrated into the residue from the sublimation chambers in which the acid is purified, and a sizeable tonnage is potentially available from this source. A method of extracting the acid has been devised, and a number of derivatives have been prepared.

Other work by the Organic Group includes exploration of the reactions between CO_2 and ethylene oxide, and between CO_2 and *cyclo*hexanone, and a re-investigation of the benzoin reaction with dialdehydes.

The preparation by the High Polymers Group of semi-permeable membranes with outstanding properties from polyvinyl alcohol, together with the simplification in apparatus made possible by their use, constitutes a major advance in the osmometry of high polymer solutions. Results of considerable theoretical and industrial significance have been obtained and by using highly selective membranes the molecular weights of simple chemicals of known structure, such as sucrose octa-acetate, penta-iodobenzene and diacenaphthylidene, have been determined.

Long-term studies of the behaviour of cation-exchange resins are nearing completion, and their practical value has already been proved. The information gained enables critical tests to be applied in assessing the value of new resins, and advice has been given in many cases on the most suitable resin for specific purposes. Emphasis will be given to anion-exchange resins, and resins possessing special properties.

The High Polymers Committee recommended that investigations on resins possessing complex-forming or other special properties should continue, and that the programme of research on semi-permeable membranes should be extended. The recommendations have been implemented, but only by reducing the effort on ion exchange.

Industrial Bacteria

Over the past two years the National Collection of Industrial Bacteria has been considerably enlarged and the Collection is now in a position not only to supply the majority of requests from research and industry but also to reciprocate the help received from other sources. During the past year, for instance, over a hundred strains have been sent to fill gaps in other collections. Altogether 620 strains are now maintained. The Laboratory now distributes 'official' cultures of antibiotic-producing organisms for the World Health Organisation.

Investigations of the microbiological production of sulphur and sulphide have been

intensified, and studies of various aspects of the metabolism of *Desulphovibrio desulphuricans* have been initiated. A continuous method of cultivation is being employed by a team from the CRL, at the Microbiological Research Department of the MOS at Porton; a marked increase in the rate of sulphate-reduction has been achieved by the use of a suitable nutrient medium.

Further development of the method now depends greatly upon the availability of a cheap fermentable waste material to use as a source of carbon. A survey of such wastes is being made, and so far distillers slop, dried whey, dark technical lactic acid, calcium lactate liquor, four chemicals from seaweed (laminarin, mannitol, sodium alginate and fucoidin), settled sewage, and sewage sludge have been investigated. Yields of sulphide were quite high with some of these materials, but except for sewage sludge, they are either too scarce or too expensive for a large-scale process.

The experience and specialised knowledge of the staff on topics within its research programme enable the Laboratory to give substantial assistance to industry and to other outside organisations.

* 'Chemistry Research, 1952', HMSO, pp. 120, 4s. 6d.

Society of Chemical Industry

Continued from page 222

Dr. F. H. Carr, a past president of the Society, presented to Mr. Curtis a past-president's badge, which would remind him in the future of the warm place he had won for himself in the hearts of the members of the Society; it was in appreciation of all that he had done for the welfare of the Society.

On the following evening, Thursday, 23 July, in the Queen's Hall, Nottingham, the members and their ladies were entertained by Monsanto Chemicals Ltd., to a reception and entertainment. There was light music, cabaret and dancing, and buffet refreshments were served throughout the evening. The thanks of the guests were expressed by Sir William Ogg to Mr. Curtis and his company, and to Mr. P. A. Singleton (managing director of Monsanto Chemicals Limited, London) and Mrs. Singleton, who had received the guests with Mr. Curtis.

The final social function held on Friday evening was a farewell dance in the lower hall at the university.

Throughout the week there were lectures in the mornings on a variety of subjects.

USA Potash

Marked Increases in Production

THE domestic production of marketable potassium salts reached a new record in 1952, increasing more than 16 per cent above the 1951 production according to reports by producers to the Bureau of Mines, USA Department of the Interior. Sales and apparent consumption of potassium salts both increased in 1952 by 12 per cent and four per cent respectively, as compared with 1951. Stocks in producers' hands at the end of 1952, more than double the 1951 figure, were 171,807 short tons with a K_2O content of 99,061 tons.

Both imports and exports of potash materials were less in 1952. Imports totalled 363,898 tons (190,862 tons K_2O) as compared to 574,361 tons (313,617 tons K_2O) in 1951. Import statistics in 1952 list East and West Germany separately. West Germany, East Germany, France, Spain and Chile, respectively, supplied 32, 27, 19, 11 and eight per cent of the total United States imports of potash. Exports of potash materials totalled 101,200 tons, 19 per cent less than in 1951, with over 97 per cent going to countries in the western hemisphere.

The production of higher-analysis materials continued to increase and was 86 per cent of the the total potassium salts produced in the United States. Production of the lower grade muriate (49-50 per cent K_2O), manure salts, sulphate of potash and sulphate of potash-magnesia all decreased in 1952. The production of manure salts has dropped from a maximum of 260,399 tons in 1948 to 8,409 tons in 1952.

The States of California, New Mexico and Utah continued to supply the major portion of the domestic production of potash. New Mexico supplied over 88 per cent of the domestic potash marketed in the United States and a fifth major producer began operations in that State late in 1952.

Canadian Fertiliser Plant

The Consolidated Mining and Smelting Company of Canada has announced the arrival of the first phosphate rock from Montana at the fertiliser department of Kimberley, British Columbia. Nearly 70,000 tons of ammonium phosphate a year will be produced at the new plant, which is scheduled to come into operation shortly.

USA Titanium Production

More Metal but Decrease in Pigments

USA Government programmes established in 1952 called for expansion of titanium dioxide pigment and titanium metal production facilities, but although the production of titanium metal for the year was twice that of the 1951 output, the production of titanium pigments was slightly lower than in 1951, according to the USA Department of the Interior (Bureau of Mines).

Rutile, required mainly for welding-rod coatings, was in short supply during the first part of 1952. The removal of price controls resulted in record imports from Australia, sufficient to meet record requirements and to double stocks at the end of the year.

The revolving-fund purchase and resale programme, established by General Services Administration in August, 1951, to maintain capacity operation of titanium sponge-manufacturing facilities during the development period of military applications, continued throughout 1952 in order to ensure an increased supply of titanium and the utilisation of such supply in the manner most advantageous to the national defence.

Commercial titanium sponge production in 1952 was 1,075 short tons, approximately double the 1951 output. Ilmenite production in 1952 decreased 7,200 short tons under the record established in 1951; whereas ilmenite shipments increased 11,700 tons over 1951 and established a new record for the sixth successive year. Shipments ranged from 45 to 66 per cent TiO_2. Rutile produced in 1952 by the Florida Ore Processing Company, Melbourne, Florida, and the Rutile Mining Company of Florida, Jacksonville, Florida, showed a slight decrease from 1951 output. Shipments of rutile ranged from 93 to 97 per cent TiO_2. Domestic production of rutile is not published as it would disclose operations of the major producer.

Titanium pigment production and shipments in 1952 decreased 4 and 11 per cent, respectively, under 1951, as production dropped to about the 1950 level and shipments fell to near the 1948 figure. Ilmenite consumption in 1952 decreased 30,500 short tons (21,500 tons titanium dioxide) under 1951. Lower ilmenite consumption occurred in the titanium pigment industry; however, this decrease was offset by the use of 24,200 short tons of titanium slag that contained 16,800 tons of titanium dioxide. Titanium slag imported from Canada in 1952 was consumed for the first time in appreciable quantities for titanium pigments, welding-rod coatings, and chlorinating experiments.

Rutile consumption totalled 18,300 short tons in 1952, an increase of 1,100 tons over 1951, and established a new record. The previous record, set in 1943, totalled 17,600 tons. The increase in rutile consumption was caused by the expansion of the titanium metal industry.

Technological Education

Position to be Examined

AT the latest meeting of the general committee of the Parliamentary and Scientific Committee, the chairman, Sir Wavell Wakefield, M.P., reported that the steering committee had set up a sub-committee to examine the present position with regard to higher technological education and see what further guidance and encouragement the committee might give to the Government regarding its proposed expansion plans.

The sub-committee—confined to members of the House of Commons and the House of Lords—consisted of Lord Glyn (chairman), Viscount Falmouth, Sir Hugh Linstead, Mr. I. J. Pitman, Mr. W. Robson Brown, Sir Wavell Wakefield, Mr. Austin Albu, Mr. A. J. Champion, Mr. A. Bottomley, Mr. W. T. Wells and Mr. I. Winterbottom.

Commander Powell reported that the main recommendations in the recently-issued 6th annual report of the Advisory Council on Scientific Policy were that more trained scientists and technologists should be employed in industry, more scientists and technically trained men should serve on boards of management, industry should put more emphasis on new methods and new products depending on scientific and engineering skills, and there should be a greater investment in manufacturing industry to assist the better exploitation of science by industry.

Mr. A. L. Bacharach reported that there had recently been some encouraging results from the representations which the Parliamentary and Scientific Committee had made with regard to the future financing of British Abstracts. It now seemed clear that financial arrangements had been made which would be sufficient to tide them over the present year.

Factory Stacks

Studies of Atmospheric Pollution

WAYS in which atmospheric pollution from factory stacks is studied are described by Dr. O. G. Sutton, who is to be the new director of the Meteorological Office, in an article in the July number of *Discovery*.

A theoretical study has been made of atmospheric diffusion from an elevated source, and compared with practical observations. By theory, the concentration of smoke at ground level rises to a maximum value at a distance from the foot of the stack roughly proportional to the stack height, and afterwards it declines slowly to zero. The maximum value at ground level is directly proportional to the rate of emission, and inversely proportional to the square of the height of the stack. (C. H. Bosanquet and J. L. Pearson, *Trans. Faraday Soc.*, **32**, 124 [1936]; O. G. Sutton, *Quart. J. Royal Met. Soc.*, **73**, 426 [1947]). These relations are confirmed by experiment.

The theory indicates the benefits to be gained from really high stacks, but another consideration to be remembered is that the temperature difference between the effluent and the outside air should be as great as possible to assist in diffusion. In certain cases it may prove advisable to install a stack heater.

The theoretical investigation of this problem (Sutton, *J. Meteorol.*, **7**, 307 [1950]; Bosanquet, W. F. Carey and E. M. Halton, *Proc. Inst. Mech. Eng.*, **162**, 355 [1950]) indicates that the decrease in ground level concentration is proportional to Q/u^3h, where Q is the strength of the source of heat, u is the speed of the side wind at the top of the stack, and h is the height of the stack. Thus, the lower the stack, the more essential it is to conserve heat in the effluent. This may mean, where the gases are washed to remove, for instance, sulphur, that no washing, and hence less cooling of the gases, will result in less pollution in the vicinity.

