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Hill country east of Stratford with skeletal soils of yellow-brown earths. A mild climate, high rainfall, and a quick drop in fertility after the virgin forest was removed have favoured reversion to scrub and bush. On the very steep slopes soils are derived from the underlying sandstone and mudstone. The easier slopes are covered with andesitic ash. Liming is not necessary, but the easier slopes can be held in production only by fairly regular dressings of phosphatic fertilisers. Potash responses are likely after some years of intensive farming.

Cobalt deficiencies in stock are not known to occur.

As the effect of lime dressings on pasture growth is generally slight, the first call is for superphosphate. The use of potash is not advised except possibly on the more deficient areas such as hay fields.

Rate of Application of Superphosphate

In central Hawke's Bay the rate of application of phosphates is closely linked to the potential productivity of the pastures and the intensity with which a farmer wishes to utilise his property. For instance, the soils which hold white clover-ryegrass pastures well through the frequent dry summers may well receive annual dressings of 2cwt. of superphosphate per acre. The lighter, shallow soils of the hills and many of the stony flats which revert to subterranean clover pastures can do with lighter annual dressings, 1¼cwt. to 1½cwt. per acre.

In central Hawke's Bay topdressing widens the gap between pasture production in winter and spring and production in summer. Winter and spring production is stimulated, but summer production, particularly in a drought year, may remain low. Regular topdressing, therefore, tends to force farmers to meet the widening gap in seasonal food supplies by changing from breeding sheep to fattening sheep, or by growing more lucerne, making hay or silage, and providing more supplementary crops for summer.

Yellow-grey Earths Transitional to Yellow-brown Earths

The transitional yellow-grey earths occupy a large area in the Manawatu district, occurring in one block from Wanganui to the Manawatu Gorge and continuing south in a narrow strip along the Tararua Range from the Manawatu Gorge to Shannon (see map on page 43). Towns such as Marton, Halcombe, Bulls, Sanson, Feilding, and part of Palmerston North lie on these soils. Marton loam is a typical soil type of this group. Smaller areas of the transitional yellow-grey earths occur in the Wairarapa and in Hawke's Bay.

The transitional yellow-grey earths are associated with a higher rainfall (30in. to 40in. per year) than are the proper yellow-grey earths, and for this reason they are slightly more leached. Leaching, however, has been offset to some extent by the heavy native bush which grew on some of these soils. This statement needs to be explained. All plants absorb nutrients from the soil, carry them to the leaves and stems, and finally return them to the soil surface, for instance, by way of the fallen leaves. Whether the soil beneath a plant remains fertile depends largely on the rate at which the plant absorbs nutrients and returns them to the surface. Plants with a fast rate of growth and a high demand for plant nutrients such as calcium, phosphorus, and potassium usually offset the detrimental effects of leaching quite considerably.

Other plants with a low rate of growth and low plant nutrient demands do little to diminish the severity of leaching and leave an infertile soil.

A hard clay pan 18in. to 24in. below the surface is commonly found in this soil group and is particularly evident at the beginning of a downward slope. The occurrence of heavy, brown iron concretions in the clay pan has caused many to call them "ironstone" soils, a name which should be reserved for the volcanic "ironstone" soils found north of Auckland, mainly in Bay of Islands County. The Department of Agriculture and Massey Agricultural College have carried out numerous experiments on the transitional yellow-grey earths and their requirements for vigorous pasture growth are therefore well known.

Pasture Responses

This knowledge of pasture responses to lime, fertilisers, and trace elements can be summarised as follows:—

Lime gives good responses up to pH 6.0 to 6.2 but seems of no benefit above pH 6.0 to 6.2. Many unlimed