Chemical Work.—Samples of soil, representative of the principal types covered by the soil survey, have been examined in the laboratory. The analyses show that sands and sandy loams are the principal soils used by growers for flue-cured tobacco. Available phosphoric acid is invariably high to very high in tobacco soils, but available potash is generally low and in some cases must detrimentally affect both yield and quality of tobacco. For the most part the tobacco soils have a base saturation of from 50 per cent. to 60 per cent. Occasionally soils are found with a base saturation of over 80 per cent. and in other cases below 30 per cent. With few exceptions, the lime content appears to be satisfactory. The magnesia content tends to be low on soils derived from granite and from the Moutere Hills. On these soil types, figures suggesting the possibility of magnesium deficiency were obtained at Orinoco, Graham Valley, Pangatotara, Dovedale, Stanley Brook, and Baton Valley. The tobacco soils at Tapawera contained very high amounts of magnesia.

SOIL EROSION.

During the course of the general soil surveys the Division has collected data concerning the amount and nature of soil erosion on the various kinds of soils. In the high country on the eastern side of the Southern Alps, where soil loss is proceeding at a greater rate than in any other district of the Dominion, maps showing degree of erosion have been prepared of the area covered to date (p. 32). The classification adopted is: (1) No accelerated erosion; the processes of regeneration are keeping pace with the rate of denudation. (2) Slight erosion; 10 per cent. to 25 per cent. of the topsoil has been removed or disturbed. (3) Moderate erosion; 25 per cent. to 50 per cent. of the topsoil removed or disturbed. (4) Severe erosion; 50 per cent. to 75 per cent. of the topsoil removed or disturbed. (5) Very severe erosion; more than 75 per cent. of the topsoil removed. (6) Extreme erosion; consisting entirely of rock and scree and mostly above 6,000 ft. The gathering of such information is the first stage in the attack on the problem of soil erosion.

SERPENTINE-GLAUCONITE COMMITTEE.

Serpentine-Glauconite Committee.—Sir Theodore Rigg (Chairman), representing Council of Scientific and Industrial Research; Dr. H. O. Askew (Cawthron Institute); Dr. M. M. Burns (Canterbury Agricultural College); Dr. E. B. Davies (Soil Laboratory, Department of Agriculture); Mr. W. M. C. Denham, M.P.; Dr. J. F. Filmer (Acting-Director, Animal Research Division, Department of Agriculture); Dr. L. I. Grange (Soil Survey Division); Mr. R. E. R. Grimmett (Chief Chemist, Department of Agriculture); Dr. C. O. Hutton (Geological Survey); Mr. E. O. Macpherson (Geological Survey); Mr. R. B. Tennent (Director, Fields Division, Department of Agriculture); Mr. F. J. A. Brogan (Department of Scientific and Industrial Research), Secretary.

The above Committee was set up by the Council of Scientific and Industrial Research during the year to co-ordinate investigations on the agricultural utilization of serpentine and certain local potash-bearing materials such as glauconite (greensand) and seaweed. The Committee held five meetings during the year, and the following is a brief summary of its activities.

(1) Serpentine.

Prior to the establishment of the Committee, preliminary experiments had shown that this mineral, of which very large quantities are available in New Zealand, when ground and mixed with commercial superphosphate (usually in the proportion of one part serpentine to three parts of super), had the property of converting the bulk of the water-soluble phosphate into water-insoluble form, and at the same time greatly improving the mechanical condition of the superphosphate. The serpentine-superphosphate mixture had the added advantage of not attacking bags and could therefore readily be stored by the farmer. The magnesium content in the serpentine also opened up a further possibility of beneficial effects from the application of this fertilizer to magnesium-deficient soils. The potential agricultural value of serpentine-superphosphate, particularly in conserving supplies of phosphate in wartime, was therefore great enough to warrant a full investigation of all aspects of its production and utilization. The Committee's work on serpentine has been along the following lines:—

(*a*) *Quantitative Surveys of Serpentine Deposits.*—Geological and geophysical surveys of the deposits of serpentine in the North Auckland district, and also at D'Urville Island, have been carried out, and estimates of the quantities of suitable material available have been supplied to the Departments of Agriculture and Mines.

(*b*) *Chemical Work on the Processes of Manufacture.*—The chemical laboratories of the Department of Agriculture, the Department of Scientific and Industrial Research, and the Cawthron Institute have collaborated in studying methods of incorporating serpentine with superphosphate, the chemical changes involved in the processes, and the effects of various factors, such as the degree of fineness of the serpentine and method of admixture, on the chemical composition of the finished product. The laboratory experiments were supported by larger-scale experiments at certain of the fertilizer-works, and as a result of this work it has been possible to indicate the most satisfactory methods of preparing the mixture under works conditions, and to recommend suitable specifications for the finished final product.

An interesting development of the laboratory experiments is the possibility of securing satisfactory reversion of the superphosphate by mixing ground serpentine with cold superphosphate to which has been added 5 per cent. to 10 per cent. of water. Preliminary experiments have resulted in a product which has good drilling-qualities and which contains over 80 per cent. of reverted superphosphate. Further experimental work will be carried out with a view to the manufacture of serpentine superphosphate at local works, where serpentine is readily available.