These calculations yield results for flat terrain, but it is impossible to analyse the effects over hilly or undulating country. The Aerodynamics Division of NPL has developed a method of studying the problem by means of a scale model in the wind tunnel.

This model may be used in two ways. If the surface is sprayed with white paint containing lead acetate, and air containing a small amount of H_2S is discharged from the model stack, a rough estimate of the concentration can be made from the density of the brown stain on the surface of the model. Alternatively, the behaviour of the plume may be examined by atomising paraffin in electrically heated jets.

Kohlrausch Flasks

THE British Standard for Kohlrausch Flasks has been revised and issued as BS 615: 1953. As in the original 1936 edition, the material, dimensions, construction, graduation, tolerances on capacity and inscriptions are specified for 50, 100 and 200 ml. flasks, but the three special sizes previously included to meet the requirements of beet sugar laboratories have been omitted as they are now seldom used.

Only minor changes have been made in the specification, but it has been brought into line with others for volumetric glassware in that only the essential dimensions are listed as mandatory, the remainder being for the guidance of manufacturers. Copies of this standard (2s. 6d.) may be obtained from the British Standards Institution, Sales Branch, 24 Victoria Street, London, S.W.1.

New Metallurgical Processes

DESIGNED to obviate the smelting and electrolytic refining of blister copper, two important metallurgical processes are being tried out at a big Australian gold and copper mine, Mount Morgan, in Queensland, by Mount Morgan Mines Ltd., in the hope of reducing the company's high production costs.

The purpose of one process is to leach the copper out of the ore and produce electrolytic copper by electrolysis. This would save about £A50 a ton on present costs. The Commonwealth Scientific and Industrial Research Organisation is assisting the company and has built a pilot plant at Melbourne.

The other process concerns the leaching of copper with ammonia and oxygen at high pressures. By using a reducing agent almost pure copper has been obtained. The company's annual output of copper is about 6-7,000 tons and it is hoped that the processes will effect a saving of about £A300,000 a year.

Chemistry & Timber

Many Interesting Investigations of the Properties of Wood

ALTHOUGH much of the work of the Forest Products Research Laboratory is necessarily concerned with the physics and mechanics of wood, the latest report shows how much chemistry is involved in the investigation of many present-day problems of timber utilisation.

A series of simple chemical tests is now applied by the Chemistry Section to all new timbers coming into the laboratory for general testing. The properties examined include tainting and staining characteristics, liability of the timber to discolour in contact with iron compounds, tendency to promote corrosion of metallic fittings, and presence of resins or gums, or of silica, which may influence the sawing properties of the timber.

The work already reported (THE CHEMICAL AGE, **66**, 471) on the delignification of wood with sodium chlorite solution, leading to the presence in wood of an acid-soluble form of lignin, has now been published.

The acid-soluble lignin may be isolated from the hydrolysate obtained by treating wood with 72 per cent sulphuric acid to remove the acid-insoluble lignin. If wood that has been partly delignified with sodium chlorite is used, a product termed 'modified lignin' is obtained. This contains chlorine derived from the chlorite, and is believed to have been so modified that it is no longer isolated as insoluble residue by the sulphuric acid method.

UV Absorption Spectra

The relationship between acid-soluble and modified lignin has been further examined, particularly in regard to their UV absorption spectra, and it is found that, both for beech and spruce lignins, there is very little difference between the spectra. This suggests that the main conjugating system is the same in the two products, and is little affected by the addition of Cl_2 or HCl.

Attention is now being directed to the carbohydrate portion of wood, and arrangements are being made to employ paper chromatography in the examination of sugars formed by hydrolysis of the various polysaccharide fractions of the cell wall. It is known that when extractive-free wood is treated with cold aqueous sodium hydroxide only a portion of the hemicelluloses present in the wood is extracted by the alkali, and the remainder can only be extracted if the wood is first delignified.

This suggests that the remaining hemicellulose fraction may be combined in some way with the lignin, or may be inaccessible to the alkali on account of the presence of lignin in the cell wall. Steps are being taken to isolate both materials and examine them after hydrolysis to find the nature and proportions of the sugar units of which they are built up. It has already been shown that the amounts of free glucose and fructose in beech wood are very small.

Dermatitis from Toporite

Dust from the Trinidad timber toporite is alleged to cause skin irritation and dermatitis among workers in sawmills. The timber has therefore been investigated in order to discover whether any toxic materials—in particular alkaloids—are present.

Treatment of the sapwood with ether extracted about 3 per cent by weight of the wood. On evaporation of the ethereal solution colourless crystals separated in 0.3 per cent yield; they were soluble in benzene and chloroform, sparingly soluble in ether and alcohol, and insoluble in water. This material has been shown by Professor F. E. King, of Nottingham University, to be a mixture of the acetates of the isomers picropodophyllin and podophyllotoxin.

Further experiments indicated that one or more alkaloids were present in addition to these crystalline compounds. It is known that podophyllotoxin has toxic properties, and an attempt is being made to discover whether the irritant properties of the wood can be attributed to this substance, to an alkaloid, or to the resinous components.

A type of breakdown often occurs in the wood of boats which, although it resembles fungal decay in appearance and in some of its effects, has been shown to be of chemical origin. The form most commonly observed is a localised softening of the wood immediately adjacent to metal fastenings such as the copper clench nails holding hull planks together ('nail sickness'), and the yellow

metal bolts which pass right through hull planks, timbers and floors.

The primary cause of this type of breakdown is thought to be the presence of dissimilar metals in contact with moist wood, the metals forming the poles of a galvanic cell. An external connection between the metals can complete the circuit so that the salt in the wood is electrolysed progressively. As a result of the electrolysis of, say, salt, sodium hydroxide forms at the cathode and concentrates in the wood adjacent to it.

The chloride ion from the salt combines with the anode, resulting in corrosion of the latter and formation of new salts around it. When, as is often the case, the anode is iron, secondary reactions produce free hydrochloric acid.

Simple experiments have verified these theories, and a striking practical example was obtained during a recent examination of the timbers of the 'Cutty Sark.' Numerous localised areas of both strong HCl and strong NaOH and sodium carbonate were found on the inside of the hull above and below the waterline, and very extensive breakdown of the wood in these regions had occurred. It was possible, at a point slightly above the waterline, to measure a potential difference of 35 to 40 millivolts between an iron plate and a bronze bolt not in contact.

Galvanised Iron

It should be noted that galvanising, while protecting iron from atmospheric corrosion and the effects of contact with the more acidic woods such as oak, does not prevent it from reacting in the manner described above. The zinc, being even more anodic to copper than iron, is rapidly attacked at the points of contact with the electrolyte.

The difference in behaviour of various species of wood under approximately similar conditions of use must be attributed to their varying intrinsic resistance to alkali. The softwoods, spruce, larch and pitch pine show uniformly good resistance, together with the hardwood teak. Mahogany, whether African or Honduras, is moderate to low, and English oak is very low.

Among inquiries which involved a considerable amount of experimental work, the Laboratory investigated the bleaching of wood flour for use as plastic filler—hydrogen peroxide made alkaline with sodium silicate gave the best results—and the determination of arsenic in wood and foliage.

The Section of Composite Wood has analysed and correlated the results of the five-year durability tests on adhesives for plywood manufacture. Under indoor conditions sodium silicate is the only glue to have failed, but urea resins extended with more than 50 per cent flour are weakening.

Semi-outdoor exposure in an unheated, ventilated shed has shown that urea glues extended with more than 30 per cent flour are suspect. Casein and animal glue would probably survive this test if condensation were absent. With full weathering, only phenolic and resorcinol glues have survived. These tests were begun five years ago, and do not, of course, include the more recently developed adhesives.

Culture Collection

The Mycology Section maintains a representative culture collection, and a complete set of all the wood-rotting *Basidiomycetes* has been sent to the Chemistry Department of Liverpool University for examination by IR spectroscopy, to detect the presence of any metabolic products of special interest. A note on the metabolic products of *Polyporus benzoinus* has been published.

Toxicity tests on proprietary wood preservatives continue to be carried out on request, and a number of standard wood block tests have been made on preservatives that contain pentachlorophenol. Agar and wood block tests on sodium fluoride-calcium chloride mixtures indicate that when sodium chloride is thoroughly mixed with soluble calcium salts it becomes inactivated as a wood preservative.

The valuable work of the Laboratory embraces many other matters, both experimental and advisory. The demand for lectures and visits, particularly by industrial bodies, is still greater than can be dealt with. Nevertheless, there has been a further increase in the amount of the more basic and long-term types of work being carried on, and officers have found time to increase the number of projects which involve intersectional collaboration.

'Forest Products Research, 1952', HMSO, Pp. 62, 3s.

Merger Proposal Dropped

It was officially announced last week that the scheme for the proposed merger of the Federation of British Industries and the British Employers' Confederation has been abandoned.

New Hydrazine Plant

Full Scale Production of Hitherto Obscure Chemical

HYDRAZINE, the chemical brought out of obscurity by the Germans in World War II for use as a rocket fuel, is to be manufactured on a large scale by the Mathieson Chemical Corporation of Baltimore. The completion of the first full-size plant in the USA was announced recently by the president of the Mathieson Chemical Research and Engineering Division, Mr. Carl F. Prutton.

Initially the new plant, at Lake Charles, Louisiana, will produce not only hydrazine hydrate but also anhydrous hydrazine, mono- and dihydrazine sulphates, hydrazine hydrobromide, and hydrazine hydrochloride. Other derivatives will be made as demand warrants.

Over 2,000 Derivatives

So far, over 2,000 derivatives of hydrazine have been reported, many with new and unusual properties. These include numerous straight chain, cyclic and cross-linked molecules, as well as a number of complex nitrogen-containing compounds useful in the preparation of dyes and pharmaceuticals. Simpler hydrazine derivatives, such as substituted hydrazines, hydrazones, hydrazides, and semicarbazides, are being used as insecticides, fungicides, antioxidants, textile processing agents, and in explosives and photographic developers.

In the drug field, hydrazine derivatives have shown promise in the treatment of such varied diseases as tuberculosis, high blood pressure, and urinary tract infections. Hydrazine is also being employed in the preparation of hormones, anti-histamines, antibiotics, and certain vitamins and sulpha drugs. One member of a group of drugs based on the nitrofuran nucleus, derived from hydrazine and furfural, is being used in poultry feeds to prevent the deadly coccidiosis disease

Some of the most interesting uses of hydrazine derivatives are in agriculture. Maleic hydrazine has shown startling properties as a growth retardant for grass and other plants. Applied in solution as a spray it is being used on onions, potatoes and carrots to stop sprouting during winter storage. It is being used to prevent the flowering of tobacco, to produce male sterility in hybrid corn, and to prevent the opening of buds on fruit trees until danger of frost is past.

