

natural obstacles, as in the lack of enterprise shown by the people and the poor market facilities. The larger growers of pine apples, bananas, etc., are Americans, and the islands present a most inviting place for the employment of American capital and energy. Unlike the Bermudas, deciduous trees are abundant and furnish a natural contribution and aid to cultivation, while the cedar, which retards cultivation, is not of sufficient abundance to have any importance. Large quantities of sea weed are available, which, combined with cave earth and sand, would furnish a cheap and available fertilizer. Most of the West Indies have had their flora greatly enriched by the introduction of exotics through Government or individual influence; the Bahamas, on the other hand, while offering a much more favorable and uniform climate than the Bermudas or the more tropical islands, has been singularly neglected, and formerly cultivated fertile tracts have been allowed to grow up in dense bush or to become denuded of soil. The present Government is making a strong effort to develop the culture of *Agave Mexicana* or Sisal Hemp.* Botanists will find a rich and almost untouched field in the cryptogamic flora of these islands, especially in the Algæ.

The Sand-Dunes of Lewes, Del.—Prof. J. T. ROTHROCK spoke briefly of the dunes at Lewes, Delaware, and illustrated his statements by some photographs, recently taken by him at that place.

It may be stated in advance that, while the conspicuous change in the surface has been most marked toward Cape Henlopen, the marshes between the Breakwater and the mouth of Lewes Creek have been slowly rising: that whereas a few years ago these marshes were a large number of times overflowed each year, that now this occurs so seldom that the flats are being built upon, and regular crops of marsh hay taken from them. South of the Breakwater, and say one fourth of a mile inland, one encounters a mass of pure shore sand, probably in its greatest depth one hundred feet deep, becoming on the north and south and west less and less deep until one reaches nearly the sea-level. On top of this ridge the dead trunks of former forests rise out of the sand. On the northern slope they become less and less abundant, disappearing when one reaches the marsh level. North of this, toward the water's edge a second growth of trees is seen appearing. On the southern slope of the ridge a forest of *Pinus rigida* stands, but this forest, by the moving of the sand toward the south, is being constantly encroached upon.

Indeed, at present one may there see trees standing on the natural level, in no wise surrounded or endangered by sand. A few yards to the north of these is the face of the advancing sand hill. There one finds the Pines in all stages of burial, from those whose roots are barely touched, to those (sixty to eighty feet high) whose

* Report of George Preston, Esq., as Special Commissioner to Yucatan to Inquire into the working of the Fibre Industry in that Country. Nassau. N. P., 1888.

extreme tips alone remain above the sand. How many are absolutely covered, one can hardly even guess.

The force at work here is plain enough. The wind from the north and north-east drives the sand to the hill-top, and when it reaches the crest, gravity carries it down the southern declivity. Once the forests have been killed, and the leaves are fallen, there is nothing to arrest the force of the wind and the slow process of uncovering the tree trunks by the sand drifting away from them begins. This, however, appears to be simply shifted further south, covering up fresh forests as it advances. While, therefore, ground is being lost to the forests and to the hay makers in the south and west, there is a gain on the north, for enough of the sand remains there to raise the general level of these meadows slightly, and to make them less subject to frequent overflow. Indeed as we have seen, a second forest growth is commencing on that very spot.

To one familiar with the dunes on Cape Cod, those of Lewes are striking from the fact of the absence of the wild rose, blueberries, beach-plums, etc., which one finds so common in the Massachusetts examples. They illustrate further, that we have on our own soil, and within a few hours of this city, the same forces operating which were so destructive on the shores of the Bay of Biscay. These dunes and trees suggest further that the same remedies which restored a vast area (rescued from the sandy deluge) again to France may in time have to be appealed to here. There is, however, this difference, that whereas, in Europe, it was the *Pinus Pinaster* Soland. or Maritime Pine that was used to make seaward barrier, we here can safely depend upon the *Pinus rigida* or Pitch Pine, which is thriving now at Lewes, to accomplish this same result. Indeed from Massachusetts south to Lewes, here and there, in sight of the sea and on a most sandy soil this tree is flourishing almost as well as it does on the rocky hillsides in the interior of Pennsylvania.

MAY 14.

Mr. EDW. GOLDSMITH in the chair.

Twenty-three persons present.

A paper entitled "Catalogue of the Muscicapidæ in the Collection of the Academy," by Witmer Stone was presented for publication.

Notes on Corema Conradii.—Mr. J. H. REDFIELD stated at the meeting of the Botanical Section of the Academy held May 13th, that it had been supposed of late years that *Corema Conradii* Torr. had disappeared from the pine barrens of New Jersey, the earliest reported station for the plant. He referred to an unsuccessful search for it, made by the late Charles F. Parker and himself in April, 1869, at Cedar Bridge, Ocean Co., N. J., where Dr. Torrey had seen it in 1834 and had indicated the exact locality in the Annals of N. Y. Lyc.



Rothrock, Joseph T. 1889. "The Sand-Dunes of Lewes, Del." *Proceedings of the Academy of Natural Sciences of Philadelphia* 41, 134–135.

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