

while on the 12,000,000 acres of tussock grassland and 10,000,000 acres of surface-sown land fertility is not improving. Over large areas of hill-country pasture lands the circumstances leading to a general decline in fertility are beyond the immediate control of many of the occupiers. On the surface-sown hill country the more widespread use of fertilizers, fencing, and cattle is necessary to maintain and improve soil fertility and carrying-capacity. On the tussock grasslands, fencing, spelling, and the destruction of rabbits, though immediately necessary, must be accompanied by research aimed at finding methods for the creation of a pasture sward more suitable than the native tussock for continuous pastoral usage. These works will be costly in labour and materials, but the science and practice of grass farming evolved on the plains must be carried to the hills, even at a great apparent cost, if a permanently productive farming industry is to be a future reality.

The surveys which were carried out in the 1945-46 and 1946-47 seasons to collect data on wheat-production practices and yields were continued in 1947-48 and extended to the Ashburton district. The data for the three seasons are now being examined, and are expected to provide information on the influence of prior crop on yield and consequently the yields to be expected on each main wheat soil, depending on place in rotation.

#### FARM MANAGEMENT AND ECONOMICS

To provide a background for future rural development studies, the Farm Management and Economics Section has prepared and published in the *New Zealand Journal of Agriculture* a short history of farming progress between 1840 and 1945. Developments in pasture-management which occurred in the 1920-45 period indicate the trends which should be followed to provide increased primary production in the coming years, and the aim should be to reach an annual usage of 1,000,000 tons each of phosphatic fertilizers and lime.

The main field-work of the Farm Management and Economics Section during the year has been in connection with cost-of-production studies of agricultural and horticultural crops. Studies were completed on potatoes, apples, and pears, and work begun on canning tomatoes and onions. In addition, some local cost-of-production surveys were done for town milk-supply and data collected on tractor usage and seasonal distribution of cultivation work on arable farms.

The Section has prepared a large number of departmental reports on the Dominion's primary industries and overseas trade and has carried out the preparatory work for the Royal Commission on the Sheep Industry. The assistant Rural Economist is acting as Economist Secretary to the Commission.

#### FARM ENGINEERING

The appointment of an Engineer during the year allowed the start of the organization of the Farm Engineering Section, which, with the increase in farm mechanization, should prove of great assistance to farmers. Four additional Farm Machinery Officers are being appointed, one for each of the Department's four administrative districts, and these officers, working through the local Instructors in Agriculture, will provide farmers with information on machinery and engineering problems.

The Farm Forestry Officer of the Engineering Section has contributed a number of articles to the *New Zealand Journal of Agriculture* on farm shelter and plantations, and is now making a regional study of the Dominion so that further articles may deal with particular district requirements and the problems of hill-country tree-planting to control erosion.