Other derivatives of hydrazine are serving successfully as insecticides and fungicides. One has been found that—for the first time—will kill mites without poisoning the birds which feed on the dead mites.

In the industrial field, hydrazine and its derivatives show promise as starting materials for new nitrogen-ring dyes, synthetic detergents, wrinkle-resistant coatings for textiles, and as modifiers of synthetic fibers and plastics, particularly those of the polyamide type such as nylon and Dacron. There is some evidence, for example, that hydrazine-modified fibers may permit finer strands with greater strength and elasticity.

The property of hydrazine that accounts for its principal industrial uses at the moment, however, is its strong reducing action. As a reducing agent it is used to separate rare metals in a pure state from their oxides or salts, to plate thin coatings of metals on glass, plastics and other non-conducting materials, and to remove final traces of dissolved oxygen from boiler water which otherwise would cause corrosion problems.

This reducing action is also put to work in the form of hydrazine hydrobromide as a soldering flux for copper and brass. The flux permits formation of a good soldering bond, but leaves no corrosive residue on the metal. Hydrazine flux is being used in the soldering of automobile radiators. Superior fluxes have also been developed for the difficult problem of soldering aluminium.

Canadian Petrochemicals

Twenty-three plants representing total capital investment of $216,000,000 have been placed in operation or are to be placed in operation soon by Canada's booming petrochemical industry. This year, 14 plants costing an estimated $112,000,000 are due for completion with three other plants, now under construction at a cost of $11,000,000, scheduled to be completed next year. Prior to this year, investment in petrochemical facilities approximated $93,000,000.

Bursaries Scheme

Royal Society & Nuffield Foundation

IN order to fill a need with respect to Commonwealth scientific relations, the Royal Society and the Nuffield Foundation have jointly decided to initiate a Commonwealth Bursaries scheme. The Nuffield Foundation is supporting the bursary scheme as a complement to its established programme of Commonwealth fellowships and other awards.

The aim is to provide facilities for increasing the efficiency of investigators of proven worth by enabling them to pursue research, learn techniques or follow other forms of study where either or both the physical and personal environment overseas in the commonwealth is peculiarly favourable. The main difference from the ordinary research fellowship is not merely one of duration but of emphasis as the bursaries will aim not so much as obtaining the answer to a particular question as at improving the powers of the of the recipient to extend the bounds of knowledge.

The scheme will be operated for an experimental period of five years. During that time the Nuffield Foundation will provide £5,000 a year, which will be devoted to bursaries to United Kingdom scientists who wish to go to oversea parts of the Commonwealth and to scientists of one oversea part of the Commonwealth to go to another. Initially, the Royal Society will also make a contribution of £2,500, which will be available for movement in any direction within the Commonwealth, including to the United Kingdom. It is, however, hoped that funds may be obtained from other sources, particularly from overseas, to make possible the full development of the scheme, especially by increasing the proportion of bursaries available for scientists of oversea countries of the Commonwealth who desire facilities in the United Kingdom.

Each bursary will provide for the cost of travel and maintenance normally for periods of two to twelve months. It will not aim at the provision of any salary as such, but of sufficient maintenance to avoid frustration. The applicant must be sponsored by a recognised research authority and must produce evidence that he or she has prior permission to work in the laboratory or other scientific institution chosen. It is expected that in the operation of the scheme Fellows of the Royal Society throughout the Commonwealth will assist in sponsoring and assessing applicants for bursaries.

A joint Royal Society and Nuffield Foundation Commonwealth Bursaries Committee has been set up to administer the scheme on behalf of the sponsors. The members of the committee include Professor A. R. Todd, F.R.S., Professor of Organic Chemistry, Cambridge University, and Professor Sir Eric Rideal, Professor of Physical Chemistry, King's College, London.

It is proposed initially to consider applications at six-monthly intervals, beginning early in 1954. Application forms containing further details are obtainable from the Assistant Secretary, The Royal Society, Burlington House, Piccadilly, London W.1, and must be submitted not later than 15 March and 15 September in each year.

New Standards for Solvents

IN the series for solvents and allied products, the British Standards Institution has just issued eight further standards as follows: B.S. 1992, Butyl Acetylricinoleate; B.S. 1993, *sec*Butyl Alcohol; B.S. 1994, Dichloromethane (Methylene Chloride); B.S. 1995, Di-2-Ethylhexyl Phthalate; B.S. 1996, Dimethyl Phthalate; B.S. 1997, Glycerol Triacetate (Triacetin); B.S. 1998, Triphenyl Phosphate, and B.S. 1999, Tritolyl Phosphate (Tricresyl Phosphate).

British Standards for these materials were not included in the original series of standards for solvents, although British Standards Aircraft Materials Specifications 2.D.11 Triacetin and 3.D.12 Triphenyl Phosphate previously covered those materials for aircraft purposes. The demand for them for general purposes has now increased. The new B.S. 1997 Glycerol Triacetate (Triactin) and B.S. 1998 Triphenyl Phosphate therefore supersede specifications 2.D.11 and 3.D.12, which have been withdrawn. Increased demand for materials of reliable quality for a variety of industrial uses has justified the preparation of British Standards for the remaining six products for which no British Standards have previously been issued.

Copies of these standards can be obtained from the British Standards Institution, Sales Branch, 24 Victoria Street, London, S.W.1 (price 2s. 6d. each, except 1993 and 1994, which are 2s. each).

Indian Newsletter

From Our Own Correspondent

AS a consequence of a liberal import policy recently announced by the Government of India for the second half of the current year, some raw materials required by the industry will be allowed to be imported in larger quantities. These include caustic soda, soda ash, coal tar dyes, raw materials for the plastic industries, glass and glassware. Actual users of caustic soda will be granted licences for half of their certified requirements, users of rayon grade caustic will get their full requirements, and the established importers will get quota licences for caustic soda at 35 per cent and for soda ash at 20 per cent. These will be calculated on the basis of half of their best year's imports during any one of the five financial years ending 1950-51.

* * *

An ambitious R.70,000,000 (£5,250,000) scheme for the establishment of a caustic soda and soda ash plant on the south east coast of Kathiawar peninsula has been proposed by the State Government of Saurashtra to the Government of India. The scheme envisages the production of 55,000 tons of caustic soda and 50,000 tons of soda ash per year to meet the entire needs of the country. It has been suggested that in view of the heavy cost involved, the project may be taken up by the Government either independently or in co-operation with private enterprise. It is estimated that R.40,000,000 (£3,000,000) will be spent outside India for plant and machinery and that production will commence in three years.

* * *

The Indo-US Technical Co-operation Programme for 1952-53, signed recently, provides assistance for lignite mining in South India, erection of a pulp and paper plant at Dehra Dun and the expansion of the Sindri fertiliser plant. The joint cost of the experimental project to determine the economic feasibility of lignite mining in South Arcot District is estimated at $250,000 and R.2,500,000 (£187,500). About 16,000 tons of lignite will be mined for utilisation in burning and consumer trials. The USA will supply equipment for lignite mining as also for the completion of the pilot plant for production of pulp and paper from a wide variety of indigeneous raw materials. This project is expected to cost $210,000 and R.320,000 (£24,000). The USA will also arrange for the engineering services in connection with the erection of the plant. A sum of $50,000 will be provided for obtaining detailed proposals for expanding the scope of the Sindri fertiliser plant, which now mainly produces sulphate of ammonia. It is proposed to manufacture urea and ammonium nitrate and to utilise fully the coke oven gas of the plant.

* * *

The Bihar Government are setting up a new fertiliser factory at a cost of R.7,000,000 (£525,000) near the giant Sindri fertiliser factory. The new plant, expected to go into production next year, will manufacture superphosphates and will have a capacity of 240 tons per day.

* * *

In a report, the committee appointed by the Government of India to assess the resources of zinc ores in India has stated that the Zawar mine is the only important source of lead-zinc ore in the country with workable reserves. It has been stated that a mill be set up to treat about 1,000 tons of ore per day. The committee has recommended the operation of the zinc plant in co-operation with a foreign specialised firm with considerable experience. The management should be vested in a new organisation, which may be backed, if needed, by Governmental finance. It may be added that the Zawar mine now produces about 180 tons lead-zinc ore per day, while India's current annual consumption of lead and zinc metals is 15,000 and 35,000 tons respectively.

* * *

The State Government of Mysore, in collaboration with Agfa Ltd. (Germany) are to establish a raw film plant near Mysore at a cost of R.25,000,000 (£1,875,000). This will be a joint stock venture with Government and private finance, as is the case with several other chemical industries in Mysore. The new venture will have the benefit of the resources of the chemical industries of the State. A modern plant is proposed to be put up for the production of high quality raw films and photographic papers.

Fire Resisting Cables

Insulated with Asbestos Paper Tape

A NEW range of asbestos paper tape insulated cables, developed by Pirelli-General Cable Works Ltd., are intended for use in circuits up to 660 volts in situations where fire resistance, non-inflammability, maintenance of electrical properties under elevated temperatures, and non-ageing properties are required. They are patented under British Patent No. 661540.

In the construction of these cables, copper conductors, which may be single or stranded, are lapped with a special quality asbestos paper tape. The cores are laid up, asbestos paper taped, and sheathed with a welded aluminium sheath (Asbestal) or, alternatively, with a welded stainless steel sheath (Asbesteel). The smaller Asbestal cables have a cold-welded aluminium sheath with a small longitudinal fin, while the larger Asbestal cables have a corrugated argon-arc welded aluminium sheath, which has the advantage of flexibility similar to that of a lead sheathed cable, combined with sufficient stiffness in relation to weight to enable the distance between supports to be considerably greater than that necessary with lead sheathed cable. The corrugations also increase the resistance of the sheath to mechanical damage.

The multicore cables are designed to have a constant insulation thickness between conductors, with a variable thickness between conductors and sheath. The conductor insulation thickness varies very little from 0.05 in., but, owing to the limited number of sheath diameters, considerably more than 0.05 in. thickness between conductors and sheath is used in many cases. Single core cables have all to be insulated to fit the nearest standard sheath and considerable variation above a 0.05 in. minimum consequently occurs. The asbestos-paper tape employed has a high degree of resistance to moisture absorption and to destruction by fire.

The insulant is indestructible and the cable itself will continue to function at temperatures up to the melting point of the sheath. Since the insulant is dry, the cables are non-bleeding, rendering them eminently suitable for vertical runs which may be subject to overload or high temperatures.

Starch & Glucose

Control to end in September

THE Minister of Food, Major the Rt. Hon. Gwilym Lloyd-George, M.P., announced in a written reply to a question in the House of Commons on 17 July that Government control of starch, starch products and glucose will end on 27 September.

'From that date,' the reply stated, 'imports on private account will be permitted under arrangements to be announced by the Board of Trade in due course. As from the same date the manufacture, distribution and sale of starch, starch products and glucose will be free of all restrictions. As a precautionary measure, however, the Starch and Dextrine (Control) Order, 1943, will not be revoked immediately after 27 September.'

