Archeological Evidence of Recent Filling in the Present Channel of the Washita River

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Like most of the larger streams of Oklahoma, the Washita River flows over a thick deposit of alluvium that has been laid down in a broad, deep valley cut in solid rock. The first filling of this valley was caused by either an increase in stream load or a decrease in gradient. Later, much of this first fill was removed so that only remnants of it now remain, here and there along the sides of the old valley, to form the highest, or third, terrace. One of the largest of these remnants is in the southeastern part of the city of Chickasha, in the area where the Oklahoma College for Women stands. Again, the second channel was filled but not to as high a level as before. This was followed by a third downcutting and the formation of a third channel within which flows the Washita River of today. Terrace No. 2 is the most noticeable as it is the one on which lie the rich level farms of the Washita Valley.

The time of the cutting of the rock valley and the ages of the succeeding fills are not definitely known. Some investigators have related them to times of the various advances and retreats of the Pleistocene ice sheets and others would place them entirely within the time of the Wisconsin glaciation. A third possibility is that they are post-Pleistocene and are a result of the climatic changes that have taken place since the end of Wisconsin time.

As to whether the filling of a valley, like that of the Washita, occurs during heavy floods or whether downcutting takes place at such time, depends on the relation between the load of a stream and its velocity. Other factors being equal, a stream undergoing an increase in volume will have its velocity increased and will erode its bed. But, as sometimes happens, if the increase in load is relatively greater than the increase in velocity, the bed of the stream will be built up. The best condition for deposition during a time of heavy precipitation is successive periods of high and low water rather than a long continued heavy volume of water. This is the condition that prevails on the Canadian and many of the other streams of the Southwest today. During heavy rains, great quantities of sediment are brought down by the tributaries but before this load can be carried very

far down the valley of the main stream the water falls, the velocity of the stream decreases and the heavy load is dropped, thus aggrading the river bed. From this it is evident that if the gradient of a stream is not changed and if the character and amount of rainfall of a region remains the same, the filling and cutting of a river will depend on the amount of sediment available.

A change in a stream from a degrading to an aggrading condition usually comes so gradually that, for anyone living on its banks, it is very difficult to determine when the change from one phase to the other takes place. Thus it is not surprising that various statements have been made in recent years regarding the cutting and filling of Oklahoma streams. In general, there is no doubt that during the past 75 to 100 years, there has been increased erosion at the heads of Oklahoma streams and increased deposition farther down. This is especially evident in such streams as the Canadian and the Cimarron. But in the Washita Valley the evidence is not so clear. At times of ordinary volume of water, the Washita flows in a narrow channel that resembles considerably the channels of the streams of the humid regions and at no time does it have a broad, sandy, braided bed like that of the Canadian.

Some time ago, Dr. Bell and Dr. Schmitt of the Department of Anthropology of the University of Oklahoma, called my attention to the fact that at a number of places along the Washita River, as near Chickasha, Alex, Lindsey, Paoli, and Wynnewood, there is evidence of long occupation by a prehistoric people of large permanent villages that are so situated at the edge of Terrace No. 2 that their sites are now covered with water during nearly every big rise of the Washita. This at once sugests that, during the time of the occupation, the channel of the Washita was deeper than now and capable of containing its flood waters at all times, for a prehistoric people would hardly dig cache pits and build houses and continue to occupy them in an area subject to overflow every few months. On the other hand, the surfaces of the sites are not deeply covered with alluvium. Flint chips and pottery sherds can still be found on the surface, especially after plowing. Thus it would seem that the overflow of terrace No. 2 has been occurring for only a comparatively short time.

As to the cause of this filling and overflow, two theories have been suggested. One is an increased precipitation during the last hundred years; another is an increased erosion of the uplands and valleys of the tributaries. Fortunately, climatological records in the southwest go back beyond the time of the organization of the weather bureau. At Dodge City, Kansas, precipitation records go back to 1874; at Fort Union, New Mexico, to 1851; and at El Paso, Texas, to 1850. In Oklahoma, records have been kept at Ft. Gibson since 1836, and at Lawton since 1870. These records cover a wide enough area so that any decided change in the precipitation during the past 100 years should be indicated. But, on examination, they show no appreciable change. During the whole time, the wet and dry years occur in about the same number and alternate in about the same way. There is no evidence of either a decided increase or decrease in precipitation.

Thus it appears that the present filling of the Washita channel is the result of an increased load coming from its tributaries and that this increased load is not caused by increased rainfall but by changes brought about in the porosity of the surface and in the character of the vegetation by the change from a hunting to an agricultural economy.

This is probably only a temporary change. As soon as the erosive factors again reach a condition of balance under the new conditions, it is likely that the stream will begin again to degrade its bed and widen its channel to correspond with the volume of its flood waters.