In Europe, owing to the scarcity of land and the proximity of towns and villages to the dune-areas, the sand-drift is a matter so serious that its encroachment has to be stopped at all costs, and in Prussia, where women are largely employed, as much as £4 8s. per acre is expended on marram-planting alone; and after the marram there is the further expense of tree-planting, which in Europe is looked upon as the only permanent remedy for sand-drift.

For some years a considerable amount of marram and tree-lupin has been planted by private land-owners in different localities on our coast, and a great deal of this planting has been quite successful. This, however, has generally been in localities where the sand-supply was not very abundant, or where old stable dunes had been caused to drift through the disturbance caused by fires and by excessive grazing. In other localities where the planting has been done next to the grassed lands, and the area between these and the sea left untouched, there is always the danger that in some dry season all the plantation will be destroyed by a drift from the seaward.

Seeing that circumstances in this country quite precluded the adoption of reclamation-work as practised in Germany, it was decided to more or less follow the Belgian and Dutch method, and to plant the dunes without previously reducing them to a uniform level.

Description of Rangitikei Dunes.

Along the coast immediately south of the mouth of the Rangitikei River there is no continuous fore-dune, but there is a series of high mounds or hummocks of sand, from 10 ft. to 40 ft. high, with little valleys between them. The outer slopes and sides of these hummocks bear a scanty growth of native vegetation, but it is insufficient to keep the sand from moving. The landward slopes are generally bare mobile sand. The mounds nearest the sea are generally longest in a direction perpendicular to the coast-line and parallel with the wind. The coast-line is approximately north and south, and is practically straight. At high-water mark there is a considerable accumulation of logs that have been brought down by floods in the Rangitikei and deposited along the coast-line. The prevailing winds are from directions between north-west and south-west. At about 6 chains inland from high-water mark, and adjoining the hummocks, there are often long-shaped flat-bottomed basins from 2 to 10 acres in area. These have their longest axes parallel with the coast-line and perpendicular to the prevailing wind. In some cases the floors of these basins are nearly bare sand, but generally they are composed mainly of water-worn andesite and greywacke shingle which must have had their origins in Ruapehu volcano and the Ruahine Mountains, and must have been brought to their present positions by the different branches of the Rangitikei River, and gradually moved along the old coast-line by a southerly set of the tide. In some places, also, on the floors of these basins there are large accumulations of marine shells, and sometimes with the shells portions of the ribs and vertebræ of whales. Close by these will be found numerous burnt stones (the remains of Maori ovens), which indicate that the shells and bones are the refuse of many a feast of the pre-European days.

Behind these basins there are irregular low sand ridges from 20 ft. to 40 ft. above the plain, and running perpendicular to the coast-line (parallel with the prevailing wind) for a distance of about three-quarters of a mile from it. Between these ridges there are small valleys with a sparse covering of native vegetation. In heavy rains some of these valleys are converted into small lagoons.

The rainfall is between 30 in. and 40 in., and is well distributed through the year. The months of January and February are the driest.

Nature of Sand.

Though quartz particles are the chief constituent of the sand of the district, there are also considerable proportions of crystals of hornblende and augite, which, with a small quantity of titanic iron, give to the sand its dark-grey colour. Small flat particles of marine shells are also a fairly constant constituent. The size of the sand-grains is small, and on this account even a quite moderate wind causes it to move.

Plant-growth.

The dunes in this locality are not quite bare, but carry a more or less sparse covering of native plants. Close to the coast the sand-mounds carry a fair amount of *Spinifex* and *Scirpus frondosus* (pingao). The long sand-ridges farther inland bear a certain amount of *Scirpus*, *Cassinia leptophylla* (tauhinu), and *Coprosma arenaria* (tataraheke), with occasional *Leptospermum* (tea-tree), *Arundo conspicua* (toitoi), *Pimelia arenaria*, and *Calystegia soldanella* (sand convolvulus). The valleys between these ridges are here, when dry, almost barren; when moist a fair amount of the small sand sedge (*Carex pumila*) and some yellow rush (*Leptocarpus simplex*) are found.

Run 24, Mouth of Rangitikei River.

The lessee of Run 24 has done a great deal of reclamation by marram-planting on the dunes in localities more than a mile from the coast; but, though the grass has in most places taken well, there is always the danger that a combination of unfavourable circumstances may cause the destruction of a great deal of it. It is recognized by all authorities as an axiom that all reclamation-work should begin at the sea, which is the source of the sand-supply, and extend from there inland.

Last spring it was agreed to plant with marram-grass a belt of the coast-line of Run 24, starting from the mouth of the Rangitikei River and extending southerly a distance of 210 chains, the belt being 6 chains wide, and starting at high-water mark. As there is here a large sand-supply (it is brought down by the Rangitikei River) and an almost constant wind from the sea, it was decided to put in the marram bunches at only 2 ft. apart,