Private imports from the sterling area, Western Europe and certain other countries (not including the dollar area or certain countries in Eastern Europe) of maize starch, potato starch (farina) and dextrine at present made on Ministry account, and of all starch preparations (including glucose) at present subject to global or specific individual licensing procedure, will be permitted on open general licence. For imports from other countries, individual applications will be considered in the light of the situation at the time.

Traders should not enter into commitments on the basis of these details until the announcement of the import licensing procedure by the Board of Trade in the form of a Notice to Importers.

The Ministry expects to have a moderate stock of maize starch on hand at the end of September. It should be sufficient to bridge any gap there may be in supplies during the early period of control.

Iron & Steel Output Up

Steel production in June, although affected by holidays, averaged 337,700 tons a week. This is the highest rate of output ever recorded in June and compares with 312,500 tons in June last year. Pig iron output was at the rate of 210,600 tons a week compared with 199,700 tons a week in June, 1952. The actual total output of steel in the first half of 1953 was 9,037,700 tons. This is the highest production in any half year and compares with 8,023,000 tons in the first half of 1952.

Pest Control Appeal

Minister Supports Company's Re-Development Scheme

THE Minister of Housing and Local Government has now considered the report of his inspector, Mr. A. D. Parham, assisted by Dr. L. E. Hockin, after the local inquiry into the appeal of Pest Control, Ltd., against the decisions of the Cambridgeshire County Council on applications for development at their chemical works at Harston and has now issued his decision.

The activities of the firm centred at Harston deal with research into and manufacture of chemicals for pest control. The works occupy about six acres of land on the eastern side of the Royston/London road, some four miles south of Cambridge.

The appeal related to four buildings—trade effluent laboratories, a new chemical works building, a second chemical works building to replace an existing unsuitable structure, and an ablutions block.

Permission for the first two of these buildings had been refused and for the last two permission had been granted for a period expiring on 28 February, 1961. In the course of the inquiry both parties to the appeals asked that in coming to a decision the Minister should take into account further proposals for development.

A scheme for this development consists of an administration block, extensions to the chemical and engineering stores, a drum filling establishment, and miscellaneous buildings including road works.

Haphazard Growth

Pest Control admitted during the hearing of the appeal that the haphazard growth of the works during and after the war had resulted in a factory ugly in appearance and below the standards which they would seek both for employees and neighbours. The plant was badly housed, the gaseous effluent known locally as the 'pest control smell' had tainted fruit and vegetables in neighbouring gardens, there had also been complaints about seepage of untreated effluent on to adjoining farm land, but all those disadvantages could be remedied by the improvements now requested by Pest Control, Ltd. They had been prosecuted and fined in 1950 for polluting the river, but had done a lot of research and pioneering work on new methods of effluent treatment. Novel ideas had been tried out in practice and their pilot plant had now worked for several years so satisfactorily that recently the Great Ouse River Board had consented to the discharge of trade effluent into the river subject to certain safeguards which the company had undertaken to provide.

Pest Control also admitted at the hearing in February that the site at Harston was unsuitable for the manufacture of heavy chemicals; they had considered the possibility of transferring the manufacturing units to another site, but contended that the cost (estimated at £1,000,000) would be prohibitive. They intended to restrict manufacture at Harston to specialised insecticides, fungicides and herbicides and experimental work. The number of workmen and of staff employed on chemical manufacture was not likely to exceed 300. Manufacturing units were being set up in Africa and this would take a considerable load off the Harston plant.

Principles Accepted

In giving his decision the Minister stated that he had carefully considered all the facts of the case and the representations made. He agreed with the Council that a rural area of this kind with no employment problem was, in general, not the right place for a substantial development of industry and if the proposals laid before him had been an entirely new development just starting he would have no hesitation in deciding that permission should be refused. The fact was, however, that the works were already established and the Minister accepted that it would be economically impracticable for them to be transferred to a more suitable area at this stage. On the other hand, he thought it would be wrong to allow unlimited expansion of the works and had therefore come to the conclusion that the proper course was to allow such building and other improvements for these purposes as might be required to give a more efficient layout, provide protection against nuisance and generally give the works a better appearance. He considered, however, that manufacturing and storage activities should be confined to the land lying to the east of the Cambridge road, and that the land to the

west of the road should be used solely for treatment and disposal of trade effluent, subject to suitable safeguards against seepage.

Accordingly, the Minister had decided to allow the four appeals and grant unconditional permission for the erection of the buildings in question in accordance with the plans submitted.

Dr. W. E. Ripper, the managing director of Pest Control, Ltd., said in an interview:

'I am glad to know the Minister's decision because it will enable us to give our hard-working workpeople and staff in the chemical works the facilities and amenities which they deserve and allow us to rebuild the factory in such a way as is appropriate to a scientific industry located close to Cambridge.

'With the help of the local authorities it will now be possible to plan the development of the company's activities in the Harston area in a manner which will have both immediate and long term benefits for Pest Control employees and our neighbours. I am relieved the matter is settled because it will enable us to finalise many decisions which have been held up pending a decision on this appeal, and it will also make investments in houses, etc., by our employees and by the company much more secure.'

Chromate Recovery

THE need for preventing stream pollution and the critical need for chromic acid have caused American industry to consider a variety of disposal methods. There is a demand for equipment to recover chromium-containing ions from baths employed for anodising aluminium, chromium plating, and copper stripping, in which processes chromic acid becomes contaminated with metallic cations.

One ion exchange method reported to be producing successful results in eliminating stream pollution and returning usable chromate to the treatment tank, utilises synthetic resins. The system incorporates a cation exchanger to remove metallic cations from the strong chromic acid anodising solution and an anion exchanger to recover chromate from dilute rinse solutions. Hydrogen ions are exchanged for metallic ions. The cycle is completed by using ion exchange resins for recovery of chromium ions.

The anodising bath is operated at a *p*H between 0.7 and 0.9 and 50 to 70 gr. per litre of chromic acid. A portion of the bath is withdrawn each day and passed through the bed of a high capacity cation exchanger. Aluminium and other metallic cations are removed from this portion and hydrogen cations are substituted. The resulting solution, having a very low *p*H, is returned and mixed with the remainder of the chrome bath, lowering the overall metallic content and *p*H.

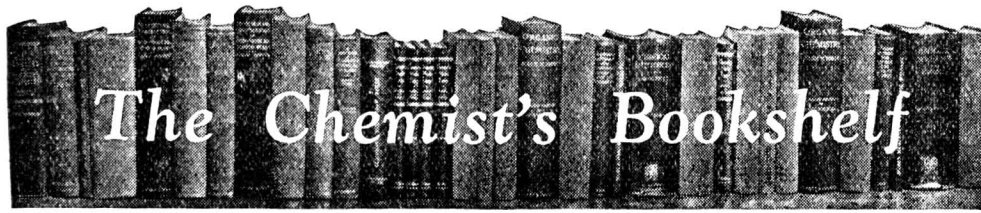
When the resin becomes exhausted, it is regenerated by contact with sulphuric acid. The effluent sulphuric acid, along with the metallic cations, is sent to waste. This acid is then washed from the unit with water. The chromic acid is displaced with water, and this results in some desirable dilution.

Method of Testing Firebrick

THE porosimetric method used for measuring the degree of cement clinker burning may also be used to measure the porosity of refractory brick. This method is claimed to be more accurate and to take considerably less time than the usual immersion method.

In the usual porosimetric test of firebrick, some of the brick slakes with water during boiling and some material chips off, making an accurate result difficult. In addition, the test usually requires about 5 to 6 hours. The new method requires only about 2 or 3 minutes. However, since the sample used is quite small, some allowance must be made for experimental error. This can readily be compensated for by additional data from repeated tests, especially since each test can be accomplished rapidly. A comparison was made of the porosities of refractory brick obtained by the usual immersion method and by the porosimetric method. Porosities differed by only 0.7 per cent.

The method uses a porosimeter. As the sample container approaches a vacuum, some walls of the closed voids in the firebrick were assumed to be broken by the high internal pressure due to the vacuum, and porosities obtained by porosimeter were somewhat greater than those obtained by the normal method. In actual fact, this assumption is not completely true; there are no completely insulated pores in firebrick. The procedure used is comparatively simple, and the porosity of the firebrick is calculated by means of an equation.



QUANTITATIVE ANALYSIS: ELEMENTARY PRINCIPLES AND PRACTICE. By Harvey Diehl and G. Frederick Smith. John Wiley and Sons, Inc., New York. Chapman and Hall, Ltd., London. 1952. Pp. vii + 539. Figs. 99. 40s.

One can hardly open this review better than by quoting from the third page of the book, where the authors say: 'The results (of the analysis) cannot be secured with a pencil, and no amount of talk is a substitute for the labour of a true analysis, skilfully and conscientiously carried out and honestly interpreted.' Success in analytical chemistry is, in other words, very much dependent on the possession of a copious fund of practical knowledge; and this practical knowledge, the tips and the wrinkles, may, and indeed does, differ from analytical chemist to analytical chemist. It is only to be expected that two workers of the international repute of the authors of this book should have at their finger tips an unequalled range of experience, and it is most acceptable that they should put the most valuable part of it at the disposal of the analytical chemist of the future (and, indeed, of the present). This book is eminently practical, and much incidental information of value, not already generally available in print, is here presented to the student.

Theory is not, however, neglected, and as much weight is laid on the interpretation of results as on the skilful attainment of these results. All the orthodox material which goes to make up a sound introductory course in inorganic quantitative analysis is included; but many additional features particularly commend themselves. Such are the sections on sampling, on problems involving specific gravity, on primary standards, on methods of effecting separations (including a discussion of the frequency with which elements are encountered in analytical work), and on errors and precision.

As one fortunate enough to have some acquaintance with one of the authors, the reviewer expected that the style of the book would be stimulating, an expectation amply justified. A student would require to be unduly unreceptive if he failed to respond to: 'Quantitative analysis has been called a bread-and-butter course. It has been likened to the grammar course in learning a language and to the practising of scales in learning the piano. It has been called an art, a science and a state of mind. It has also been called a variety of names not fit for print,' or to the sub-heading (to Primary Standards) 'Do not descend into a well on an old rope—*Turkish Proverb.*'

As might be expected, the uses of perchloric acid are fully presented, and this merely makes the reader regretful that a similar comprehensive treatment has not been accorded the other general-purpose reagents. The principal regret, however, is that the price of the book may put it outside the grasp of some students. Every student, and probably the large bulk of practising analysts, would benefit from a close study of it, although it is represented only as an elementary text. Anyone so studying the book might still fail to be a good analytical chemist; if he had pursued his study conscientiously and thoroughly he could never be a bad one.—CECIL L. WILSON.

