

RICCARTON BUSH

A remnant of the Kahikatea
swamp forest formerly exist-
ing in the neighbourhood of
Christchurch, New Zealand.





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Riccarton Bush

A remnant of the Kahikatea swamp forest
formerly existing in the neighbourhood of
Christchurch, New Zealand.

Edited by
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Rector and Professor of Biology
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Hon. Secretary, Riccarton Bush Trustees.



Christchurch, N.Z.
The Canterbury Publishing Co., Ltd.
1924.



General view showing forest trees with growth of shrubs and juvenile forms in the foreground.

Riccarton Bush

AN APPEAL

*The forest springs eternal; gnarled, o'ergrown
With thousand fragile plants that soften age,
The trees of centuries stand mute and hoar,
Their young supplanters tender at their feet.
Shall we erase what ruthless time has spared?
The trees stand mute, but in our hearts we hear:
"Beneath this shade our earliest pioneer
Awaited a young people; in this shade
The ancient Maori rested, ere yet spade
Or sickle touched these teeming plains, or voice
Of man bade this wide fruitful waste rejoice.
Silent the link 'twixt past and present stands;
Shall it be spared, or perish, at your hands?"*

JOHANNES C. ANDERSEN.

30/7/06.

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PREFACE

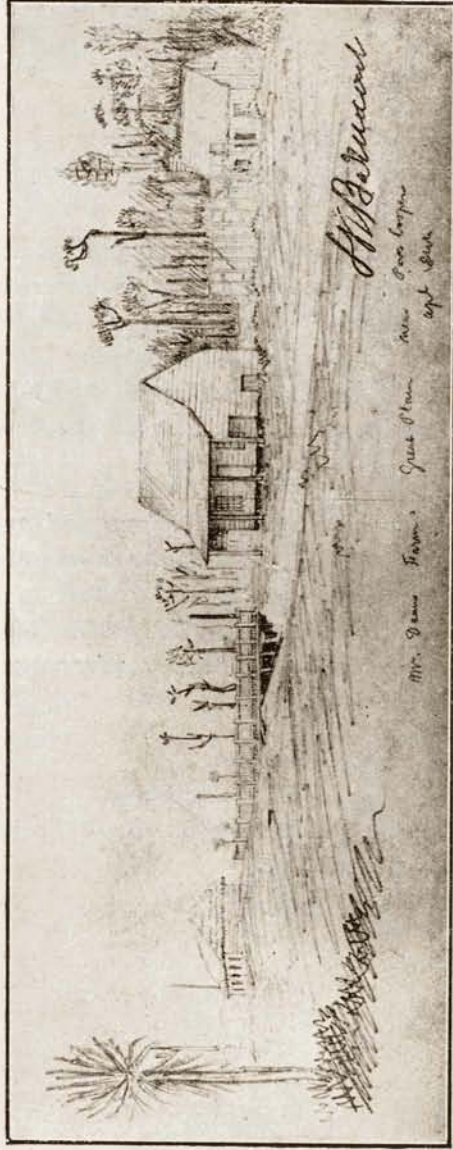
The Trustees desire to express their grateful thanks to all who have contributed to this booklet, and particularly to Mr. W. F. Robinson, Lecturer in Surveying at the School of Engineering, Canterbury College, for the preparation of the map of the Bush.

They hope the booklet will make the value of the Bush better known and appreciated, and that it will encourage its readers to assist the trustees in their effort to preserve the Bush as nearly as possible in its original condition for the advantage of future generations.

*Chas. Chilton,
Hon. Secretary,
Riccartern Bush Trustees.*

*Canterbury College,
November 30, 1924.*

(d)



(b)

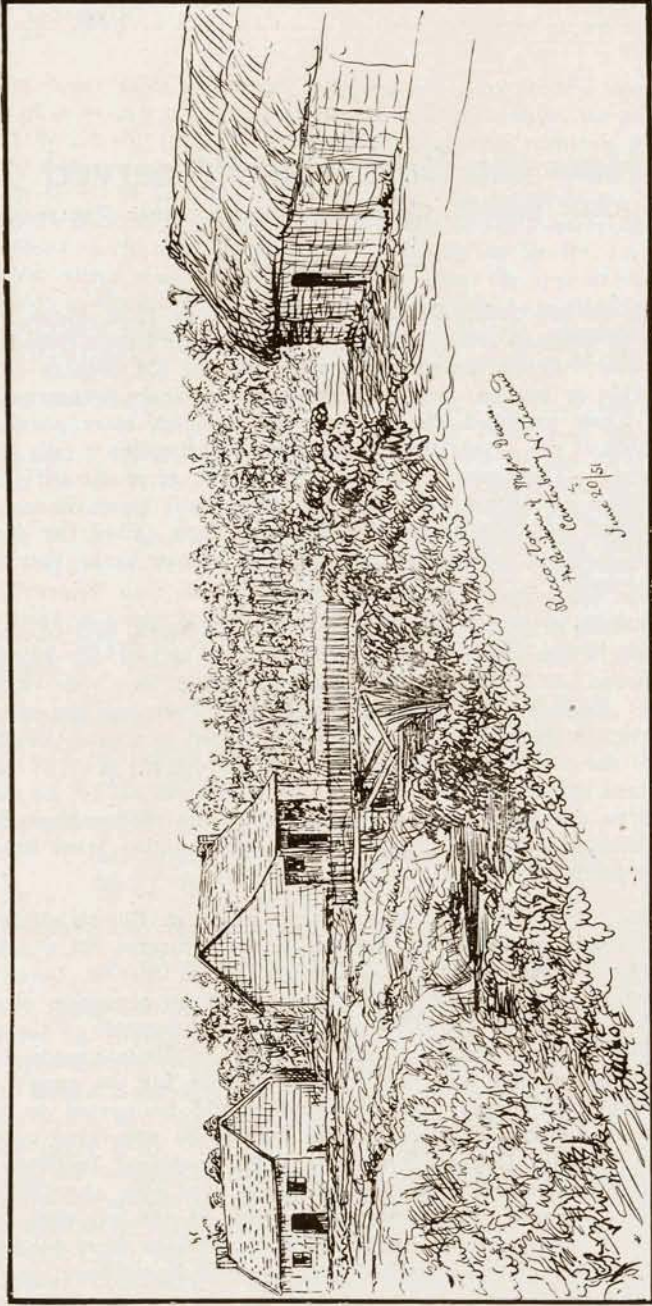
(a)

The Deans Homestead in 1844. (a) First house built. (b) Second house built (still standing, 1924).
 (c) Third house in course of erection. (d) Shed. River Avon in foreground.

(c)

(b)

(d)



The Deans Homestead in 1851. (b) Second house built (still standing, 1924).
 River Avon in foreground.

(c) Third house built. (d) Shed.

How the Bush was Preserved

By JOHN DEANS, Chairman, Riccarton Bush Trustees.

William and John Deans left Scotland in 1839, arriving in Wellington early in 1840. Finding the land in the North Island and Nelson that they had bought before leaving the old country either inaccessible or useless, they determined to try their fortunes elsewhere. They explored the country, and decided, after obtaining the consent of the authorities, to settle at Putaringamotu (the place of an echo). They named the place Riccarton, after the parish on the outskirts of Kilmarnock, where their father's home, Kirkstyle, was situated, and the river (the Otakaro) they called the Avon, after the Scottish stream of that name on whose banks they had played as boys.

The Bush originally consisted of about 50 acres, half of which was given to the Canterbury settlers on their arrival, for building purposes and for firewood. The balance was kept as a reserve, and a belt of English trees planted round it to keep out the winds, which, even in those early days, were recognised as among the chief causes of the decay of the native forests. Before his death in 1854, John Deans expressed a wish that every endeavour should be made to preserve the Bush from destruction, and his wishes have been strictly carried out, since that time no living native trees having been cut down for any purpose whatever.

