

cause of the loss of magnesium, since it is able to displace this element from the clay complex into the soil solution, and thus readily leached out in the drainage water. Potash is lost mainly in products taken from the farm. It is not suggested that these elements have reached an actual deficiency level, but some alteration in the top-dressing programme may be desirable in the future. Potash and magnesium have been tested in the present instance, but it is possible that other elements are in a similar position.

Linen-flax Soils.—Over a hundred samples have been examined from fields where flax was grown last season to ascertain the characteristics of soils that grew poor and good flax. Results to date indicate no marked nutrient differences, and suggest that if physical and moisture factors are suitable good flax can be grown with suitable top-dressing on soils of fairly low fertility.

Method for Estimation of Magnesium, using 8-Hydroxyquinoline.—During the year a critical examination of the 8-hydroxyquinoline estimation of magnesium in soils was completed and conditions found for estimating with confidence replaceable quantities down to that associated with magnesium-deficiency symptoms in apples and tobacco.

CHEMICAL WORK AT THE CAWTHRON INSTITUTE.

SIR THEODORE RIGG, Officer in Charge.

The main work at the Cawthron Institute during the past year has been the continuation of the soil survey of tobacco lands in the Nelson district. Soil maps for the Kaiteriteri and Motueka subdivisions were finalized, and copies taken off for the Tobacco Control Board, the Tobacco-growers' Federation, several Government Departments, and the three tobacco companies operating in the Nelson district. Tobacco maps showing the distribution of tobacco gardens in the Riwaka and Motueka districts were also prepared and have been made available to interested organizations.

The soil survey has been continued in the Motueka Valley and in the Dovedale-Thorpe Valley, and soil maps covering these additional areas are being finalized with a view to their reproduction in the interests of the tobacco industry. The tobacco maps for the Motueka and Riwaka districts have been revised to take into account the increase in tobacco acreage during the past season. Similar maps showing the distribution of tobacco throughout the Motueka and Dovedale Valleys are nearing completion.

In the chemical laboratory, samples of soil representative of the different soil types covered by the surveys have been examined for texture, plant food status, and exchangeable bases.

At the request of the Lands Department, reports have been prepared on the soils of different development projects on the west coast.

During the year the chemical branch of the Soil Survey Division of the Department of Scientific and Industrial Research was transferred to Wellington. This work has been associated with the Cawthron Institute ever since the establishment of the soil-survey organization in 1930. The centralization of the field and chemical work of the Soil Survey Division in Wellington has involved the transfer of two valued officers from the Soil staff at the Cawthron Institute. By arrangement with the Department of Scientific and Industrial Research, the Cawthron Institute will continue soil-survey work in Nelson and Marlborough Provinces.

Soil Mapping.—With the completion of soil maps for the Riwaka and Motueka districts, mapping was continued in the Motueka and Dovedale valleys. The aerial maps have again proved invaluable in the preparation of the soil maps and have greatly accelerated the work. In view of the importance of soil texture and underlying strata in assessing land for tobacco, very systematic soil examinations in the field have been required. For the purpose of the tobacco industry, the soils have been separated into five groups, depending on their suitability or otherwise for flue-cured tobacco.

In the Motueka Valley, including the Waiwhero, Orinoco, and Graham Valleys, over 5,000 acres of terrace and alluvial lands have been mapped and the different soil types delineated. Approximately 1,500 acres have been placed in categories 1 to 3, indicating suitability for the culture of flue-cured tobacco. As the area actually used for tobacco during the 1940-41 season was only 480 acres, it is clear that considerable expansion of tobacco culture should be possible. In the Dovedale-Thorpe Valley, some 2,300 acres of alluvial and terrace lands have been surveyed and separated into different soil types. The total acreage included in soil groups 1 to 3 is approximately 680 acres, of which over 270 acres were in actual use for this crop during the past season.

Land Utilization.—Maps have been prepared showing the present utilization of the land for different crops in the Motueka and Riwaka districts. Similar maps are in course of preparation for the Motueka and Dovedale valleys. The location of the different tobacco gardens, together with the names of the growers, is shown on the maps, enabling the maximum utilization of the soil maps to be made.

During the past season, 1940-41, 2,932 acres of tobacco were grown in the Nelson district. This represents an increase of over 400 acres compared with the 1939-40 season. The increase in tobacco acreage is confined almost entirely to the Motueka-Riwaka district. The distribution of the tobacco acreage according to districts is shown below:—

	Acres.
Motueka and Riwaka district	1,690
Motueka River Valley	428
Orinoco Valley	51
Dovedale and Thorpe valleys	275
Stanley Brook, Tapawera, and Motupiko	240
Wakefield, Waiti, and Waimea	177
Upper Moutere and Mapua	71
Total	2,932