

## FORESTRY

### Effect of Trees Upon the Water Supply

During the past twenty-five years the progress made in agriculture in Ontario has been very rapid, our farmers as a rule having fully realized the fact that if they are to succeed in keeping the production of their soil in quality and quantity equal to that of other nations they must acquire a knowledge of the natural laws which govern the production of plant and animal life and apply that knowledge to their every-day practice on the farm.

By careful cultivation the mechanical condition of the land has in many cases been brought well up towards perfection and by the proper rotation of crops and scientific manuring the soil has been well supplied with plant food, yet only too often there is a failure in obtaining expected results because of an insufficient supply of that most necessary element, water.

The quantity of water required by plant life is enormous. Mr. Lawes found that in a plant of any one of our ordinary grain crops more than two hundred grains of water must pass through it for a single grain of solid substance to accumulate within it. He states the evaporation from an acre of wheat during the period of its growth to be 114,860 gallons, with clover it is rather more, with peas and barley less.

As this supply of moisture is furnished by the water in the soil it is necessary in order that the plant can develop itself normally, that the soil moisture shall be equal at least to the volume of water given off by the leaves. Should this equality be disturbed the leaves droop and dry up and the plant will eventually die.

Water is the vehicle by means of which the mineral food of the plant is carried from the soil to its leaves, it is also necessary to keep the cells expanded so that the plant may have sufficient rigidity to enable it to maintain its natural position and so permit all parts to perform their various functions. An ample supply of water therefore is the first essential to the production of crops, without it the most skilled tillage is labor lost and the richest plant food will lie in the soil unavailable to the plants for which it was intended.

The management of the water supply thus becomes one of the greatest problems the farmer has to solve; upon it depends the success or failure of all his efforts and with the solution of this problem, the forestry problem is most intimately connected, for without the maintenance of a proper proportion of woodland no systematic water management is possible to us.

Of late years the failure of our springs and streams has been very noticeable. Wells have gone dry which were never dry before, and constant stirring of the soil in cultivated fields has become a necessity in order to keep the crops growing at all; this certainly has not been caused by any deficiency in rainfall for of that there has been ample.

That the precipitation of water either in the form of rain or snow has not been scanty is evidenced by the fact that Lake Ontario has been for some time and still is much higher than it has been for many years; yet in many districts there is a scarcity of water. These constantly recurring droughts are becoming a very serious matter, they used not to occur in former years as often as they do now, nor when they did occur were the springs, streams and wells affected to an appreciable extent. The reason for this should be patent to every farmer who sees in the spring the water from the melting snow running rapidly over the surface of the land and pouring into the streams converting them for a time into raging torrents of muddy water which develop into a flood when they join the river below.

During the summer months the greater part of the rain which falls passes off in precisely the same way, a few hours precipitation sullying to fill the channels of the streams with a great volume of surface water which carries with it to the lakes a vast amount of plant food leached from the soil and the small quantity of water absorbed by the surface of the land being exposed to the action of the sun and the drying winds which sweep over it, is evaporated too quickly to be of service to the crops and cannot by any possibility penetrate deep enough to replenish the underground springs which supply the wells. Thus it is that in all

countries having a similar physical conformation to ours, when the land has been overcleared droughts and floods alternate, rendering in the end successful agriculture impossible and causing serious injury to all other industries.

A proper proportion of tree cover on the land conserves the water derived from the snow of winter and the rains of summer and regulates its distribution at all seasons in such a way as to provide a continuous and even supply for all purposes in nature; by changing surface drainage into subsoil drainage and by lessening the evaporative effects of sun and wind. It keeps the soil porous and with its deep reaching root system assists the percolation of water from the surface to the soil beneath. Water falling upon tree covered land finds its level underground and furnishes the required constant supply to the fields, replenishes the underground springs which feed the streams and ensures their regular and even flow.

There is also a natural process at work which causes water to rise to the surface from greater depth in the soil than the roots of our cultivated plants can reach, bringing with it as it rises soluble plant food which would be otherwise unavailable, in this way the fertility of land well supplied with soil water is kept up under heavy cropping.



### Studies in Trees

A thrifty wood lot presents a field for varied and important observation which a teacher experienced in presenting topics of nature study will know how to appreciate. Nowhere can better illustrations be found of the operation of many important biological laws and the lessons learned here are sure to be remembered, because once grasped other examples of the same phenomena are certain to be frequently presented.

Naturally one of the first lessons in forest work will be to study the different kinds of trees and to learn the characteristics which separate them into groups; for example the points of difference between evergreen and deciduous trees, between oaks and maples, and between one kind of maple and another.

Prominent among the distinguishing characters of trees are their twigs, buds, leaves, flowers and seeds. Great variation will be found, not only in