Some years ago an endeavour was made in Christchurch to raise a fund to purchase the Bush from the Trustees for a public reserve, but the movement failed through lack of interest. Later on, after certain legal difficulties had been overcome, a portion of the Bush, with an area of 15½ acres, was given to the public of Canterbury. The principal conditions under which the gift was made were that the Bush should be preserved for all time for the growth of native trees and plants, that the land should be vested in, and managed by a Board of five Trustees, two to be appointed by the Christchurch City Council, one by the Philosophical Institute of Canterbury, and two by the Deans family, and that the City of Christchurch should provide annually a sum of not less than £100 towards the upkeep of the Bush. These conditions were accepted by the City Council, on behalf of the people of Canterbury, and on December 9, 1914, the Bush passed into the hands of the Trustees.

Of those who had taken a prominent part in the steps that resulted in securing the Bush for the use of the public, the names of Mr. H. G. Ell and Dr. L. Cockayne deserve special mention. By their efforts a committee of fifty-five well-known and influential citizens of Christchurch was set up to further the proposal to acquire Riccarton Bush as a public reserve. A List of the Flowering Plants and Ferns of the Riccarton Bush was drawn up by Dr. Cockayne, and this, with a short introduction pointing out the special character and value of the Bush, the names of the committee and Mr. Johannes C. Andersen's poetical appeal for its preservation, were published as a folio leaflet by the Lyttelton Times Co. on July 30, 1906.

It was, however, not until November 2, 1914, that the Act to incorporate the Trustees of the Riccarton Bush was passed by Parliament. Before this the members of the Deans family had offered the Bush as a gift to the Mayor of Christchurch, as the representative of the people of Canterbury, on the conditions already set out above; these had been accepted by the Mayor and are incorporated in the Act. In accordance with the terms of the Act Trustees were nominated by the bodies empowered to do so, a meeting was summoned by the Town Clerk, and on December 9, 1914, the Board of Trustees met, and was duly constituted, as follows:—

Nominated by the Deans Family—

Mr. John Deans, of Kirkstyle, Coalgate.
Mr. James Deans, of Homebush.

Nominated by the Christchurch City Council—

Mr. Henry Holland, Mayor of Christchurch.
Mr. J. R. Hayward, Councillor.

Nominated by the Philosophical Institute of Canterbury—

Dr. Charles Chilton.

Mr. John F. Tickell, who had previously been provisionally employed by the City Council as caretaker of the Bush, was duly appointed Ranger. Steps were taken immediately for the building of the Ranger's cottage, the erection of entrance gates, the fencing of the Bush, and the formation of a few narrow paths through certain parts of it. The City Council generously voted a sum of £500 for the erection of the Ranger's cottage, and allowed the plans to be drawn up by the City Architect, Mr. C. R. A. Dawe. The funds were supplemented by a subsidy of £125 from the Government, received through the good offices of Mr. C. R. Pollen and Mr. W. H. Skinner, Commissioners of Crown Lands, and by a special grant of £200 by the City Council.

The necessary work was accomplished in good time, and on February 24, 1917, the Bush was formally declared open to the public by His Excellency the Governor, Lord Liverpool, in the presence of Lady Liverpool and a large number of citizens, many of whom had taken part in the previous negotiations. By-laws for the control of the Bush were drawn up, and after approval by the Minister of Lands, Sir Francis Dillon Bell, were gazetted on May 31, 1917.

When the Bush was taken over by the Trustees, it was found that parts of it were overrun with elderberry, and that wild cherries and certain exotic trees had invaded other parts. These were gradually removed, care being taken not to injure the seedlings of native trees, which were growing in abundance on the forest floor. The result has been that native shrubs and trees have grown up in great abundance along the sides of the paths and in other vacant places, and the bush has been much improved, thus showing that the parts of the Bush destroyed are capable of regeneration. It is hoped gradually to replace the oaks and ashes, which had been planted around the Bush for protection, by native trees, and thus restore the Bush as nearly as possible to its original condition.

Contributions towards the funds at the disposal of the Trustees have from time to time been received from the Waimairi County Council, the Riccarton Borough Council, the Beautifying Association, Mr. H. F. Wigram, Mr. George Humphreys, and others, and an arrangement has been made with Canterbury College by which the College makes a small annual vote to the funds, in return for special privileges to the students of the Botany Classes, and the right to take specimens from the Bush for scientific purposes.



The History and Importance of the Bush

By DR. LEONARD COCKAYNE, F.R.S., F.L.S., F.N.Z.Inst.

The Riccarton Bush is quite young as compared with many New Zealand forests, but from the standpoint of British history it is venerable enough, for, at a modest estimate, there would already be on the ground a stately assemblage of tall trees at the time William the Norman first set foot on English soil.

The History of the bush is bound up with that portion of the Canterbury Plain where Christchurch stands. To north and to south of that city, as swamps and excavations have testified, there were here and there, perhaps several thousand years ago, forests of considerable size.

These forests, judging from the relation of their remains to the present surface of the Plain, would, as Professor R. Speight has pointed out, be buried through the "pouring in of sediment from adjacent rivers." Such destruction of trees by river gravel can be now seen especially well in the aggrading bed of the River Perceval (Hanmer), not far from its source. These early forests of the Canterbury Plain would be destroyed in one place, and established in another, and this would frequently occur. Or another method of destruction would be the flooding of the land, as Speight also explains, "owing to the changing course of the rivers," and, it may be added, the blocking of water-courses leading to actual swamp. These early forests would most likely receive their species in the first instance from Banks Peninsula, which, even during the glacial period, would be more or less covered with trees and their accompanying plants.

As for the Riccarton Bush itself, its actual origin may be learnt in the light of what is now happening in various parts of the North Island. No forest comes into existence all at once. There is a gradual procession of events—the successions of the plant-ecologists. The blocking of water-courses, already mentioned, would lead to growing-places suitable for swamp plants, whose seeds would be brought from older swamps, or wet ground, by rivers, birds and wind. According to the depth of the water,

different species would colonise the habitat. On its margin a belt of New Zealand flax would be established, and in the fairly deep water colonies of raupo, while on the water itself one or other of the pondweeds would make its home.

With decay of the dead parts of the plants forming peat, the water would become shallow enough to permit the flax to extend its area, and certain shrubs would enter the association, notably the common coprosma, the common koromiko, and the manuka; also cabbage-trees would gain a footing. With the advance of the flax and the shrubs the raupo would be sorely tried, and eventually destroyed. The niggerhead, the swamp-fern, the holy-grass, various willowherbs, and one or two water-buttercups would now join the assemblage if some had not already done so.

Humus would now accumulate more rapidly, and dust-like soil be brought by every north-west gale, so that a suitable dwelling-place for trees and shrubs tolerating wet ground would be available. An early settler would be the white pine or kahikatea, which, as its numbers increased and grew tall enough, would bring in forest conditions. Then would arrive the hepatics, mosses, lichens and ferns, the two former often making seed-beds on which would germinate the seeds of the incoming forest shrubs, herbs and lianes.

With the increase of species and individuals the struggle for existence would become much more deadly, and some species would disappear, but others survive, and some increase in numbers. Eventually a fairly stable forest association would be established which would belong to the class called white pine or kahikatea swamp-forest. Many other pieces of similar forest would arise northwards and southwards.

Finally came settlement, which rapidly wrought havoc in these primitive tree-communities, so that soon the Riccarton Bush alone remained. The latter was destined for a noble fate, thanks to the loving foresight of its original owners and their descendants, for they strove to preserve this ancient monument of Nature. Certainly their farmland had to be drained, and with this, to some extent, the Bush likewise. New conditions thus came about; competition between the species increased, which led rather to change in the relative number of individuals than to the extinction of species, though doubtless some succumbed.

How the Bush has been set aside by the splendid action of the Deans family, so that its silent development can proceed not only unchecked, but assisted, has been already told. But do those to whom it belongs—not the people of the district alone, but all New Zealanders—recognise how beyond price is this piece of ancient

forest? Do they understand it is the last tree-association of the kind in the whole world? Do they know that, if destroyed, it can never be replaced? Do they comprehend that it is an open-air museum of living organisms themselves belonging to species of great age, whose ancestors, far older, came to New Zealand in the dim past?

