

the north of these lines the climate becomes gradually drier, until, at a certain distance from the east coast, easterly rain comes into play. From the above it can be seen that there are two extreme classes of pasture—the “wet” and the “dry”—while between these two are all kinds of intermediates. Nor is this matter of north-western and south-western rain all, for the latter is much the colder of the two and more liable to bring snow.

Besides the average amount of rain to which any piece of pasture is exposed, considerable modifications exist through the effect brought about by change of latitude in passing from the north to the south of the South Island. Finally, altitude plays a most prominent part.

As for soil, that of the mica-schist is of extreme fertility. The limestone soils which occur here and there, but rarely continuously over wide areas, are also excellent. Far poorer than either of the above are the soils overlying greywacke rocks, while these rocks themselves, so readily disintegrated, long before man came to New Zealand had formed on the dry mountains those great masses of unstable stony debris known as “shingle-slips.”

Coming next to special climates dependent upon the lie of the ranges, there is that of Central Otago, where rain from all quarters is precipitated on the mountains bounding that district, while in the area itself an extremely dry climate exists in the river-valleys, intermontane basins, and lower hills. Higher up—say, at above 2,500 ft. altitude—the rainfall is greater, but not nearly equal to that of the South Island mountains in general. Other dry areas, but not so arid as Central Otago, occur in the Mackenzie country (Canterbury), and in the Clarence and Awatere Valleys (Marlborough).

From the above brief accounts of the climate of the pastoral country of the South Island it can readily be seen how diverse must be the pastures, and how certain causes leading to deterioration, or even depletion, must be greatly assisted or retarded; and how, in considering remedies for improving the grass-land, the climate of each area to be dealt with must be considered. In other words, the problem of improvement is complex enough, nor can hard-and-fast methods be suggested, since evidently each special pasture must be considered on its merits.

The main constituents of the sheep-pastures are a number of indigenous grasses having one important character in common, the tussock form. Evidently this particular form of growth, as it originally was dominant over all the South Island east or north of the forested area, is highly suited to its environment. This statement is strongly supported by the fact that, even after the pastures have been grazed without intermission for about seventy years, the tussock, except in certain localities dealt with farther on, still dominates in the pastures.

According to the evidence given before us a large number of the witnesses spoke of tussock as if there were only one species, which they called the “white tussock.” This name refers not to one species, but to the following two quite unrelated species, mistaken for one another—viz., the poa-tussock (*Poa caespitosa*) and the fescue-tussock (*Festuca novae-zealandae*), this latter being by far the more common above an altitude of 1,000 ft. Also, there are two more tussocks of about the same size as the fescue-tussock—the tall blue-tussock (*Poa intermedia*) and the blue-grass (*Agropyron scabrum*). There is also a smaller tussock, closely related to *Poa intermedia*—the small blue-tussock (*Poa Colensoi*). Next come two much larger tussocks—the snow-grass (*Danthonia flavescens*) and the red-tussock (*D. Raoulii* var. *rubra*), also called “snow-grass” by a good many. It is necessary to be quite clear about these various tussock-grasses, since they are frequently mentioned in what follows, and the correct determination of each is of great importance in determining the feeding-value of a pasture.

Besides the tussocks, there are in the mountain sheep-pastures—taking only the more common into consideration—at least three hundred species of indigenous plants, together with some forty species of introduced plants—mostly European; so that no pasture is anything like so pure as are even the most weedy artificial meadows of the lowlands. Of these indigenous plants probably only a dozen can claim to be of any feeding-value. With the intro-