MINISTRY OF AGRICULTURE.

Soil Survey Conference.

Memorandum by Mr. G.W. Robinson.

The Soil Survey in the United States forms an important section of the Bureau of Soils. Under it, a considerable proportion of the area of the country has been surveyed and mapped. In the classification used by them, soils of common origin, colour and structure are grouped together into series which are further sub-divided according to their texture. Although the work of the field surveyors is supported by mechanical analyses, this support seems somewhat inadequate, judging by the rapid rate at which areas are mapped. Ten square miles per man per week is not an uncommon rate of progress. It seems rather strange also that the Soil Survey has itself no laboratory facilities but has to send soils across to the Bureau of soils to be dealt with.

A new direction is now being given to the soil survey by the Director, Professor C.F. Marbut, who, as an able exponent of the views of the Russian school of pedologists, is fitting the soils of the United States into the climatological classification with conspicuous success.

There is much to be said for and against a national soil survey. The actual soil survey would seem however to be more appropriately a labour for provincial institutions, of whose activities it would form a useful feature. At the same time, there are obvious advantages in securing the correlation of survey data by some kind of central organisation. Apart from correlating results, such a body would have to ensure that the methods of working of the provincial soil surveys are sufficiently uniform for the data obtained by them to be comparable.

The writer had an opportunity recently of going over some of the soil types of the U.S. Soil Survey and whilst in some cases the types seemed definite enough to be mapped by mere inspection, in other cases the types were not so well defined. It must be added that there are many critics of the work of the Soil Survey in the United States. For instance, Professor C.B. Lipman of Berkeley, California, doubts whether one can speak of soil types at all. Others have referred to the scheme of the Soil Survey as a 'Procrustean classification'. Judging by the writer's own experience in this country it would appear that there are many districts where soil types are not at all well defined, districts in fact, where the term 'soil type' has little meaning.

A soil survey may be carried out from either of two points of view. In the first place the soil may be treated as a naturally occurring material and studied with a purely scientific object. Such a soil survey would be carried out on the same lines as the Geological Survey. The work of the Russian school of pedologists has been carried out in this way and has resulted in a climatological classification which, though requiring considerable adjustment in details gives a broad system capable of including the soil types of all regions and climates. It would be a great gain if pedology could be recognised as a branch of geology and developed as the scientific study of the soil horizons. It is much to be regretted that so little work has been done in this country on the soil in which the problems have been treated from a purely scientific point of view.

The other type of soil survey is that which seeks to classify soils according to their relations to the growth of plants in general and to the growth of agricultural crops in particular. The object is to obtain a map of the soils of each district or province which shall reflect their agricultural properties. It must be admitted that in spite of the considerable amount of effort directed to this end, no very striking practical results have been obtained. In some districts, marked correlations have been made between soils and agriculture, whilst in others, correlations are by no means so well marked, owing to the fact that soil properties form only one group of factors among those which influence crop production. In many regions climate and situation appear to be dominant factors, whilst the economic factor generally introduces a complication. A related problem is the actual existence of soil types. In some regions there seems good evidence for grouping soils together into types. In other regions, variation between rather widely separated extremes is encountered and well defined types are absent.

The soil survey is simply one aspect of the regional investigation of the factors affecting crop production. In order to secure correlations between natural factors and agricultural conditions, a number of maps are required in addition to the soil map. Of these the principal are rainfall, temperature conditions, altitude, and relief. There appears to be no satisfactory integration of all these factors into a single scheme.

Inasmuch as the soil survey in any area serves to collect valuable information, it is to be recommended, even although it may not result in the production of a detailed map. It has been the practice in this country to support the field examination of soils by laboratory examination and this is probably necessary, since it is impossible to form anything more than a rough qualitative estimate of a soil from mere inspection. It may be possible to develop rapid field laboratory methods which will lead to economy in time. The mapping of soils by mere inspection seems hardly suitable in this country as a general rule although in some districts with a few well defined soil types this may be possible.

Whilst there is a close connection between geology and soil properties in the south and east of England, this connection is not so close in other regions. Geological information is however always of great value. The writer suggests that the Geological Survey can assist by supplying mineralogical and chemical data for the parent materials of soils in each locality, including rocks, drifts, and alluvial deposits. Information as to the probable depth and succession of drifts, and the position of the water table would be welcomed.

Much information has already been collected as to soils in all parts of Britain but comparatively little has been published. In the published results of surveys it has generally been assumed that the soils were classifiable according to their parent geological formations. No attempt has been made to correlate and compare large numbers of soils in widely separated areas. It is suggested that the Ministry might take the initiative in collecting all the published and unpublished data in order to find out if any classification

can be obtained which will be satisfactory for the country as a whole. At the same time it is much to be desired that studies should be instituted on the purely scientific side in order to discover the relationships of British soils to the soils of other counties and their place in a universal climatological classification.

G. W. ROBINSON.

University College of North Wales,
Bangor.

February 26th, 1924.