SYNTHETIC ORGANIC CHEMISTRY. By R. B. Wagner and H. D. Zook. Chapman & Hall, Ltd., London. John Wiley & Sons, Inc., New York. 1953. Pp. xii + 887. 92s.

This book has been designed to summarise in a single volume the methods of organic syntheses that are most frequently used in the preparation of monofunctional and difunctional compounds. The methods available are arranged in chapters, each of which deals with the formation of compounds containing particular functional groups. Detailed comment has been avoided so as to present as wide a coverage of organic chemistry as possible, but very numerous references to the original literature and to other books and review articles

are included. These references have been selected so as to include the most useful examples of preparative procedures. Over a hundred tables are included which not only supplement the text in recording additional references and examples, but also serve as a handy index to the literature for the preparation of organic compounds of relatively simple constitution.

The particular types of compounds dealt with in the 39 chapters include the following: paraffinic, naphthenic, and aromatic hydrocarbons; olefinic compounds; acetylenic compounds; halides; hydroxy compounds; ethers and oxides; acetals and ketals; aldehydes; ketones; quinones, ketenes and ketene dimers; carboxylic dimers; carboxylic acids; carboxylic esters; lactones; ortho esters; acyl halides; anhydrides; amides, imides, hydrazides, hydroxamic acids and oxides; cyanides; imino esters and amidines; isocyanates; carbamates, semicarbizides; and ureas; amines, imines, hydrazines; oximes and nitroso compounds; nitro compounds; azo and azoxy compounds; mercaptans sulphides; disulphides; sulphoxides and sulphones; sulphinic acids; sulphonic acids; derivatives of sulphonic acids; thionalogues of some oxygenated compounds; and heterocyclic compounds.

The authors have arranged the information relating to the different methods and compounds in a clear and systematic manner so that particulars of the formation of a compound of the type listed above can be found with very little difficulty. Preparative organic chemists are likely to find this volume an invaluable work of reference.—G.S.E.

QUANTITATIVE ANORGANISCHE ANALYSE IN DER TECHNIK. By Franz Specht. Verlag Chemie Gmbh. Weinheim. 1953. Pp. 236. Figs. 56. DM17.80.

This book is not intended as a student's text, but is offered to the practising analyst as a working manual for the common analyses of industry. Consequently, no serious attempt had been made to present the theory of the methods chosen, and the aim is to give full working details for a wide variety of the more common problems of the industrial analyst.

The range covered is very wide, and the book will undoubtedly prove a valuable compendium of methods. Analysis of acids and alkalis, of the common commercial compounds of the alkali metals, of chlorines, of enamels, of miscellaneous residues, of common oxides, fluor spar and fluorides, and common gas analyses are all included. A chapter is devoted to the photometric determination of the more usual elements, and there is a useful section on the preparation and storage of standard solutions.

The book is clearly written and well illustrated, and should be found easy to read even by those with only moderate acquaintance with German. The methods appear to be chosen with a proper regard for reliability and ease of operation. Consequently the book should form a useful addition to the reference books immediately available in any general analytical laboratory.—C.L.W.

ELECTRIC RESISTANCE HEATING. British Electrical Development Association. London. 1953. Pp. 182 + xvi. 8s. 6d.

'There are few manufactured articles that do not involve the use of artificial heat: there are few heating processes where cleanliness and better temperature control do not produce a better article.' The epigraph to this volume is one with which no-one would disagree, and the contents therein should serve to convince them that electricity undoubtedly gives the cleanest and best-controlled heat. Profusely illustrated, the book shows and describes a large number of applications of electrical resistance heating in all branches of industry, and should prove very stimulating to anyone concerned with the production of heat in a factory or workshop.

In such a comprehensive survey, omissions are the more remarkable, and the very little space devoted to vacuum drying, and the total absence of any reference to Electrothermal rubber sheeting, are somewhat disconcerting. Nevertheless, this is a book to be recommended to those anxious to know all that electricity can do in industry.—B.I.

Government Zinc

The Ministry of Materials has announced that it intends selling the 64,000 tons of zinc remaining in its stocks at the rate of 2,000 tons a month after 31 July, when the Government broker ceased to operate. Sales will normally be made by the Ministry to the producers' agents and through other members of the London Metal Exchange.

• HOME •

Fellowship Granted

A fellowship of £500 a year for three years has been granted by Dunlop at Birmingham University for research work on biosynthesis with special reference to rubber.

Rise for Scientific Officers

The Institution of Professional Civil Servants announced last Saturday that its claim for 'career parity' with the administrative class of the Civil Service had been met by the Civil Service Arbitration Tribunal with an award which gives some salary increases, but without the parity claimed. The award, which takes effect from today (1 August), is: scientific officer, £400 rising to £750, with £525 on confirmation of appointment; senior scientific officer, £850 rising to £1,000; principal scientific officer, £1,000 rising to £1,375.

Changed Telephone Numbers

The telephone numbers of The Association of British Chemical Manufacturers have been changed to HYDe Park 4126/7 and HYDe Park 1557/8. This change also affects the following affiliated associations operated from 166 Piccadilly, London, W.1: Animal Medicine Manufacturers' Association, The Association of British Insecticide Manufacturers, The Association of British Sheep & Cattle Dip Manufacturers, British Barytes Producers' Association, The British Colour Makers' Association, The British Disinfectant Manufacturers' Association, Industrial Pest Control Association.

Improvement in Trade

Busier times for the chemical industry in the north-west are reported in a survey sent to the TUC by its North-Western Regional Advisory Committee. The report, compiled by union leaders, states that in the dyestuffs section of the heavy chemical industry a slight improvement in trade has followed in the wake of the revival in the cotton industry. 'So long as the cotton mills continue to be reasonably busy, there is hope that the dyestuffs section of the chemical industry will also keep turning over,' it says. Increased activity is also taking place in the drug and fine chemical section of the industry.

Copper, Lead and Zinc

The Order, 'The Copper, Lead and Zinc Distribution (Revocation) Order, 1953, (S.I. 1953 No. 1082), is now on sale at HM Stationery Office.

New Tinplate Works

A contract for the main civil engineering and contracting work in connection with the Steel Company of Wales' new tinplate works at Velindre has been awarded to Robert M. Douglas (Contractors), of Birmingham. The new works are expected to take about three years to complete.

Too Few Textile Exports

The Lancashire textile industry is having to rely too much on the home market, said Mr. Philip L. Wright, chairman of the Bleachers' Association, Ltd., at the annual meeting in Manchester recently. The industry is relying too little on export trade and until some headway can be made against this position there are no grounds for undue optimism, he declared.

Nationalisation Move

The report on public ownership prepared by the Economic Committee of the Trades Union Congress, by whom it was approved last week, differs from the Labour Party programme in insisting that the chemicals industry should be nationalised only if a Government inquiry establishes the need. As such an inquiry would only be carried out by a Labour Government, the TUC will make no plans for the industry until Labour comes into power.

£10,000 Compensation

Compensation of £10,000 has been paid to Mr. James Holden Clayton, formerly joint managing director of Hardman & Holden, Ltd., the Manchester chemical manufacturers, for loss of office. Mr. Clayton, who was with the firm for 21 years, and had been a director since 1936, is reported to have said he intends to buy a company of his own. He said on 16 July that he has retained his directorship of Murgatroyd's Salt and Chemicals Company, and his interests in other companies.

• OVERSEAS •

Puerto Rico Oil Refinery

The first oil refinery in Puerto Rico is to be built by the Caribbean Refining Company at a cost of about $10,000,000. The estimated daily capacity will be 10,000 barrels.

Metal Prices Freed in Australia

The Australian State Prices Ministers have decided to remove price controls from antimony, lead compounds, nickel, nickel compounds and non-ferrous alloys, except those containing a substantial portion of copper.

Canadian Paint Plant

British Paints, Limited, a subsidiary of British Paints (Holdings), has announced that it is negotiating with the General Products Manufacturing Corporation, of London, Ontario, for the acquisition of its Langmuir Paints Division at Oakville, Ontario.

Chilean Copper Trade

Freedom of trade is to be permitted for copper produced by small and medium mines in Chile. The copper committee of the Central Bank, which has been acting as sales agency for all Chilean copper, will now handle only the copper produced by the big mining companies.

Norwegian Aluminium

Norway's biggest aluminium plant, Ardal and Sunndal Verk, made a gross profit of £1,551,000 last year. Production at Ardal was 25,000 tons of raw aluminium and 30,000 tons of pig iron. Of the aluminium, 8,280 tons went to the Aluminium Union, Ltd., of Canada, in payment for oxide supplied by that company.

New Canadian Association

An organisation has been formed in Montreal to foster, 'in a manner consistent with the public interest,' the progress and development of industries in Canada which produce and distribute agricultural chemicals. Known as the Canadian Agricultural Chemicals Association, it already has a membership representing 14 firms. Others will be invited to join.

Australian Oil Refinery

A start has been made on the construction of the permanent jetty for the £A20,000,000 oil refinery which is being built at Kwinana, near Fremantle, Western Australia, for the Anglo-Iranian Oil Company.

Aluminium Plant in Manila

The Reynolds Metals Company, USA, is shortly to establish an aluminium plant in Manila at a cost of 3,000,000 pesos, according to a Philippines Government announcement. Initial production is expected to be about 8,500,000 lb. a year.

Rhodesian Asbestos

Asbestos production in Rhodesia in 1953 is likely to eclipse last year's record of 84,834 tons valued at £6,651,975 and production is assured for many years ahead as the main mines have large reserves and diamond drilling has proved that the ore bodies extend to much greater depths than had been anticipated.

New Australian Plant

A new £A5,500,000 plant erected at Rhodes for the C.S.R. Chemicals Proprietary Limited has been opened by Sir William Slim, the Governor-General of Australia. The company is a joint enterprise of the Colonial Sugar Refining Company and the Distillers Company, of England, and is pioneering the manufacture in Australia of a group of organic chemicals, the main product being cellulose acetate.

Aluminium Output at Kitimat

Production from the Kitimat, B.C., project of Aluminium Co. of Canada, Ltd., on the basis of initial capacity, has been sold ahead for the first four and a half to five years of its operation and it is possible that the initial producing capacity of the plant will be doubled to fill all sales contracts. Smelter units at Kitimat with an annual capacity of 83,000 metric tons are expected to be producing by the middle of 1954. Additional smelting capacity of approximately 180,000 tons a year will be possible and the project is designed for ultimate expansion to 500,000 tons a year.

• PERSONAL •

SIR CHARLES DARWIN, M.A., Sc.D., F.R.S., formerly Director of the National Physical Laboratory, has been elected to an Honorary Fellowship of Trinity College, Cambridge.

The Council of the Royal Society has made the following research appointments:

MR. P. J. BLACK, B.Sc., of Cambridge University, has been appointed to a Mr. and Mrs. John Jaffe Donation Studentship to carry out research on the structural studies of intermetallic compounds at the Crystallographic Laboratory, Cavendish Laboratory, Cambridge.

