

the subject of top-dressing is becoming progressively more important, especially as erosion gains its greatest hold where the fertility is not maintained at a high enough level to ensure that a vigorous sward covers the ground.

(1) North of Wainui much of the high country is used for dairying because it is run in conjunction with the lower and warmer areas. The cows graze on the higher country during the warm weather—i.e., October to April—and are then brought down to the lower paddocks, where they are generally wintered on cocksfoot roughage. The cocksfoot is grazed in June, July, and August and shut up for seed in September, the cows soon afterwards going to higher altitudes. In this way the maximum use is made of the high cold areas, and of the cocksfoot-seed paddocks which would deteriorate in seed-production under heavy grazing, and at the same time the need for winter hay is largely obviated. Cocksfoot thrives very well on the Pawson silt loam, Summit silt loam, and on sheltered parts of Stewart brown loam type. The highest country south of Stewart's Peak is used for sheep-farming only.

(2) South of Wainui, farmers have been in the habit of buying in two-tooth ewes, but some are now breeding their own. English Leicester and Southdown rams are used. In a good season 50 per cent. of the lambs may be sold fat, half of these being off their mothers. The remainder go away as stores. A few dry cattle are run as scavengers and to break down fern and scrub, but no dry sheep are kept.

GENERAL.

The Addison and Wilson soils are usually referred to as "pakihi" land, which is characterized by a cover of pakihi rush and fern, a very poor drainage, the presence of a pan, extreme acidity, and a very low content of lime and phosphate. The supply of potash is satisfactory, but nitrogen, though a good supply is present, is not available to the plant because of the sour condition of the soil. The surface presents a desolate appearance and is exposed to winds from all points of the compass.

Attempts to bringing the pakihi into pasture have not been successful until the last few years. One or two farmers have established good pastures, and the Cawthron Institute Experimental Farm at Sargeant's Hill has shown that, without cultivation but with suitable top-dressing and seed-mixtures an excellent pasture can be grown on the Sargeant's type of pakihi land. The question of what trees to plant for shelter and how to grow them is an important one and requires more investigation if any of the land is to be settled.

Much of the greater part of the area surveyed is pakihi land and it is this that has to be considered from the point of view of development. Other more fertile series are already being farmed, though some of these are not producing to their maximum.

The Addison series has been divided into a number of types, and these, together with the Wilson types will be carefully appraised in a detailed report. Those having a shallow depth of soil on the gravel, as at Virgin Flat and Addisons Flat, can definitely be classed as unsuitable for development. At Sargeant's Hill there are about 1,200 acres to 1,300 acres, and between the Buller Bridge and the intersection of Greymouth and Nelson main roads another 1,200 acres to 1,300 acres of land, suitable for development.

On the Wilson Series no attempt has yet been made to establish a pasture, but probably the same methods as at Sargeant's Hill would be successful on the dry ridges. Unfortunately, however, the wet patches, which are numerous and large, present great drainage difficulties, as there is very little slope. In the cut-over area towards Cape Foulwind, which constitutes the major part of this series, there is the additional problem of getting rid of the logs and stumps at a cost low enough to warrant its being brought in.

FLAX SOILS.

By J. K. DIXON and N. H. TAYLOR.

In company with Dr. J. S. Yeates, of Massey Agricultural College, visits were paid in September, 1937, to a number of typical flax areas in the Manawatu, Bay of Plenty, Waikato, and Wairarapa districts with the object of correlating growth of flax with soil conditions. At each location Dr. Yeates acquainted the writers with data relating to quality, growth, and variety of flax (*Phormium tenax*). Owing to the brief and preliminary nature of the investigations the conclusions outlined below must be regarded as tentative only and are useful mainly in indicating possible lines of research if the project is taken further.

DRAINAGE.

(1) Flax grows well on fertile, well-drained soils, as well as on fertile ground-water soils (soils in which the water table rises within the zone of soil formation).

(2) Other soil factors being equal, the flax-growth on the ground-water soils is poorest where the water-table approaches nearest to the surface. Peats, in general, whether drained or not, are not associated with good flax.

(3) No absolute height can be given at which the water-table should stand for good flax-growth. The fertility of the soil and the state of aeration and fluctuation of the ground-water all bear upon this point. On the mineral ground-water soils the zone over which the water-table fluctuates can be gauged by the zone of mottled subsoil that separates the topsoil from the bluish colours of the permanently water-logged subsoil. On peaty soils this evidence is difficult to collect, and the only satisfactory solution in these areas would be to collect ground-water data regularly throughout the year.

(4) The strong growth of flax on the banks of running streams suggests that rate of movement of ground-water and or aeration are important factors in good flax growth.