be mapped, not by mapping the individual patches of the different kinds of soils present, patch by patch, but by indicating that all variations occur in regular succession between certain types. This includes both the ordinary method of mapping associations and Milne's method of recognizing catenas. The principle is easily applied if only one soil-forming factor is varying appreciably over the region, but becomes more difficult to apply if several are varying. Prof. Wooldridge discussed the more specific problem of the value of recognizing the geomorphological age of the surface on which the soil is formed, and illustrated the points he made by discussing the chalk surfaces of southern England.

The second session was devoted to problems of land classification. Here the problems are of immediate interest to the community, since they concern the conflicting demands upon the use of land for buildings, mineral exploitation and food production. Dr. E. C. Willatts described some of the problems confronting the administrator who has to approve certain types of land use, developments and changes to ensure they are consistent with the policy laid down in the White Paper on "The Control of Land Use" (Cmd. 6537) and in subsequent legislation. By clearly stating the problems facing land planners, he hoped that soil surveyors and other people who had to assess the value of land would prepare their results in such a form that the administrator could easily understand and use them.

Dr. D. A. Osmond gave the definitions, adopted by the West Midland Group on Post-War Reconstruction and Planning, for classifying agricultural land into three categories of good, medium and poor on the basis of its inherent features of site and soil. Site involves the consideration of aspect, slope and elevation, while water-conditions, depth and texture are taken into account as soil factors. Using this simple classification, the major categories of agricultural land can be readily picked out. Eight western counties of England have been mapped on this basis. Because of the high farming on soils frequently of medium quality, market garden areas such as the Vale of Evesham, and some other districts, are included in sub-categories of good agricultural land.

Mr. F. R. Day (Oxford) then discussed criteria for judging the economic value of land for forestry. He showed that if the tree is to come to a proper height at maturity, or at a given age, there is an optimum curve relating its rate of growth with age for each species of tree in a region. Any falling off from this curve is due to some soil factor making the site less suited for the economic exploitation of that species. He illustrated these points by discussing the rate of growth of forest on thin or wet land, often considered suitable for forestry because unsuitable for agriculture, and showed that growth of many species is too slow for economic exploitation, even though initially the growth may be very rapid.

Finally, Mr. G. R. Clarke (Oxford) described the gravel survey of the London area, a survey undertaken to map the good, medium and indifferent agricultural soils overlying the gravel. The object was to see how far it would be possible to prevent the exploitation of the gravels under the best agricultural and market garden land and to continue their exploitation under the poorer soils. Unfortunately, as Prof. Wooldridge later pointed out, there are many different types of gravels, and some essential for making concrete only occur in sufficient quantity under some of the best agricultural land.

TUBERCULOSIS OF VOLES AND SHREWS

IT is ten years since Dr. A. Q. Wells reported the presence in the wild vole (*Microtus agrestis*) of a murine type of tubercle bacillus; since then a good deal of work has been done upon this organism. Tuberculosis has been found also in the bank vole (*Clethrionomys glareolus*), the wood mouse (*Apodemus sylvaticus*) and the shrew (*Sorex araneus*), and the relationships of this murine type of tubercle bacillus to the bacilli which cause human and avian tuberculosis have been carefully studied. The present position of our knowledge of the problems raised by the discovery of this bacillus has now been ably stated by Dr. A. Q. Wells in a report entitled "The Murine Type of Tubercle Bacillus (The Vole Acid-Fast Bacillus)", to which Dr. A. H. T. Robb-Smith has contributed notes on the morphology of infection by the vole acid-fast bacillus.*

Illustrated by very clear photographs and by graphs and diagrams, this report is a valuable addition to the literature about tuberculosis. The structure, cultivation, antigenic structure, pathogenicity and other features of the vole bacillus are all discussed, and Wells concludes that the statement that the disease which it produces is tuberculosis "seems justified, in spite of the fact that tuberculosis as a disease of other wild animals in their natural habitat has not hitherto been found". It is not possible to separate the vole bacillus from the human or bovine bacilli tubercle by serological methods; animals infected with the vole bacillus are sensitive to human or bovine tuberculin, and animals infected with human or bovine tubercle bacilli are sensitive to a tuberculin prepared from the vole bacillus. The vole bacillus can, moreover, produce progressive disease of the animals which it can infect, and this disease is indistinguishable from that produced by human or bovine tubercle bacilli. The vole bacillus is therefore a third type of tubercle bacillus. One of the most valuable sections of this report discusses experiments which have been designed to find out whether experimental infection of laboratory animals with the vole bacillus will confer any degree of immunity to the human or bovine tubercle bacilli. The use of a vaccine prepared from the vole bacillus for the production of immunity in man is also described; and the instrument used for some of these experiments, which enables forty simultaneous punctures of the skin to be made, is described and illustrated. Wells discusses the results obtained and also the relative merits of B.C.G. vaccine and the vole bacillus vaccine. An evaluation of the results obtained can be made only by experts who have a wide experience of that kind of work. Those who are interested must read the report itself.

Dr. A. H. T. Robb-Smith's notes on the lesions produced by the vole bacillus and the excellent photographs of them with which he illustrates his notes are a worthy addition to the report. Everyone who is interested in the intricate problems presented by tuberculosis will be grateful for the inclusion in a single compact and well-written publication of so much information, together with the references to the literature which are relevant to it.

G. LAPAGE

* Medical Research Council. Special Report Series, No. 259. The Murine Type of Tubercle Bacillus (The Vole Acid-Fast Bacillus) with Notes on the Morphology of Infection by the Vole Acid-Fast Bacillus. By A. H. T. Robb-Smith. Pp. iv+48+13 plates. (London: H.M. Stationery Office, 1946.) 2s. net.