OKLAHOMA GEOLOGICAL SURVEY

William E. Ham, Acting Director

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OIL POSSIBILITIES NEAR IDABEL, McCURTAIN COUNTY, OKLAHOMA

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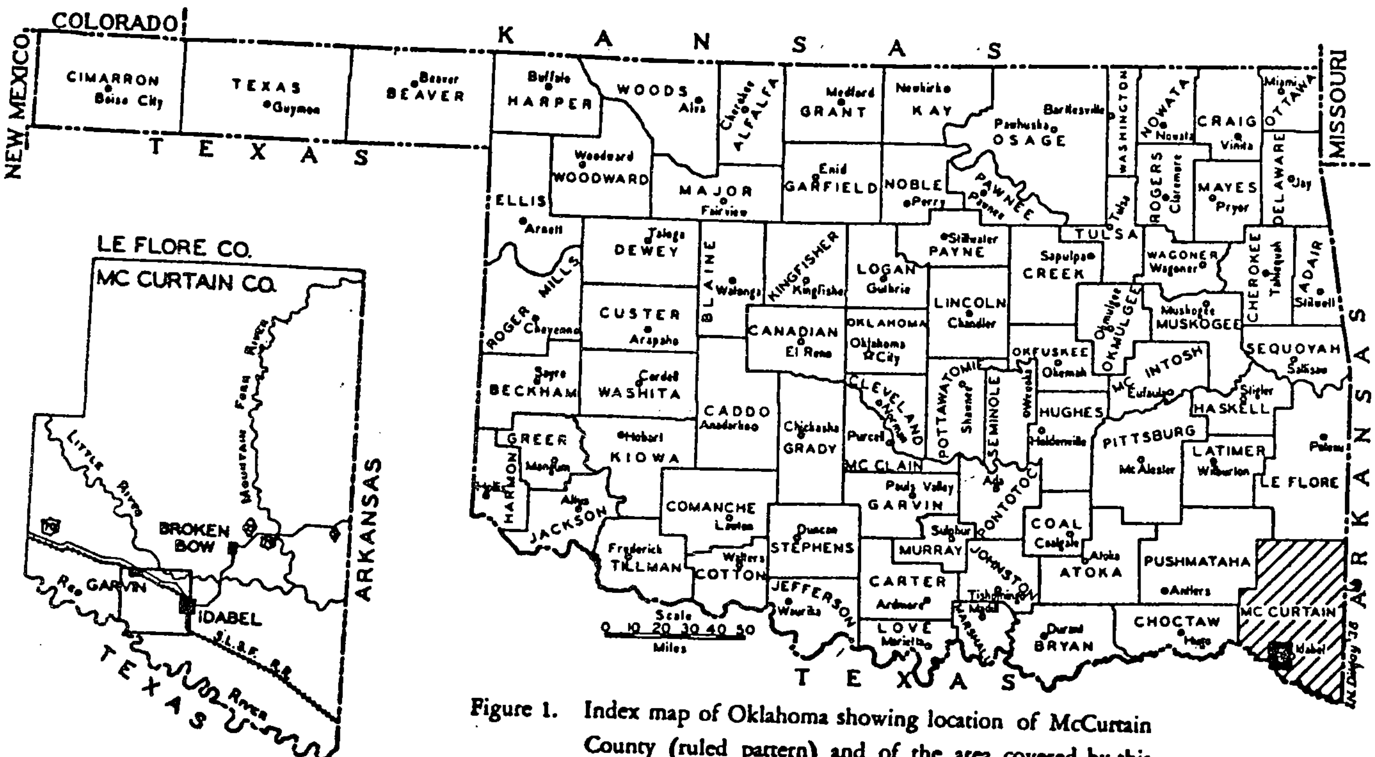

Figure 1. Index map of Oklahoma showing location of McCurtain County (ruled pattern) and of the area covered by this report (solid black). Inset map shows principal features in this county.

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McCURTAIN COUNTY, OKLAHOMA
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INTRODUCTION

The discovery of oil in a well drilled for a farm water supply near Idabel, Oklahoma, in December 1952, aroused interest in the oil possibilities of McCurtain County, where all previous oil tests had proved to be dry holes. The discovery well was drilled on the W. O. Harmon farm in sec. 5, T. 8 S., R. 23 E., and encountered oil in the upper part of the Paluxy sand, of Cretaceous age, at a depth of about 325 feet. This well is in an area where an investigation of ground-water resources is in progress, and as a result considerable geologic information is available that pertains to the possible occurrence of petroleum in structural or stratigraphic traps. The present report is a release of information that should be helpful to further exploration. It describes parts of Tps. 7 and 8 S., Rs. 22, 23, and 24 E. (fig. 1), where drilling is currently active.

