

TREE-GROWING IN THE WHANGAREI DISTRICT.

After, and sometimes before, the sawmillers take the millable timber from a forest area, a fire sweeps over the land, destroying the natural growth, and, what is of infinitely more importance, the forest-floor, which has been accumulating perhaps for centuries. Such land at first takes well with grass, but on hilly country this disappears in a few years, owing to the rain washing off the soil, the deterioration of the humus from exposure, and the tracks worn by cattle. It is quite a common thing to see hillsides that have been denuded of tree-growth with cattle-worn tracks running diagonally across them. These tracks are usually worn into the subsoil, and between each track is a weak growth of grass, holding together the remains of the humus which at one time must have covered the whole of the land. Land such as this has simply been ruined, and the plantation at Puhipuhi has many acres answering this description. In the wet season the rain, instead of soaking into the soil, runs off the surface into the lower levels, and in the dry weather it becomes parched and cracked. To grow trees, or, in fact, almost any crop, on land of this nature without first ploughing it is a difficult undertaking.

On level land or on slopes with an easy grade much of the humus has been saved by a dense growth of bracken, which protects the soil from the sun and driving rain. Here, again, is a difficulty in growing such species as have been tried at Puhipuhi.

Insects, too, amongst the bracken are very numerous, and large numbers of trees have been injured by them. A small moth which obtains its sustenance from the green part of the bracken has found an equally generous host in many species of eucalypti. Locusts also cause much damage.

There are many areas of land in New Zealand which, owing to their steep nature and inaccessible position, should never have been denuded, and there are still such areas that should be reserved for all time. Where land is liable to become absolutely worthless if the natural growth is removed, the valuable timber could be extracted and the smaller growth protected to save the soil. Such precautions are indispensable on hills where a stream of water which supplies power for manufacturing purposes has its source.

The natural regeneration of our best timber trees may be unprofitable when we consider the length of time these trees take to mature, but surely it would pay to save the natural water-power in many districts, and also to keep the land from deteriorating and becoming absolutely worthless. A reserve of this nature could be gradually stocked with exotic trees of a quicker growth than our native trees, and although the work in the first place would cost more than similar work on cleared land, yet such work has a value beyond the mere market value of the timber that would be produced. It would be probably cheaper in the long run to introduce exotic timber trees by grouping them amongst the valueless native growth than by allowing the land to be denuded before planting commenced, because the resultant growth of the planted trees would be quicker where the soil conditions are congenial than on land where the soil has been eroded.

The general remarks that I have made explain the position of affairs at Puhipuhi. On land that had once been heavily stocked with timber, but had been cleared with the axe and fire, experiments were made by planting the native totara and a number of the most useful eucalypti, such as red-gum, jarrah, ironbark, &c. Other trees such as Oregon pine, Sitka spruce, and walnut were also tried, but with poor results. The experiments show that the *Eucalyptus Stuartiana* is the most suitable species in this class, *E. resinifera* next, then *E. rostrata*. *Pinus muricata* succeeded, but the other species of trees mentioned were a complete failure. The cause of the failures was owing to the conditions necessary for the growth of trees having been destroyed by the removal of the natural forest, and the subsequent deterioration of the humus by sun, wind, and rain. Very few species will adapt themselves to such conditions, and under these conditions forestry operations are not likely to be a financial success. The primary object in commencing tree-growing in this district was to experiment with our native totara. This is a very valuable species, and in cultivation it grows perhaps quicker than any other of our native taxads. No difficulty was experienced in getting seeds of this tree, and the crops of seedlings raised each year in the Ruatāngata Nursery made better growth than any exotic conifer I know of except the larch, and in comparison with that species the growth made by the totara is not far behind. The raising of seedling totara then presented no difficulties, but when the young trees were planted at Puhipuhi under the conditions previously described they simply came to a standstill, or died off during the first spell of dry weather. It is quite evident that the totara has not the power to accommodate itself to such conditions. This same difficulty is met with in growing many valuable species of exotic trees, and instances of this are given in the report on tree-growing in the Rotorua District. Some trees will not grow without the protection of a hardier species, and totara is particularly demanding in this respect. To grow it successfully, a cover crop of a hardier species should first be grown, and when this crop has properly covered the soil, it should be thinned to allow of the introduction of the totara.

It has already been said that certain lands should never be entirely denuded of forest growth. Now, suppose a thin growth of small native trees is left after the removal of any timber of a millable size, why not use this as a cover crop for growing a more valuable species, instead of having to face the numerous difficulties in the way of growing trees on land that has been destroyed by erosion? Tree-planting amongst native growth is, of course, necessarily expensive, but the time will surely come when it will be found necessary to plant such land with trees, and why not do it before the humus is destroyed? Agricultural pursuits and forestry operations should proceed side by side. Let us at once distinguish between land that is useful for farming and land that would be destroyed if the forest growth is removed. Reserve the latter for all time after taking out the valuable timber; gradually introduce a timber tree by planting as time and funds permit, but never let the land be entirely denuded. In this manner some return in the way of timber will be got from such a reserve, and, in addition to that, many such reserves will have a value that could not be computed in this way.

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