The lover of natural beauty, the reverent adorer of Nature, the student of life's processes, the curious merely—all find a welcome in the Bush, and, as time goes on, and primitive New Zealand fades away beyond our ken, near to the city's heart should stand, for the long years to come—a natural object to delight in and revere—this historic fragment of our country!

It must again be emphasised that the Bush is the last portion on the globe of a special type of forest. Change it into another type—no difficult matter—and its value is gone for ever. Never should tree, or shrub, or any other plant gain access to its soil which was not present in the primeval tree-community. Before introducing anything not there at present, the most anxious care should be exercised, and the best scientific advice procurable obtained and followed. Possibly better still would it be to let the Bush severely alone, with the proviso that all foreign growths be eradicated.



Botany of Riccarton Bush

By FLORA B. MURRAY, M.A.

KINDS OF FOREST IN NEW ZEALAND.

The islands of New Zealand have always been noted for their magnificent and impressive forests, some of which resemble tropical rain forest in the profusion of climbing plants and epiphytes. But our forests are not all mixed rain forests; there are some where one particular species of plant dominates the whole, as, for instance, the beech forests of the Southern Alps, and the kauri forests of Auckland. In addition to these there are small patches of forest growing in swampy localities which have a peculiar character of their own, and are spoken of as "swamp forests."

THE SWAMP FOREST.

Riccarton Bush may be looked upon as being the sole surviving remnant of those swamp forests which once flourished near the city of Christchurch and northwards along the coast of Canterbury. A swamp forest, unlike the luxuriant mixed rain forest seen in such beauty on the West Coast, has been determined more by soil conditions than by climatic factors; that is, the nature of the sub-soil has done more towards moulding its appearance than the number of rainy days and other weather conditions.

As Dr. Cockayne has said in an earlier part of this booklet, the land occupied by this forest was originally a vast swamp in which flax and bulrushes were the dominant plants. As the swamp became drier, the land was invaded by certain forest trees which there found favourable conditions for growth, and so formed the nucleus of the present forest. It has been estimated that this gradual change to drier conditions and subsequent invasion of the land took place before the earliest aborigines appeared in New Zealand, so that the land in Riccarton Bush has been occupied by this particular type of forest, swamp forest, for many hundreds of years. No tree, however, at present existing there is as old as the forest, but the present trees are the direct descendants of those original forest inhabitants, for so long as the soil conditions remained constant, then this particular type of forest would continue to occupy the land.

CLASSES OF PLANTS IN RICCARTON BUSH.

The general arrangement of the plants growing in Riccarton Bush may be first commented on. According to their height, the plants may be said to belong to one of four different tiers, namely, the tall trees forming the canopy of the forest, the smaller trees,



White Pine (*Podocarpus dacrydioides*) showing buttresses at base of trunk.

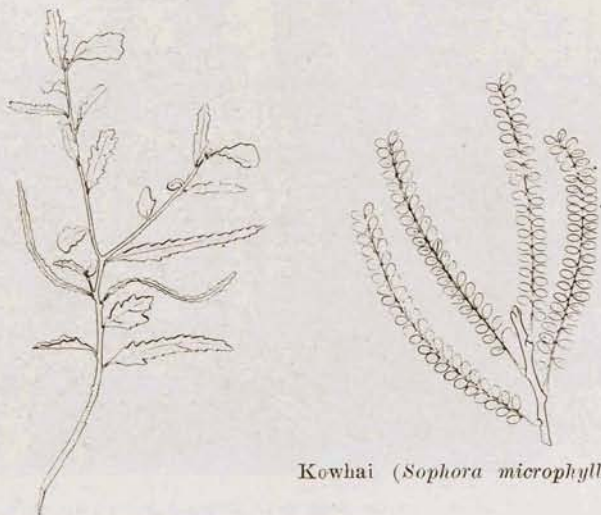
the shrubs, and finally, the forest floor, while connecting one tier with another are the lianes, or climbing plants.

FOREST TREES.

Most of the tall forest trees are Taxads, members of the Yew family, and are known as the White Pine (*Podocarpus dacrydioides*), Black Pine (*P. spicatus*), and the totara (*P. Totara*). The White Pine, or Kahikatea, is the most numerous, and hence the alternative name often given to this class of forest: Kahikatea forest.

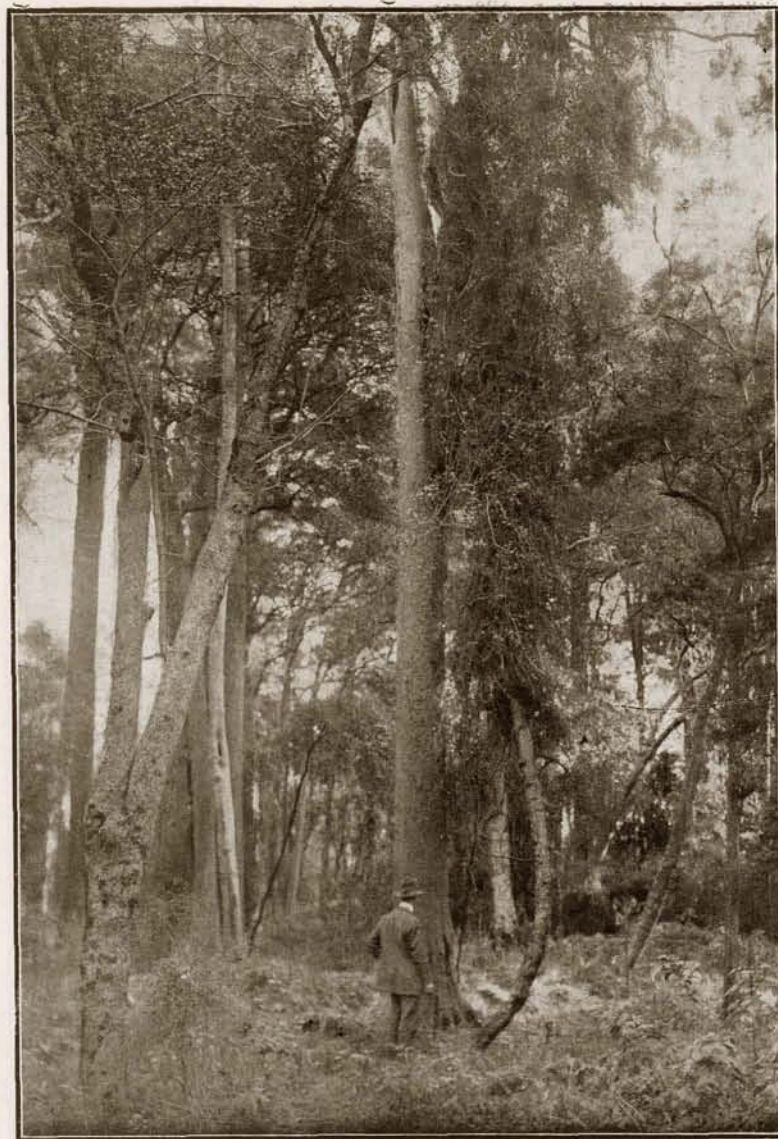
The White Pines grow closely together, and attain a great size, their trunks often being several feet in diameter and rising perpendicularly to a height of 90-120 feet with their lowest branches some 60 feet from the ground. The bark is dark grey, almost black in colour, and presents a beaten or hammered appearance. On the surface of the ground, the roots spread widely, forming, as it were, buttresses for the support of the tree. The ripe fruit of the White Pine, which falls about March or April, is very noticeable as it lies scattered on the ground; it consists of a small fleshy berry, about a quarter of an inch in length, and bright crimson in colour, bearing a shiny black nut, about one-fifth of an inch in length, at its summit. The leaves differ according to age, though owing to the height of the tree, the adult leaves, scale-like and closely appressed to the twig, cannot be readily examined; the young leaves are about a quarter of an inch long, flat, and arranged in a single row on each side of the twigs.

