

Do Forests Increase Rainfall?

By Dr. B. E. Fernow, Dean, Faculty of Forestry,
University of Toronto.

A Speculative Problem on Which Convincing Data is Yet to be Developed.

This question, often asked, includes two questions, namely, whether such increase is found over the forest itself, or whether the forest increases the rainfall over the adjoining field; the latter being, of course, the one practically most important. To ask the question is to throw doubt on what is axiomatic natural philosophy with every popular writer, but the candid professional student of the influence of forests on their surroundings will have to admit that we cannot yet demonstrate positively that, how, and to what degree the rainfall of a locality is influenced by forest cover. This ignorance is due partly to the complicated character of the problem, partly to the inefficiency of meteorological instruments for measuring rainfall, so that an exact proof cannot, as yet, be reached by measurement. Natural philosophy, however, leads us to assert that there is no condition on earth that does not have an influence on all other conditions more or less, and hence we can infer such an influence of forest on rainfall. Whether this influence in one or the other direction is of practical import is still another question.

A human rain maker.

Some years ago the Congress of the United States appropriated several thousand dollars for the writer—to his dismay—to be devoted to the production of rain by artificial means. This reference of the appropriation was made, because the writer had published a bulletin on the influences of forest cover on its surroundings, including rainfall. The experiments, however, were not to be made by forest planting and waiting a half century or so for an answer, but by bombarding the atmosphere, in the belief of the assertion that large bat-

les were usually followed by rainfall—an assertion which was found then not supported by the existant evidence, although a book under the title, "War and the Weather," had brought together the statistics in this respect, leaving out, of course, the battles which were not followed by rain. In looking up the history of rainfall, it was amusing to find that in France suffering from floods the opposite effect, namely of driving away thunder clouds by bombarding the air, was expected to prevent these floods. The efficacy of prayer in breaking a drouth, and in some villages in the East Indies an official rainmaker is employed to perform the miracle. The Snake Dance of the Hopi Indians is such a prayer for rain.

The cause of rain.

At any rate, it became necessary for the writer to find out what was known as to the conditions under which and by what means Nature herself produces rain. It was found that even this fundamental knowledge was not very fully developed beyond the primary physical law that air at a given temperature and under a given barometric pressure could contain only a given amount of moisture and that by decrease of that temperature, as when a cold wind blew into a moisture-laden, warm current or by decrease of barometric pressure, as when such a current had to ascend a mountain, some of the moisture in the current would have to be precipitated as rain or snow. The same would take place if a warm, moisture-laden air current added its quota of humidity to bring to saturation a passing current.

In the first place, then, the sun, the oceans, the distribution of land and water areas, the air currents due