gested by the number of vessels lately lost in that vicinity, owing to the fact that they were out in their reckoning. The bottles, which are of gutta percha, are to be sealed and thrown into the sea by passing vessels, each one containing a label showing the date and the position at which it was cast adrift. They are then supposed to drift ashore and to be recovered. The expense involved is considerable. On the bottle it is stated that a reward of five francs will be paid for the return to any of His Majesty's consuls—an instance of liberality of expenditure in the acquisition of knowledge which is almost unprecedented.

## SUMMER MEETING OF THE AMERICAN FORESTRY ASSOCIATION.

By Prof. ALFRED J. HENRY, U. S. Weather Bureau.

The American Forestry Association held its summer meeting at Lansing, Mich., August 27–28, 1902, under the joint auspices of the Michigan Forestry Commission and the Michigan Agricultural College. The sessions were held in the State Capitol and the Botanical Laboratory of the Agricultural College, Hon. Charles W. Garfield, Vice President of the Association for Michigan, in the chair.

The papers read and discussed at the meeting were for the most part upon practical problems in forestry and forest management, particularly as applied to the conditions which obtain in Michigan. It is gratifying to note in this connection that the people of that State, and indeed those of other States as well, are fully alive to the great necessity of taking prompt action looking to the preservation of their rapidly disappearing forests.

The advanced position that Michigan has taken in industrial affairs during recent years and the development of new industries has drawn rather heavily upon her water resources. The question of the constancy of stream flow and the possibility of developing additional power is now receiving attention so that a very substantial as well as a sentimental interest attaches to the preservation of the forests on the headwaters of her principal rivers.

During the last thirty-five years vast tracts of Michigan pine lands have been cut over and the merchantable timber removed. In many districts the lumberman has been succeeded by the agriculturist, and prosperous farming communities have been established. In other districts, especially in the region northwest of Saginaw Bay, the attempt at farming has not been as successful as might be wished. Many tracts of land from which the lumber has been removed were abandoned, and in course of time reverted to the State.

From the lands thus acquired the State has set apart about 57,000 acres in Roscommon, Crawford, and Oscoda counties as a forest preserve. At the same time a commission was appointed to have charge, not only of the forest preserve, but also of all matters relating to forests and forest management wherein the State was an interested party. Naturally much of the discussion of the meeting turned upon the measures best adapted to the reclamation of the waste lands, pine barrens as they are locally known, in the forest preserve and elsewhere in the State. These lands are for the most part unfit for agricultural purposes. The soil is sandy, coarse in texture, so coarse in fact that its capillary power is exceedingly low. The rain that falls upon it soon passes far below the roots of the scanty flora that now subsists upon it and is lost so far as plant life is concerned. That such a condition is not of recent origin is clearly shown by the fact that the present flora of the region is composed largely of species which have developed structural forms adapted to much less humid regions. On the other hand it should be remembered that a great part of these abandoned lands was once covered by a growth of magnificent white and Norway pine. The important question is therefore "Can not these trees be grown again?"

The concensus of opinion as expressed at the meeting was in the affirmative, but on certain of the poorer lands it would be necessary to first plant trees of a relatively low order in the economy of nature, as for example, the jack pine, a tree that will grow on lands that have been fire-swept and abandoned by other forest trees, or left to waste by the farmer.

The forest, as was pointed out by Dr. Gifford, performs simultaneously two important functions, soil fixation and soil betterment. The improvement of the soil would be a comparatively slow process, yet with the gradual formation of humus and with the added protection of the trees the moisture conditions would also improve, especially as regards the conservation of the snowfall, much of which is now wasted. Thus the way would be paved for the return of the better species of trees.

Mr. Thomas H. Sherrard of the Bureau of Forestry, United States Department of Agriculture, gave a general description of the physical characteristics of the lands in the forest preserve. He classed the existing forest covering as (1) Swamp; (2) Jack pine plain; (3) Oak flat; (4) Oak ridge, and (5) hardwood lands, and showed the distribution of these types in a representative township. Mr. Sherrard also gave an estimate of the possible production of a second crop of timber on these lands based upon measurements of existing second growth.

The climatologist will be interested chiefly in the deliberations of the several sessions respecting the destruction of the forests, the blighting effect of forest fires, and the diminution of stream flow due to these causes. Fortunately for the State, the scars made upon her surface are not so deep or lasting as they might have been under different conditions as to climate and topography. The rainfall is generally abundant for all needs, though not heavy enough to cut and seam the surfaces from which the timber has been removed. Then, too, owing to the humid climate, the original forest has in many cases become covered with a second growth of native trees or underbrush, thus preserving the character of the original covering. So far as can be judged from the scanty data available, deforestation has not changed the climate to an appreciable degree.

## THE PERMANENCY OF PLANETARY ATMOSPHERES, ACCORDING TO THE KINETIC THEORY OF GASES.

By S. R. COOK, Case School of Applied Science, Cleveland, Ohio, dated September 3, 1902.

### 1. HISTORICAL.

Since the development of the kinetic theory by Clausius, Meyer, and Maxwell, and especially since it has been shown by Maxwell and Boltzmann that the molecules of any gas may have velocities ranging from zero to infinity, it has been a problem of intense interest to many scientists to determine the probability that the molecules of highest velocity may escape from the outer limits of an atmosphere, and hence deduce the condition of atmospheric permanence.

The vast extent of the gaseous envelope of the sun, the absence of an atmosphere around the moon, the extent and permanency of the atmosphere of the earth and the probable existence of atmospheres on the planets are problems that arouse and hold the interest alike of astronomers and physicists.

According to the nebular hypothesis, these bodies at one time all belonged to the same nebulous mass. It may then very naturally be assumed that under similar [temperature] conditions they would each contain the same forms of matter in their atmospheres. Various hypotheses, both chemical and physical, have been presented to explain the absence of all free gases from the surface of the moon. The presence of certain markings on Mars, that appeared to be accounted for by atmospheric conditions, has caused much interesting speculation and scientific discussion as to the probable constitution of this planet's atmosphere. The existence at times of what