The Black Pine, or Matai, is not so large as the White Pine,



Kowhai (*Sophora microphylla*).

Pokaka (*Elaeocarpus Hookerianus*), juvenile.

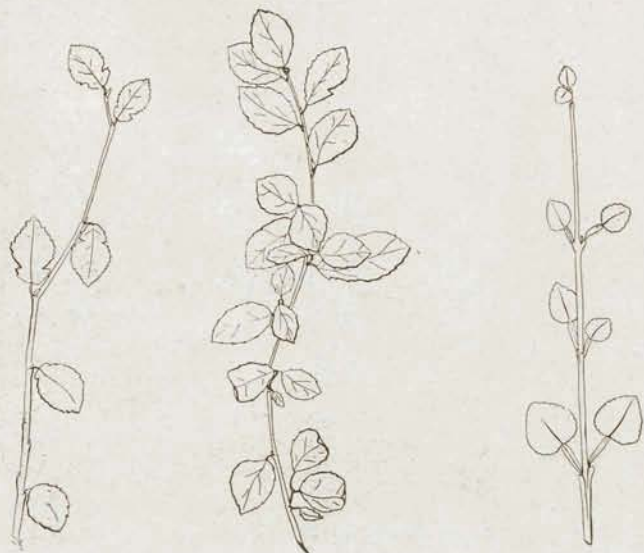


Bush-lawyer (*Rubus subpauperatus*) stretching up beside a supporting White Pine.

and is present in smaller numbers. The trunk does not show the buttress formation at the base, is darker in colour, and shows red when the bark scales are chipped off. The fruit, when mature, is like a small plum, having a fleshy, black outer portion enclosing a woody kernel. There is a more striking difference between young and adult stages of this tree than in the case of the White Pine. The young trees bear slender, drooping branches, with small, narrow, bronze-coloured leaves at the ends of the twigs, the whole having the appearance of a weeping tree. Very different is the adult tree, with its upright trunk bearing no branches until a considerable height is reached, these being then erect, and having a spiky appearance, due to the short, straight twigs, and the small, stiff, green leaves.

In both these pines, the juvenile characteristics may appear on small branches or twigs growing out from the trunk at no great height from the ground.

The Totara, of which there are very few in the bush, is very distinct from the White Pine, but bears a similar, though larger, fruit. Of the three, the Totara produces the most valuable timber, being next to the Kauri in durability and in its powers of resistance to marine animals when used as wharf piles, etc. The White Pine timber is useful, but is very liable to the attacks of a boring grub.

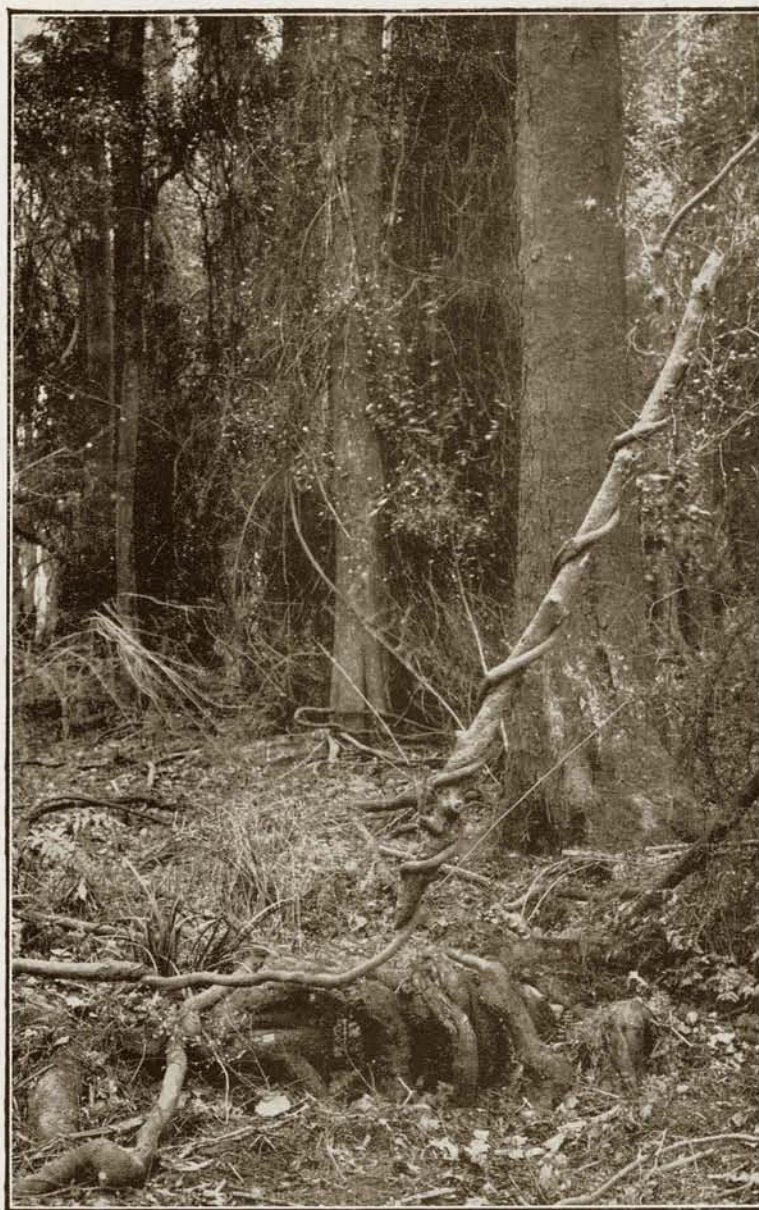


Juvenile.

Adult.

Melicope simplex.

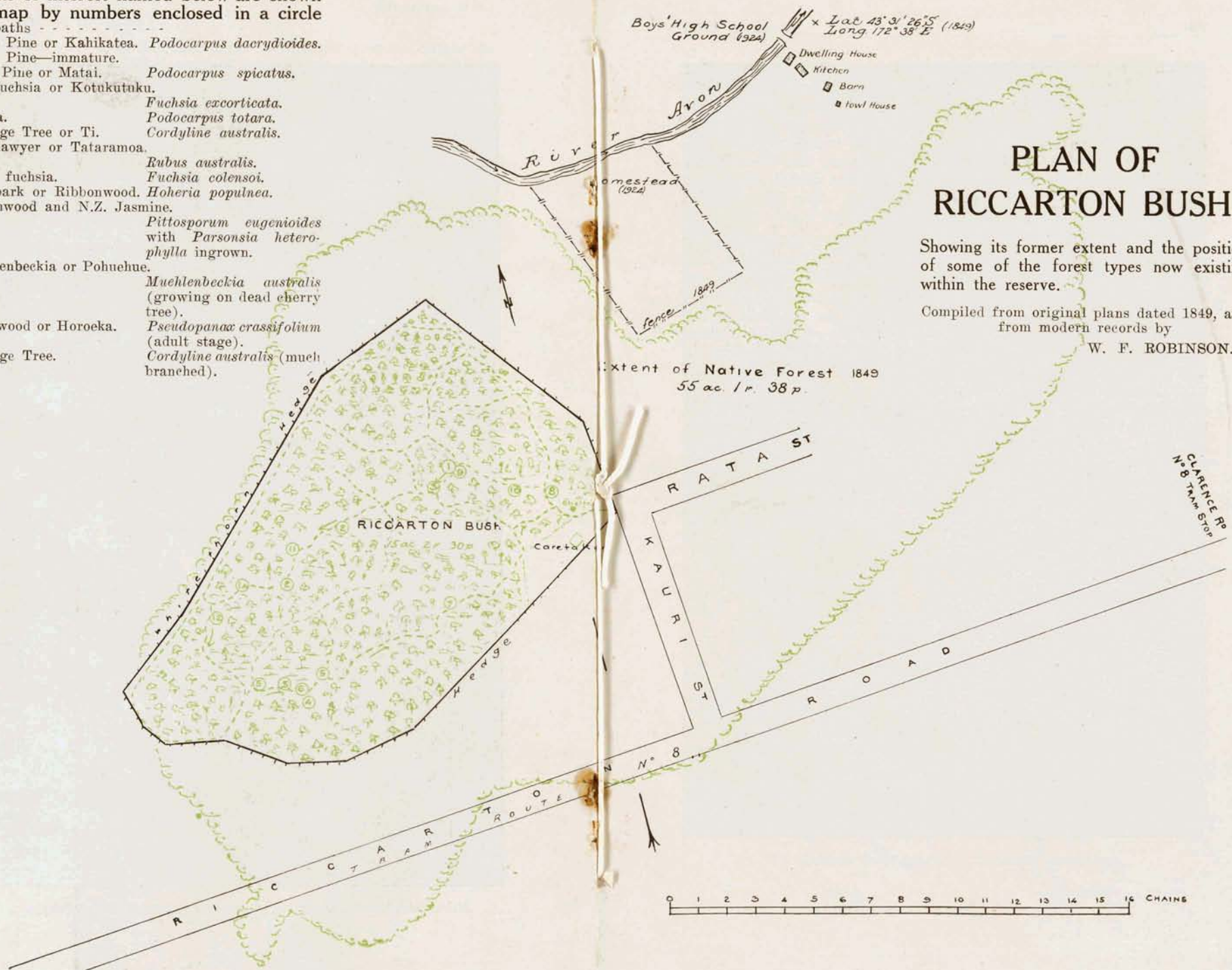
Milk Tree.
(*Paratrophis heterophylla*).



