averages 19½ trillions (19,500,000,000,000) of cubic feet, varying from 11 trillions in dry years to 27 trillions in wet years. The Amazon, in the tropics, with a drainage area not twice as large, carries to the sea *five times* as much water as the Mississippi.

The mean annual discharge of the Missouri River is about 3¾ trillions, or $\frac{15}{100}$ of the amount of the rains over the region. The corresponding amount for the Ohio is 5 trillions, which is ¼ the amount of rain. (Humphreys and Abbot.) The Ganges carries down about 4½ trillions annually, and the Nile 3½ trillions. The rivers of England and Wales carry to the sea 18·3 inches in depth out of an annual fall of about 32 inches.

Working-power and Action of Rivers.

1. *Energy from height of fall.* — It has been stated that in rivers the water works as it falls; so that the amount of work done depends on the rate of fall along its course to its outlet, and the amount of water.

In the mountain stream the slope of the water varies from 90°, or that of a waterfall, downward to one degree and less. But in the large rivers it seldom exceeds 12 inches to a mile, and is sometimes but one third this amount.

The slope of the Mississippi, from Memphis down (855 m.) is 4·82 inches per mile at low water; from Cairo, at the mouth of the Ohio (1088 m.), 6·94 inches; and above the Missouri, from its source, 11⅞ inches. The Missouri, from its highest source (2908 m.), descends about 6800 feet, or 28 inches a mile; but from Fort Benton to St. Joseph (2160 m.), about 11½ inches; and below St. Joseph to the mouth (484 m.), 9⅛. (From Humphreys and Abbot.) The average slope of the Amazon for 3000 miles from its mouth is less than an inch, the descent in this distance being 210 feet; of the Lower Nile, not 7 inches; of the Lower Ganges, about 4. The Rhone is remarkable for its great slope, it being 80 inches per mile from Geneva to Lyons, and 32 inches below Lyons. The tidal portions of rivers, which have no slope with the rising tide, have a slope and a strong flow with the ebbing tide.

During high floods the course of a river is shortened, because the minor bends are obliterated by the overflow, and where the channel is broad and open, the slope is commonly increased in amount and uniformity. Narrows between rocky bluffs act like a dam, and diminish the pitch above them, often spreading the waters into lakes, while they increase the pitch below. At such narrows floating ice often makes obstructions in the spring, which greatly increase the height of the waters. A dam higher up the stream, that obstructs or holds back the ice during its break-up, may save large areas from the flooding effect of the narrows. Narrows are sometimes created along streams by encroaching human "improvements"; but a narrowing either of a river's natural flood-grounds or its place of discharge may be a source of disaster. The water-power of the flooded river is safely controlled only by keeping the channel and outlet large enough to carry off all the water as it comes.