

The Climatic Influence of Forests.
by
W. J. Pope.
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Outline.

The Climatic Influence of Forests.

I. Man's developed industry the cause of his observation of the climatic influences of forests.

II. Climate.

1. Forests do influence local climate.

(a.) Absence of forests.

(b.) Forest preservation.

2. Influence of forests on temperature.

III. Chemical influence of forests.

IV. Electrical influence of forests.

V. Forests as purifiers.

(1). A protection against malaria.

2. Influence on springs.

Climatic Influence of Forests:

In the rudest stages of life, man depends upon spontaneous animal and vegetable growth for food and clothing, and his consumption of such products consequently diminishes the numerical abundance of the species which serve his use. At more advanced periods, he protects and propagates certain vegetables, plants and animals, and at the same time, wars upon rivals which prey upon these objects of his care or obstruct the increase of their numbers. The action of man upon the organic world tends to subvert the original balance of its species; and while it reduces the number of some of them, or even exterminates them altogether, it multiplies other forms of animal and vegetable life. The extension of the various industries has enlarged the sphere of man's domain by encroachment upon the forests which once covered the greater part of our earth's surface, otherwise adopted

to his occupation.

Man's needs have compelled him to extend his empire alike over barren sands and wood-lands. The history of man's industry as exerted upon animal and vegetable life, upon the woods, upon the waters and upon the climate, gives evidence of his great power to influence nature.

Experience has proven a dear school, and some disastrous results have caused him to observe, to study his surroundings, and to make scientific inquiries as to how his conditions could be improved. While nature supplied his wants, he existed, and thought no more about it; but when he came to want, he found that he must assist nature. From time to time, he has made discoveries that have been of great value to him. For ages he has removed the ores from the mountains and cut down the forests to supply his wants; but of late the supply has become short, and he has begun to study how he can overcome this defect.

It is thru this study that the climatic influence of forests has become known to him.

Climate is the condition of the atmosphere, chiefly with respect to its temperature and moisture. These conditions are primarily determined by latitude and elevation, but the nearness of large bodies of water, mountain ranges, or extensive plant growth affords important modifying influences to the climate of places having the same latitude and elevation. Lesser modifications are occasioned by differences in soil, in trend and slope of surface variations, as well as by small bodies of water and by surface coverings. Most of these are beyond man's control, but by drainage or overflow, and by tree planting or protecting of those already growing, and the cutting out of certain portions, he is able to effect note-worthy changes in local climate, the extent of which is measured by the extent of his efforts.

That our forests improve the climate

cannot be doubted. Observations and experiments show that the presence or absence of trees in masses have influence both upon the temperature and relative humidity of the atmosphere.

In those regions where the enormous increase in population has resulted in the removal of the forests from wide extended areas, much care and intelligence, has unfortunately, in most cases, not been exercised. The timberlands have generally been purchased at figures almost entirely on the value of the standing wood. The trees have been cut down in a reckless manner and fires carelessly started have often been left indifferently to burn themselves out, instead of some of the trees being carefully removed and leaving the area in such a condition as to enable it to produce a new growth. Lumbermen to frequently attack the virgin forest and cut it down in so careless a manner that the lumber fit for use amounts to perhaps, but a third or even less, of the total growth, and the remaining part is abandoned.

The importance of forests preservation as a national measure has of late been widely discussed in the public press, but usually in a general way. The solution of the question thus far has hardly been hinted at and is now believed by nearly all who discuss the matter, that forests preservation in the United States is necessary for climatic, as well as commercial reasons.

The cooling effect of forests is very great, and of much importance. The well moistened earth under the trees accounts for a part of this. The trees shading the ground prevents the very rapid evaporation that would otherwise result. The leaves and rubbish that fall from the trees act as a mulching, and keep the upper surface of the ground well moistened and also prevents rapid evaporation, tends to check the rain water and prevent its running off to the rivers, and being thus prevented from moving away, it can now enter the soil and soak into it.