Muehlenbeckia australis. Twining stem round former support.

The points of interest named below are shown on the map by numbers enclosed in a circle

- Footpaths - - - - -
- 1 White Pine or Kahikatea. *Podocarpus dactyloides*.
 - 1a White Pine—immature.
 - 2 Black Pine or Matai. *Podocarpus spicatus*.
 - 3 Tree-fuchsia or Kotukutuku. *Fuchsia excorticata*.
 - 4 Totara. *Podocarpus totara*.
 - 5 Cabbage Tree or Ti. *Cordyline australis*.
 - 6 Bush-lawyer or Tataramoa. *Rubus australis*.
 - 7 Shrub fuchsia. *Fuchsia colensoi*.
 - 8 Lace-bark or Ribbonwood. *Hoheria populnea*.
 - 9 Lemonwood and N.Z. Jasmine. *Pittosporum eugenoides* with *Parsonsia heterophylla* ingrown.
 - 10 Muehlenbeckia or Pohuehue. *Muehlenbeckia australis* (growing on dead cherry tree).
 - 11 Lancewood or Horoeka. *Pseudopanax crassifolium* (adult stage).
 - 12 Cabbage Tree. *Cordyline australis* (much branched).



PLAN OF RICCARTON BUSH

Showing its former extent and the position of some of the forest types now existing within the reserve.

Compiled from original plans dated 1849, and from modern records by
W. F. ROBINSON.

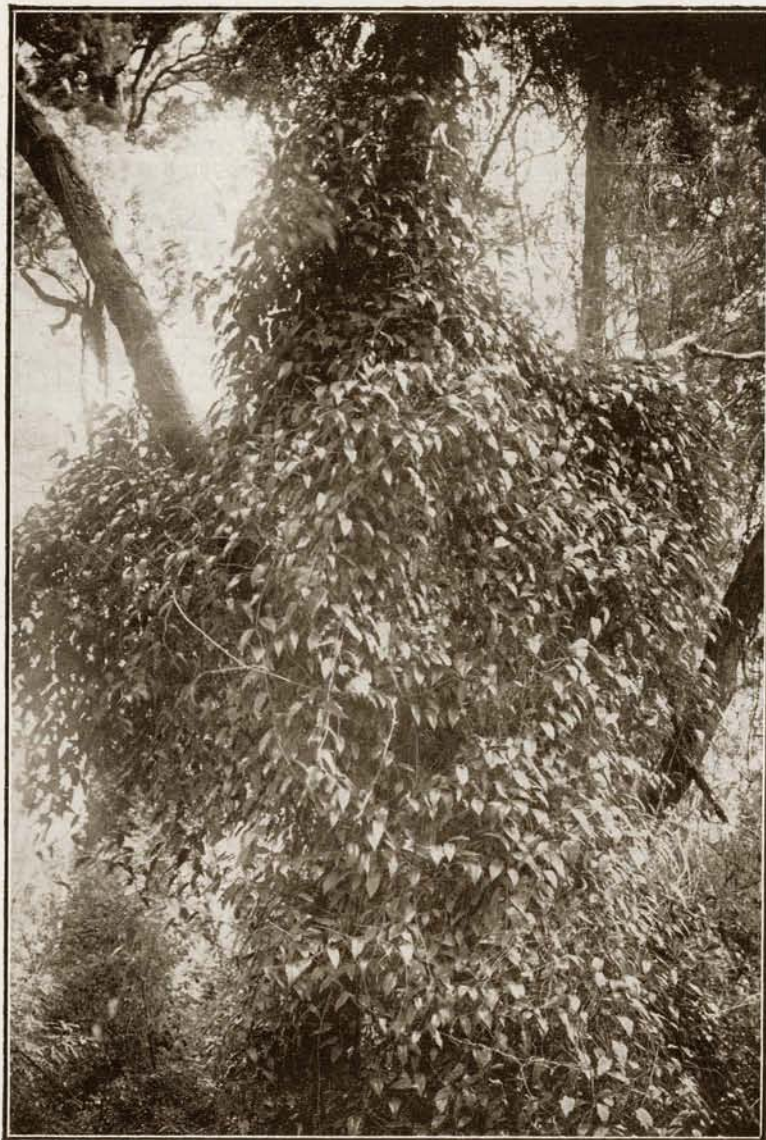
Growing to nearly the same height as the pines are two other species of tree, the Pokaka (*Elaeocarpus Hookerianus*), and the Hinau (*E. dentatus*). In a good season in October and November these trees are very beautiful, particularly the Hinau, with its sprays of creamy flowers. The fruit is bluish in colour, and somewhat resembles a small damson. These trees are also valuable for timber, that of the Hinau being the more durable, though the timber of both is equally used for general purposes. The Maoris made use of the bark of the Hinau for dyeing their flax cloaks black.

The smaller trees forming the second tier are represented by many more species, *Paratrophis microphylla*, the milk tree, and *Sophora microphylla*, the Kowhai, being especially abundant. Of these trees there are two, the Mahoe (*Melicactus ramiflorus*) and the Kaikomako (*Pennantia corymbosa*), which are the fire trees of the Maoris. A sharp, pointed Kaikomako stick was vigorously rubbed along a flat surface of Mahoe wood, the friction finally resulting in flame. Other trees of economic importance to the Maoris were the Ribbonwood (*Plagianthus betulinus*) and the Lacebark (*Hoheria angustifolia*). The inner bark of the former, which is very tough, and easily peels off, was in great demand for rope for fishing nets; while the inner fibre of the Lacebark was used more for ornamental purposes, as it is perforated in an irregular pattern. In Riccarton Bush there are also found, growing side by side, the true Maori Matipo or Mapau (*Suttonia Australis*=*Myrsine Urvillei*), and what is popularly known in our gardens as Matipo (*Pittosporum tenui-*



Juvenile.
Kaikomako (*Pennantia corymbosa*),

Adult.



New Zealand Passionflower (*Passiflora tetrandra*).

folium). These two, though at first glance similar, may be readily distinguished by the reddish stems of the former in contrast with the brown stems of the latter.

SHRUBS.

