

the question of gas charges, and those interested in smoke abatement will welcome tariffs framed to encourage the displacement of raw coal, not only in the home, but also in industry.

Dr. M. Fishenden reviewed the problem of domestic fuel problems in an illuminating manner, and concluded that although any rapid cure is impossible, present trends to the use of gas, coke, electricity, anthracite should in time be effective.

Three papers dealt with the medical aspects of smoke abatement, two of them with tuberculosis. Today when the improvement of physique is increas-

ingly regarded as of national concern, it is time to expect that the State will act as though the reduction of atmospheric pollution were something of national importance. A paper by Sir Arthur Hill and Dr. C. R. Metcalfe, on the effect of such pollution upon plants at the Royal Botanic Gardens, Kew, illustrated the direct interest of a public department in the subject.

Only a few of the papers have been mentioned, but all merit study, and together form a very comprehensive survey of the problem as it stands to-day.

H. J. HODSMAN.

## Pedology (Soil Science) at the British Association

THE assignment of pedology (or soil science as it is still, unfortunately, termed) to Section M (Agriculture) of the British Association is the natural outcome of its historical development from a branch of agricultural chemistry. But although, in its applied aspect, it has the closest and most vital connexion with agriculture, it is to be feared that it is not entirely at home in the agricultural section. Indeed, if the geologists could be persuaded to adopt it, pedology might more fittingly find a home in Section C. It is probably the exception rather than the rule for papers or discussions to be interesting, or even intelligible, to all attending members, even in the senior sections of the British Association. Section M, however, is expected to be more popular in its appeal, and it might be better in future years to introduce pedology in the form of joint meetings with other sections. Problems of applied pedology might still be assigned to Section M.

One session in Section M on September 14 at Blackpool was devoted to pedology. The president, Prof. J. Hendrick, devoted his address to a review of the development of soil studies in the twentieth century. He directed attention to the great change which has taken place in our outlook on soil science since the beginning of the century. At that time there were no British text-books on the subject, little was known of work in other countries, and the soil was regarded simply as a medium for the growth of crops. Since that time, our outlook has been widened both by the recognition of the soil as an object of study in itself and also by the extension of our interest to include not only British soils but also those of other lands. The study of soils is essentially international, and Prof. Hendrick traced the development of that active organization, the International Society of Soil Science, which held its third Congress in England last year. In the remainder of the address, the newer conceptions in pedology were briefly adumbrated. In conclusion, Prof. Hendrick dwelt on the applied aspect of the subject and its impact on society. Increased knowledge means the possibility of increased production and even over-production, problems for the economist and the social reformer. Yet, whilst malnutrition and under-nutrition exist, even in a prosperous country like Great Britain, the fear of over-production is not likely to restrain the soil investigator from pursuing that fundamental knowledge from which progress in practice ensues.

The remainder of the session was devoted to three different aspects of pedology. Prof. G. W. Robinson dealt with the problems and difficulties of soil classification. Pedology as an independent branch of inquiry being still comparatively youthful, the principles of soil classification have not yet been so clearly defined as in the older disciplines. Whilst there is general agreement in regarding the soil profile as the unit of study, it is not always easy to define its lower limit. Further, actual profiles are not always developed to climax. Apart from complications due to immaturity of development, human interference introduces a group of soil-forming factors which must be accorded their place in a scheme of classification. The importance of giving relevant and precise information about soil profiles was stressed. Much of the published descriptive material is almost valueless through irrelevance and lack of precision. Whilst the final elaboration of a world system of classification must await the accumulation of more information, it seems possible to distinguish three main groups, depending on the character of the leaching processes, namely, (1) completely leached soils; (2) incompletely leached soils; and (3) soils with impeded leaching.

The effect of human interference as a pedogenic factor was raised in the discussion, and it was agreed that the study of soil history is of great importance for the comprehension of contemporary soils.

Dr. R. K. Schofield dealt with the behaviour of soil moisture in the field. Given the importance of soil moisture for the growth of plants, and remembering that the interstitial space of soils is the reservoir not only of water but also of air, the importance of studying the moisture conditions of the soil in profile is evident. Ideally, it would be desirable to follow the moisture changes and movements in each horizon throughout the year. By frequent sampling, a certain amount of information may be obtained, and Dr. Schofield gave the results of observations on the classical Broadbalk field at Rothamsted, on a soil in Utah, and on a soil in the Sudan—the last two under the influence of irrigation.

One of the most striking advances in our knowledge of soil moisture has been the virtual abandonment of the 'capillary-tube hypothesis' and the recognition of the limited role of capillary action in determining water movements in soils. This was

stressed in the ensuing discussion by Dr. B. A. Keen, who gave a striking instance of the way in which erroneous ideas of the influence of a deep water-table on surface moisture conditions can still enter into questions of compensation in public schemes for water supply.

