XXXIV. SOME OBSERVATION ON EROSION AND TRANSPORTATION IN THE WICHITA MOUNTAIN AREA

Oren F. Evans

From the Oklahoma Geological Survey and the Department of Geology of the University of Oklahoma.

In the Wichita Mountain area the processes of disintegration and decomposition are working faster than erosion and transportation. The igneous mountains usually have steep, even slopes with

some soil except near the top where they are covered by a mass of granite or gabbro. The lighter rains sink into this soil and the water gradually works its way downward into the crevices of the rock and does little or no carrying of materials. During the heavier rains a process of sheet erosion occurs in many places; the water running down the side of the mountain as rain runs off a roof. As this sheet of water is shallow its carrying power is small and it picks up only the finer material. This is carried downward with increasing velocity until it reaches the bottom. As the water rushes out over the surrounding plains its velocity is checked and the load of finer materials is deposited. This material slopes away from the foot of the mountain at an angle of usually about 2° or 3° and extends outward to distances of from 500 feet to one-half mile. It is mingled more or less with the surrounding Redbeds material at the contact but it can readily be distinguished from it by means of a hand-glass as the true Redbeds material is much finer.

The surface material from the greater part of the igneous area of the Wichita Mountains is being carried by the streams into the Red River and the North Fork of the Red. These streams run, as a rule, in narrow channels from 10 feet to 40 feet deep. During the greater part of the year the volume of water in them is so small that only the finer sediments are carried down, but at times of high water the channels are filled and often overflow. At such times the streams have great cutting and carrying power and the finer material that has accumulated during the low water is rushed out to the Red River and the North Fork of the Red River. These heavy rises last usually only a short time so that only a relatively small amount of coarse material has time to find its way to the main streams after the finer material has been disposed of. These floods are often local and so when a tributary dumps its load into the main stream there is usually not sufficient volume to carry it and this results in the local filling up of the bed of the main stream. This keeps the main drainage channels in an overloaded condition and gives them the appearance of aggrading streams while in reality the whole area of the watershed is being rather evenly degraded. A part of the material in the main channels is rushed down stream with each period of high water and is again deposited as the water goes down. During these periods of high water the river cuts through its sand bed in many places to the rocks from 30 feet to 50 feet below and abrades them to some extent. As the flood goes down these holes are again gradually filled as the stream deposits its load. Thus the sand and silt of the river bed is carried in successive stages toward the mouth of the stream.

In this way it may be possible for a stream to appear to be aggrading its bed and yet the sum total of its work to result in the degrading of its bed while the entire area of the water shed is being worn down gradually and evenly.