

SECTION B, GEOLOGICAL SCIENCES

An Isopachous and Paleogeologic Study of Pre-Desmoinesian Rocks in Northwestern Oklahoma

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Major tectonic features bordering the Anadarko Basin are outlined and their relationship to present thickness and distribution of pre-Desmoinesian rocks are discussed.

Inasmuch as no wells have completely penetrated the Arbuckle group of Cambro-Ordovician age, the exact thickness or character of underlying Cambrian sediments is not known. Thickness of the Simpson ranges from 73 to 466 feet. The Viola-Fernvale thins to the north and east from 508 feet in Harper County to 48 feet in Alfalfa County.

The Sylvan is missing in the northern part of the area by erosion. The Sylvan basin was beginning to exhibit signs of tectonic movement which later produced the Anadarko Basin in late Mississippian or early Pennsylvanian time. The Hunton thins from 551 feet in Dewey County to zero in the northern part of the area. Following deposition of the Hunton, a strong upwarping occurred resulting in removal of the Hunton and Sylvan from much of the northern part of the area. The Woodford formation rests uncomfortably upon Hunton, Sylvan and Viola-Fernvale from south to north.

Mississippian limestones are present throughout the area, reaching a maximum thickness of 2,818 feet in Ellis County. Lower Pennsylvanian Springer rocks are limited to the southern part of the area where the maximum thickness penetrated is 343 feet in Custer County. The subsurface limit of the Springer trends northwestward across the area.

The Morrow sea transgressed the area from the southeast depositing a basal sand across the truncated surface of the Mississippian. The maximum thickness of Morrow in the area is 1,473 feet in Dewey County. The subsurface limit of the Morrow trends northwestward across the area.

The Atokan, represented by the "Thirteen Finger Lime" at the base and thin limestones and shales above, thickens from 1,057 in Ellis County to zero in the northeastern part of the area.

Major structural movements in the early Paleozoic were limited to geosynclinal development in the southern part of the area and oscillation of the shelf area to the north. Strong warping occurred in post-Hunton and pre-Woodford time. Major orogenic movements are post-Mississippian and pre-Desmoinesian with maximum movement in late Morrowan time.
