made. He has therefore described it in "The Flora of New Zealand" as *Fagus fusca*, var. *dubia*, nearly resembling *Fagus solandri*. Serrations of the leaf are confined to the upper portions; the veins are not prominent, and the texture is rather thicker.

The customary vagueness of the bushman's vocabulary gives the same tree the names of black-birch in Auckland, North Otago, and Southland; red-birch in Wellington, Nelson, and South Otago. Other species indigenous to New Zealand are *Fagus solandri* (the entire-leaved beech), *Fagus menziesii* (the silver-beech), *Fagus cliffortioides* (the mountain-beech), and *Fagus apiculata* (the pointed-leaved beech). The English names given to these varieties by Professor Kirk so accurately describe them that they may easily be distinguished by laymen, and the misleading terms red-, black-, and white-birch set aside, to the great advantage of sawmiller, timber-hewer, and others, even though they have no knowledge of botanical lore.

The *Fagus fusca*, *F. solandri*, and *F. menziesii* are the most valuable varieties of beech for industrial purposes. They are also the most ornamental, are easily transplanted, and will thrive anywhere. They average 70 ft. in height, some reaching 100 ft. in altitudes up to 2,500 ft. Above that the *Fagus cliffortioides* (mountain-beech) takes the place of the better-known forms of this useful tree.

The pointed-leaved beech is rare, and only found about Matamau and Dannevirke, Hawke's Bay. It averages 40 ft. high, with entire pointed leaves, though but little is known of the timber. It approaches the *F. fusca* in its entire form, and might easily be mistaken for that tree, but grows at the highest altitude of any New Zealand tree (4,800 ft.—Professor Kirk). It is, however, of little value save for firewood, and for protecting the soil of mountain-tops from being swept away by torrents and from land-slips.

The tooth-leaved beech is especially useful to the digger, selector, or settler, as it is fissile, makes good fencing, shingles, boards for sluice-boxes, &c., is easily worked, and, though not so durable as some better-class woods, is generally found of large size, and can be converted with a minimum of waste.

Timber obtained from trees of large size is generally found to be of the best quality, and most durable; while that grown upon mountains, at an elevation between 1,000 ft. and 2,500 ft., is stronger than that in the lowlands and in moister localities. The tests have been somewhat variable, but Professor Kirk (page 811) speaks with no uncertainty about the great value and durability of the beech, an opinion confirmed by many representative sawmillers during my tour of New Zealand.

Extensive forests of this beech are found in Southland, in parts of Otago, in the mountain districts in the gorges of the Southern Alps, at elevations between 2,000 ft. and 3,000 ft. Above Auckland Isthmus it is scarce in the North Island; also at Te Aroha, and on the West Coast, between Waikato River and the sea. At Hawke's Bay are considerable forests of *F. fusca*, mixed with *F. solandri* and *F. menziesii*, which extend along the slopes of the Tararua and Rimutaka Mountains to Cook Strait. It is generally plentiful throughout the South Island, but very scarce in the Province of Canterbury; and there can be no doubt that the beech forests will form a stand-by for the people of New Zealand, since these trees are so easily regenerated from seed that the forests can be renovated and maintained at comparatively small expense.

The disparity shown in tests of New Zealand timbers can be explained by the fact that specimens were taken from trees of different ages and growth. Trees of varying ages, taken from different sites, and at different seasons of the year, must, of course, show widely differing results. It is therefore quite certain that to obtain reliable and satisfactory tests of timber must involve long and patient research and extensive scientific knowledge.

Timber for testing purposes is frequently submitted by different persons, instead of being carefully selected by an expert. In this manner many trustworthy and painstaking examiners are misled, and their testimony is conflicting, the samples submitted to them for observation differing so widely in age, climatic influences, &c., that the results are inevitably confusing, and very different from those which would be obtained by systematic expert testers.

In Australia, as, is well known, many *Eucalypti* have been tested under incorrect names, and with data supplied in good faith, but, through ignorance, misleading. Through such circumstances the information supplied even to some standard works is by no means reliable.

In making tests the questions of timber being cut at the proper time, and of seasoning, must be carefully noted and taken into account, and especially in the former connection sawmillers will be forced to deal with the matter in a very different spirit from that in which it was approached by the members of the Timber Convention held at Wellington in July, 1896. In a moist climate like that of New Zealand the season for cutting has a most important bearing upon the value of all timbers as to strength and durability. Kauri, perhaps, represents the sole exception to this rule, or, at any rate, is least affected by the season of cutting. Blair gives from ninety-nine tests a mean breaking-point at 158·86 lb., the maximum being 262·5 lb. and minimum 105 lb. Forty of these specimens (*Fagus fusca*) were from the west coast of the South Island, and fifty-nine from the interior of Otago. The mean for both lots was almost identical—viz., 156·91 and 156·83—but the maximum of the West Coast was only 186 lb., and that of the Otago specimens 262·5 lb. On the other hand, the minimum—105 lb.—was that shown by Otago specimens (Professor Kirk, page 180). Balfour records, of seven tests, mean breaking-point 202·5 lb.; maximum, 250 lb., and minimum, 122·5 lb.; while the mean for Lake Wakatipu timber was 232 lb., against Blair's 192·79 lb. Blair's tests, however, were made of timber from the South Island only, and nearly one-half of this was obtained from low levels. Blair ("Building Materials of Otago," p. 224) gives the weight per cubic foot (green) from 39·62 lb. to 68·909 lb.; seasoned from 34·124 lb. to 40·648 lb.; and records that boards 12 in. by ½ in. shrank from 0·92 in. to 1·17 in.

It will be seen from these records that the various tests present a conflict of testimony, and this applies so much all along the line that engineers and architects attach very little value to timber tests, though they are useful as a general guide in approximately gauging the strength of timber for important construction-works.