

crested dogstail, meadow-foxtail, *poa trivialis*, *poa pratensis*, and alsike. Many settlers still pin their faith to the cocksfoot and other first-class grasses, but there is a big leaning at the present time towards certain of the second-rate grasses and clovers, such as *danthonia pilosa*, brown-top, and lotus major; and *paspalum* on certain of the warmer slopes is advocated.

Excepting where areas have been very carefully farmed, or where the soil naturally is somewhat better, or where top-dressing has been practised, it must be said that the first-class English grasses and clovers are not holding. The rye-grass held good for two or three years and then it dwindled, leaving the cocksfoot as the dominant grass. Under certain conditions of grazing, the cocksfoot, associated with *poa pratensis*, crested dogstail, and white clover (generally with a good deal of Yorkshire fog), persists, and just so long as the surface-soil fertility remains up to a certain standard this sward may be kept almost indefinitely; but under the system of hard grazing, generally close and continuous, by sheep the sward opens up and the pasture becomes a prey to weeds, unless such grasses as brown-top and *danthonia* are present and are spreading over the areas.

In the choice of species of grasses and clovers to constitute the pasture sward the farmer has two alternatives:—

- (i.) To use only the first-class grasses and clovers—mainly rye-grass, cocksfoot, crested dogstail, *poa pratensis*, white clover—and by a system of spelling or by manuring maintain the fertility of the country so that these species are kept sufficiently vigorous to maintain a close cover over the whole of the hillside; or
- (ii.) To use in addition to the above species grasses and clovers which will form a close turf over the country even though the soil-fertility may be considerably reduced—such additional grasses are *danthonia pilosa*, brown-top, New Zealand rice-grass (*microlaena*), *paspalum*, ratstail, lotus major, lotus hispidus, subterranean clover, yarrow, and suckling-clover.

The first-mentioned grasses and clovers, provided they are kept strong and vigorous, will beat the ones below in production, but the cost of maintenance of fertility in order to keep them going will in most cases be extremely high, and often impracticable. More cattle will be necessary, more spelling of the country, which means more fencing, or artificial manures will have to be liberally applied. Once a sward of brown-top, *danthonia*, New Zealand rice-grass, ratstail, *paspalum*, &c., becomes established the country is cheap to maintain, and on hard and difficult country it would appear a sounder proposition to accept the lower-producing yet less costly sward rather than to attempt to supply the demands of higher-fertility-requiring grasses and clover. Few hill-country farmers in other parts of New Zealand have managed to retain intact the first-class English-grass sward. Almost everywhere one sees creeping in one or another of the low-fertility-demanding grasses and clovers. This fact speaks for itself, for there is no doubt that if only the first-class grasses are kept growing strong and vigorous there is no fear of invasion of that sward by the lower-producing inferior grasses. The maintenance of fertility is the decisive factor in regulating the composition of any pasture turf. Where the costs of fertility-maintenance are high it is better to accept the second-rate lower-fertility-demanding grasses and clovers; and where soil conditions are poor, and fertility upbuilding and maintenance is impossible owing to the topography and inaccessibility of the country, the acceptance of these second-rate grasses is the only safe course.

(e.) *Depletion of fertility.*

According to the standard of fertility maintained so will the composition of the pasture vary. The first-class grasses and clovers require a high standard of fertility; the second-class grasses and clovers a lower standard. Any farming practice that tends to reduce fertility has a deleterious effect upon the pasture sward. In the above counties, while the fertility due to the humus of the forest and the potash lasted, the rye-grass, cocksfoot, clovers, &c., grew luxuriantly. We feel that a good deal of the deterioration in the older pastures is the result of a gradual reduction in the surface fertility of the soil, brought about by close and continuous grazing, and by the natural loss of plant-food by leaching, due to the constant rain and loose nature of the soil.

Indirectly, the following causes also are to some extent responsible for the deterioration:—

(f.) *Boom and slump periods.*

During the war period, and onwards to the height of the land boom, labour, grass-seed, and fencing-wire, and also stock, were very dear. This deterred many settlers from going on with improvements and purchasing stock, and those who went on with improvements during that period did so largely on borrowed money and greatly increased the indebtedness of their holdings. When the slump came many settlers were forced to sell their stock at heavy loss, and were unable, owing to lack of funds or credit, to purchase other stock, and in consequence second growth was allowed to grow unchecked. Even settlers who had their farms stocked received such low returns from them that they were unable to afford expenditure on improvement and maintenance.

(g.) *High maintenance costs, these being in most cases too high for the unfinancial settler to keep up and live.*

The felling of the natural forest, the surface-sowing of the seed, and the fencing is by no means the last cost in the farming of hill country, and particularly is this true of virtually all the country in the above counties. The cost of maintenance is a most important economic factor to be considered, for it is not until the costs of maintenance have been accurately gauged that one can get any idea of the net earning-power of the land. In the older forest country, such as that of the Wairarapa,