XXXVII. SOME PROCESSES IN THE FORMATION OF THE STREAM VALLEYS OF THE INTERIOR PLAINS REGION OF THE UNITED STATES

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Abstract

Many stream vallys of the interior plains region of the United States have broad valley flats cut by a deep trench. On superficial examination this valley form suggests an early stage of rejuvenation, but in many cases, rejuvenation is clearly an impossible explanation as in the case of the Middle Otter Creek and in many of the tributaries of the South Canadian River.

This valley form is perhaps common enough to be called the normal type of the plains region. The differences between it and the valleys of the streams of the humid regions are the result of differences in climate and rock structure. The climate is one in which the rainfall resembles that of the arid or semi-arid regions in its concentration. The rock structure which favors it is that of alternate layers of hard and soft material.

The erosional process known as sapping is the most important in cutting the trench and in the production of the valley flat. Sapping is of two kinds: surface sapping, and sub-surface sapping. A relatively hard layer of material is helpful but not absolutely necessary to the working of the sapping process. Because of the nature of the process, sapping will not act to produce a second valley flat until the trench has been eroded to a size large enough to hold the flood waters of the stream most of the time.

Repeated flooding results in deposition of material on the valley flat and causes it to take on gradually the appearance of a flood plain.