In the third tier many of the shrubs are but young stages of the mature trees, although in most cases the juvenile is so different from the adult that the two forms may be thought to be plants bearing no relation to each other. The commonest form which the juvenile stage assumes is that of a wiry shrub with twiggly interlacing branches and small membranous leaves, as seen in the young Ribbonwood, the Kaikomako, the Kowhai, the Pokaka and the milk tree. The juvenile stages of these plants at first sight seem to be similar, but differences may be found in their leaves. These young plants may be seen bordering any of the paths and attaining a height of over six feet. The most numerous shrubs, etc., are the Wineberry (*Aristotelia serrata*) and the various Coprosmas. The Wineberry is easily recognised by its handsome large leaves, thin and pale green, through which the sunlight filters. The central path from the entrance gate has a large number of these shrubs bordering it for some distance. The Coprosmas bear an identification mark on the under-surfaces of their leaves in the minute pores along the mid rib which are sometimes the home of small mites. The fruit of the *Coprosma* is a berry which varies in colour, being yellow, reddish orange, bright red or bluish black, according to the species. Another tree which should be noticed, on account of its handsome foliage, is the Putaputaweta (*Carpodetus serratus*). The



New Zealand Myrtle (*Myrtus obcordata*).



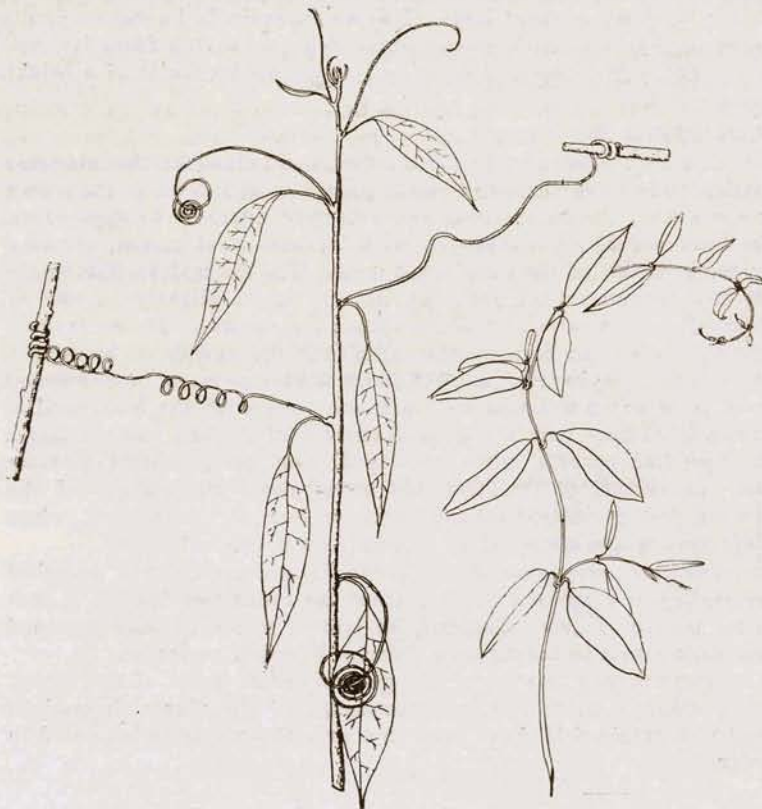
Ribbonwood (*Plagianthus betulinus*) adult.

leaves show a mottled surface of varying shades of green, and are very beautiful, while the flower is small and very fragrant.

On the floor of the forest are a certain number of smaller plants and ferns, such typical swamp plants as the niggerhead (*Carex secta*) and the toe-toe (*Arundo conspicua*) being among the number. Seedlings of all plants are also found in countless numbers, together with a grass (*Microlaena avenacea*), forming a living floor of vegetation.

LIANES.

Lianes, or climbing plants, are also present in great abundance from floor to ceiling of the forest, and attain a very great size. Especially is this the case with the Bush Lawyers (*Rubus spp.*), there being two giant plants of *Rubus australis*, one growing beside



New Zealand Passionflower (*Passiflora tetrandra*).

the track if the path to the left from the entrance be followed (6)*, and the other more towards the centre of the bush. The latter shows a very thick main stem, well over a foot in circumference, dependent from a dead white pine trunk which has been propped up in various ways so that it may still continue to support the creeper. The *Muehlenbeckias* also attain to a great thickness of stem. In many cases the stems of the lianes have slipped from their support, and lie in grotesque twisted masses on the ground. Besides the Lawyers, scrambling upwards by means of prickles on the stems and midribs of the leaves, and the *Muehlenbeckias*, there are also the New Zealand jessamine (*Parsonsia*, 2 species), a climbing Fuchsia (*F. Colensoi*), a Rata (*Metrosideros hypericifolia*) climbing by aerial roots, and the New Zealand Passionflower (*Passiflora tetandra*). The fact of the last being found in Riccarton Bush is noteworthy, since it is typically a North Island plant, and this is its most southern limit. It is an exceedingly handsome plant, forming sheets of dark, glossy green foliage hanging from its supports, and in the season displaying its ripe, fleshy fruits of a bright orange colour.

PARASITES.

The Parasites are three in number, and belong to the mistletoe family. They are partial or water parasites, and develop their own green tissue, the roots being the defective organs. In appearance they are shrubby little plants, with leathery oval leaves, growing on the branches of the shrubs and trees. The method of attachment to, and penetration of the host tissues, varies slightly in two of them, *Tupeia antarctica* and *Loranthus micranthus*. In the former, when the seed has been deposited through the agency of birds in a favourable position for growth, a root-like process is developed from it, which penetrates the bark and tissues of the host until it comes in contact with the upward current of the sap. In the latter the root-like process, when developed, does not penetrate directly into the tissues of the host, but grows down the surface of the branch, and at intervals sends suckers into the host stem, while leafy shoots are given off at intervals on the exterior.

The third mistletoe, *Korthalsella*, in Riccarton Bush, parasitic on *Melicactus ramiflorus*, differs from the other two in that it produces no true leaves. Instead, its jointed stems become flattened and dark green in colour, and thereby function as leaves.

So much may be said for the general arrangement of the forest, but possibly a more accurate knowledge of the plants themselves might be obtained if those seen on a typical walk were indicated in order.

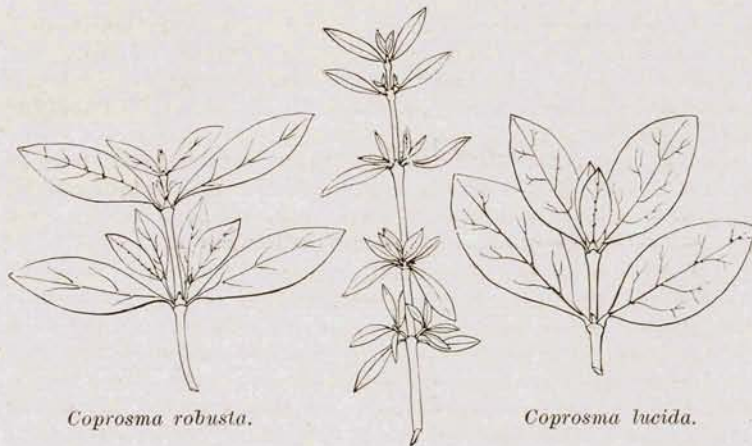
*These figures refer to the numbers enclosed in a circle in the map of the Bush, which indicate the position of the trees referred to in the text.

TYPICAL WALK.

The patch of shrubs seen on entering the main gate into the Ranger's grounds from Kauri Road should be first noticed, for here are many of the commoner plants. On the right of the path are Coprosmas, both large and small leaved species, while on the left are small shrubs of *Melicope*, Kowhai and Myrtle (*Myrtus*), together with flax (*Phormium*) and cabbage trees (*Cordyline*). In the centre of the patch are two juvenile White Pines and one Totara, while in the background are two large specimens of the adult Lancewood (*Pseudopanax*). At the smaller gate entering into the Bush itself two other distinctive plants are seen, on the left the Lemonwood (*Pittosporum eugenioides*), while over the fence to the right clammers a creeper, one of the *Muehlenbeckias* (*M. australis*). Immediately inside this smaller gate one passes through a group of young kowhais, easily recognised by their feather-like leaves.

As one stands in front of the shelter a very typical group of white pines can be seen some distance away, while in the foreground stands the large trunk of an old Lacebark (8)*, which, however, does not show any adult leaves, but bears instead tufts of juvenile branches the whole length of the trunk. To the right may be seen a portion of the shelter belt of oaks planted for the preservation of the bush.

