

The fixation of sand dunes has also been begun in the United States by the Harbor Commissioners of Massachusetts at Cape Cod and elsewhere. It is a simple operation, which consists in first quieting the sand by mechanical means, fences and brush, or turf cover, and by cutting off or breaking the force of the wind by means of an artificially induced forward dune. Then grasses and other deep-rooting and root-creeping plants are used to bind the sand together, and finally tree growth can be established to give permanent protection.

On the denuded mountain slopes it is also first the mechanical quieting of water and soil movement which must precede the work of the forester. This work must begin at the top of the mountains, where the waters gather their momentum into torrents which carry soil and debris to lower levels. By fascine works, revetments and retaining walls the waters are obstructed



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in their direct descent, and the violent rush over steep slopes is changed into gentle falls, when the pockets behind the breastworks are filled up with the debris and soil. Then when the waters are directed into proper channels and the soil has thus become quieted, sodding and sowing with grass restores the meadow on the gentler slopes, while on the steeper slopes a forest growth is planted and the equilibrium of nature's forces, which man had disturbed to his own detriment by the reckless devastation of the mountain forests, will be gradually re-established.

These glimpses into the problems of an engineering character which are presented to the forester will suffice to justify the claim that he is in need of a considerable amount of engineering knowledge and gumption, which is to be applied under conditions in which it is not usually practicable to employ an engineer.