

shoots brownish at their apices. Also there are many patches of the rather taller but less dense creeping shrub *Gaultheria antipoda*, its coriaceous small leaves frequently more or less deeply tinged with red. *G. perplexa*, too, a plant with narrow leaves, is abundant in many places. The pale-green, small, creeping shrub *Styphelia Frazeri*, with its short erect stems covered with acerose, imbricating, stiff, and small leaves, tiny white flowers or orange drupes, is everywhere mixed with the general groundwork of the meadow, consisting of *Celmisia longifolia*, *Euphrasia cuneata* var. *tricolor*, and *Wahlenbergia saxicola*. Frequently growing close up to the tussocks are conspicuous mats of the depressed shrub *Styphelia Colensoi*, 2 yards across by 1 yd. and 4 in. or so tall. As for grasses, there are occasional small close tussocks of the slender leaves of *Poa Colensoi*, the flowers raised for some 4 in. above the ground; and the straw-coloured *Danthonia semiannularis* var. *setifolia* dots the ground in places. Also, there is more or less, but not evenly distributed, of *Hierochloa redolens*, *Poa anceps*, *Poa caespitosa*, and *Agropyrum scabrum*. Finally, one of the most distinctive features of the spaces between the tussocks, and the most striking in many places on account of its colour, is the alpine club moss *Lycopodium fastigiatum*, with its orange-coloured shoots flattened to the ground and close together, thus forming a kind of mosaic, while the spikes are erect and some 2 in. tall. Certain other plants enter into the formation, but they are for the most part of little physiognomic value, and comparatively few in numbers.

(3.) Meadows of Tongariro.

The steppe on Tongariro is of a much more meadow-like character than the typical grass steppe, although the constituents are the same for the most part. The *Danthonia Raoulii* steppe is of closer and more luxuriant growth. In some places *Celmisia spectabilis* is extremely abundant, and gives the dominant character. In others are many cushions of the white xerophytic moss, reminding one of the so-called "moss" of Mount Egnont. But the most interesting formation is the collection of alpine herbs at an altitude of 5,500 ft. or so on some of the slopes. In such places the ground is covered with stones, large and small, between which is almost a closed covering, with small glaucous-coloured tussocks or mats of *Poa Colensoi* everywhere and in the greatest abundance, giving a colour to the whole hillside, which at a distance is of a general grey hue. With them, dotted about in profusion, are large plants of *Gentiana bellidifolia* (Photo. No. 25). Here, too, are *Ranunculus nivicola*, *Carex pyrenaica*, *Coprosma repens*, *Ligusticum aromaticum*, *Helichrysum bellidioides*, *Celmisia spectabilis*.

(g.) THE SHRUB-STEPPE.

The shrub-steppe is a transitional phase between desert and grass on the one hand or sub-alpine scrub and forest on the other, according to climate and soil conditions. It is most common at altitudes of between 3,600 ft. and 4,500 ft., and occupies the flat ground which is not boggy, such as river-valleys or even gentle slopes. The following are the principal constituents of the formation: (Epacridaceæ) *Dracophyllum recurvum*, *D. subulatum*, *D. Urvilleanum* var. *montanum*, *Epacris alpina*, *Styphelia Frazeri*, *Pentachondra pumila*; (Compositæ) *Cassinia Vauvilliersii*, *Celmisia spectabilis*; (Taxaceæ) *Dacrydium laxifolium*, *D. Bidwillii*, *Podocarpus nivalis*; (Rubiaceæ) *Coprosma depressa*, *C. repens*; (Scrophulariaceæ) *Veronica tetragona*, *Ourisia Colensoi*, *Euphrasia cuneata* var. *tricolor*, *E. revoluta*; (Myrsinaceæ) *Suttonia nummularia*; (Campanulaceæ) *Wahlenbergia saxicola*; (Ericaceæ) *Gaultheria rupestris*; (Umbelliferæ) *Ligusticum aromaticum*; (Gramineæ) *Danthonia Raoulii*, *D. semiannularis* var. *setifolia*, *Poa Colensoi*; (Filices) *Gleichenia dicarpa*.

The general colour at a fairly close view is reddish-brown as the groundwork, out of which rise here and there the straw-coloured or somewhat orange tussocks, which first catch the eye and give the physiognomy a quite different stamp to that of a grass-steppe, where the individual tussocks blend one into the other. The tussocks, of course, vary considerably in their relative distance; one or two may be close together, but usually they are isolated and distant, say, 5 ft. to 10 ft. They are of smaller dimensions than those of the grass-steppe.

The formation is an open one, and consists of raised mounds of shrubs separated by patches of flat ground, either quite bare or with a scanty vegetation—the remains of the desert, in fact. These mounds are built up of fine dust-like sand and humus, and are of a dune character. They are a foot or more tall or less, of most irregular shape, and closely covered with the generally prostrate shrubby growth. The dominant colour of these mounds is reddish-brown, owing to the blending of colours of the *Dracophyllums*, *Dacrydium laxifolium*, and the especial abundance of *Dracophyllum recurvum*. *Veronica tetragona*, both from its upright habit and yellow-green colour, affords a contrast, and is of physiognomic importance consequently. The shrubs are not isolated, but are mixed up together, perhaps almost the entire flora of the formation being present. Thus *Dracophyllum recurvum* may rise out of *Dacrydium laxifolium*, and a solitary plant or so of *Veronica tetragona* will be present, taller still, with a tussock or two growing out of the centre of the mound, while a closer examination reveals *Pentachondra pumila*, *Styphelia Frazeri*, *Wahlenbergia saxicola*, and *Ourisia Colensoi*; or there may be a low bush of yellowish-green *Dacrydium Bidwillii*, and here and there, dotted over the mats of shrubs, a collection of, or even solitary, rosettes of *Celmisia spectabilis*. Here and there the white xerophytic moss *Racomitrium lanuginosum*, its cushions a foot or two across, gives a special colouring. A few plants of the green *Veronica laevis* also add a contrast. Finally, there are the reddish-brown waving tussocks. Sometimes the rims of the mounds may be irregularly torn by weathering, or in other places beautifully and closely edged with a thick, even, and rounded covering of *Dacrydium laxifolium*, or, again, *Podocarpus nivalis* may spread beyond the boundary out on to the flat bare patches of soil. In many places are clumps of the pale-green fern *Gleichenia dicarpa*, 1 ft. or more in depth, the fronds close and entangled, quite hiding its slender, wiry, brown or purple stems. The fern frequently surrounds the base of a *Danthonia* tussock or climbs over the *Dracophyllum* and the taller shrubs.