Totara Reserve

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A country member who has been to this unique and beautiful reserve many times here describes the vegetation. A visit in the springtime to see the kowhais and clematis (three kinds) and to hear the birds is a memorable experience and can be recommended to all.

Totara Reserve is situated in the Pohangina Valley at the foot of the Ruahine Mountains, twenty-two miles by road from Palmerston North, at an altitude of roughly 500 feet. The climate of the district is equable. The rainfall is just over 50 inches with no marked seasonal variations and prolonged dry spells are infrequent.

The Reserve takes in an area of over 600 acres, and, except at one end where it extends back on to an old terrace, consists of flats and slopes between the road and the river. Parts of the river flats are in grass, but the bulk of the area is forest covered. Although in some parts the original forest has been extensively modified or destroyed, much still remains largely untouched; and this, together with small relict areas elsewhere in the Pohangina Valley, is sufficient to give some idea of the original vegetation. The Reserve is especially interesting in that in such a comparatively small area there are several distinct plant communities occupying different ecological sites. These are described below:

Northern Rata—Podocarp—Tawa Forest. This forest type in its various modifications probably covered the greater part of the Pohangina Valley up to about 2000 feet altitude. Northern rata, podocarps (especially rimu) and trees like rewarewa and pukatea stand with their crowns extending above the general level of tawa and other medium-sized trees, such as hinau, the maires (**Olea** spp.) and titoki. This forest type is but little represented in the Totara Reserve, as most of the area which would have carried it was apparently burnt over early this century. The rata normally starts life as an epiphyte on some other large tree. Rimu is the usual host, but developing ratas have also been seen on hinau, pukatea, rewarewa, totara, white maire (**Olea lanceolata**) and probably there are others. The large trees carry a wealth of epiphytes, and beneath the canopy grow shade-tolerant trees and shrubs. Lianes are plentiful, especially supplejack which often forms extensive entanglements.

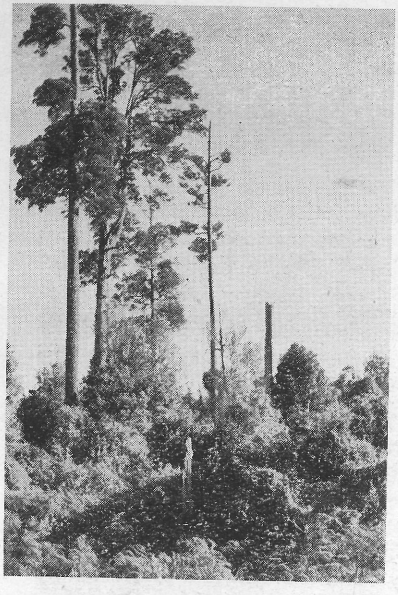
The area burnt over is now dominated by a vigorous growth of sapling tawa. The trees are mainly between 15 and 30 feet high, with a diameter of 2 to 6 inches. Intertwining the tawa is much supplejack, and the resulting growth is very dense. Other trees occur also, and in damper places sapling pukatea and young nikau are plentiful

together with groups of mamaku (**Cyathea medullaris**). Pockets containing bracken and light-demanding shrubs such as koromiko (**Hebe salicifolia**) and karamu (**Coprosma robusta**) still occur, but they are now being shaded out by the surrounding vegetation. A few young podocarps are to be found under the dense canopy; however as the tawa grows older more light will probably reach the ground, allowing a greater number to establish and grow.