On following the central path from the shelter, one passes almost immediately into a dense leafy avenue. On either side of



Coprosma robusta.

Coprosma lucida.

Common coprosma (*Coprosma propinqua*).

*These figures refer to the numbers enclosed in a circle in the map of the Bush, which indicate the position of the trees referred to in the text.

the path there grow thickly together Coprosmas, broad, narrow, and round-leaved species, intermingled with the Lemonwood, the Gardener's Matipo (*P. tenuifolium*), and the Wineberry. At intervals large trees are seen at the edge of the path, the first noticeable one on the left being a half-dead Cherry tree (10)*, which has been ringed, but still supports the climbing stems of a *Muehlenbeckia*. A little further on, on the right, stands a large Hinau, with many large, dead-looking *Muehlenbeckia* stems depending from it. The first White Pine to be seen at close quarters on this walk stands a few yards further on from the Hinau and on the opposite side of the path. It shows some juvenile shoots growing out from the mature trunk, and also, to a certain extent, the buttress formation of the lower part of the trunk. Behind the tree may be seen a vista of pines and liane stems.

Taking the left path when the main path divides, one finds that the dense growth on either side still continues. Two specimens of the Lemonwood, growing side by side on the left, are worthy of notice in that a climbing stem of *Parsonsia* (9)* has twined round their trunks and become almost embedded in the tissue of the trees.

A magnificent White Pine (1) is seen a little further on, its large partially-buried roots forming tangled masses on the ground and affording a convenient seat for the visitor. The huge trunk shows the buttress-like formation of its base exceedingly well. A smaller pine grows close beside it, and such has been the development of the trunk of the first that the two trees have become fused at their base so that the appearance is of a large trunk divided into two upright parallel branches. Overarching the path a short distance further on stands a large Fuchsia (*F. excorticata*) (3), easily identified by its light-coloured papery bark, which comes off in thin strips.

By keeping straight on one comes to a more open part of the bush, where the shrubs are fewer, and the columnar trunks of the pines can be seen to advantage. Intermingled with the pines are a number of oaks which have been planted for shelter. On the left a large Black Pine (2) is seen near the edge of the path, its bark showing yellow stains from the presence of a lichen growing on it; while a little further on, on the opposite side of the path, grows a large adult Lancewood (11). Continuing, one comes to a young White Pine (1a), about twenty-five feet high, and showing juvenile foliage overhanging the path to a certain extent. If, on the division of the path, the one to the left be followed, one passes several large Cabbage Trees hung with various creepers, the pods

*These figures refer to the numbers enclosed in a circle in the map of the Bush, which indicate the position of the trees referred to in the text.



View of portion of the Bush showing lianes.

of the *Parsonsia* being conspicuous objects in January and February. In the foreground are creepers again, the lawyer, Passionflower, and a climbing *Solanum*, an introduced species, whose scarlet berries make a bright patch of colour in March and April. This portion of the bush affords a very fine view of the various lianes clothing the tall trunks, and binding one trunk to another with festoons of greenery.

Following the windings of the path as indicated by arrows on the map, one finds oneself returning towards the centre of the bush, and the smaller trees and shrubs are again seen growing in profusion. The track passes through a grove of young Cabbage trees (5), while a few yards further on, and some distance back from the right border of the path, stands a Totara (4), not yet fully grown. Just past the small gate leading into the Ranger's back garden may be seen on the right a large shrub of the second species of Fuchsia found in the Bush, namely, *F. Colensoi*. The path now joins the one from which the tour was commenced, and so a circuit of the Bush has been completed. This is but a typical walk, and much time might be occupied by those interested in exploring the numerous other paths.

VALUE OF RICCARTON BUSH.

This general account of the botany of Riccarton Bush does not do justice to it as a unique forest type. Its value does not arise so much from the actual native plants which are found there (for similar plants may be found in other parts of New Zealand), but from the combination in which the plants are found, Dr. Cockayne claims that there is "no other similar combination on the face of the earth"; for all the species of trees and shrubs, with but two exceptions, *Melicytus ramiflorus* (found also in Norfolk and Tongan Islands) and *Solanum aviculare* (found in Norfolk Island, Tasmania and Australia), grow only in New Zealand, while, with the exception of *Muehlenbeckia australis* (growing also in Norfolk Island), all the climbing plants are true New Zealanders.



Small-flowered Jasmine
(*Parsonsia capsularis*).

*These figures refer to the numbers enclosed in a circle in the map of the Bush, which indicate the position of the trees referred to in the text.

Flowering Plants and Ferns of Riccarton Bush

1.—TREES AND SHRUBS.

<u>Botanical Name.</u>	<u>English Name.</u>	<u>Maori Name.</u>	<u>Family.</u>
Aristolotelia			
<i>serrata</i>	Wineberry	Makomako	Elaeocar- paceae
Carmichaelia	Common N.Z.		
<i>subulata</i>	Broom		Leguminosae
Carpodetus			
<i>serratus</i>	N.Z. Hawthorn	Putaputawheta	Saxifragaceae
Coprosma	Thin-leaved		
<i>areolata</i>	Coprosma		Rubiaceae
*Coprosma			
<i>crassifolia</i>			"
*Coprosma			
<i>Cunninghamii</i>		Mingimingi	"
*Coprosma			
<i>lucida</i>		Karamu	"
Coprosma	Common		"
<i>propinqua</i>	Coprosma	Mingimingi	"
Coprosma	Red-fruited		"
<i>rhamnoides</i>	Coprosma		"
Coprosma	Round-leaved		"
<i>rotundifolia</i>	Coprosma		"
Coprosma			
<i>robusta</i>	Glossy Karamu	Karamu	"
Coprosma rubra			
Cordyline			
<i>australis</i>	Cabbage-tree	Ti, Ti-kouka	Liliaceae
Elaeocarpus			
<i>dentatus</i>		Hinau	Elaeocar- paceae
Elaeocarpus			
<i>Hookerianus</i>		Pokaka	"
Fuchsia			
<i>excorticata</i>	Tree-Fuchsia	Kotukutuku	Onagraceae
Griselinia			
<i>littoralis</i>	Broadleaf	Kapuka	Cornaceae
Hoheria			
<i>angustifolia</i>	Lacebark	Houhere	Mulvaceae
Melicope simplex		Poatanihwa	Rutaceae
Melicytus			
<i>ramiflorus</i>		Mahoe	Violaceae
Melicytus			
<i>micranthus</i>			"
Myrtus			
<i>obcordata</i>	N.Z. Myrtle	Rohutu	Myrtaceae

* Included in Dr. Cockayne's list, 1906, but not in Professor Wall's, 1923.

Botanical Name.	English Name.	Maori Name.	Family.
Myrtus pedunculata	N.Z. Myrtle	Rohutu	"
*Myporum laetum		Ngaio	Myoporaceae
*Nothopanax (Panax) arboreum	Ivy-tree	Whauwhau-paku	Araliaceae
Paratrophis microphylla	Milk-tree	Toropo	Moraceae
Pennantia corymbosa		Kaikomaka	Olacinaceae
Plagianthus betulinus	Ribbon-wood	Manutu	Malvaceae
Pittosporum Colensoi	(Possibly introduced into the bush)		Pittosporaceae
Pittosporum eugenioides	Lemonwood	Parata	"
Pittosporum tenuifolium	"Matipo" of garden (not of Maoris)	Kohuhu	"
Podocarpus dactyloides	White Pine	Kahikatea	Taxaceae
Podocarpus spicatus	Black Pine	Matai	"
Podocarpus totara		Totara	"
Pseudopanax crassifolium var. unifoliolatum	Lancewood	Horaeka	Araliaceae
Solanum aviculare	"Bull-a-bull"	Poroporo	Solanaceae
Sophora microphylla	"N.Z. Laburnum"	Kowhai	Leguminosae
Suttonia australis	Red Matipo, Red Maple.	Mapou	Myrsinaceae
Wintera colorata	Pepper-tree	Horopito	Magnoliaceae

2.—CLIMBING PLANTS.

