

Beneficial Effects of Forest Cover.

Perhaps the most obvious relation that exists between forests and water is the tendency of the tree cover to check erosion. The leaves and branches of the trees prevent the rain from beating upon the soil as it does in the open; the cover which they afford delays the melting of snow in the spring; the upper layers of the forest soil act as an enormous sponge that absorbs large quantities of water which in turn are passed on to the great reservoir of mineral soil underneath; and finally the surface cover of stumps, fallen twigs, branches, and even whole trees acts as a mechanical obstruction to prevent rapid run-off. The surface run-off from forest areas is less, both in total amount and in velocity, than that from similarly situated unforested areas. The steeper and more rugged the topography, the more marked is this contrast.

In hilly country some erosion is, of course, inevitable under any conditions. When the soil cover of trees, under brush, and litter is kept intact, however, this is more often beneficial than otherwise, since only the lighter soil particles are washed away, to be later deposited in the more level lands below, adding to their fertility. But when this protective cover is interfered with, whether by fire, destructive lumbering, overgrazing, or injudicious clearing of land for agriculture, the proportion of coarser, infertile materials washed away increases greatly and transforms erosion from a constructive into a dangerously destructive force, difficult of control and capable of doing untold damage.

As Water Users See It.

From the standpoint of the water user, the tendency of the mountain forests to prevent erosion is of the utmost importance. Wherever storage reservoirs must be used, whether for municipal supplies, irrigation, or water power, they are exposed to the ever-present danger of silting up. Every bit of soil brought down by the streams and deposited in them reduces their capacity and consequently their effectiveness by just so much. This sedimentation is serious under any condition, but doubly so when, as not infrequently happens, no other satisfactory dam sites are available and the reservoir can not be replaced at a reasonable cost.

Water heavily laden with eroded material often decreases the efficiency and increases the cost of maintaining diversion dams, pipe lines, flumes, canals, and other irrigation works. Sometimes such water damages the crops to which it is applied, and not infrequently it seriously injures or even ruins the land by burying it under a mass of sand, gravel, boulders, and other infertile debris. Excessive erosion may interfere seriously with navigation by filling the streams with material which is deposited in their lower reaches and in the harbors into which they empty.

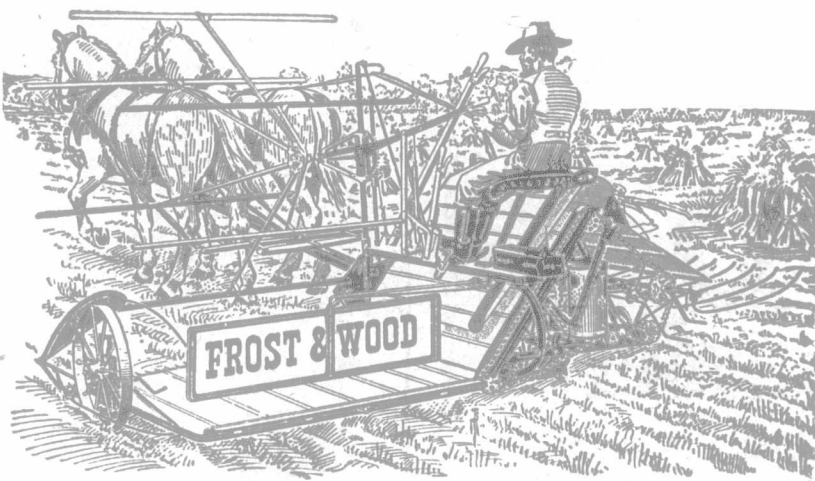
Even-Flowing Streams.

The action of the forest in reducing surface run-off tends also to regulate the flow of streams. Instead of rushing away in uncontrollable torrents the water is absorbed into the great reservoir of mineral soil, from which it is gradually paid out to the springs and streams. This tends to decrease the high water run-off and to increase the low water run-off. Both results are good. The decrease in the high water run-off means that there is less danger of destructive floods and less waste of valuable water; while the increase in low water run-off means that a larger supply of water is available during the dry season, when it is particularly needed. It is the low water flow that to a great extent determines the availability of any given supply for municipal use, irrigation, or hydroelectric development, and anything which will increase this flow is therefore a factor of prime importance. —By S. T. DANA IN CANADIAN FORESTRY JOURNAL.

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