Technical Papers

The Lake Altus Wave-Cut Surface in the Wichita Mountain Area, Oklahoma

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In the western part of the Wichita mountains of Oklahoma there may be seen an erosion surface, on the granite hills, at an elevation of about 2200 ft above sea level and 500 to 700 ft above the adjacent plains. The best development of this surface occurs on Soldier Mountain and adjacent peaks south of Lake Altus. The surface described here is named from Lake Altus.

Locally the Lake Altus surface is hundreds or even several thousands of feet across, but in general it truncates granite knobs of small mass or encircles, as a platform 50 to 150 ft wide, granite hills of greater mass. The slope of the surface, in the latter instances, is radially outward, in the range 30 ft/mi to somewhat more than 100 ft/mi.

Taylor (*1*) reported and Evans (*2*) described in detail grooves or notches cut by wave action on granites of the Wichita mountains. The grooves are approximately horizontal and perfectly parallel, are associated with narrow but distinctive wave-cut platforms, and are developed inside an old sea cave and between the faces of fractures.

No notches have been found above the erosion surface. Commonly the notches are preserved only within 25 to 50 ft of the modern ground surface on the adjacent plains. Inasmuch as they are present at many different elevations (today controlled by the depth of erosion and the elapsed time since the shale cover was removed), the assumption is that at one time they did exist above the erosion surface.

The notches, the radial-outward slope, the low slope angle, the thin veneer of granite boulders on the slope, and the narrowness of the platform indicate that the Lake Altus surface was cut by wave action.

Wave-cut notches have not been reported from the eastern Wichita mountains. The Lake Altus surface is present, however. It has its best development in the eastern part of the mountains on Elk Mountain, north of Indiahoma. It may be seen on USGS topographic maps of the area (Cache, Cooperton, Saddle Mountain, Snyder sheets). A statistical study of 200 hilltop and 100 random hillside elevations from these four quadrangles indicates a definite accordance between 2200 and 2270 ft and a possible surface between 2400 and 2500 ft. The top of Mount Scott, a flat surface about 700 ft long, fits in the latter interval.

Two similar surfaces at elevations of about 400 to 500 and 900 to 1000 ft above sea level have been studied in the subsurface, north of the western part of the mountains, by means of electric logs and drillers' logs. They also possess radial-outward slopes in the same range of values.

The two surfaces studied from well log data are overlain by coarse arkose and red shales of late Virgil (late Pennsylvanian) to Garber (lower middle Permian) age. The lower surfaces are therefore tentatively dated as late Pennsylvanian and early Permian, respectively. The exposed Lake Altus surface is thought to date from post-Garber, probably middle Permian time.

The sequence of three, perhaps four, surfaces, associated with uncounted wave-cut notches, indicates a late Pennsylvanian and Permian sea advance that may have completely submerged the mountain range. Because the elevation differences among the surfaces is of the order of 2000 ft, subsidence rather than sea-level fluctuation probably accounted for the transgression (*3*).

References

1. C. H. Taylor, *Okla. Geol. Survey Bull.* **20**, 59 (1915).
2. O. F. Evans, *J. Geol.* **37**, 76 (1929).
3. For a detailed description, with figures, see *Shale Shaker* (Okla. City Geol. Soc.), in press.

6 July 1954.

Nutritional Studies with the White-Throated Wood Rat (*Neotoma mexicana*)

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In the development of the science of nutrition, the use of different species of animals has greatly facilitated the advancement of knowledge and the discovery of new dietary factors. The cotton rat and the hamster have been particularly useful in the study of dental caries and in virus work. This prompted us to study the white-throated wood rat, *Neotoma mexicana,* as a mammalian species that might have nutritional patterns of unique value for research (*1*). During the course of the experiments several interesting observations were made concerning the behavior of wood rats: (i) the wood rats could be maintained on a commercial rat chow but did not readily accept a purified type of diet containing all the nutrients known to be essential for the albino rat; (ii) the water intake was observed to be unusually high; and (iii) when the commercial chow was supplemented with aminopterin, a folic acid antagonist, the wood rats survived for a longer period than mature albino rats.

The wood rat is indigenous to the arid southwestern United States and Mexico and, in its natural habitat, lives where vegetation affords protection from carnivores and shelter from the elements. It is primarily nocturnal. Flowers, fruits, and leaves are the main items of diet. Animals for our studies were obtained from Colorado through the courtesy of the Fish and Wildlife Service of the Department of the Interior.