Dr. A. B. Stewart dealt with a group of problems in applied pedology by describing the methods used in the advisory service at the Macaulay Institute, Aberdeen. The problems are attacked by three methods, namely, (a) field experiments, (b) pot experiments, and (c) laboratory examination. Since the last method is the cheapest and most convenient, a considerable amount of work has been devoted to correlating laboratory results with field and pot trials. The work is concerned chiefly with the investigation of deficiencies in lime, phosphate and potash. Field and pot experiments are generally

in good agreement in the case of potash. In the case of phosphate, agreement is less satisfactory, and the necessity for taking the subsoil conditions into account is suggested. Laboratory methods are, to a large extent, arbitrary and empirical, but, with adequate interpretation, can serve as useful guides to the application of manures and fertilizers.

Soil problems were also dealt with in the session of the Forestry Sub-Section on September 10, where, arising out of an interesting series of papers on afforestation, an animated discussion took place on the possible disadvantages of purely coniferous planting. There was also a discussion on the position of British soils in a world system at a meeting of the British section of the International Society of Soil Science, held in connexion with the Blackpool meeting.

G. W. R.

## Work of the Government Laboratory

PRESENTING his first report as Government Chemist, Dr. J. J. Fox\* refers to the considerable increase in volume and complexity of the work carried out in the Government Laboratory under the direction of his predecessor, Sir Robert Robertson, who held office from March 1921 until April 1936. During this period, the number of samples examined annually rose from about 300,000 to nearly 550,000, whilst the literature of chemistry has been enriched by many accounts of investigations arising out of fiscal and technical developments.

The subject matter of the report follows familiar lines, and provides ample material for satisfaction that the hand of the Government Chemist is on the pulse of so many activities affecting the health and revenues of the nation. Thus one paragraph commences with the words, "In order to ensure that no tea but that which is fit for human food shall pass into the country for human consumption . . .", and records the fact that of the 22,741 samples of imported tea examined during the year ended March 31, 1936, 100 samples, representing 311 packages, were found to contain foreign substances or to be unfit for human consumption. The increase in the number of samples was due principally to the necessity for re-examining nearly 10,000 samples after outbreaks of fire in the warehouses. It is of interest to note that damaged or condemned tea may be used, free of duty, for the manufacture of caffeine, after being suitably denatured with nauseous materials.

Tobacco smokers are informed that in order to maintain the moisture in tobacco and to improve its quality, glycerol or diethylene glycol is added by foreign manufacturers, but such additions are illegal in Great Britain, and the prohibition automatically extends to imported manufactured tobacco. Offal tobacco is used for manufacturing nicotine; now, however, an alkaloid, anabasine, from *Anabasis aphylla*, a weed growing in eastern Europe and

northern Africa, is produced for use as a substitute for nicotine in insecticidal preparations. This fact has necessitated researches into methods for the detection of anabasine, and for distinguishing it from nicotine.

Beer is of interest in the Government Laboratory principally in its relation to the revenue, but we are informed in the report that of the 2,115 samples of beer and brewing materials examined, 23 were found to contain arsenic in slight excess of the limit recommended by the Royal Commission on Arsenical Poisoning, namely, the equivalent of one hundredth of a grain of arsenious oxide per pound in solid materials or per gallon in liquids.

Services are rendered to numerous Government departments and offices. Thus the Prison Commission for Scotland desired an opinion on soap; the Post Office on gum, gold thread and ink, among other things; the Mines Department on bath water; the Ministry of Labour on refuse dumps; the Home Office on seized drugs and on matters affecting the health of factory workers; the Ministry of Pensions on Stores supplied to hospitals; and the Board of Inland Revenue on stamps and documents.

Once again we reproduce comments on the composition of cheese and cream. In the paragraph on cheese we read: "The water ranged from 27.0 to 66.8 per cent; the proportion of fat varied from 7.9 to 40.4 per cent of the cheese. . . . As, however, there are no regulations relating to the marking of skimmed or partially skimmed cheese, no exception could be taken to any of the importations". Of tinned cream it is said: "The percentage of fat varied greatly. Two samples contained 50-52 per cent of fat, and the remainder [88] contained from 19-30 per cent. Since there is no standard for cream in this country, exception could not be taken to the samples in respect of low proportion of fat, even when the tins were labelled 'thick cream'". We remind ourselves, with Little Buttercup, that things are seldom what they seem, but we do not find the thought entirely satisfactory.

\* Report of the Government Chemist upon the Work of the Government Laboratory for the Year ending 31st March, 1936; with Appendices. Pp. 46. (London: H.M. Stationery Office, 1936.) 9d. net.