

Bannockburn, where a severe stage of gully erosion has been reached. Erosion on this soil type, which began with the burning of the tussocks by the early settlers, was completed in the late seventies and eighties by the hordes of rabbits which overran Otago and Southland. Experimental plots laid down by the late Dr. Cockayne demonstrate that the progress of erosion on this soil type can be arrested, and under certain circumstances the topsoil can be rebuilt. No uneroded areas of this type exist at the present day.

(2) *Grey-brown Loams*.—The soils of the grey-brown-loam group show all degrees of erosion from practically-uneroded slopes to extensively-eroded slopes. In general the erosion is less severe than on the previous group of soils, and given suitable opportunity the soils recover much more rapidly than the buff loams, although it is a relatively slow process. Wind and water play an equal share as the agents of erosion, while burning of tussocks and rabbits are the major causes.

(3) *Yellow-brown Loams*.—The soils of the yellow-brown-loam group also show a wide variety in degree of erosion. Owing mainly to burning and partly to overstocking with sheep, the erosion of these soils is increasing at an alarming rate on the higher slopes, and if unchecked will result in removal of all soil from these slopes. This will be followed by wide extensions of the present scree slopes, with a consequent increased runoff and flooding at lower levels. The principal cause of the increased erosion is the burning of the danthonia tussock, and this should be forbidden, as the subsequent loss of topsoil and increased runoff quite overshadows the temporary growth of young vegetation, which is unable to check the removal of topsoil. The exposed subsoil is of very low fertility and is difficult to reclothe with vegetation. Rabbits are a negligible factor in the erosion of the soils of this group.

CAWTHRON INSTITUTE.

TOBACCO-SOIL SURVEYS.

Soil surveys of tobacco land in the Dovedale and Motueka valleys have been completed. Soil maps showing the classification of the soils into six groups, depending on their suitability or otherwise for tobacco-work, have been finalized and copies made available to the three principal tobacco-manufacturing companies, the Tobacco-control Board, the State Advances Department, and the Tobacco Research Station.

A detailed soil survey of the Moutere Valley has been suspended owing to the calling-up of men for the armed forces.

A preliminary examination was made of soils in the Takaka Valley, with a view to carrying out a detailed soil survey of this valley in relation to tobacco-culture. The preliminary examination showed that the area of light soils was largely restricted to the alluvial land in the vicinity of the river, but a considerable area of this land was subject to flood. Aerial photographs have been obtained of the Takaka, Waimea, and Upper Motueka valleys, and these will enable soil-mapping to proceed rapidly as soon as men become available.

SOIL SURVEY OF NELSON HAVEN.

At the request of the Controller of Employment, a soil map has been made of 1,000 acres of mud-flat at the northern end of Nelson Haven. The soil survey shows that there is considerable variation from fine sand to clay loam on different parts of the 1,000-acre block. There are some 330 acres of clay and silt loams, 420 acres of fine sandy loam underlaid by silt loam, and approximately 250 acres of fine sand.

LAND-UTILIZATION.

Maps showing the distribution of tobacco in the districts covered by the soil surveys have been prepared. These maps show the exact acreage of tobacco, together with the names of growers, for the 1940-41 season, and have been made available to the principal manufacturing companies and other interested organizations. Staff shortages prevented a check up on the exact distribution of tobacco during the 1941-42 season, but the data furnished by the Tobacco Control Board show an increase of 170 acres of tobacco grown in the district, the figures being 2,933 acres for 1940-41, as against 3,104 acres for the 1941-42 season.

The principal increases in acreage occurred in the Motueka-Riwaka, the Motueka Valley, and the Wakefield districts. There was an apparent reduction of acreage in the Dovedale and Orinoco valleys.

CHEMICAL WORK.

The analysis of soil samples collected show that tobacco soils, with the exception of some located on the Moutere Hills type of soil, have a high content of phosphate, but are invariably low in available potash. Great variation occurs in the percentage of base saturation, the figure ranging from 10 per cent. to 80 per cent., with the majority of the samples falling within the limits of 40 per cent. to 50 per cent. base saturation.

MINERAL CONTENT OF PASTURES.

INVESTIGATIONS AT THE CAWTHRON INSTITUTE.

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A. COBALT INVESTIGATIONS.

I. *Animal Trials.*

During the present season (1941-42) the same fields have been used for a further sheep trial as were used in the previous year. The Nelson limestone area of last season received this year cobaltized superphosphate providing 2 oz. cobalt sulphate equivalent per acre, while the Southland limestone area received the equivalent of 4 oz. cobalt sulphate. The control area received 2 tons per acre of Nelson limestone. No further treatment, except superphosphate, was given the cobaltized superphosphate