

In Switzerland, too, floods and landslides have increased greatly in the course of the centuries. Because of the increase in population, the forests in the plains and on the larger slopes of the mountains have given way to cultivated lands. In the mountains the herds of goats, sheep and cattle, always increasing, have hindered natural sowing and regeneration in the forest (particularly in localities where the natural conditions had already been rendered unfavourable through other causes).

By examination it was proved that through the influence of men and their cattle the upper forest boundary had, in the course of the centuries, been pushed back in many valleys about 300 to 1,000 feet, and that in other districts mere ruins of the once luxurious forests remained. To the destruction of part of our forests is attributed the growing damage done by inundations and landslides.

Our Swiss Forest Research Institute has undertaken to examine this question. At the beginning of this century it chose two small valleys in the Emental mountains—or, as they call them there, two “Graben”—the Rappengraben and the Sperbelgraben. The Rappengraben is only one-third wooded, the Sperbelgraben almost completely covered by forests. For over thirty years rain and snow have been measured here with special instruments; automatic installations have noted continuously the volume of water that drained away, and in specially built basins all the stones and boulders washed down in each valley were held back and measured. Observations were made as to how the water moved in the earth, and the number of landslides which occurred in each valley.

It was established that in great storms the mountain stream of Sperbelgraben never rose so quickly and only reached to one-third or one-half of the high water mark of the Freildanl-bach in the Rappengraben. Also in thaws in winter, or when the snows melted in the spring, the wooded brook never rose as high as the unwooded brook. The wooded brook also brought down fewer stones than the unwooded brook, and on the wooded slopes of the Sperbelgraben there were no landslides, while in the pastures of the Rappengraben fresh landslides broke away every year and the piles of stones in the valley grew larger.

How can one explain the beneficent levelling influence of the forests on the stream flow and on the amount of soil wash and gravel?

Let us imagine a valley completely overlaid with lead, so that nearly all the water of one rainfall runs off at once. None can soak in and only very little can evaporate. The rain water would in a very short time reach the bottom of the valley from the highest watershed. Each fall of rain would quickly fill the stream