

below the confluence (2,900ft) without additional podocarps (which could be taken to mark the boundary) coming in.

The recent discovery of a *Libocedrus* log and the report by Druce of an isolated specimen of silver pine (*Dacrydium colensoi*) in the lower Waipakihi Valley introduces a new and unexpected element, a link with the *Libocedrus* forest of Rangataua and the south-west Kaimanawa, 15–20 miles distant.

(3) RANGITIKEI FOREST. Not only silver beech but red beech are completely absent, leaving mountain beech the sole dominant from as low as 2,800ft to 4,400ft and occasionally as high as 4,800ft. *Podocarpus hallii* is noticeably rare but the shrubby *Podocarpus* frequent. Subcanopy trees are infrequent and limited in variety, but there is a fairly dense growth of undershrubs (List 6).

The uniform composition of this type of forest and the complete absence of certain species, particularly of red beech, suggest that this area represents an early stage of forest succession.

CENTRAL KAIMANAWA, RIVER BANK

Pumice terraces are characteristic of almost the whole length of the Waipakihi Valley, and to a limited extent of the Rangitikei and Mangamaire Valleys. These terraces, particularly in the Waipakihi, are dominated by tussock, *Festuca novae-zelandiae* below 3,000ft, red tussock above this, and, as already stated, towards the valley-heads forest becomes discontinuous and red tussock becomes continuous with subalpine tussock. *Bulbinella hookeri* is common, and over the last 10–15 years there has been an invasion of the introduced *Senecio jacobeus*. *Gleichenia circinata* dominates on boggy ground. In the tussock scattered bushes of *Hebe venustula*, *Aristolelia fruticosa*, *Coprosma rugosa* and *Dracophyllum subulatum* are characteristic.

In these valleys there is not a great extent of exposed shingle, and what there is carries a considerable growth of mat-forming plants (List 7). In fact not only the shingle but the adjacent tussock terraces possess considerable stability, and descending the Waipakihi River in the midwinter of 1953, shortly after a flood which had covered the valley from side to side, the absence of any evidence of scour, either in tussock or shingle, was most striking. (Scouring caused by a big flood, presumably that of February 23, 1958, is recorded, but from recent information was only severe towards the lower end.)

CENTRAL KAIMANAWA, SUBALPINE VEGETATION

The general altitude of the Central Kaimanawa and the easy contours of most of its main ridges combine to give considerable areas above the timber line, but a lack of variety of land forms. Cliffs and screes are infrequent as compared with neighbouring North Island ranges.

Extensive areas of rock fragments carrying a sparse vegetation (List 8) are characteristic of the wide rolling crests particularly of the Middle and Umukari-kari Ranges, and associated with these the development of frost striping on a large scale (Fig. 6).

Snowgrass (*Danthonia* sp.) is present throughout but only forms a closed association on the more sheltered slopes or in hollows. Elsewhere it is scattered except on pumice hummocks. This is the snowgrass tussock that occurs above the timber line of the central North Island ranges. It is recognizably distinct from either the broader or narrower-leaved forms that take its place in the Tararua Range. Over a considerable extent of the northern scarp on either side of the head of the Rangitikei River *Danthonia* is in the last stages of being replaced by large bluish-green tussocks of the sedge *Gahnia procera*, otherwise a forest species. As recently as 1945 a few tussock bases could still be identified here as *Danthonia* from occasional green shoots, apparently surviving intense browsing by deer.