

The effect of a gradually increasing rainfall is well exemplified in travelling from Clyde to Dunedin. Up to Omakau the railway passes through country of a maximum depletion. But at that point the altitude has considerably increased, the rainfall consequently is rather higher, so tussocks once more put in an appearance. Proceeding onwards, there are large and small pieces of depletion here and there, but by the time the Maniototo Plain is reached no depletion such as that near Clyde or Alexandra can be seen. On the slopes of the Rock and Pillar there are isolated areas of depletion, but there is no scab-weed. Farther on depletion ceases altogether, and foxglove (*Digitalis purpurea*), a weed of a wet climate, appears in quantity. Even in Central Otago itself the sunny face of a shallow gully may be altogether depleted, while the shady face is still covered with tussocks. This occurs again and again.

Another kind of depletion appears on the greywacke mountains of Canterbury and Marlborough. This rock, as already stated, disintegrates rapidly. Once remove the plant-covering and the stony debris beneath is quickly laid bare. Burning tussock near shingle-slips has thus led to their extension. Many such slips once covered with tussock have been again denuded, and, moving downwards, have buried the grassland below. But this matter receives further consideration under the heading of "Burning."

Besides rabbits, deer most certainly, and possibly hares, may assist in bringing about deterioration, but on these matters we have no direct evidence.

Before leaving this subject of deterioration it must be emphasized that a pasture may to the eye appear quite good—there may be abundance of tussocks, and the ground between these be well clothed with plants—yet such pasture, so far as the ground between the tussocks goes, may with regard to palatability be not much better than bare soil. Nor must it be forgotten that it is upon the ground-plants that the feeding-value of a mountain pasture depends, and not upon the fescue-tussock. The following are some of the indigenous unpalatable plants which are specially aggressive: The different species of pipiri (*Asaena* spp.); various allies of the scabweed, especially the turfy raoulia (*Raoulia subsericea*); the mountain-twitch (*Triedia exigua*); the mountain-cotula (*Cotula squalida*); the Maori onion (*Chrysobactron Hookeri*); the common cotton-plant (*Celmisia spectabilis*). Certain indigenous shrubs may spread greatly—e.g., the mountain-tauhina (*Cassinia* spp.) and the manuka (*Leptospermum scoparium*); and, of introduced plants, the sweetbrier (*Rosa rubiginosa*), especially in dry areas; and, where the rainfall is fairly high, bracken-fern (*Pteridium esculentum*) may occupy much valuable country, as in the neighbourhood of Lakes Wanaka and Wakatipu.

(3.) *The Regrassing of Depleted Areas.*

(Part (5) of the Order of Reference.)

In this section the term "depleted areas" is taken to mean not only those defined by us as "depleted," but also those areas treated of as "deteriorated," since many intermediate grades occur, and both classes equally require being brought into a far better state of palatability. If the carrying-capacity of the grasslands under consideration could be increased only one-fourth, how great the gain to New Zealand! Even without any new discoveries in the treatment of tussock-grassland it does not seem absurd to think that better management of the runs should accomplish this.

With regard to what follows under this head it must be pointed out that we have to guide us only the evidence of our witnesses and our previous experience. On the other hand, very little, perhaps nothing, is known for a certainty regarding the actual regrassing or improving of depleted and deteriorated lands, and in order to arrive at any just conclusions several years of well-considered experiments are required. Then there is the almost equally important work of studying the grasslands themselves and seeing, *inter alia*, what nature is doing in the way of destroying or restoring. This work is, in fact, being carried out on a small scale by the Department of Agriculture, and from what we have seen we are strongly of opinion that such work should