Black Beech Forest. This is the characteristic forest type on the crests of ridges and spurs, and sometimes on exposed faces—places usually with a thin gravelly soil, and thus liable to dry out rapidly. Considerably more light penetrates the beech canopy, and the associated species are generally light-demanding, and drought-resistant in character. Those plants commonly growing with the beech are **Leucopogon fasciculatus, Cyathodes acerosa,** kohuhu (**Pittosporum tenuifolium**), lancewood, mapou (**Suttonia australis**), kowhai (**Sophora microphylla**), **Coprosma lucida, C. ramnoides, Helichrysum glomeratum, Libertia ixioides** and **Dianella intermedia,** but often little grows right under the beech trees. The normal epiphytes **Earina autumnalis, E. mucronata** and **Astelia solandri** are sometimes found on the ground with their roots in the humus layer. **Clematis hexasepala** is plentiful, but for the most part lianes are not very common. In the more stable areas there is a tendency for the beech forest to be invaded by podocarps and other mixed-forest species; seedlings of rimu (rare elsewhere) are sometimes to be found, also young rata growing terrestrially. The beech itself normally regenerates by groups of young trees growing up in light pools caused by the death of an old tree, and also on slips.

Kahikatea—Tawa Forest. This is the climax forest type on river flats where the soil is deep. Other podocarps and broad-leaved trees occur in lesser numbers, but northern rata is almost absent. The kahikatea is the tallest tree in the Reserve, and here it often grows more closely spaced than do the big trees in the rata-podocarp-tawa forest. In wetter areas pukatea becomes plentiful. The undergrowth consists largely of shade-tolerant trees and shrubs: kawakawa, hangehange, mahoe, **Coprosma australis,** pate (**Schefflera digitata**), fuchsia, rangiora, porokaiwhiri (**Hedycarya arborea**), and others. Lianes are plentiful, particularly supplejack, bush lawyer (**Rubus cissoides**), native passionfruit, climbing ratas (**Metrosideros perforata** and **M. colensoi**), **Muehlenbeckia australis** and kiekie. Groups of **Dicksonia squarrosa** and other tree ferns are plentiful, and except where the canopy is very dense there are many ferns on the ground and on fallen logs. Tawa saplings are abundant; those of kahikatea and other podocarps are not so plentiful, but they are scattered throughout singly and in groups, and are presumably sufficient to keep the balance considering the greater age reached by the mature podocarps.

The gale of February 1936 extensively smashed about 25 acres of this type of forest. The fallen trees were milled, 204 podocarps (85%



TOTARA RESERVE

Left: **Surviving kahikatea standing high above the regeneration, in the area smashed by the gale of February 1936.**

Right, top: **Two generations of totaras, the older trees on the right growing on a slightly higher terrace.**

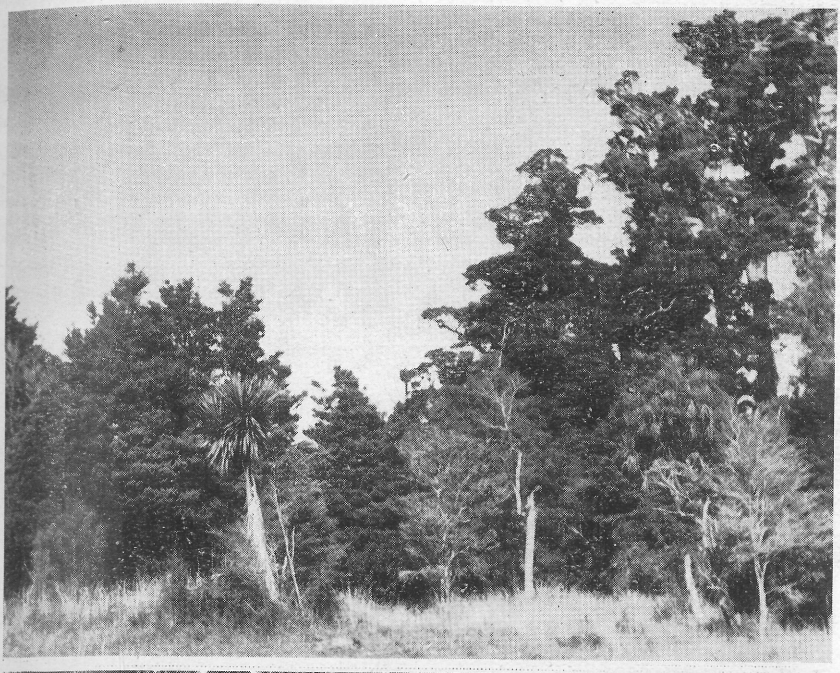
Right, bottom: **Two forest interiors. Totara forest** (left) **where undergrowth is sparse. Moss, ferns and low shrubs on the ground, matai on the right.**