MR. J. R. CROSS, of University College, Swansea, has been appointed to a Mr. and Mrs. John Jaffe Donation Studentship to carry out research on the physical chemistry of cell processes at the Physical Chemistry Laboratory, University of Oxford.

DR. J. E. FALK, B.Sc., M.Sc., Ph.D., of University College Hospital Medical School, has been appointed a Foulerton Research Fellow to carry out research on the biochemical mechanisms involved in the production of porphyrins and haemoglobin by animal tissues at University College Hospital Medical School, London.

MRS. P. M HOLTEN, B.A., D.Phil., M.A. (nee Watson Williams), of the Physiological Laboratory, Cambridge University, has been appointed a Foulerton Research Fellow to carry out research on chemical transmission in the nervous system at the Physiological Laboratory, Cambridge University.

MR. A. E. LITHERLAND, B.Sc., of Liverpool University, has been appointed a Rutherford Memorial Scholar to carry out research on fast neutron spectroscopy at the Atomic Energy of Canada, Ltd., Chalk River, Canada. The financial provision for this scholarship is being made by the Atomic Energy of Canada, Ltd., with whose agreement the Council of the Royal Society has conferred on Mr. Litherland the title of Rutherford Memorial Scholar.

MR. B. J. ROBINSON, B.Sc., of Sydney University, has been appointed a Rutherford Memorial Scholar to carry out ionospheric research at the Cavendish Laboratory, Cambridge.

SIR HERBERT BUTCHER, M.P., has joined the board of directors of the Beecham Group.

The title of Reader in Physical Chemistry in the University of Nottingham has been conferred upon MR. D. O. JORDAN, Ph.D., D.Sc., F.R.I.C. MR. W. C. TAYLOR, M.Sc., has been elected to a research fellowship in chemistry.

SIR JOHNSTONE WRIGHT and MR. W. C. HANDLEY have resigned their directorships of Thomas Bolton & Sons, copper refiners and smelters. MR. G. J. POOLE, Mr. Handley's alternate, has been appointed to the board of the company.

Among members of the newly-appointed London advisory committee of the Scottish Council (Development and Industry) are MR. R. S. CUMMING, director of The Distillers' Company; SIR ALEXANDER M'COLL, director of the Vacuum Oil Company, Ltd.; MR. ANGUS MORRISON, Powell-Duffryn Carbon Products, Ltd.; and MR. JOHN ROGERS, late chairman of I.C.I.

MR. ERIC R. THOMAS was married on 18 July to MISS JOYCE HULATT. Mr. Thomas is the managing director of Elcontrol, Ltd., who are pioneering in the manufacture of industrial electronic controls, and was for some years before the war, manager of the dealer publicity department of Murphy Radio. Miss Hulatt is a well-known Fleet Street personality, having been secretary to Walton A. Cole, editor of *Reuters*, for the past eleven years.

The directors of The Brush Electrical Engineering Co., Ltd., have agreed at the request of Simms Motor Units, Ltd., to release MR. JOHN AYRES, at present managing director of Petters, Ltd., Staines, from his service agreements with the Brush Group, to enable him to take up the appointment of general manager and director of Simms Motor Units, Ltd., on 1 October. CAPTAIN R. C. PETTER will as from that date be appointed managing director of Petters, Ltd. Captain Petter, who is a member of

the Brush board, has agreed to assume these responsibilities on a temporary basis until it is possible for the board to make a permanent appointment.

MR. D. J. BIRD, a director of Fisons Limited, has been elected vice-chairman of the company. MR. G. V. K. BURTON has been elected a director. Mr. Bird has been a director of Fisons since 1929. Mr. Burton, who is 37, has been with the company since 1934 and at present holds the position of sales controller in the fertiliser division.

Obituary

MR. JAMES J. FRASER, managing director of Honeywell-Brown Limited, died at his home on Friday, 17 July, aged 51. Born at Grantown-on-Spey in Scotland, Mr. Fraser graduated from Edinburgh, and spent a number of his early years in West Africa. In 1928 he joined the Minneapolis - Honeywell organisation in Canada, where he became manager of the Montreal office. When, in 1936, a decision was taken to form the British company of Honeywell-Brown Limited, Mr. Fraser was chosen for this work. As managing director since its inception, he has been directly responsible for its growth and development over the years.

J. J. Fraser

During the war period, Mr. Fraser concerned himself particularly with navigational instruments for the RAF and USAF. His energy, ability and foresight in this field were of inestimable value to the country at a time when such service was needed as never before.

Mr. Fraser's hobbies were diverse. His literary skill was such that he had several articles and stories published. He was a bridge enthusiast and a keen sportsman, being particularly notable as a tennis player.

His untimely death will be regretted by many—both in industry and among those who met him through the pursuit of his widespread interests.

MR. J. T. NANCE, former Mayor of Bebington, Cheshire, and lecturer in organic chemistry at Liverpool University until he retired several years ago, collapsed and died while driving his car on 24 July. He was 72. His home was at Benty Heath Lane, Willaston, Wirral.

The death has occurred at Oxford of DR. GEORGE LESLIE KELLEY, aged 72. A well-known metallurgist, he was an authority on the manipulation and uses of steel. He had been vice-chairman of the Pressed Steel Company since 1948 and was formerly managing director and scientific adviser.

Canadian Sulphur

ALTHOUGH at present only a third of the total demand for sulphur in Canada is met from home production, it is expected that by 1955 the proportion will have risen to 60 per cent, despite an expected increase of 20 per cent in demand during the next two years.

This conclusion is reached in a recent bulletin issued by the Department of Defence Production, which includes a survey showing that total Canadian production of sulphur in all forms is expected to rise to nearly 570,000 long tons this year, 610,000 tons next year, and 628,000 in 1955. This will be close to the level of estimated total Canadian consumption — 629,000 tons this year, 648,000 tons next year and 664,000 tons in 1955.

In the past exports have absorbed up to 80 per cent of Canadian output in the form of sulphur-bearing ores, such as pyrites and zinc blends, because of lack of extraction facilities in this country. This year, Canadian processing and use of sulphur from pyrites is expected to rise from the 1952 figure of 30,000 to nearly 80,000 tons and up to 152,000 tons by 1955. This year is also expected to bring an increase of over 40,000 tons in extraction of sulphuric acid and sulphuric dioxide from smelter gases, in particular by Canadian Industries, Ltd., at Copper Cliff, Ontario.

Altogether, the production of Canadian sulphur to meet Canadian needs is expected to rise from about 200,000 tons last year to nearly 384,000 tons by 1955, with a parallel drop in imports. This will be of particular importance to the pulp and paper industry, which uses approximately half of all Canadian consumption

Publications & Announcements

AVAILABLE only from USA sources, scientific and technical books and journals required by the Department of Scientific and Industrial Research and 13 British research associations in their every-day work are to be purchased for them as a result of $13,000 being allocated for the purpose by the Mutual Security Agency under its Technical Assistance Programme, it has been announced. The research associations which will benefit in this way are as follows: British Cast Iron Research Association, British Coal Utilisation Research Association, British Electrical and Allied Industries Feltmakers' Research Association, British Research Association, British Hat and Allied Food Manufacturing Industries Research Association, British Hydromechanics Research Association, British Jute Trade Research Association, Printing, Packaging and Allied Trade Research Association, British Rayon Research Association, British Scientific Instrument Research Association, British Welding Research Association, British Whiting Federation Research Council and Production Engineering Research Association.

* * *

A NEW high-voltage relay is announced by Electro Methods, Ltd. It is a two pole change-over relay designed primarily for aerial switching, but since a very high degree of insulation has been achieved, it will have many other applications. By using a new insulation material and wide spacing contacts, very high figures for breakdown voltage have been attained.

* * *

'CHEMOTHERAPY in the Treatment of Tuberculosis' is the theme of a postgraduate course organised by the Tuberculosis Educational Institute, to be held at Cambridge from 1-4 September. Details may be obtained from the TEI, Tavistock House North, Tavistock Square, London, W.C.1.

* * *

SIR Geoffrey Heyworth's speech on 'Synthetic Detergents,' delivered at the annual general meeting of Unilever Ltd. (CHEMICAL AGE, **68**, 931) has now been printed for private circulation. Copies are obtainable from Unilever House, Blackfriars, London, E.C.4.

ORIGINALLY the Sulphur Exploration Syndicate Quarterly Bulletin was intended for Syndicate members only, but as no other publication gives a collated world-wide review of the sulphur situation it has been decided to make the Bulletin available by private circulation on a subscription basis. The Syndicate—whose address is 35 Portland Place, London, W.1—was formed in 1951 by the leading sulphur consumers in the UK for the purpose of carrying out a world survey of elemental sulphur. Investigations in a number of countries have yielded a wealth of first-hand information and further personal contacts provide the Syndicate with continuous up-to-date news of developments in the industry. Further information regarding the bulletin is obtainable from Major General G. E. Wildman-Lushington at the address given.

* * *

THE water-repellant silicone rubber product recently introduced by Midland Silicones Limited, 19 Upper Brook Street, London, W.1, under the designation of Silastomer 131, has had its name changed to Drisil 131. It has been specially developed for application to textiles and is fully described in Silicone Notes D 9. Other Drisil water-repellant products are described in Silicone Notes D 4 (Drisil 104 and 115 for shower-proofing textiles), D 6 (Drisil 29 for treatment of masonry) and D 13 (Drisil 1109 for leather treatment).

* * *

IT frequently happens that the design efficiency of many industrial plants is attainable only by close control of a number of variable factors, of which, for instance, the supply pressure of steam for heating or of fuel to burner equipment is of considerable importance. For precise control the more costly pilot-operated regulator is often the only solution, but the Fisher Governor Company Ltd., Century Works, Lewisham, London, S.E.13, is now offering an inexpensive pilot-operated regulator—the 'Wizard.' Of simple but robust construction, this provides accurate control of vacuum or pressure of all fluids and gases up to 5,000 psi. A full description of the 'Wizard' controllers is given in Publication D4-GB, now obtainable from the company.

ALTHOUGH great strides have been made in the field of oil-engine design, there has not been the same progress in developing ancillary equipment, particularly with regard to cooling facilities. An article on this subject, entitled 'Modern Trends in Diesel Engine Cooling,' appeared earlier this year in '*The Oil Engine and Gas Turbine*' and aroused considerable interest. The joint authors are Martin E. O'K. Trowbridge and Dr. A. J. Hayter, of Head Wrightson Processes Limited, Teesdale House, Baltic Street, London, E.C.1, from whom reprints are now obtainable free of charge.