Plate 1 shows the distribution of geologic formations at the surface. It is taken from a geologic map prepared by Charles L. Fair in the course of an investigation of the ground-water resources of southern McCurtain County. This investigation is being made under a cooperative agreement between the U. S. Geological Survey and the Oklahoma Geological Survey, by which the ground-water resources of the State are being evaluated systematically. This program of investigation is under the immediate supervision of Stuart L. Schoff, District Geologist, Ground Water Branch, U. S. Geological Survey.

The geologic details shown in figures 2 and 3 and the structural interpretations were made by the writer and H. D. Miser, of the Geological Survey, who together spent a total of about three days examining rock exposures in the area. The lithologic descriptions of the rock formations are partly adapted from field notes by Fair and are partly based on the writer's observations.

STRATIGRAPHY

Formations of Cretaceous age exposed in the area of this report range from the Goodland limestone, of Comanche age, to the Tokio formation, of Gulf age (table 1). Alluvium and terrace deposits mask the bedrock along the streams. Formations belonging to the Trinity group, of the Cretaceous system, crop out immediately north of the area.

CRETACEOUS SYSTEM

Comanche Series

TRINITY GROUP

The Trinity group is exposed in an east-west band about 10 miles wide across the middle of McCurtain County. Most of the outcrop is north of Little River. The beds in this group overlie highly folded Paleozoic rocks and dip southward so that, in the area shown on plate 1, they underlie the younger formations of the Cretaceous. In ascending order, the Trinity group is divided into the following formations: Holly Creek formation, Dewueen limestone, and Paluxy sand. The driller's log of an oil-test hole in the $SW\frac{1}{4}SW\frac{1}{4}SE\frac{1}{4}$ sec. 3?, T. 7 S., R. 24 E., indicates that the Trinity group is about 880 feet thick. The exact thickness is uncertain because it is not clear from the log where the underlying Paleozoic rocks were encountered. From this locality, the Trinity thins to the west and north and thickens to the southeast.

Holly Creek formation. Lenticular beds of gravel, clay, and sandy clay make up the Holly Creek formation.

About half the pebbles in the gravel are quartz and the remainder are novaculite. According to May 1/ the formation is about 300 feet thick at the Arkansas-Oklahoma State line and thins westward, disappearing west of Broken Bow, Oklahoma.

DeQueen limestone. Beds of dull-gray, dull bluish-gray, and white limestone interbedded with gray clay make up the DeQueen limestone. 2/ In some exposures the clays are locally stained light yellow and yellowish gray by iron oxide. The formation thins westward and disappears a few miles west of Broken Bow. However, it extends much farther westward in the subsurface and is identifiable in well logs in eastern Choctaw County. In the area of this report, in the SW¼SW¼SE¼ sec. 30, T. 7 S., R. 23 E. (Pl. I) the DeQueen was encountered at about 1,000 feet and is about 60 feet thick, as determined from sample log. The driller's log given in this report is in somewhat general agreement but differs in detail and exact depth.

Paluxy sand. On the outcrop, the Paluxy sand consists principally of well-rounded, well-sorted, cross-bedded sand, which in most exposures is unconsolidated and friable. The sand is generally dark reddish brown to light gray, but some lenses are almost white. The color is determined mainly by the degree of oxidation of iron, which is present principally as cement but occurs also as nodules of pyrite, marcasite, and limonite. Interbedded with the sand are minor amounts of clay, which generally are in lenticular beds. A clay stratum 5 to 20 feet thick at the top of the Paluxy across McCurtain County is approximately in the stratigraphic position of the Walnut clay of the Fredericksburg group. In the absence of fossils, however, the

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1/ May, M. E., "The DeQueen limestone formation of the Trinity group in McCurtain County, Oklahoma": University of Oklahoma, unpublished thesis, p. 22, 1950, (in university library).

2/ May, M. E., op. cit., pp. 17-22.

Table 1. Generalized section of Cretaceous and younger rocks in McCurtain County, Oklahoma

System	Series	Group	Formation	Thickness (feet)	Lithology
Quaternary	Pleistocene and Recent		Alluvium and terrace deposits	0 - 60 ±	Stream-laid gravel, sand, silt, and clay
UNCONFORMITY					
Cretaceous	Gulf		Tokio formation	0 - 102 ±	Gray, cross-bedded sand, interbedded with gray and dark gray shales
			Woodbine formation	0 - 70 ±	Upper member mostly gray to brown cross-bedded quartz sand and sandy gravel. Lower member principally cross-bedded dark green tuffaceous sand; red clay; gravel lentils.
		Unconformity			

Unconformity

Cretaceous	Comanche	Washita	undifferentiated	105 - 277 --	Gray fossiliferous limestones and calcareous dark blue shale. Thins eastward.
		Fredericksburg	Goodland limestone	48 - 67	Thin-bedded, hard limestones at the top; soft chalky and massive limestone in lower part. Entire formation fossiliferous.
		Trinity	Paluxy sand	880 ±	Mostly quartz sand, with some interbedded clay
			DeQueen limestone		Clayey limestone, blue gray and gray. Thins westward.
			Holly Creek formation		Gravel. Thins and disappears west of Broken Bow

age of this clay remains in doubt and in this report the clay is included with the Paluxy.