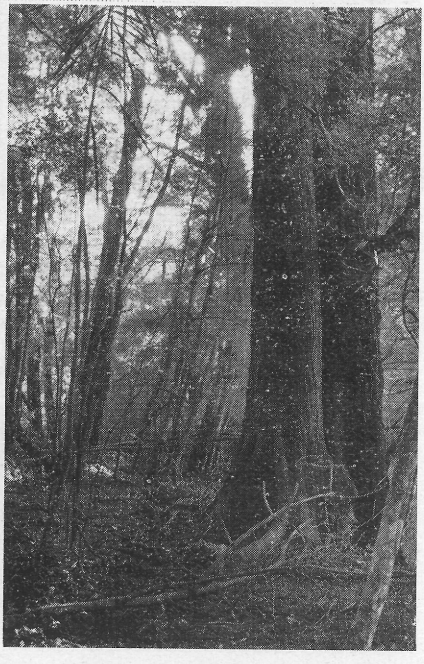
Beech forest (right) **at a place where undergrowth is almost absent.**

(Photographs by the author)

kahikatea) being removed. The area now presents a rather sorry spectacle with the remaining kahikatea and other podocarps standing out high above the regenerating small trees, thickets of bracken, and lanes of tall fescue on the old logging tracks. Cattle have been plentiful in the area at times, and have probably killed many seedling trees and greatly encouraged the growth of grass in the more open areas. When well established, the grass can only be ousted by trees at the edge growing over and shading it out, or by invasion by bracken. Bracken sometimes grows to 12 feet high here and is a considerable barrier to regeneration; and though young trees can often be found beneath it, many would be bent over and suppressed by the old dying fronds. Lianes, particularly bush lawyer, **Muehlenbeckia australis** and **Calystegia tuguriorum,** cover and weigh down the smaller trees and shrubs—mahoe, pate, fuchsia, rangiora, makomako (**Aristotelia serrata**) etc.—restricting their growth, and making it so dark underneath that it is difficult for other tree seedlings to establish. Notwithstanding these factors regeneration is progressing, and some trees have got above the lianes and are growing well: rewarewa, tawa and titoki in places, a group of ribbonwood (**Plagianthus betulinus**), and single trees of pukatea and lacebark (**Hoheria sexstylosa**).

After the gale the State Forest Service planted several thousand kahikatea seedlings. Unfortunately these were not often cleared round and suffered much from competition with other growth and from trampling by cattle. However many of the survivors have made





fair growth. Those look the healthiest that are growing with overhead light, but with lateral shade sufficient to prevent the dense growth of grass.

Totara Forest. This forest type occurs on the drier parts of the river flats. It appears to be a stage in the succession from bare riverbed towards a more mixed forest type. Several areas of different age are present in the Reserve, and from these it is possible to sketch their probable development.