The action of forests as conductors of heat between the atmosphere and the earth

has been found to be of great importance, especially in those countries where the forests have been destroyed. The superficial strata of the earth are colder in winter and warmer in summer than those a few inches lower. The roots of large trees penetrate beneath the superficial strata, and reach earth of nearly constant temperature, corresponding to the mean of the entire year. As conductors they convey the heat of the atmosphere to the earth when the earth is colder than the air, and transmit it in the contrary direction when the temperature of the earth is higher than that of the atmosphere. Hence we find that they are equalizers between the air and the earth.

In many of our forests, we find a deciduous foliage which often interposes a complete canopy between the ground and the sky, protecting the soil from the extreme heat of the sun, which would otherwise cause great evaporation to take place and change of texture of the soil. This cool, moist earth under the foliage produces a cooling affect upon the atmosphere

which is of much importance as it causes a greater amount of rain to fall in that locality, besides making a more pleasant retreat for animals from the sun.

In many of the forest regions, we find that the early snows settle down among the trees and the partial shades of the trunks and branches cause this snow to remain during the winter, and being in contact with the warmer earth it begins to melt. The water is held in the leaf-mould and slowly seeps down. There are times when the thermometer stands far below the zero point when this under thawing is taking place.

It is said that the forests robbed the atmosphere of an enormous quantity of carbonic acid and thereby transformed it into respirable air, long before man inhabited the earth.

Trees heaped upon trees, filled up the marshes and ponds, and buried with them in the bowels of the earth, the carbon which was destined to become, by this wonderful condensation a precious store

of future wealth in the form of bituminous and anthracite coal.

The decomposition of the vast vegetable mass annually shed by trees cause a permanent change in the constitution of the terrestrial atmosphere.

Plants take from the air carbonic acid and other gaseous or volatile products exhaled by animals or developed by the natural phenomena of decomposition. On the other hand, the vegetation pours into the atmosphere oxygen, which is taken up by animals and appropriated by them. The result is that a forest withdraws from the air by its great absorbent surface, much more gas than meadows or cultivated fields, and exhales proportionately a much greater quantity of oxygen.

The properties of trees, singly and in groups, as excitors or conductors of electricity, and their consequent influence upon the electric state of the atmosphere, do not appear to have been much investigated; and the conditions of the forest itself are so variable

and so complicated that the solution of any general problem respecting its electrical influence would be a matter of extreme difficulty. But it is indeed, impossible to suppose that a dense cloud, a sea of vapor, can pass over miles of surface bristling with good conductors, without undergoing some change of electrical condition.

The true electrical condition of neither cloud nor forest can be determined, and it could seldom be predicted whether the vapors would be dissolved as they floated over the woods, or discharged upon it in a deluge of rain.

It has, however, been observed that hail storms which were once generally supposed, and are still held by many, to be produced by a specific electrical action, and which, at least, are always accompanied by electrical disturbances, are believed, in all countries particularly exposed to that scourge, to have become more frequent and destructive in proportion as the

forests have been cleared. The rapid congelation of vapors by the obstruction of heat being impeded by the influence of the woods, it is rare that hail storms or water spouts are produced within the precincts of a large forest when it is assailed by the tempest.

A good climate must, of course, be a healthy climate, and some authorities claim that forests are good purifiers of the air. A belt of trees have been said to act as a filter, and cases have been known where a screen of trees have preserved everything beyond it while the unprotected ground was subject to fever. It is a belief of some people that groves of trees afford an important protection against malaria.

It is argued that the foliage of the forest exercises a chemical as well as a mechanical effect upon the atmosphere. It is claimed that the great swamps of Virginia are healthy so long as the forests in and around them remain, but become very insalubrious when these forests are removed.

Forest protection against the escape of moisture from the soil, insures the permanence and regularity of natural springs, not only within the limit of the woods, but at some distance beyond its borders, and thus contribute to the supply of an element essential to both vegetable and animal life. As the forests are destroyed, the springs which flowed from the woods and consequently the greater water courses fed by them diminish both in number and volume.

There are many things that are necessary to produce a good climate and the more vigorous searches made on the subject of forests and their relations to climate only reveal to us the greater relation between them.

W. F. Pope.

The end.