

The later accretions to the park area, however, have brought in two types of forest community common enough elsewhere—so common, in fact, that their omission from the preservation secured by park status would have seriously impaired the value of the park as a sanctuary for primitive forest types. These are—

(a) Sub-tropical rain forest of dry ground exemplified in (1) rimu communities; (2) matai communities.

(a) Sub-tropical rain forest of wet ground exemplified in silver-pine-kaikawaka communities.

*The Rimu Community* will be found at its best in the western salient of the park near Erua Railway-station (2,400 ft. altitude). The steeper slopes still carry a magnificent stand of untouched rimu forest; the flat country, whilst aesthetically unimpaired from an exterior view, has been milled over and carries now a modified indigenous forest of second growth, which is of great scientific interest in its development, although scarcely in line with the avowed objects of park management. This milling-right was granted before the Park Board was constituted.

*The Matai Community.*—As a species matai (*Podocarpus spicatus*) reaches its optimum development in the forest belt to the north of the park. This forest belt (nearly all at slightly lower altitude than the park forest) is, moreover, the last extensive remaining example of the matai association, which must once have played a considerable part in the primitive vegetation of New Zealand.

Near or within the park boundaries are numerous small colonies of matai, the outliers, so to speak, of the true matai communities of the lower altitudes to the north and south. (The southern ones have in the main been now cleared to make way for settlement.)

*The Silver-pine-Kaikawaka Community.*—Bog forest with silver-pine (*Dacrydium Colensoi*) as the dominant species occurs to any extent only in Westland and on the volcanic plateau of the North Island. This type of forest in the latter case occurs in large areas chiefly to the north and the west of the park proper, and is differentiated markedly from the Westland bog forest by the great abundance of kaikawaka (*Libocedrus Bidwillii*), which in many places is practically co-dominant with the silver-pine. This extremely interesting, although sombre and almost repellent, type of forest community occurs to the west of the park boundary near Pokaka Railway-station, and representative areas of it have been retained in that neighbourhood within the park proper.

*Ecological Notes.*—The above brief sketch will suffice to show the importance of the National Park to the plant ecologist. For the tourist and sightseer, for the geologist, for the winter sportsman, the park's main interest must always be the open areas of the higher altitudes that formed the central nucleus of the original reservation. For the ecological botanist, the lowest elevations, particularly in the vicinity of Erua Railway-station on the westerly salient of the park, carry permanent interest. Here is as it were a focal-point where at least five types of plant community meet and carry on the struggle for supremacy. Within the course of a single afternoon's walk one may traverse—

- (a) Red tussock grassland dominated by *Danthonia Raoulii* var. *rubra* (red tussock).
- (b) Sub-antarctic rain-forest of *Nothofagus* (beech).
- (c) Sub-tropical rain-forest dominated by *Dacrydium cupressinum* (rimu).
- (d) Sub-tropical rain-forest of the bog-forest type dominated by *Dacrydium Colensoi* (silver-pine) and *Libocedrus Bidwillii* (kaikawaka).
- (e) Small colonies of *Podocarpus spicatus* (matai) type of sub-tropical rain-forest.

It is safe to say that nowhere else in the Dominion could such variety be found within an equal area. Moreover, the reason for the transition from one association to another is not at all apparent, and will for long give cause for speculation, until means are provided for elucidation of the problem by careful, intensive, and possibly prolonged research.

The demarcation lines between the various associations—the tension zones, as they are sometimes termed—are sharply drawn, and are perhaps the most interesting areas to examine. They are certainly of crucial importance from the point of view of retention of truly representative primitive forest associations. These zones are usually quite narrow, and their importance is often underestimated. The casual and accidental (frequently railway-caused) fire on the tussock grassland near National Park Station is frequently condoned on the plea that "it always stops at the green bush." This is true; but unfortunately the green bush on which the fire spends its dying vigour is exactly that narrow "tension zone" (often only  $\frac{1}{4}$  chain wide) different in composition from the main forest inside it and from the tussock grassland outside it. It is the protective belt of the forest, the zone where, in some places, the forest is in ever so leisurely fashion overcoming the tussock grassland community; but where in most places it may rather be deemed to have established a fortified frontier, impregnable to all attack by natural agencies. The fire invariably assists the grassy invaders, and then there is lost yet another forest outpost, regained after a century or more of silent conflict, or held for even longer since some long past major cataclysm. Successive fires (and these fires are of annual occurrence on the western side of the park) carry on a war of attrition against the forest, although in any one year their territorial gains are but small.

One can justify fire properly used, even on occasions used for forest amelioration; but at a point such as the forest-edge on the western side of the park, where the vegetative balance has an adjustment more delicate than that of the finest man-made precision instrument, both incendiarism, whether deliberate or accidental, and neglect to extinguish fire before it reaches the bush-edge can be regarded only as symptoms of pyromania.

From an ecologist's viewpoint, then, fire is the catastrophe chiefly to be guarded against on the western salient; and, in order to minimize the risk of it, removal of all activities save forest protective ones to a point well beyond the park boundaries in this vicinity would be a cheap and easy safeguard.

*Exotic Trees on the Park.* No note on the park forests can be complete without a passing reference to the few incongruous groups of exotic conifers to be seen within the western boundary where the Whakapapa River flows out of the park. These were planted experimentally on the Waimarino