Clematis indivisa	Native Clematis	Puawhananga	Ranunculaceae
Fuchsia Colensoi	Climbing Fuchsia		Onagraceae
Metrosideros hypericifolia	Common Climbing-rata		Myrtaceae
Muehlenbeckia complexa	"Wiggy Bush"	Pohuehue	Polygonaceae
Muehlenbeckia australis		Puka	
Parsonsia heterophylla	N.Z. Jasmine	Kaiku	Apocynaceae

* Included in Dr. Cockayne's list, 1906, but not in Professor Wall's, 1923.

Botanical Name.	English Name.	Maori Name.	Family.
Parsonsia capsularis var. rosea	Small-flowered Jasmine	Aka-kiore	"
Rubus australis	Bush-lawyer	Pataramoa	Rosaceae
Rubus cissoides var. glaber	"	"	"
*Rubus cissoides var. pauperatus	"	"	"
Rubus schmidelioides	"	"	"
Rubus subpauperatus	"	"	"
Passiflora tetrandra	N.Z. Passion-flower	Kohia	Passifloraceae

3.—PARASITES.

Korthalsella Lindsayi	N.Z. Mistletoe		Loranthaceae
Loranthus micranthus	"		Loranthaceae
Tupeia antarctica	"	Pirita	Loranthaceae

4.—HERBACEOUS PLANTS.

Acaena Sanguisorbae	Biddy-biddy	Piri Piri	Rosaceae
Arundo conspicua	Toetoe	Toetoe-kakaha	Gramineae
Astelia nervosa	Bush-flax	Kakaha	Liliaceae
Cardamine heterophylla	Hairy Bitter-cress		Cruciferae
Carex dissita var. Lambertiana			Cyperaceae
Carex lucida	Shining-sedge		
Carex secta	Nigger-head		"
Carex Solandri			"
Carex ternaria	Cutty-grass		"
Carex virgata			"
Epilobium rotundifolium	Round-leaved Willowherb		Onagraceae
Epilobium pictum			
Erechtites prenanthoides	Common Fireweed		Compositae
Geum urbanum	Common Avens		Rosaceae
Gnaphalium luteo-album	White Cudweed		Compositae
Gnaphalium japonicum	Japanese Cudweed		"

* Included in Dr. Cockayne's list, 1906, but not in Professor Wall's, 1923.

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<i>Botanical Name.</i>	<i>English Name.</i>	<i>Maori Name.</i>	<i>Family.</i>
Hydrocotyle americana	American Marsh-pennywort		Umbelliferae
Microlaena avenacea	Forest Rice-Grass		Gramineae
Parietaria debilis	Pellitory		Urticaceae
Poa imbecilla	Weak Poa		Gramineae
Ranunculus hirtus	Hairy Buttercup	Kopukapuka	Ranunculaceae
Ranunculus rivularis	Water Buttercup	Waoriki	"
Stellaria parviflora N.Z.	Stitchwort	Kohukohu	Caryophyllaceae
Solanum nigrum	Black Nightshade		Solanaceae
Uncinia australis	Hooked-sedge	Matau-a-Maiu	Cyperaceae
Uncinia leptostachya	Hooked-sedge	Matauririki	"

5.—FERNS.

Aspidium vestitum	Prickly Shieldfern		Filices
Aspidium Richardi	Richard's Shieldfern		"
Asplenium bulbiferum	Common Spleenwort	Mouki, Moku	"
Asplenium flabellifolium	Necklace Fern		"
Asplenium flaccidum	Flaccid Spleenwort	Raukatauri	"
Asplenium Hookerianum	Spleenwort		"
Hypolepis tenuifolia	Thin-leaved Hypolepis		"
Lomaria penna marina	Alpine Hardfern	Horokio	"
Lomaria capensis	Long Hardfern	Kio Kio	"
Pellaea rotundifolia	Round-leaved Pellaea		"
Polypodium diversifolium	Common climbing Polypody	Paraharaha	"
Polypodium pennigerum	Feather-fern	Pakaurohroha	"
Polypodium punctatum			"
Cyclophorus serpens	Creeping Polypody		"
Pteris aquilina var. esculenta	Bracken	Rau-aruke	"
Histiopteris incisa	Water-fern	Matata	"

Publications and researches dealing with the Riccarton Bush

RICCARTON BUSH. List of the Flowering Plants and Ferns, with introductory note, etc. DR. L. COCKAYNE, F.R.S. Lyttelton Times Co., July 30, 1906.

OBSERVATIONS ON THE LIANES OF THE ANCIENT FOREST OF THE CANTERBURY PLAINS OF NEW ZEALAND. J. W. BIRD, M.A. Transactions, New Zealand Institute, vol. 48, pp. 315-351, Plates 23-26, 1915.

SOME ECOLOGICAL AND ANATOMICAL NOTES ON THE MILK TREE (*Paratrophis heterophylla*). MISS R. M. INNES, M.A.

Read before the Philosophical Institute of Canterbury, August 24, 1921.

THE RICCARTON BUSH. PROFESSOR ARNOLD WALL. Lyttelton Times Co., 1923.

RICCARTON BUSH—A DEGENERATING REMNANT OF THE KAHIKATEA SWAMP FOREST OF CANTERBURY. MISS MARGARET S. FITZGERALD, M.Sc.

Read before the Philosophical Institute of Canterbury, October 22, 1924.

The Board of Trustees of the Riccarton Bush

CHAIRMAN:

Mr. John Deans.

HON. SECRETARY and TREASURER:

Dr. Chas. Chilton.

TRUSTEES:

Nominated by the Deans Family—

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Nominated by the Philosophical Institute of Canterbury—

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Ranger: Mr. John F. Tickell.

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FORMER TRUSTEES:

Mr. Henry Holland 1914 to 1919.

Mr. J. R. Hayward 1914 to 1919.

Mr. C. S. Harper 1919 to 1921.

Mr. J. W. Beanland 1919 to 1921.

Riccarton Bush—By-Laws

Department of Lands and Survey,

Wellington, 29th May, 1917.

His Excellency the Governor has approved the following by-laws made by the Riccarton Bush Trustees under Section 15 of the Riccarton Bush Act, 1914.

Hours.

1. The Bush shall be open daily from 1 p.m. to sunset. On the following holidays the Bush shall be open from 10 a.m. to sunset—viz., Christmas Day, Boxing Day, New Year's Day, Good Friday, Easter Saturday, Easter Monday, and Labour Day.

Children.

2. Children under twelve will not be admitted, unless accompanied by some responsible person.

Firearms.

3. No person shall take any firearms or any instruments of a dangerous character within the limits of the Bush, except with the permission in writing of the Board.

Fires.

4. No person shall light any fire within the limits of the Bush, except with the permission of the Board.

Dogs.

5. No person shall bring any dog into the Bush.

Bicycles.

6. No person shall take any bicycle into the bush.

Parcels.

7. No person shall carry parcels of any kind into the Bush, unless permitted to do so by the Ranger.

Injury to the Bush.

8. No person shall injure any tree, shrub, fern, or plant, or wilfully take or injure any bird or animal in the Bush, or in any way do damage to the Bush.

Disorderly Persons.

9. No disorderly person, vagrant, or person of bad repute shall be allowed within the limits of the Bush.

Refuse Litter.

10. No person shall leave bottles, glass, paper, or other litter within the limits of the Bush, except in receptacles especially provided for the purpose.

Keeping to the Paths.

11. All persons visiting the Bush shall keep to the paths provided.

Sale of Goods.

12. No person shall sell, or offer for sale, any article of merchandise, or carry on any trade, within the limits of the Bush, without the permission in writing of the Board.

Assemblages.

13. No sports, games, or meetings of any sort shall be held within the limits of the Bush without the permission in writing of the Board.

F. H. D. BELL,

For Minister of Lands.

[Extract from *N.Z. Gazette* No. 91, 31st May, 1917.]



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