

Thunbergii, and *Pinus densiflora*. If the complete afforestation of the dunes is aimed at, then the trees nearest the sea, for a breadth of about 12 chains, must always be left to serve as a protection-belt. Trees in this belt are planted from 2 ft. to 3 ft. apart, but farther inland the distance may be increased to 4 ft. or 6 ft. according to the habit of the tree to be planted.

In Belgium and Holland the erection of a foredune by means of sand-catching fences is not practised, but marram alone is relied on to hold the coastal sand. This method is cheaper than but not so efficacious as the French method. An article by Van Dissel, a translation of which is appended, gives a full description of the methods adopted in Holland. Of the trees he mentions, only *Pinus maritima* has been found successful in this country, but it is not so good as the trees quoted in the previous paragraph.

It is far the best plan for any one who wishes to reclaim by afforestation to establish a small nursery not far from the area to be planted, as the seedling trees will then be more able to withstand coastal conditions.

RECLAMATION BY LUPINS AND GRASS.

After the fixation of the coastal belt by means of marram and trees an owner of sand-dunes may prefer to reclaim the balance of his land by the comparatively inexpensive method of establishing tree-lupins on the area. Where there is a fair amount of native vegetation on the sand lupin-seed may be sown or lupin-seedlings planted in the autumn, but the safest plan is to scatter over the sand small branches of lupins bearing ripe pods. The seeds will drop out, and after the seeds have germinated the young plants will be protected by the branches.

After lupin has become established, prairie-grass, clovers, trefoils, danthonia, *microlaena*, and cocksfoot may be sown in patches where the lupin is thin or where cattle have broken it down. (Cattle must never be allowed on the protection-belt.)

TREATMENT OF THE DUNES IN HOLLAND.

From *Conservation des Dunes: Plantations dans les Dunes des Pays Bas*, by E. D. VAN DISSEL, Inspector of State Forests and Cleared Lands, Holland.

Translated by E. Phillips Turner.

THE dunes of Holland extend in a long chain along the North Sea. They occupy an area of about 92,625 acres—that is to say, nearly 1.15 per cent. of the surface of the country. They are almost entirely composed of sand with a mixture—more or less abundant—of broken shells and other material. This sand may show differences as great from the chemical as from the physical point of view. The nature of the sand exercises a great influence on its instability and on the vegetation. It is where the dunes are driest and where their soil is the poorest that the sand is most mobile; the wind raises it in places and disperses it as dust; this causes holes; at the same time the vegetation in these places is not vigorous enough to oppose the action of the wind with an effective resistance. It goes without saying that it is just there that it is important to fix the dunes by planting marram (*Ammophila arenaria*), or by making an effort to plant trees on them. One must always understand that the lands that are most in want of these remedies are also those where it is most difficult to apply them.