vanian. The Pennsylvanian rests on Precambrian at the margins of the basin but within the basin variable thicknesses of pre-Pennsylvanian sedimentary rocks are known to occur in thicknesses varying from small amounts up to more than 1,000 feet. Basement rocks are reached in the basin at depths of about 4,500 feet or less. The number of significant tests drilled in this basin to date is comparatively small and is certainly inadequate to disprove this large area. The only oil production in this basin to date is in the southwestern part where some Pennsylvanian production has been developed. Adequate reservoir rocks are known to be present in the pre-Pennsylvanian sediments in many parts of the basin. Ground-water mineralization in the pre-Pennsylvanian sedimentary rocks is generally low but this condition is not believed to be completely unfavorable so far as the possibility of commercial accumulation of petroleum is concerned. The complex geologic history of the region presents some interesting possibilities for the accumulation of oil or gas in commercial amounts.

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Geology of McAlester-Arkansas Coal Basin

The McAlester-Arkansas Coal basin is an elongate arcuate basin in southeastern Oklahoma and northwestern Arkansas. It is bounded by the following: Mississippi embayment on the east, Ozark uplift on the north, Ouachita Mountains on the south, and Arbuckle Mountains on the west.

The stratigraphic sequence ranges from Cambrian through Pennsylvanian age with aggregate thicknesses of 2,000 feet of sediment along the northern rim of the basin to probably in excess of 25,000 feet in the southern part of the area. Paleozoic rocks of late Pennsylvanian age crop out over most of the area. The depositional axis has not been determined by drilling as yet. Geophysical methods may define the basin and clarify the relationship between the Arbuckle-Ozark type rocks and the Ouachita rocks.

Surface structures generally strike east-west and were formed by compressional forces from the south (Ouachita area) against the Ozark positive area on the north beginning in early Pennsylvanian time, and extending into the late Pennsylvanian. The effect of these forces is reflected by the amount of structural relief present; highly faulted structures occur south of the Choctaw fault, well defined structures north of the Choctaw fault, and gentler folds along the Arkansas River.

The basin has been the scene of exploratory work for many years with the greatest and best organized effort being carried out presently. Surface, subsurface, aerial photo interpretation, and geophysical mapping methods have been attempted. Monotonous sequences of sands and shales crop out, making surface work difficult. Rough terrane, poor accessibility, and hard drilling make seismic work expensive. Subsurface work will become increasingly important as more deep wells are drilled.

Gas prospects in Atoka and Morrow rocks are numerous, but a great volume of sediments both Pennsylvanian and pre-Pennsylvanian in age have not been evaluated.

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Interpretation of Ouachita Mountains of Oklahoma as Autochthonous Folded Belt

The Ouachita Mountains of Oklahoma are considered by many as a classical example of large scale, flat overthrusting, and are envisaged as a huge, floating, allochthonous body with a root somewhere farther south.

During extensive geologic mapping between June, 1953, and January, 1956, the authors failed to find large, flat overthrusts in the Ouachita Mountains. On the contrary, the stratigraphic and structural evidence indicates that the mountains are an autochthonous folded system.

The Potato Hills anticlinorium, where the idea of overthrusting was conceived, was mapped in detail. This anticlinorium consists of closely spaced, steep, partly overturned folds. The overturning is both toward the north and, against the supposed overthrusting, toward the south. Some anticlinal limbs have ruptured and steep reverse faults have developed, some of which yield north, others south. All of these faults die along strike, generally in the steep limbs of anticlines.

In the eastern Potato Hills there is the Round Prairie synclinorium which is bounded on opposite sides by faulted, overturned anticlines which face each other. Round Prairie is part of what has been described as a window in a major overthrust. However, the "window" is non-existent. The two border faults are separate, distinct, and die toward the west in unbroken folds. At the eastern end of the "window" the southern fault truncates the northern.

The Choctaw anticlinorium is also autochthonous, as originally determined by Honess (1923). Southward overturning predominates, and slaty cleavage has developed which mostly dips steeply north. This confirms predominant southward yielding and is incompatible with the concept of a great thrust sheet which has moved north.

In the core of the Choctaw anticlinorium the style of deformation changes: steep folds disappear and the cleavage becomes gently inclined. The change is gradual, stratigraphic and structural continuity being maintained. There is no overthrust break and there is no window. This change in structural style with increasing stratigraphic and structural depth suggests that a basal zone of disharmonic shearing-off is approached.