FORESTRY

# Trees Aid Flood Prevention

By Tom Gill

Mr. Gill is a well-known authority on forestry.

The appalling floods now raging in the lower Mississippi valley have revived the ancient issue of forests versus engineering works as means of flood prevention. Much has been claimed for the beneficent influence of forests and much denied. Here in America we lack the results of scientific experimentation either to absolutely prove or deny the importance of the forests in this role. But the older countries of the world have spent long years in the harsh school of experience in this regard. Spain, Switzerland, France and Italy for example, have suffered more than a little and the mass of experience and scientific data they have built up in regard to torrent control holds lessons for us.

There as here, foresters are substantially agreed that a forested area provides no absolute insurance against floods, yet they have found that forests play a very important part in controlling floods and in diminishing the evil effects of water at flood stages. They have found that forests actually decrease the height of streams in times of high water and increase the height in times of low water—in other words, that they tend to equalize stream flow.

But, even more important from the standpoint of flood control, they have found that without a forest cover to bind and protect the soil, other methods of flood control prove in the long run valueless.

For without the protective leaf mold that a forest gives, without the protection of the tree crowns against heavy downpours, great quantities of the earth's most fertile soil are swept down the streams, filling up catchment basins and reservoirs, raising the beds of rivers and silting up levees and irrigation ditches. Meanwhile the taxpayer continues sadly to provide the dollars to remove these tons of earth that should never have got there in the first place.

The importance of the role played by this solid material, this soil, sand and gravel, that are carried by streams at flood stage is frequently overlooked. One flood in France has been computed to have carried over two and a half times its own volume of solid matter. For every bucket of water it moved with destructive force two and a half buckets of solids. The Pueblo, Colorado, flood was 50 per cent. earth and sand. In this way thousands of acres of fertile soil may be destroyed each year and millions of cubic feet of silt deposited in levees, river beds and reservoirs.

So France, Spain and Italy, which have spent millions in flood control, have come to make use of a combination of engineering methods and forestry. The first work on the upper streams consists of dams of stone, logs, or masonry built directly in the stream-bed. "Barrages," they are called. These barrages are placed at frequent intervals and finally form part of the bed itself. Aspen and alder cuttings are planted now to aid in holding the soil. This is followed by the main planting of pine and larch. It costs money—but so do floods, and only in this way are they able to prevent violent erosion of their upper streams on deforested slopes. "There are three ways of solving the flood problems," says P. L. Yang, a Chinese engineer. "Reforestation, barrages and reservoirs. Reforestation is the most important measure."

So there exists today a high degree of unanimity among foresters and engineers abroad in holding that the establishing of forest cover is a very necessary step, whatever method of flood control is agreed on. If we pin our faith on levees we must prevent them from silting up. If we put millions into storage reservoirs we cannot afford to fill them with mud.

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GEOLOGY

## No Quakes From Flood

Earthquakes and tornadoes that have occurred in and near regions stricken by the Mississippi flood would probably have occurred even if the country had not been inundated, and there is no need to fear that any severe earthquake is apt to come and further damage the levees. This is the opinion of two government experts in such matters, Dr. W. J. Humphreys, professor of meteorological physics at the U. S. Weather Bureau, and Commander N. H. Heck, in charge of the earthquake investigations of the U. S. Coast and Geodetic Survey in Washington.

"Practically all of the region now affected was severely shaken by what is known as the 'New Madrid earthquake' in 1811, so probably that relieved the strain for many, many

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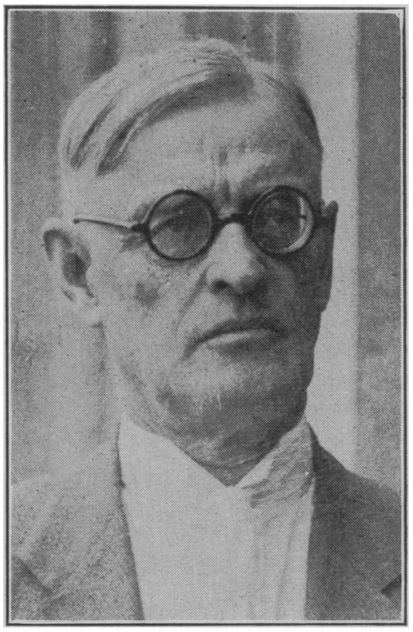
ASTRONOMY



EDWIN BRANT FROST

## Stellar Spectroscopist

As director of the Yerkes Observatory of the University of Chicago for twenty-two years, Dr. Frost has been able not only to engage in valuable research himself, but to aid in the training of many men and women now prominent in astronomical circles. And now, though he has lost his sight, a handicap which, for an astronomer, many would believe unsurmountable, he still continues his work with unabated zeal.

It is in spectroscopy, the translation of the messages sent us from the stars over their radio waves of light, that the most important of Dr. Frost's work has been accomplished. Early in his career he translated, revised and enlarged Scheiner's classical treatise on the subject, and since then he has been applying these principles.

Born at Brantford, Vermont, on July 14, 1866, Dr. Frost graduated from Dartmouth at the age of 20. Afterwards he taught astronomy there until 1890, then served for two years as an assistant at the famous Astrophysical Observatory at Potsdam, Germany. Then he returned to his *alma mater* as an assistant professor and then professor until 1898, when the newly founded Yerkes Observatory called him. At the resignation of Dr. George E. Hale, in 1905, to found the Mt. Wilson Observatory, Dr. Frost succeeded to the directorship, the post which he still holds.

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