

heights and shapes, with the intervening ravines and small aggraded flats—we may call the “hill complex” (Figs. 1 and 2).

The surface soil is a light, friable, chocolate-coloured loam; the subsoil is either sandstone or blue papa. The sandstone formation may often be seen lying on top of the papa at the junctions of the two great subsoil formations. Here often a layer of sandstone alternates with a layer of blue papa, telling the geologist in his own language of oscillations of the sea-floor prior to the uplift which decided that thenceforth only sandstone would be deposited instead of the deep-sea deposit of blue papa. In the two subsoil formations, but more particularly in the sandstone, pockets or seams of a fairly hard pebble-and-shell conglomerate occur. This “shell rock” is quarried and used as road-metal.

The two classes of subsoil are held by the local farmers to have quite different agricultural possibilities, that of blue papa being considered superior in quality to the sandstone. Nature, in the great forests it has produced on these classes of soil, has differentiated scarcely at all between the two. The forest cover is, in the main, similar throughout both formations.

TYPES OF FOREST.

In view of the fact that the forest is a valuable index in deciding which grasses and clovers are the most likely to be successful in the establishment of grassland on these soils, a short description of the forest, particularly from the point of view of the disposition of its species in regard to the various aspects of the country, will be of considerable value. Tawa is essentially the dominant primary-forest tree (Fig. 3). If we start from the small flats and gradually rise up to the highest ridges we pass through a sequence of forest-growth. On the small aggraded flats between the slopes (Fig. 2) kahikatea (*Podocarpus dacrydioides*), rimu (*Dacrydium cupressinum*), and pukatea (*Laurelia novae-zealandiae*) predominate; but as the ground begins to rise, so tawa (*Beilschmiedia tawa*) comes in, and on the lower levels and in the gullies it is associated with rimu, miro (*Podocarpus ferrugineus*), matai (*Podocarpus spicatus*), and maire (*Olea Cunninghamii*). The rimu, miro, matai, and maire become increasingly fewer as we ascend, and almost pure forests of tawa are met with a short way up the slope. Within the rimu, miro, matai, maire, and tawa forests tree-ferns are abundant, particularly the weki (*Dicksonia squarrosa*) and hemitelia (*Hemitelia Smithii*); and in the drier parts the mamaku (*Cyathea medullaris*) rises gracefully through an opening in the forest-roof. Within these forests also the floor is, in the main, covered with terrestrial ferns. Weki extends well up into the tawa forest, but here the general forest-floor is more or less free of ferns or other growth, with the exception of the graceful single crape fern (*Leptopteris hymenophylloides*), which may be abundant.

As we climb higher up the slopes and get on to the poorer and higher ridges the tawa becomes intermingled with kamahi (*Weinmannia racemosa*), hinau (*Eloecarpus dentatus*), rewarewa (*Knightia excelsa*), rata (*Metrosideros robusta*), and totara (*Podocarpus totara*); then higher up still, on the poorest and driest ridges and knolls, the tawa almost disappears, and black-beech (*Nothofagus Solandri*) there