FREDERICKSBURG GROUP

The Fredericksburg group of other parts of Oklahoma and Texas comprises the Walnut clay and the Goodland limestone. Thus far, only the Goodland limestone has been identified in McCurtain County. The Walnut clay, discussed under the Paluxy, may be present but has not been recognized because diagnostic fossils have not been found.

Goodland limestone. The Goodland limestone is one of the most easily recognized formations in the Cretaceous of southeastern Oklahoma. Over much of its outcrop it is well exposed, the best exposures being along the Little River and its southern tributaries. In general, the formation consists of a thick irregularly bedded soft, chalky, finely crystalline limestone overlain by one to three relatively thin beds of hard, dense coarsely crystalline limestone. The soft lower limestone is white on fresh surfaces, and gray, pale orange, or pale blue on weathered surfaces. The hard upper limestone is oolitic in places. It is grayish white to pale orange where unweathered and sooty gray on weathered surfaces. The formation is abundantly fossiliferous, containing pelecypods, gastropods, echinoids, and ammonites.

One of the most accessible exposures of the Goodland limestone in the area shown on plate 1 is in sec. 14, T. 7 S., R. 23 E. Here the Goodland consists of about 40 feet of chalky, finely crystalline white limestone overlain by about 8 feet of hard fossiliferous or oolitic coarsely crystalline light-orange limestone. Vertical jointing is common, the joints generally trending northeastward. Most of the joints have been enlarged by solution.

Well logs show the Goodland limestone to be about

56 feet thick in the NW¼ NW¼NW¼ sec. 23, about 48 feet thick in the SW¼SW¼SE¼ sec. 30, and about 67 feet thick in the NW¼NW¼NW¼ sec. 34, all in T. 7 S., R. 23 E.; and about 65 feet thick in the NW¼SW¼NW¼ sec. 4, T. 8 S., R. 23 E. The upper part as identified in drill cuttings corresponds to the upper part as described from surface outcrops, but the lower part differs in having one or more shale breaks.

WASHITA GROUP

The Washita group has not been subdivided into formations in McCurtain County. The group consists of a sequence of relatively thin highly fossiliferous gray limestones alternating with thick beds of dark clay shale and some thin beds of unconsolidated clay. In the lower part of the Washita group, the limestone beds are hard, thin, bluish gray to white, and very fossiliferous. Many of the beds are made up almost entirely of the shells of the pelecypod *Gryphaea*. In the upper part of the group, the limestones are softer, thicker-bedded, and gray or yellowish tan. Fossils are almost as abundant as in the lower part, and, as a rule, they are better preserved and break out of the rock more easily. Thin beds of clay separate some of the limestone beds. Thicker beds of clay shale interbedded with the limestones are mostly dark blue or black, weathering to light gray, yellow, and varicolored. The clays and clay shales are calcareous and commonly are sandy.

The Washita group thins eastward owing to erosion prior to the deposition of the next younger rocks.3/ Local differences in thickness in the area covered by this report are illustrated by the following measure-

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3/ Miser, H. D., "Lower Cretaceous (Comanche) rocks of southeastern Oklahoma and southwestern Arkansas": Am. Assoc. Petroleum Geologists Bull., vol. 11, pp. 443-453, 1927.

ments from logs of wells drilled in southern McCurtain County:

T. 7 S., R. 23 E.	T. 8 S., R. 23 E.
Sec. 23.......105 feet	Sec. 4.......165 feet
Sec. 30.......277 feet	
Sec. 34.......202 feet	

UNCONFORMITY

The erosion that caused the eastward thinning of the Washita group marks the end of the Comanche epoch, and the contact between the Washita and the overlying Woodbine formation marks a plane of unconformity. The local differences in thickness of the Washita group doubtless are partly due to unevenness of the eroded surface, even though that surface may have approximated a peneplain. The differences may be partly due also to the influence of minor folding during the period of erosion.

Gulf Series

Woodbine formation. The Woodbine formation is the oldest formation of the Gulf series in southern McCurtain County. It crops out across the middle of the area shown on plate 1 and is divided into a lower tuffaceous member and an upper sandy member.

The lower member of the formation consists principally of highly cross-bedded coarse poorly consolidated dark-green tuffaceous sand that weathers yellowish green to yellowish red and locally is cemented by calcite into balls or lenses. Interbedded with the sand is brownish-red clay. At the base in a few places is a white sand that is almost identical with sand in the Trinity group. Also included are a few gravel lentils, some of them rather extensive. The clays are lenticular and occur throughout the member, but are more abundant in the upper part. Typically the clays are brownish red, but in places they are so red that they can be described as red beds. The clays are almost entirely noncalcareous. The lack of calcium carbonate and the reddish color of some clays of the Woodbine differentiate them from clays in the underlying Washita group.

