

Are You A User of Water Power? Here's Evidence for You

The Effect of Forests on Water Powers

Proof Abounds that Destruction of Forest Cover Injures the Commercial Value of Streams

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IT IS well-known that the equalization of the flow of rivers is largely dependent on wooded lands, especially in mountainous districts, or in districts where precipitation is not uniform throughout the year, or where extreme frost prevents the flow of moisture during the winter.

This importance of forests around the water heads of streams utilised for power purposes is sometimes overlooked—or ignored—by engineers designing small hydraulic plants. There is nothing more annoying at a water-power plant than to have water rushing to waste over the dam during springtime, and then later in the year to find the plant can only take part load owing to low water. Another trouble, which is the direct result of deforestation, is the quantity of mud and silt brought down during the time of spate. Apart from the wear on bearings, etc., caused by this sand, there is always the possibility of water-gates and wheel channels getting silted up, with the subsequent expense of a diver and perhaps the temporary shutting down of the plant in order to clear the blocked passages.

Precise figures on this subject are hard to obtain although the principle is generally accepted by water-power engineers. The following particulars from Wallace, Idaho, seem to show that not only equalization of flow but also the yearly average flow is affected by the destruction of forests. At Wallace, the watershed which furnishes the city's water supply was burned down in 1910. A bulletin of the United States Forest Service states that the basin had an area of about 2,000 acres, formerly well-timbered with trees from 50 to 200 years old, and that these were almost wholly destroyed in the year mentioned. Before the fire the stream flow was never below 1,000 miner's inches. Since then it has fallen to 250 miner's inches and the company furnishing the water, light, and power has been compelled to spend considerable sums of money annually in developing power from steam and using part of it in pumping water. Records of the weather bureau at Wallace show that the precipitation has been about normal. Hence the towns-people think the unevenness of flow must be due to the destruction

of the timber and not to any change in climate or rainfall.

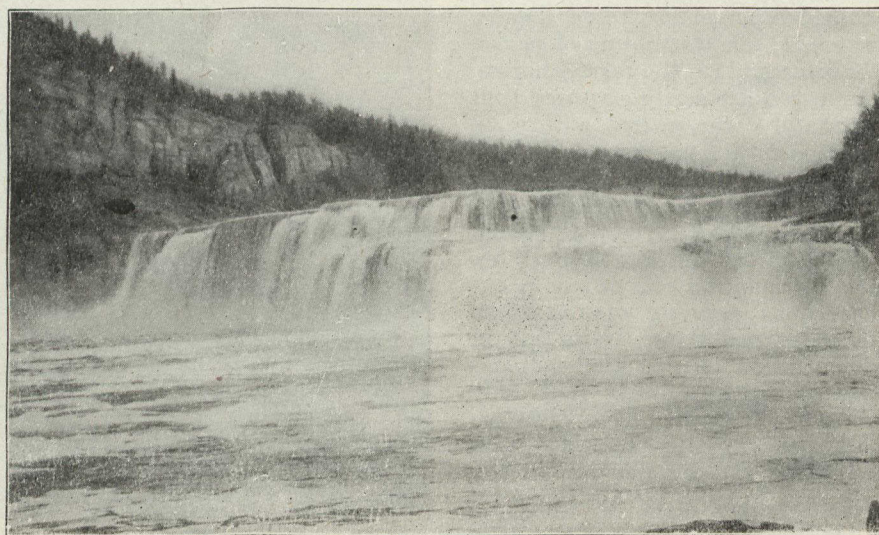
Similar troubles are not unknown in older countries than ours, and the following extracts from a book—"La Houille Blanche" by MM. Guieu and Babey—published last year in Paris, France, show that reforestation is the remedy there, as here.

"Great variations of stream flow

to M. Mongin, Inspector of Waters and Forests. The trees which it is proposed to establish should:

1. Possess roots powerful enough to penetrate the innumerable interstices of the soil, thus rendering it more permeable and protecting it from being carried away.

2. Present a covering complete enough to protect the surface against meteorological influences.



Canada's unequalled water power resources must be safeguarded by the maintenance of her water-shed forests.

are detrimental to full development of the water power of a stream, but do not form an unsurmountable obstacle. Some measures allow regularization to be effected among which the most important is reforestation. This method has been practised for some years in the French Alps.

"The influence of vegetation on the regularization of stream flow is not now disputed, the Engineer of Roads and Bridges, Department Hautes-Alpes, Surret, has established the four following principles:

(1). The presence of a forest on a soil prevents the occurrence of torrential floods.

(2). Deforestation renders the soil a prey to floods.

(3). Development of forests helps to reduce floods.

(4). Cutting of forests increases the violence of floods and may even cause them to re-appear."

"Reforestation, to be efficacious, should follow certain rules, according

3. Furnish a humus in increasing quantity, destined on the one hand to fertilize the soil and increase vegetable growth, and on the other hand to increase the regularization of the flow of streams and to steady the melting of snow.

4. Maintain and perpetuate these beneficial effects and further develop them in the course of time.

"Long experience has established that resinous trees are the best for reforestation for the purpose of stream flow regularization. Besides retaining a large quantity of water in their foliage, they make healthy and dry top layer of the soil, they make the climate more uniform, and also break the violence of winds which wither certain Alpine valleys.

"Planting should be done by means of very young trees about four inches high. Trees are planted in twos, four feet apart, which gives about 5,700 plants to the acre. The best season for planting is generally in spring."