

The examination of *Libocedrus* patterns on the limestone outcrops of the Western Ruahine Range show that it is favoured by the presence of limestone. The tertiary formation between Waiouru and Moawhango is a likely factor in the occurrence of *Libocedrus*, though it should be pointed out that *Libocedrus* is absent from Te Rei Forest at the eastern end of the scarp. There are a few trees, living and dead, in its vicinity on the Paoneone Range but no trace has been found east of this till Pukeokahu.

The main forest area, known as the Kaikawaka Bush, lies on the slope south of the head of the Hautapu River, 3,000-3,600ft above sea level. At the present day it is an oblong some four miles by three, but continuous forest, probably podocarp forest, extending south of it down the slope has recently been burnt.

In the main forest *Libocedrus bidwillii* is dominant, frequently associated with *Podocarpus hallii*, which may dominate in limited areas, and occasional *Dacrydium colensoi*. There is a complete absence of beech species and of *Phyllocladus alpinus* from the margins. There is instead a dense marginal belt some two chains wide of small trees and shrubs. Where this belt has been breached by tussock fires the appearance of *Libocedrus* saplings is noticeable, but these are heavily browsed by sheep or deer. From a distant viewpoint it is likewise noticeable that a marginal belt of *Libocedrus* several chains wide has a denser canopy and fewer dead trees than the forest interior and is presumably younger.

As elsewhere the small conical heads form an open canopy so that sub-canopy trees are abundant and undergrowth dense (List 13). The number of species rare on the ground but frequent as epiphytes indicates selective browsing.

A number of forest islands lie round the main forest, most of them to the north near Auahitotara trig. In most of these *Podocarpus hallii* becomes more prominent and may dominate, *Phyllocladus alpinus* appears as an important member of the community and beech makes its appearance as a narrow marginal hedge (Fig. 9), replacing a scrub margin in both northern and eastern directions. This hedge consists usually of mountain beech and occasionally of red beech, each island having its own species. The mountain-beech hedges are aged, in poor condition and smothered in *Usnea*. *Usnea* is also conspicuous on certain marginal shrubs.

PODOCARP FOREST

At the western end of the Kaikawaka Bush a promontory of podocarp forest projects to the edge of the scarp overlooking the Main Trunk Railway. This is dominated by *Podocarpus hallii* while *P. spicatus* and *Libocedrus* are frequent and *Dacrydium cupressinum*, *Podocarpus ferrugineus*, *P. dacrydioides* and *Gymnelaea cunninghamii* present. There is a corresponding variety of undergrowth, the whole community being somewhat unusual at an altitude approaching 3,300ft.

COMMENTARY

Since the publication in 1954 of Holloway's "Forest and Climate in the South Island of New Zealand" evidence of corresponding changes in the North Island has generally been accepted as bearing out his proof of the rapidity with which changes in climate are reflected in the vegetation. As he has pointed out these are less clearly defined further north; the influence of climate is not so crucial and the greater number of species and the corresponding variety of communities make the change more complex. In the central North Island such effects are further obscured by a succession of extensive showers of volcanic ash, and further still by the use of fire by a comparatively dense Maori population in the volcanic district.