Harbour. This protective work extends, with short intervals, for several miles, and is composed of two rows of piling, the outer row being driven strictly within high watermark and about 8 or 9 feet above the ground level; the inner row is driven into the embankment about 8 or 10 feet behind the outer row, and about 3 feet above the ground level. The two rows are connected by rimu scantlings, which are roughly let into the piles and secured by spikes, the front row being covered, to the height of 5 or 6 feet, with rimu boarding, and the space between the two rows of piles for the most part left open.

Many of the piles in both rows are miro, but a most remarkable difference is shown in the durability of those in the front row, which are exposed to the influence of sea water, and those in the back row, which are not. Not a single miro pile in the back row is in a sound condition—many of them can be easily kicked to pieces. In the front row, not a single pile is unsound, and the bark and sap-wood, in many instances, appear as fresh as when the trees were cut. Mr. Hawkins, Inspector of Permanent Way, informed me they had been driven ten years.

I have been unable to find another instance in which the miro has exhibited equal durability in exposed circumstances. Used as piles for fresh-water bridges, it has decayed in less than seven years.

23. Entire-leaved Beech.—(*Fagus Solandri.*)

This tree occurs from the centre of the North Island to Otago, and is often found in much greater abundance than the preceding species. It attains similar dimensions, but is easily distinguished by the entire leaves. The heart timber is of a darker colour, and the white sapwood much larger in proportion, which has probably led to its being called white birch in certain districts.

The timber is certainly less durable than that of *Fagus fusca*, but, owing to the confusion arising from the misapplication of the common names of the different beeches even in the same district, I have been unable to obtain precise and satisfactory evidence on this point, except with regard to its employment for piles.

For fresh-water piles it is said to last eight years in good condition. In marine situations it is usually attacked by the teredo as soon as the bark is detached, and is often much damaged in two or three years, but will stand for ten years without requiring removal. Mr. Akerson, of Nelson, is of opinion that it would stand for more than twenty years, if protected with copper sheathing. Piles drawn thirteen years after being driven had the parts exposed to the attack of the teredo perforated to the centre and badly decayed; the upper and lower portions of the pile in fair condition, but not equal to *Fagus fusca* under similar circumstances.

Mr. Thornton, Engineer for the Province of Canterbury, imformed me that the first sleepers used on the Lyttelton Railway were of this species, and that they were so badly decayed within eighteen months as to require removal. He attributed this rapid decay to their indifferent and sappy quality.

For this species I propose the name "entire-leaved beech.

23a. *Fagus Cliffortioides.* (Hook.)

This is a much smaller tree than the preceding, with which it has been generally confused. The largest specimens observed in the Wakatipu district had trunks not exceeding 2½ feet in diameter. In the Grey Valley all the specimens were much smaller.

The spray of this tree is somewhat intermediate between that of *F. fusca* and the European beech, *F. sylvatica.* The foliage has a close resemblance to that of *F. Solandri*, but the leaves are round at the base, instead of wedge-shaped; somewhat thinner and larger.

Nothing certain is known with regard to the durability of the timber, but in all probability it will be found to approach that of *F. fusca.*

24. Towai.—(*Weinmannia silvicola.*)

25. Tawero.—(*Weinmannia racemosa.*)

The Towai is a tree 30 to 60 feet high or more, with a trunk 1 to 3 feet in diameter. The mature leaves are usually more or less compound, and it bears a profusion of erect racemes of pinkish flowers. It is found from the North Cape to the Hauraki Gulf, and attains its maximum dimensions at elevations of 1,500 feet and upwards.

The Tawero attains similar or larger dimensions, and is distinguished by its mature leaves being usually simple, and its racemes rather smaller. It occupies a much wider area than the preceding, and has come into more general use. Its maximum size is attained at Catlin's River and about Hokitika

Both trees produce timber of apparently similar quality, but the grain of the towai is the finest of the two. They appear of equal density.

The timber of the towai has not been utilized, so far at least as known to me, but the tawero has been used in various parts of Westland and Otago. In 1874 I observed small specimens, which had been driven as piles, sound and in good condition after nine years: larger specimens, which had been lying in the forest for some years, were much decayed and worm-eaten.

Railway sleepers were in good condition after being down five years.

A great drawback to its value is the excessive amount of cracking and twisting to which it is subject on conversion. Recently sawn scantling about 10 in. by 10 in., at Catlin's River, was cracked nearly the whole depth, so that it was almost worthless, except for firewood.

The bark of both species has been extensively used for tanning, for which it is of great value.

The tawhero is also known as kamai and black birch in Otago.

Mr. Blair considers the durability of tawhero under the most trying circumstances to be thoroughly established; my opinion of its value is not equally favourable.

26. Pukatea.—(*Atherosperma Novæ-Zelandiæ.*)

A striking tree, sometimes 150 feet high, with a trunk 3 to 6 feet and upwards in diameter. Common in swampy places. Timber soft, but apparently durable in water. It has been used in Auckland for boat-building, but is not valued. In Taranaki it is utilized for general purposes, and much valued.