The whole estate has been covered with about 15 ft. of volcanic-ash deposits. The latest of these deposits is the Tarawera basaltic ash, which, however, is appreciably thick in the north-west corner only. The chief soil-forming deposit, the Kaharoa rhyolitic ash, a bed of hard white pumice 18 in. to 22 in. thick, rests on Taupo rhyolitic pumice, which in turn rests on older rhyolitic-ash beds. Since the Kaharoa eruption the streams and rivers have deposited along their banks beds of pumice mixed with fragments of greywacke, and some of the smaller drainage-channels at the foot of the Tawhinau Range have changed their courses on the fans and spread out similar material.

Climate.

According to Kidson's maps, the rainfall at Galatea is between 50 in. and 60 in. per annum. It is greatest in October, least in February, and moderate in December and January; but great variations occur in mean monthly rainfalls. The statement of residents that the grass commences to grow in October and that growth is sustained until well on in May gives some idea of the temperatures. Although the rainfall is moderate, the leaching of plant-foods is fairly rapid, for the soils are very porous and the run-off is low.

Soil Series and Types.

Three soil series are recognized—(1) the Kaharoa Series, derived from the Kaharoa rhyolitic pumice; (2) the Tarawera Series, from the Tarawera basaltic lapilli; and (3) the Water-sorted Series, derived from the resorted ash and greywacke detritus deposited by the rivers and streams. As far as possible, these are further subdivided into types on the basis of texture.

The *Kaharoa medium sands* occupy 10,544 acres, and thus cover a much greater area than any other type. The profile on the southern part of the estate is:—

Kaharoa ..	4–5 in. dark medium sand. 7 in. dry, loose, white, gravelly sand. 4 in. fine grained, white, gravelly sand. $\frac{1}{4}$–$\frac{1}{2}$ in. white sand. 4 in. fine, white, gravelly sand.
Taupo ..	9 in. dark brown, sandy silt, *on* gravelly sand.

In the northern part of the estate the top medium sand layer thickens to about 8 in., the bottom few inches being mottled cream and brown, and in some places compacted. In all profiles the top 9 in. of the Taupo pumice is dark brown in colour and seems to contain more clay than it does in other districts where it forms the soil. The 400-acre swamp—"No Man's Land"—is mainly on Kaharoa medium sand, the profile being—

Kaharoa ..	3 in. black medium sand, much humus. 1 in. mottled dark-brown and buff medium sand. 3 in. buff medium sand. 15 in. gravelly sand *on* Taupo pumice.

In deeper parts of the swamps muck and peat are accumulating on the top of the sands.

The pasture on the Kaharoa medium sand is poor, being chiefly sweet vernal, *Danthonia pilosa*, and tussock. The native vegetation is manuka, tussock, and *Leucopogon Fraseri*, together with a short rush which grows in the northern area where the medium sands are compacted.

The *Kaharoa gravelly sands* occupy only about 600 acres, being confined to the steeper parts along the eastern margin. The largest area is in the south-east corner, where greywacke and tuff hills rise to 1,400 ft. The dark humus layer is usually 7 in. or 8 in. thick. On the steep greywacke slopes the soil contains fragments of greywacke.

The *Tarawera gravelly sand* covers the northern end of the estate and thins gradually southward. It covers 93 acres to a depth of 3 in., 1,350 acres to depths between 2 in. and 3 in., and 4,324 acres to depths between 1 in. and 2 in. This type can be divided into two sub-types—one, the Tarawera ash on Kaharoa medium sand; the other, the Tarawera ash on water-sorted deposits. The vegetation on the Tarawera gravelly sand is largely influenced by the type of soil that underlies it.

Water-sorted loams, silts, sands, and gravels, light brown in colour occupy 8,546 acres, 2,704 acres of which are covered with Tarawera gravelly sand. They occur principally in the north and east of the estate on the flood-plains of the streams from the Tawhinau Range and on terraces bordering the Whirinaki and Rangitaiki Rivers. In general, the existing river-channels and old watercourses are bordered with greywacke gravels, and back from these the soils become progressively finer, grading from sands to silts and loams. Sands are the predominant type in all the main areas of water-sorted beds.

White clover is much more abundant on these soils, and on the silts and loams rye is often the most common grass.

Soil Moisture.

With the exception of the loams and silts, all the soils and subsoils of the estate are coarse in texture and very porous, and consequently are expected to dry out badly during periods of low rainfall. On areas covered with Kaharoa medium sand and Tarawera gravelly sand the main source of moisture to deep-rooting plants is the top 9 in. of the Taupo pumice, 20 in. to 24 in. below the surface. The loams and silts are usually well supplied with moisture, as they occur in low-lying places.

Bush Sickness.

Bush sickness is reported from many localities north of Rotorua where cattle and sheep are grazed on soils derived from Kaharoa ash, so that its appearance is to be expected among stock grazed entirely on the Kaharoa soils of Galatea. The trouble, however, will probably be less acute at Galatea, where the soil is finer in texture, than nearer Rotorua. However, the only way to get definite information on this point is to conduct actual stock experiments. Bush sickness is now being successfully combated with licks and drenches and is not the great obstacle to settlement it was once thought to be.