

The Joins and Tulip Creek Formations are limited essentially to the southern half of Oklahoma as a result of non-deposition and only locally by erosion from the Ozark uplift in Black Riveran time. Absence of the Corbin Ranch Formation locally below Viola strata in the Arbuckle and eastern Wichita Mountains is evidence that minor incipient tectonism of these elements occurred in post-early Trenton time.

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*"Mesozoic Igneous Activity in the Northern Gulf Coastal Plain"*

Igneous rocks of Mesozoic age occur at widely scattered localities in the central part of the United States. Some of the surface exposures, such as the intrusive stocks at Little Rock and Magnet Cove, Arkansas; the peridotite pipes near Murrefreesboro, Arkansas; and the lamprophyric dikes of southern Illinois have been known for many years. Deep drilling in the Northern Gulf Coastal Plain has shown the presence of many additional igneous occurrences, particularly in the Monroe uplift and Jackson dome. More than 100 wells have encountered primary igneous rocks, and many others have penetrated pyroclastic debris.

The diabase province includes at least 14 known occurrences in northeastern Texas, southwestern Arkansas, and western Mississippi. None of these rocks are exposed at the surface. They occur as thick dikes and sills in the Eagle Mills or at the base of the Cretaceous where the Eagle Mills has not been encountered. The age is pre-Upper Jurassic and may be the same as the similar Triassic diabases of the eastern United States. They represent relatively rapid emplacement of a basaltic magma into zones of tensional movement.

The alkaline province includes a greater variety of igneous rocks ranging from the truly alkaline rocks (nepheline syenite, tinguaitite, phonolite, etc.) to normal syenites, lamprophyres, peridotites, tuffs, and volcanic breccias (diatremes). The age of emplacement ranges from lower Woodbine to lower Taylor, based on the intrusive relationships and the associated tuffs. The activity thus occurred during a relatively long geological span, during which there was sufficient magmatic differentiation to produce a variety of rock types.

There appears to be little relationship between the presence of igneous rocks and the general absence of oil or gas, except in a few places where larger dikes and stocks have caused rather severe metamorphism. The presence of relatively thin dikes and sills, such as those encountered in the Big Creek-Delhi field of northeastern Louisiana or the Omaha pool of Galatin County, Illinois, seems to have had little effect on the producing capabilities of otherwise favorable reservoir rocks. As a general rule, the width of the zone adversely affected by an intrusion is no greater than the thickness of the intrusive itself.

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*"Women in Exploration"*

Petroleum geology as a science had its beginning in the minds of geologists even before the discovery of oil in the Drake well in 1859. In 1848 Sir William Logan, director of the Geological Survey of Canada, visited oil seeps of the Gaspé Peninsula and pointed out that these seeps were on anticlines. T. Sterry Hunt of the Canadian Survey gave the first clear formulation of the Anticlinal Theory in 1869 and concluded that the following conditions were necessary for oil accumulation.

1. A source bed.
2. Proper attitudes of strata.
3. Suitable fissures to act as reservoirs.
4. Impervious strata above and below the oil bearing zone.

It was left to I. C. White to reaffirm the anticlinal theory in 1882 and prove the practical application of the theory with the discovery of gas on three out of four anticlines drilled in West Virginia in 1888.

This theory was opposed by many geologists, because much of the oil in Pennsylvania was not found on anticlines. As more and more geologists left surveys and entered into oil exploration other theories such as the trap theory were advanced. There was extensive surface and subsurface mapping, stratigraphic studies with sample examination, and the extensive use of micropaleontology followed by various kinds of geophysical mapping and electrical logging that helped in interpretation of geological conditions.