

COAL UTILISATION RESEARCH IN GREAT BRITAIN

ON December 12, Mr. R. W. Foot gave the presidential address to the British Coal Utilisation Research Association, his last before the vesting date of the nationalization of the coal industry in Great Britain. This Association worked for eight years under the control of the Mining Association, which had contributed for maintenance during this period more than eight million pounds. The Mining Association had envisaged the development of a permanent institution, more particularly since the possibility of nationalization of the coal industry was recognized. In that event it was hoped that the National Coal Board would agree to take over the activities of the Association. In anticipation, and in order to prevent the slackening which might arise during a period of uncertainty as to the future, the Mining Association continued its financial support without reservation until the vesting day, January 1, 1947. The National Coal Board has accepted the principle mentioned, and on that day stepped into the shoes of the Mining Association so far as the British Coal Utilisation Research Association is concerned, and was able to find the organisation in a state of full activity.

During its existence, most of which had been during a period of war, the Association concentrated on certain major operations of coal utilization. Mr. Foot, referring to the last three years, mentioned in particular the work of Mr. J. S. Hales on domestic coal-burning appliances—a subject touching almost every householder—and described it as a 'landmark' in space heating. So far as Great Britain is concerned, there is some justification for the term. In countries where colder conditions are common, people appreciate the advantages of dispersing available heat throughout their dwellings; in Britain, practice has led to the localization of warmth and its insulation from the rest. Efforts to cope with the effects have of necessity tended to be improvisations. The work of the British Coal Utilisation Research Association has shown how, by more rational design of domestic grates, the effective use of coal heat can be increased, and at the same time can be more widely dispersed through a dwelling. Such principles can be applied generally, and already appliances have been designed whereby a single unit fed by smokeless fuel can be made to serve a whole house. This may lead to a radical change in household practice.

On the industrial side, the use of coal in the generation of steam is the largest outlet, and was given pride of place. Priority was given to the so-called 'shell' boilers—the smaller fire-tube units in common use. Although everywhere in use, it was believed that familiarity had led to neglect in some respects; it was thought that carefully conducted research with modern resources would promote improvements in design and increases in efficiency. The work of a section of the Association under Dr. E. G. Ritchie has confirmed these anticipations. The larger water-tube boilers have been developed under more scientific conditions, mainly stimulated by the needs of electrical industry. In modern practice these encounter extremely severe conditions of operation. It has become a major problem to keep such plant in continuous service, owing to the destructive action of acid and other inorganic materials present in the products of combustion. The work of the Association has already made

contributions to improve the 'availability' for service of large steam generators.

Mr. Foot referred to the 'down-jet furnaces', which arose from work done, during the War, on gas producers. It has led to the construction of a furnace, no bigger than a filing cabinet, but capable of producing per hour 200 lb. of steam at 200 lb. pressure. It is thought that such a furnace may enable solid fuels to be used to operate gas turbines.

The Association prosecutes a considerable range of more fundamental scientific work under the direction of Dr. D. H. Bangham. For all these branches there is now a staff of three hundred of all grades, under the control of the director, Dr. D. T. A. Townend. To provide for the necessary accommodation of all kinds, the Association is carrying out at Leatherhead a very extensive programme of building and equipment. It is planned to cope effectively with the great problems of coal utilization which the future promises to bring.

H. J. HODSMAN

CHEMOTHERAPY

THE Linacre Lecture, 1946, delivered by Sir Alexander Fleming, on "Chemotherapy, Yesterday, Today and Tomorrow" (Cambridge University Press, 1946. 2s.), has now been published. Opening his lecture with the warning that the title chosen was too ambitious and would require a series of lectures, Sir Alexander limited his remarks to chemotherapy of which he has had first-hand knowledge. He refuses to confine the meaning of the term 'chemotherapy' to the administration of chemical substances by way of the blood; he extends it to include any form of treatment which enables a chemical substance to exert directly an injurious effect upon bacteria. This definition includes antiseptic treatment, two cardinal principles of which are the avoidance of chemical substances which are too toxic to the host or to the tissues, and the effective diffusion of the therapeutic agent into the infected tissues. Discussing the antiseptic methods of Lister and the practice of asepsis which followed them, Sir Alexander demonstrates, by reference to experience gained during the First World War, how important it is that diffusion of the local chemotherapeutic agent into the infected area should occur and, by reference to the mode of action of Dakin's solution, how important is the drainage of the infected lesion by the exudation of fluid from it. Important also is the action of local chemotherapeutic agents upon the phagocytes which attack the bacteria. Sir Alexander's own work on this problem is well known, and he here shows how essential it is to consider the speed of action of the chemical substance on the bacteria and on the phagocytes respectively. If the phagocytes are killed by it before it kills or appreciably inhibits the growth of the bacteria, the tissues are left without one of their main means of defence.

Sir Alexander points out that scientific chemotherapy began with Ehrlich. He then discusses the aniline dyes, and thus comes to the sulphonamide of chrysoidine (prontosil), with which Domagk began the remarkable series of researches by many workers which have produced the sulphonamides now in use. The relative advantages and disadvantages of the sulphonamides are briefly indicated, and thus we come to the year 1940, when penicillin, discovered by Sir Alexander in 1928, four years before the first sulphonamide