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OIL SOUTHEAST OF THE CHOCTAW FAULT
IN OKLAHOMA

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Many years ago geologists condemned the "Red Beds" as possible oil

*Abbot, C. G. Science No. 2002 May 12, 1933.

producing horizons. Oil and gas production from Permian rocks of the Mid-Continent region is now well-established.

That part of Oklahoma immediately adjacent to the mountain-uplifts, particularly the Arbuckle Mountains, was given little chance by geologists to be oil-producing territory. Only a few months ago oil and gas was found in T. 2 N., R. 7 E., south of Ada, and located only a few miles from outcrops of Arbuckle limestone of Ordovician age.

Other places in Oklahoma and adjoining states could be cited as having had at one time or another the whole-hearted disapproval of the geological profession, in the matter of finding oil. Many of these areas now yield commercial production. Others will undoubtedly become productive in the future. All of which leads up to the case at hand.

That part of Oklahoma situated south and east of the Choctaw Fault and known as the Ouachita Mountains, has been generally regarded as unimportant from the standpoint of the petroleum geologist. The reasons for this attitude have been, (1) the highly faulted and folded nature of the rocks, (2) the presence of solid hydrocarbons and asphalts, (3) an excessively high carbon ratio. In this particular case, the so-called "impossible" has happened. Oil and some gas has been found during the past two years in the eastern part of the Ouachita Mountain region.

This paper is concerned only with that part of the Ouachitas in which oil has been found up to the present time, including: T. 2 S., R. 13 E.; T. 1 S., R. 14 E.; and T. 1 N., R. 15 E., in Atoka county, and T. 2 N., R. 15 E.; and T. 2 N., R. 16 E., in Pittsburg county.

HISTORY OF DEVELOPMENT

Active interest in oil and gas development in this region began in 1906 when the Bass well was drilled in the NW. part of Sec. 9, T. 1 S., R. 14 E., near McGee Creek. This well was drilled to a depth of 1,200 feet and was abandoned after having encountered oil and gas showings between 800 and 900 feet. In the succeeding years a number of wells were drilled in the northern part of McGee Valley, but there is very little accurate information available concerning them. In 1929 local water well drillers found some oil in shallow holes drilled in the NW part of Sec. 5, T. 2 N., R. 16 E. One of these wells is reported to have pumped five barrels a day for a short period and another about two barrels daily of green-colored 42 gravity oil.

In 1930, E. V. Croxton of Norman, began drilling a series of shallow tests in Sec. 9, T. 1 S., R. 14 E., near the old Bass well. At the present time Croxton has five producing wells, ranging in depth from 165 to 350 feet. One of the wells averaged about seven barrels a day of 42 gravity oil for nearly a year's time. The wells on this lease have not been operated efficiently, hence the periods of production have been very irregular. At the present time they are shut down.

Following the discovery of oil in T. 1 S., R. 14 E., a drilling campaign ensued resulting in the finding of four other small producing areas, listed below.

OPERATOR	LEASE	LOCATION
Independent Oil Co.	James farm	Sec. 28-2n.-15E.
Hicks	Morris farm	5-1N.-15E.
Barton	Miller farm	26-1N.-14E.
Malarnee	D. O. K. ranch	35-2S.-13E.

The maximum initial production of these wells, after being shot, was about five barrels. Most of them made only a barrel or two. The gravity of the fresh crude from all of the locations described above and in the Croxton wells is strikingly similar, that is from 40 to 42 degrees.

GEOLOGICAL FEATURES

The general stratigraphy and structure of the Ouachita Mountains has been described by Honess* and others. Recently, Bruce Harlton**, a paleontologist for the Amerada Petroleum Corporation, who has collected from more than 6,000 localities in the Ouachita region, has determined a lower Pennsylvanian age for the Stanley and Jackfork formations. Both were formerly regarded as being in the Mississippian. He has also differentiated the Caney shale from the John's Valley shale.

The rocks of the Ouachita Mountains consist of a series of overthrust sheets, pushed up from the southeast and complicated by intense folding. The major axes trend northeast-southwest. The western margin of the area is marked by two major thrust faults, the Choctaw and Winding Stair Faults. The latter crosses the northeast part of the area under discussion. The structure of the rocks in the oil-producing areas is further complicated by numerous small, normal, dip and strike faults.

Five of the six producing spots in this region are located on the outcrop of the Stanley formation. The other is on the outcrop of the Jackfork. In each case the wells are located a short distance down-dip from the exposure of an asphalt-impregnated sandstone ledge. The asphalt residuum has completely filled the pore-spaces at and near the surface, thereby forming a seal which permits the live oil and gas to accumulate down-dip. These Stanley sandstone beds are from 50 to over 300 feet thick and dip at angles from 25 to 70 degrees.

PROBLEMS

The writer has spent only a short time in this area and no attempt shall be made at this time to submit theories concerning this interesting but perplexing region. A few of the problems that is thought to have an important bearing on oil production in the eastern part of the Ouachitas, are listed as follows:

- (1.) Are the shales in the Stanley formation capable of being a source for petroleum?
- (2.) If the oil seeps up from below, is its source from rocks of the Ouachita facies or rocks of the Arbuckle facies?
- (3.) Is the oil younger, older or of the same age as the grahamite and gilsonite deposits of the region to the east?
- (4.) Are the petroliferous Stanley sandstones eroded original oil sands or are they simply the media through which petroleum from below has migrated upward?
- (5.) How far down-dip will these horizons contain oil? Will bottom or edge-water be present?
- (6.) Will oil production in this area be limited to small narrow strips down-dip from asphalt-sealed sandstones or will other types of reservoirs and other types of structures be found to have trapped oil and gas in commercial quantities?

*C. W. Honess, "Geology of Atoka, Pushmataha, McCurtain, Bryan and Choctaw Counties, Oklahoma," Bull. 40-R, Okla. Geol. Surv., 1927.

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