GEOLOGICAL SCIENCES

THE CRINER HILLS

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LOCATION

THE CRINER HILLS are located in south-central Oklahoma, in T. 5 S., R. 1 E., of Carter County, and T. 6 S., R. 1 E., of Love County.

AREA

The area covered by the pre-Pennsylvanian rocks of the Criner Hills is approximately seven square miles. There are several small areas of Bostwick conglomerate which is of early Pennsylvanian age, resting unconformably upon the older rocks, and very closely related to them.

TOPOGRAPHY

The Criner Hills are quite low, having a relief of only about 300 feet. The trend is northwest-southeast, and nearly parallel with the trend of the Arbuckle and Wichita mountains. The relief is due partly to differences of resistance of the constituent rocks, and partly to structure. The harder limestones form the ridges, and the shales and softer limestones form the valleys. The more resistant limestones are the Arbuckle group and the Viola limestone. The Hunton group of limestone and marls are less resistant and form slopes from the more resistant Woodford cherts above them.

STRATIGRAPHY

The formations exposed in the "Criners" are: the upper Arbuckle group, of Canadian age[1]; the Simpson group, of early Ordovician age; the Viola formation, of middle and late Ordovician; the Sylvan shale, of early Silurian age; the lower Hunton (Chimneyhill limestone and Henryhouse shale), of Silurian age; the upper Hunton (Haragan marl and Bois d'Arc limestone), of early Devonian age; the Woodford chert and Sycamore limestone, of Mississippian and early Pennsylvanian ages.

STRUCTURE

The structure of the Criner Hills is that of an intensely folded and faulted area. The southwest side of the uplift is bounded by a fault in the Arbuckle limestone, called the Criner fault. This fault has a northwest-southeast trend, parallel to, and probably very close to the axis of the anticline, the southwest limb of which is faulted downward. The northeast limb contains the upper Arbuckle group, the Simpson group, the Viola limestone, and part or all of the Sylvan shale. The average dip of these formations is about 40° northeast. Another fault, which I have named the Sylvan fault, cuts the lower Paleozoic rocks. It cuts off the Sylvan shale, Viola limestone, and Simpson group and Arbuckle in succession to the south, and joins the Criner fault in the NE.¼ sec. 34, T. 5 S., R. 1 E. To the east of the Sylvan the Sycamore limestone and Woodford chert are dipping 65° southeastward. They make a turn in the road along the

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[1]Ulrich and Decker's classification, not yet published.

north line of the NW.¼ NW.¼ sec. 15, T. 5 S., R. 1 E. forming a reverse fold. The dip of the Woodford and Sycamore on the northeast side of this fold is 49°. A cross-fault cuts the Sycamore off near the south line of the N. ½ NW. ¼ sec. 15, T. 5 S., R. 1 E. A fault valley is formed and the Sycamore and Woodford are exposed again to the south as a Sycamore ridge with a southwest and south trend. This ridge gradually becomes a Woodford ridge, and the Sycamore forms a synclinal valley. These formations crop out on the west limb of the syncline along the Sylvan fault in the NW. ¼ sec. 22, T. 5 S., R. 1 E. A thin section of these formations, with east dip continues along the east side of the Sylvan fault to a point a short distance north of the intersection of the Criner and Sylvan faults.

An anticline, which ends abruptly to the north under unconformable beds of Bostwick conglomerate in the extreme south part of the NE. ¼ sec. 22, T. 5 S., R. 1 E., is made up of rocks in stratigraphic order, from the Simpson to the Hunton, extends southeastward to the southeast end of the Criner Hills. Only the west limb of this anticline is exposed from the north end to the SE. ¼ NW. ¼ sec. 26, T. 5 S., R. 1 E., where both limbs are found. Only the Simpson group and the Viola limestone have been found on the west limb. Both limbs are exposed from the SE. ¼ NW ¼ sec. 26, T. 5 S., R. 1 E., to the NW cor SE. ¼ sec. 35, T. 5 S., R. 1 E., just below Rock Crossing on Hickory Creek. From Rock Crossing to the southeast end of the Criner Hills only the east limb of this anticline is exposed. It is quite evident that the southeast continuation of the Criner fault has cut off the west limb in the southern part of the area.

RELATION OF THE CRINER HILLS TO THE ARBUCKLE AND WICHITA MOUNTAINS, AND THE HEALDTON AND HEWITT BURIED HILLS

I consider the Criner Hills and Arbuckle Mountains as contemporary uplifts, and the Criner Hills, Wichita Mountains, and the Healdton and Hewitt buried hills as parts of the same uplift. The fact that the stratigraphy of the Criner Hills and the Arbuckle Mountains, as well as the age of folding and faulting, is practically the same is proof enough that they are contemporary. The general trend of the Wichita Mountains, the Healdton and Hewitt buried hills, and the Criner Hills is evidence in favor of their being parts of the same uplift. It is true that the Wichita Mountains have no formations exposed between the Viola and the Permian, but there might be two ways to explain that condition. Either there was no deposition in the region of the Wichita Mountains, or any post-Viola deposits which might have been laid down were eroded away before Permian times. The Wichita Mountains have igneous rocks and Cambrian Reagan sandstone exposed, while no rocks older than Canadian Arbuckle outcrop in the Criner Hills. That is no proof that the older rocks do not underlie the Arbuckle group in the Criner Hills, as well as in the Healdton and Hewitt buried hills. The Wichita Mountain folding could have been anytime between Viola and Permian, however, as the direction of trend of both the Wichita and Arbuckle mountains is practically the same, and there is no real proof that the Wichita uplift was earlier than Pennsylvanian, it is reasonable to consider those two uplifts contemporaneous, the result of the same set of forces.