* * *

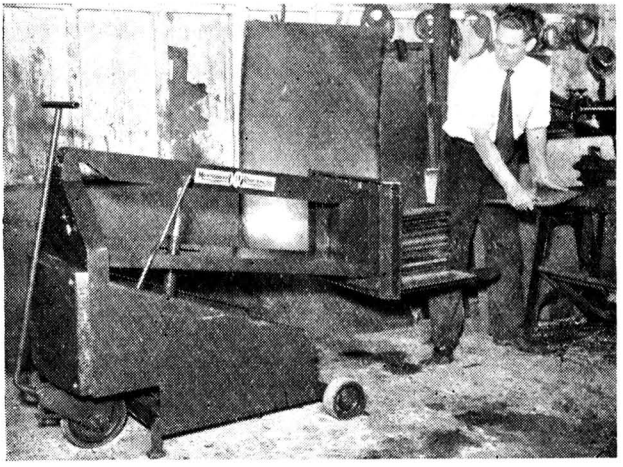
THE Sir Jesse Boot Foundation Lecture was instituted at the University of Nottingham in 1922 to commemorate the benefactions of the first Baron Trent to University College and, in particular his foundation and endowment of the Sir Jesse Boot Chair of Chemistry. The lecture is delivered annually on some aspect of chemistry bearing on the life of the community or the industries of Nottingham. Copies of this year's lecture, 'Plant Products and Their Utilisation,' by Sir John L. Simonsen, are now obtainable from The Registrar, The University, University Park, Nottingham.

* * *

PUBLICATION CH 195/22, issued by Hilger & Watts Limited, Hilger Division, 98 St Pancras Way, Camden Road, London, N.W.1, gives a detailed list of their current catalogues, any of which will be sent post free on application, as follows: — General Catalogue Matter; Spectroscopic and Spectrographic Apparatus; X-ray Diffraction Apparatus; Spectrophotometric, Fluorimetric and Absorptiometric Apparatus; Apparatus for Colour Measurement and Surface Appearance Polarimetric and Refractometric Apparatus; Interferometric Apparatus; Apparatus for Engineering Research and Control; Apparatus Used in the Glass Industries; and Miscellaneous Apparatus and Books.

* * *

THE M.R. Wheelabout Loader has been designed to lift and move weights up to half a ton in confined spaces. It is hydraulic in operation—either manual or power—the systems consisting of the usual cylinder piston and ram, with pump and fluid tank. The pump can be operated alternatively by hand or power, the latter consisting of a 12-volt starting battery driving a small motor. General construction of the loader is of welded steel, with counter balance at the back end. The only maintenance required is for seven greasers, and topping up the battery and fluid tank. When a load is being moved it should be within 2 in. or 3 in. off the ground. When the loader is stationary, a braking mechanism attached to the handle is in operation. Adjustable forks, platform, ram or other attachments are available. The loader is manufactured by Mongomerie Reid Engineering Company, Ltd., Bramley, Hants, and is distributed throughout the UK by The Western Hire Company, Ltd., 17 Central Chambers, Ealing Broadway, W.5.



An operative in a small shop cutting and loading sheet steel on to an M.R. Wheelabout Loader. It will be noted that the forks have been raised to facilitate ease of loading. Other points of interest that can be seen are the press button for power operation; the release valve in the main body of the loader; the pump handle for manual operation; and the steering arm in the up position, thus applying the brake

Law & Company News

Commercial Intelligence

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

Mortgages & Charges

(Note.—The Companies Consolidation Act of 1908 provides that every Mortgage or Charge, as described herein, 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 or 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.)

LANCASHIRE TAR DISTILLERS, LTD., Manchester. (M., 1/8/53.) 26 June, charge supplemental to a Trust Deed dated 5 January, 1951; charged on property, comprised in an underlease and situate between James Street, Vickers Street and Varley Street, Manchester. £325,373. 5 January, 1953.

MORRIS & RUSSELL, LTD., London, S.E., chemists. (M., 1/8/53.) 26 June, £1,322 3s. 9d. charge, to Mrs. E. L. Wood, Blackwood; charged on lease, goodwill, fixtures and fittings on chemist's business at 53 Rosemary Road, Peckham, and all books and other debts due or to become due or owing to the company.

R. A. CLEMENTS (LONDON), LTD., chemical manufacturers. (M., 1/8/53.) 26 June, £750 charge, to Mrs. S. James, London; charged on 10 Circencester Street, Paddington. £2,227. 5 May, 1950.

SOUTHERN INSTRUMENTS, LTD., Camberley, scientific instrument manufacturers, etc. (M., 1/8/53.) 29 June, mortgage (supplemental to a debenture dated 22 December, 1948), to Industrial & Commercial Finance Corporation, Ltd., securing all moneys and liabilities due or to become due from the company to the mortgagee; charged on land at Frimley with buildings thereon, fixed plant, etc., and a general charge (subject to, etc.). £10,333. 14 August, 1951.

Satisfactions

ANGLO-IRANIAN OIL CO., LTD. (formerly Anglo-Persian Oil Co., Ltd.), London, E.C. (S., 1/8/53.) Satisfaction 1 July, of Trust Deed registered 14 March, 1924.

CANON (EXPORT), LTD., London, W., manufacturers of domestic chemicals and appliances. (S., 1/8/53.) Satisfaction 2 July, of debenture registered 20 October, 1952.

FINE DYESTUFFS & CHEMICALS, LTD., Manchester. (S., 1/8/53.) Satisfaction 1 July, of mortgage registered 14 August, 1947 (fully).

NEWTON WRIGHT (ILFORD), LTD., London, E.C. (S., 1/8/53.) Satisfaction 30 June, of debentures registered 27 February, 1948, and 9 November, 1951.

Changes of Name

The following changes of name have been announced:—Jenolizing Co. of Canada, to Jenolizing Company, Ltd., on 4 July, 1953. Structural & Mechanical Development Engineers, Ltd., 2 Buckingham Avenue, Slough, Bucks, to S.M.D. Engineers, Ltd. S.M.D. Engineers, Ltd., is the construction company of the Almin Group (parent company, Almin Ltd., Farnham Royal, Bucks).

Company News

British Match Corporation

Although group net profits of the British Match Corporation for the year ended 31 March last were £309,378 less than for the previous year, the total being £715,111, the ordinary dividend is maintained at 9 per cent, less tax, the final dividend being 5½ per cent plus a bonus of 1 per cent. The group proportion of exchange adjustments arising from the conversion to sterling (for purposes of the consolidated accounts) of the currency net assets of overseas subsidiaries resulted in a loss of £392,491, which has been provided out of the exchange adjustment account.

Murex Ltd.

Although group profit for the year ended 30 April was £266,000 less than that for the previous year—£393,000, subject to audit, as compared with £659,000—Murex Ltd. are paying a final dividend of 9 per cent, bringing the total up to 15 per cent for the year, which is the same as last year. This year, however, the final dividend is payable on a total of £2,200,000 ordinary capital as increased by a rights' issue of 200,000 new £1 shares at 48s. per share. The 6 per cent interim dividend was paid on the old capital of £2,000,000. Tax of £311,000 compares with £948,000 for the previous year.

Coalite & Chemical Products Ltd.

Reference to the progress made in the development of smokeless zones outside London was made at the recent annual meeting of Coalite and Chemical Products Limited by Commander Colin Buist, who presided. He said 13 cities and towns now had powers to establish such zones, for which the company would make available the maximum quantity of 'Coalite.' Demand for the company's chemical products had been well maintained and the company retained the leadership, home and abroad, in knowledge relating to liquids and chemicals when coal was carbonised at low temperatures. Output was maintained at the maximum throughout the year. Net profits of the group for the year totalled £152,827, compared with £265,552 for the previous year. The final dividend was 5 per cent, making a total of 8 per cent with the interim dividend.

The Fullers' Earth Union Ltd.

Substantial reserves of Fullers' earth, even to cover expected extension of the sales tonnage over many years to come, were mentioned by Mr. L. P. O'Brien, chairman of the Fullers' Earth Union Limited, at the recent annual meeting. The proposal to build an entirely new works on the North Lincolnshire coast had been abandoned, he said, because of the scaling down of estimated future demands for activated earth for oil refining. Instead, the activating works in Surrey were being extended and the more modest production programme should be in operation before the end of the present financial year at considerably less cost than expected. A final dividend of 10½ per cent was declared, making 12½ per cent for the year—1¼ per cent more than the previous year.

The Distillers Co. Ltd.

The directors of The Distillers Co., Ltd., in their report for the year ended 31 March 1953, recommend payment of a final dividend of seven and one-fifth pence per share less Income Tax (last year, same rate) making ten and four-fifths pence for the year (same). An interim dividend has been paid on the Ordinary Shares of three and three-fifths pence per share less Income Tax. The profit for the company and its subsidiary companies, after writing down stocks as found necessary during the year by £1,970,016, was £13,205,539 and compares with the exceptional figure of last year of £21,265,450, and with £17,934,520 for the previous year. While all sections of the group shared in the fall in profits, in particular the Chemical Section felt most keenly the severe economic changes experienced by industry generally in the past year. A general improvement in the Chemical Section both as regards output and profit margins has since been experienced, but it is too early yet to be sure that this will be maintained or extended throughout the current year.

Market Reports

LONDON.—There has been a steady call for most of the routine industrial chemicals, but with the holiday season now in full swing the volume of strictly new business is small. A fair export trade is passing at keen rates.

The price position is very steady, with no important changes on the week. The Nitrate Corporation of Chile Limited has announced lower prices for the 1953/54 fertiliser year for agricultural nitrate of soda and nitrate potash.

Trade in the coal tar products has shown no special feature and supplies are adequate to meet current requirements with the possible exception of toluole, which is reported to be in short supply.

MANCHESTER.—Values have been mainly firm on the Manchester chemical market during the past week and few changes of any consequence have to be recorded compared with last report. Holidays continue to leave their mark both on the volume of contract deliveries and on new business, but in spite of this seasonal influence fair activity on home-trade account, especially in the textile chemicals, has been experienced. On the export side, also, a fair movement of supplies has been reported. In the fertiliser section the nitrogenous materials have met with some inquiry, the compounds have been in fair demand and a steady trade is being done in basic slag and agricultural lime.

GLASGOW.—The Glasgow Fair holidays are having the usual unsettling effect on business at the present time and the approaching Paisley Fair holidays are also having an adverse effect which is only to be expected.