The totaras, together with other light-demanding trees and shrubs such as kowhai, lacebark, karamu, and tutu (**Coriaria arborea**), probably established early under a light cover of manuka. These trees would grow up together, others would come in, including a few matai, and soon the manuka would be overtopped and suppressed. In time the totaras with their potentially greater height would overtop all the other trees. There is an example of forests at this stage; the totaras are 30 to 40 feet high and their tops are still growing vigorously upwards. As the totaras got older their growth in height would slow up, and their crowns would broaden out and meet. There is a fine stand of totaras at this stage. The trees here vary considerably in girth, but they are of much the same height and except for a few gaps they form a complete canopy more even than that of the other forest types. This totara canopy, together with that of the trees (mainly titoki and white maire) growing beneath it, does not cast a very deep shade. Lianes though present are not abundant. The undergrowth is composed predominantly of small-leaved shrubs such as **Myrtus obcordata, Coprosma rigida, C. rotundifolia, Paratrophis microphylla,** juvenile kaikomako and ramarama. Broad-leaved shrubs are present, but in lesser numbers and mainly as young plants. There are also seedlings and young saplings of tawa, white maire, rewarewa, titoki and other trees, but **not** of totara. On the ground are ferns, uncinias, the grasses **Microlaena avenacea, M. polynoda** and **Poa anceps** and also patches of moss. In many respects the undergrowth gives the impression of having to withstand periods of desiccation, and this is demonstrated in summer when the leaves of any mahoes present become visibly wilted by the warm air blowing in from the riverbed, and also by the presence of dead tawa saplings apparently killed by drought. However this comparative lack of broad-leaved shrubs may partly be the result of browsing by stock, which have been plentiful there in the past.

As the forest got older some totaras would die through wind-throw and other causes and the gaps be filled by various mixed-forest species. There is a small area of older forest preserved. Here the totaras are considerably larger and more widely spaced. Their crowns often do not meet, and between them are tawa, titoki and other trees. The undergrowth is more of the mixed-forest type. This particular area of forest appears to be moving towards tawa dominance, but where the soil is built up sufficiently to retain moisture kahikatea would probably come in.

Swamp Forest. Only small pockets of this type occur, in hollows and at the base of a cliff where there is a seepage. The main tree species are kahikatea, pukatea and maire-tawake (**Eugenia maire**). Where the forest is very dense kahikatea is largely replaced by the more shade-tolerant pukatea. In more open places there is often much young kahikatea, together with such species as cabbage tree, mapou, putaputaweta, karamu, **Coprosma tenuifolia,** tutu, **Rubus schmidelioides, R. australis,** several sedges and sometimes even totara. Some of these species may occur here because of the greater light rather than the abundant moisture.

Cliffs, Stream Banks, Forest Margins. These situations are similar in that greater light reaches the ground than it does in the forest proper. In other respects they may vary from wet to dry and from sunny to shady, with corresponding differences in the vegetation. Dry cliffs sometimes carry beech forest. Other sunny cliffs, particularly those of papa, carry light-demanding shrubs and small trees. Kowhai is particularly conspicuous, together with tutu, koromiko, karamu, toetoe, **Poa anceps,** and on more stable and gentler slops kohuhu, tarata, fivefinger, akeake, mamaku, rewarewa, totara, a number of lianes and bracken. On damp and shady banks there are hangehange, **Coprosma australis** and other plants composing the normal forest undergrowth, with kamahi conspicuous on poorer soil. Small gullies may be dominated by mamaku.

Along stream banks are found pate, fuchsia, tutu, karamu, kamahi in places, and often thickets of **Dicksonia squarrosa.** The crack willow and tall fescue are now common here, and are usually the most vigorous colonizers of any moist bare ground.

The forest margins along the river have been extensively modified by stock. Such light-demanding species occur as manuka, mapou, lacebark, kowhai, young totara and willows, sometimes with a growth of bracken. The bracken, which is also present along the artificial bush edges at the back, does have one good point in that it is excellent at stopping ground winds, which in summer would dry up the undergrowth considerably.

The Reserve holds great attractions as a picnic and camping ground. In 1947 the Palmerston North City Council took over the control of the area with the idea of further developing it for this purpose. In the past extensive damage has been caused by fire and by wind. Cattle have trampled out much undergrowth, but are now largely excluded. Opossums are plentiful, but the amount of damage they are doing, though probably considerable, is difficult to assess. The greatest menace is fire. Since 1927 four fires have been recorded, luckily all confined largely to areas of bracken. This raises the question of whether anything should be done to speed up the regeneration along the road and in other places where the present growth of bracken is a real fire danger. I do not think there could be any objection to planting these danger areas with species natural to the situation, raised from seed gathered in the Reserve.