

Operations were, therefore, conducted on this range and its eastern extension known as the Hindley Range, and a very high percentage of the deer population was killed. This will undoubtedly result in a great diminution of the deer which have infested the Lillburn Valley, besides proving of great benefit to the forest-clad slopes and open tops of the Billows and Hindley Ranges.

Simultaneously with those already referred to, operations were commenced at the head of Lake Monowai, and, as the season advanced, were progressively extended to the west and north in the valleys of the Grebe River and its western tributaries the Pamela, Florence, and Emerald Streams, along the Heath Mountains, and along the Cleughearn and Hunter Mountains and all other country between the Grebe and Waiau Rivers.

As the sphere of operations was extended the personnel of this party was increased, all country was "covered" at least twice, and excellent results were obtained.

It was hoped to be able to deal with the country right up to the south shores of Lake Manapouri by constantly pushing this party northwards, but it eventually became apparent that there yet remained so much to be done in the area described above that they would not be able to embrace the whole area to Lake Manapouri, so another party was established there with bases at the heads of the Hope and South Arms. This party operated over the north end of the Hunter Mountains, on Mount Titiroa, in the valleys of the Garnock Burn and lower Grebe River, and along the lake faces and shore area.

Reconnaissances were conducted by this party also to the Seaforth Valley and on the Turret Range.

This area—*i.e.*, from the south coast to Lake Manapouri and between the general line of the Princess and Heath Ranges and the Waiau River—is the chief centre of deer-infestation in Southland, and a close study of the country and the situation generally has revealed the following facts: (1) Although farms, and forests adjacent thereto, in such localities as the Lillburn Valley have for years suffered considerable damage by deer, it is only comparatively recently that the deer have increased to such numbers in the majority of the more remote areas that they have eaten out most of the bush feed and taken to feeding on the open "tops." The result is that these operations were conducted at a stage when the forests will greatly benefit thereby. (2) The percentage of deer killed was very high, and this will result in checking the spread and depredations for some time, and permit of a considerable degree of forest-recuperation taking place. (3) While deer exist in considerable numbers in some of the country between the western limit of this season's operations and Preservation Inlet and Dusky Sound, their spread in that direction has been occasioned by the pressure of over-population of the area over which intensive operations were conducted. The far western areas are not as popular with the deer, nor as conducive to a high rate of increase, and not only will the relief of the outward pressure result in the cessation of this spread, but the great diminution of the population of the more favoured localities will induce many scattered deer to return thereto thus causing a reduction of the population of the more remote areas, and facilitate further successful operations in the future. (4) Special mention should be made of the country adjacent to the shores of Lake Manapouri, as deer have for years existed in such numbers in proportion to the comparatively limited area inhabited that they have caused very grave damage to the forest and the alpine vegetation above the timber-line. The country surrounding this beautiful lake, which is the most accessible and valuable portion of the Fiordland National Park, is very steep, and through it flow many mountain torrents, which, while very beautiful, are capable of causing widespread destruction of the forest-clad slopes of the lake-basin if erosion of their sources and water-sheds becomes general. In the forest itself there are many localities where all edible shrubs have been killed by browsing and bark-eating, most other saplings have been killed by antler-rubbing, regeneration of the major and predominating species of trees has ceased owing to the browsing off of all seedlings, the forest-floor covering of ferns, mosses, and grasses have been killed, the ground has been severely trampled, and the roots of the large trees laid bare. The forest in such places is now a community of adult trees only, with no possibility of their replacement when they die unless the deer population be kept numerically low. The conditions obtaining in the forest have, moreover, compelled the deer to seek sustenance—for as long a period as the snow will permit—on the open "tops," and here also very extensive damage has been done over large areas. The snow-tussock has been killed by excessive grazing, other grasses and shrubs have been killed, swampy patches have been trampled and used as "wallows" until they start slips, and considerable erosion is being caused by the melting of snow and water run-off on denuded slopes. (5) Although a few scattered deer inhabit the country between Lake Manapouri and Doubtful Sound and between Lake Te Anau and the west coast between Thompson and Milford Sounds, the great majority of the country is so unsuitable for them that they do not appear to be increasing to any great extent, and further spread can be checked by operations in the more populous areas.

#### *Auxiliary Reconnaissances.*

With a view to ascertaining the exact position with regard to deer, wapiti, and moose in the whole of the Fiordland National Park and the adjacent Takitimo Range, the opportunity was taken to conduct reconnaissances as under: (a) The country between Lake Hauroko and Preservation Inlet and Dusky Sound, and that between the Grebe River and the Seaforth River (two expeditions), including the valleys of the Seaforth River and the Long Burn: The deer situation of this area has already been referred to in the foregoing. The vicinity of Dusky Sound and the Seaforth are the known home of the herd of moose, and, although none of these animals were seen, signs of their presence there in small numbers were noted. The fact was established that the moose have not increased to any extent nor have they extended their range beyond the valley of the Seaforth, and it appears most unlikely that they will ever cross the divide or materially increase, although a more comprehensive survey is desirable. It was considered that the position did not warrant the despatching of a special expedition to kill moose, which would have proved very costly and have accounted for only a very few animals, when the same amount of money spent on the deer would meet a pressing need and account for a far greater number of animals. (b) In the Takitimo Mountains, which lie to the east of the Waiau River, and are an isolated range surrounded by open grazing-land, red deer were found to be present in