CLASSIFIED ADVERTISEMENTS

EDUCATIONAL

A.M.I.Chem.E. More than half of successful candidates since 1944 have been trained by T.I.G.B. All seeking quick promotion and higher pay in the Chemical and Allied Industries should send for T.I.G.B. prospectus, 100 pages of expert advice, details of guaranteed Home Study Courses for A.M.I.Chem.E., B.Sc.(Eng.), A.M.I.Mech.E., A.M.I.Prod.E., C. & G., etc., and wide range of Diploma Courses in most branches of Engineering. Send for your copy today. **FREE. T.I.G.B., DEPT. 84, 46a, NORTH ROW, LONDON, W.1.**

SITUATIONS VACANT

***The engagement of persons answering these advertisements must be made through a Local Office of the Ministry of Labour or a Scheduled Employment Agency if the applicant is a man aged* 18-64 *inclusive, or a woman aged* 18-59 *inclusive, unless he or she, or the employment, is excepted from the provisions of the Notifications of Vacancies Order,* 1952.**

CABOT CARBON LIMITED have a vacancy for **CHEMICAL ENGINEER,** who will be actively engaged on technical problems associated with the factory, improvement in unit processes and pilot plant investigations.

The applicant must possess a good Honours Degree in Chemical Engineering, together with some experience in industry.

A salary of not less than £700 per annum is offered for the post, but will depend to a large extent on qualifications and experience.

Applications should be addressed to **THE WORKS MANAGER, CABOT CARBON LIMITED, STANLOW, ELLESMERE PORT,** stating age, education, qualifications and experience.

CHEMICAL ENGINEER required for industrial instrument manufacturers. Some sales experience preferred and willingness to travel essential. Salary, £600-£700 per annum plus allowances. Interesting job, with good prospects. Apply to **BOX No. C.A. 3240, THE CHEMICAL AGE, 154, FLEET STREET, LONDON, E.C.4.**

CHEMIST (graduate or equivalent) required by cellulose film manufacturers. Experience essential in the development of synthetic resins, adhesives or printing inks used in this particular industry. Salary in accordance with experience and qualifications, and assistance towards housing, if necessary, after a probationary period. Details to **SECRETARY, TRANSPARENT PAPER, LIMITED, BRIDGE HALL MILLS, BURY,** marked "CHEMIST."

CIBA LABORATORIES, LIMITED, GRIMSBY, have a vacancy with good prospects of increasing responsibility for a **CHEMICAL ENGINEER.** Applicants should have had not less than three years' experience in a chemical works. Good salary and generous Contributory Pension Scheme. Applicants should give full details of education, qualifications, industrial experience, and be addressed to **THE CHIEF ENGINEER.**

EMULSION CHEMIST. Experienced with vinyl emulsion an advantage. Excellent opportunity. High salary rate. Full particulars in confidence to **BOX No. C.A. 3239, THE CHEMICAL AGE, 154, FLEET STREET, LONDON, E.C.4.**

SITUATIONS VACANT

DRAUGHTSMAN. Excellent opportunity with leading Chemical Company in Cumberland for Draughtsmen experienced in Chemical Engineering and Solid Material Handling. Housing facilities may be available to suitable candidates. Please state educational background, experience, age and salary expected, in your reply, which will be treated in confidence. **BOX NO. C.A. 3242, THE CHEMICAL AGE, 154, FLEET STREET, LONDON, E.C.4.**

TRANSPARENT PAPER LIMITED, Bridge Hall Mills, Bury, have vacancies for Graduate Chemists who have experience in the application of synthetic resins, adhesives and printing inks for use on all classes of regenerated cellulose film. These posts are essentially for men between 28 and 35 who have energy, initiative and experience of development works. Salary will be in accordance with experience and qualifications. Applications in writing, addressed to the **PERSONNEL OFFICER,** envelopes endorsed **CHEMIST.**

FOR SALE

C. BARBER, LTD.

BOILING PAN, C.I., jacketed, 150 galls.
BOILING PAN, 30 galls., copper with C.I. jacket, arranged for hand tilting.
Three Welded Horizontal Cylindrical, 500 gall. **STORAGE TANKS,** double compartment.
FILTER PRESS, flush plate and distance frame type, by "Johnson," cake size 29 in. square by 1 in. thick; 40 plates and 41 frames.
FILTER PRESS, recessed plate type by "Johnson," cake thickness 1 in.; 24 plates, each 24 in. square.
STORAGE BINS in stainless steel cylindrical with covers, 40/20/14/10 galls. capacity.
Cannon Steam jacketed enamel lined **PANS,** 10 and 25 galls. All new and unused.
Doulton 25 gall. **COPPERS** with lids. New and unused.
Several new and unused double trough type steam jacketed **MIXERS,** Fitted twin contra-rotating Z blades. Arranged for hand tilting and suitable wet or dry mixing. Capacity 25 galls.

C. BARBER LTD.
SILVERDALE GARDENS
HAYES MIDDLESEX
Telephone—Hayes 2735/6

CHARCOAL, ANIMAL AND VEGETABLE horticultural, burning, filtering, disinfecting, medicinal, insulating; also lumps ground and granulated; established 1830; contractors to H.M. Government.—**THOS. HILL-JONES, LTD., "INVICTA" MILLS, BOW COMMON LANE, LONDON, E. TELEGRAMS: "HILL-JONES, BOCHURCH LONDON." TELEPHONE 3285 EAST.**

DELAFILA, THE INERT FILLER. Used in the manufacture of Fertilisers. Insecticides, Paints, Plastics and Insulating and Sealing Compounds. Prompt supplies in a wide range of fineness grades. **THE DELABOLE SLATE CO., LTD., DELABOLE, CORNWALL.**

IT is impossible not to like the **JENCON'S ALL-GLASS PRECISION BEARING LABORATORY STIRRER.** Inexpensive too. **JENCON'S, ACTON, LONDON,** for leaflet.

FOR SALE

3 JACKETED INCORPORATORS, double " Z " arms double geared, power-driven tipping motion, with counterbalancing weights.

—Baker Perkins and Werner Jacketed **MIXERS,** screw tipping pattern, friction pulley drive, single geared, with double-fin type agitators.

4—Gardner **RAPID SIFTER MIXERS** and **MIXERS** only, various sizes, one with brass fitted interior and glass-lined end plates.

27—Various **POWDER DRESSING** or **SIFTING MACHINES,** totally enclosed, with barrels from 80 in., long by 22 in. diam. to 120 in. long by 30 in. diam., belt driven with collecting worm in hopper bottoms.

4—Recessed Plate **FILTER PRESSES,** 30 in. square 70 plates in each, centre fed.

4—Johnson **FILTER PRESSES,** 24 in. square, side feed and enclosed delivery, fitted 29 plates and 30 frames.

1—Johnson **FILTER PRESS,** 36 in. square, plate and frame type, double inlet and enclosed delivery ports.

Johnson Oil **FILTER PRESS,** Premier type, plates 2 ft. 8 in. by 2 ft. 8 in., of which there are 45, with angle lever closing gear.

1—Johnson **FILTER PRESS,** 42 cast-iron plates, 32 in. square, centre feed.

Steam-heated **FILTER PRESS,** Premier type, 32 in. square, with 30 recessed plates

1—Johnson **FILTER PRESS,** 46 plates, 32 in. square, centre feed, bottom corner open delivery.

Wood **FILTER PRESS,** fitted 69 ribbed plates, 2 ft. 8 in. square, with top centre feed and bottom enclosed delivery channel.

1—24 in. and 1—30 in. **HYDRO EXTRACTOR,** self-balancing, swan-neck type, self-emptying bottom, belt driven.

1—30 in. and 2—36 in. Ditto with enclosed motors, 400 volts, 3-phase, 50 cycles.

Heavy Cake **CRUSHING MILL,** 2-pair high, by Nicholson, for cake up to 3 in. thick, rolls 30 in long, top with coarse teeth 9 in. diam., bottom, with finer teeth 12 in. diam..

5—sets A.A. **CRUSHING ROLLS** for linseed, cottonseed, etc., 48 in. long, belt driven, with feed hopper, side frames, baseplate and striking gear.

Bennett Copper-built **EVAPORATOR,** 4 ft. diam. by 4 ft. 6 in. high, steam-jacketed bottom, mounted on legs, with swan-neck vapour pipe and separate vertical belt-driven vacuum pump.

Douglas **ROTARY PUMP** for oil, soap, etc., belt driven.

6—various Horizontal Duplex **STEAM PUMPS,** Worthington and Tangye pattern, 1 in. to 2½ in. suction and delivery.

" U "-shaped Horizontal **MIXER,** 7 ft. long, 3 ft. wide, 3 ft. 3 in. deep, belt and gear driven, end outlet, square horizontal centre shaft with cast radial type mixing arms, last used for linoleum paste.

4—5-roll **REFINERS,** fitted chilled iron, water-cooled rolls, 40 in. long, 16 in. diam., belt and gear driven with clutch drive suitable for motor, by Baker Perkins, Ltd.

No. 1 and No. 3 Size **MIRACLE MILLS** with fans and cyclones.

7 ft. Torrance Positive-driven **EDGE RUNNER,** 2 vertical Paint Pug Mills, 2-bar Disc Paint Grinding Mills, and 2 Horizontal 40-gallon capacity Cox Pug Mills for paint.

1—No. 1A Water-cooled **CIRCULATOR MILL.**

1—4½ Christy & Norris **DISINTEGRATOR** with 60 h.p. A.C. motor and starter.

RICHARD SIZER, LTD.,
ENGINEERS,
HULL.
Telephone 31743.

FOR SALE

600

PROCESS PLANT

THREE Steam-heated **WATER STILLS** by Manesty, type 4. Capacity, 50 g.p.h. each. Steam consumption, 667 lb./hr. at 20/45 lb. sq. in. 450 gal. cooling water required per hour.

SOLVENT RECOVERY PLANT by British Carbo Union, comprising 2 horizontal carbon-charged M.S. absorbers each 6 ft. diam. by 3 ft. with 18 in. bolted manhole, four 8 in. diam. inspection covers. brass tube condensers, separator and distillate collection tank, 20 in. input fan and all connecting pipework. Recovery rate for naphtha, 10 gal. per hour.

Scott Triple-effect **EVAPORATOR** unit, comprising three pans each 4 ft. 7 in. diam. by 13 ft. deep on straight with calandriad of 300 M.S. tubes 2 in. diam. by five 4 in. diam. tubes, 6 ft. long between tube plates; one vertical M.S. condenser 3 ft. 9 in. diam. by 11 ft. deep, with 250 M.S. tubes 2 in. diam. by 9 ft.; one horizontal steam-driven wet vacuum pump. Including pipework, valves, thermometers, etc.

Two Single-effect **VERTICAL EVAPORATORS** by Worthington Simpson. Output of each, 50 tons fresh water per 24 hrs. Twelve internal steam coils coupled to cast steam and drain headers. Test pressures: Steam and drain headers, 200 lb./sq. in.; body and dome, 60 lb./sq. in. Overall height, 12 ft. Weight, approx. 5½ tons.

Gas-fired **OVEN** by Bertram Thomas. Internal dimensions 3 ft. wide by 3 ft. 3 in. high by 2 ft. 6 in., with removable framework for trays. Two burners fitted governor and Spersom regulator. Double swing doors.

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