The upper member of the Woodbine formation is composed principally of gray to brown cross-bedded sand and sandy gravel which is generally free of tuffaceous material.

Logs of test holes suggest that the thickness of the Woodbine formation in McCurtain County is about 150 feet, but none of the holes in the area shown on plate 1 penetrated all the formation. Within that area, test holes penetrated about 70 feet of the Woodbine in sec. 30 and about 10 feet in sec. 34, T. 7 S., R. 23 E., and about 58 feet in sec. 4, T. 4 S., R. 23 E.

<u>Tokio formation.</u> The Tokio formation in southwestern McCurtain County is composed of light-gray quartz sand and clay shale. The sands are cross-bedded and poorly sorted, in many places are argillaceous, and weather to brown, red, or mottled. In some exposures small hard plates cemented with iron weather out of the sand; in other exposures the sand is massively bedded and weathers to a soft, sandy soil. The clay shales are generally gray and at many places have dark-brown or black streaks caused by iron and manganese staining.

The Tokio formation overlies the Woodbine formation in McCurtain County and crops out along the south edge of the area shown on plate 1. No measurements of thickness have been made in this area. A test hole was drilled about 10 miles southeast of the area and penetrated 102 feet of the Tokio, but this thickness represents less than the maximum because some of the upper part had been eroded. Miser and others 4/ report that the Tokio is as much as 300 feet thick in Arkansas and thins westward. It probably is substantially less than 300 feet thick in McCurtain County.

QUATERNARY SYSTEM

Alluvium and terrace deposits. Alluvium and terrace deposits are widely distributed and have considerable thickness over rather large areas along streams, notably the bottom lands of the Little and Red Rivers and the larger tributaries of the Red. These are stream-laid unconsolidated sand, gravel, and clay in intergrading and intertonguing beds, and they are not well exposed except in the banks of streams. The terrace deposits lie at somewhat higher levels than the alluvium and are thought to have been deposited by the streams before the streams cut their valleys to the present levels. Hence, the terrace deposits probably are somewhat older than the alluvium and in particular are older than the deposits of the lowest bottom lands. The terrace deposits and alluvium mask the structure of the underlying bedrock, from which they are separated by a major unconformity. They are shown together as a single unit on plate 1.

GEOLOGIC STRUCTURE

The regional structure of the Comanche rocks in southern McCurtain County is a southward-dipping homocline, on which the maximum dip is about 100 feet per

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4/ Miser, H. D., Ross, C. S., and Stephenson, L. W., "Water-laid volcanic rocks of early upper Cretaceous age in southwestern Arkansas, southeastern Oklahoma, and northeastern Texas": U. S. Geol. Survey Prof. Paper 154-F, pp. 179-180, 1929.

mile. 5/ The regional stratigraphic and structural relationships of the rocks of the Comanche series are described by Miser, who says, "They are separated from the underlying rocks by a profound unconformity whose plane truncates folded and faulted rocks of many ages.. ......Also, they are separated from the superjacent Upper Cretaceous (Gulf) rocks by an angular unconformity whose plane truncates all the several formations of Lower Cretaceous (Comanche) age, the youngest in Oklahoma and the oldest in Arkansas. Furthermore, the basal unit--the Trinity formation--contains beds in Arkansas that do not extend westward far into Oklahoma, owing to a westward overlap of the upper part of the Trinity over the lower part of the formation."

The overlap and unconformable relations described by Miser and the folds now known to be present in southern McCurtain County have resulted in structural and stratigraphic traps in the sands of the Trinity group where petroleum, if present in nearby rocks, could accumulate. At least some of these traps are now known to contain petroleum.

Measurements of dip in exposures of the Woodbine and Tokio formations are not reliable guides to the structure of the rocks of the Comanche series because of cross bedding and because of the unconformity separating the Comanche from the Gulf series. In the area shown on plate 1, indications of structure are found where the rocks of the Washita group crop out as inliers along Bokchito and Garvin Creeks and where they extend southward along Perry Creek. These localities are described below.

Bokchito Creek inlier. The Bokchito Creek inlier is in the SW¼ sec. 33, T. 7 S., R. 23 E., and the NW¼

5/ Miser, H. D., "Lower Cretaceous (Comanche) rocks of southeastern Oklahoma and southwestern Arkansas": Am. Asso. Petroleum Geologists Bull., vol. 11., pp.443, 445, 1927.

sec. 4, T. 8 S., R. 25 E. Figure 2 shows the measurements of dip made on exposures of limestone beds of the Washita group along the creek. In the northern part of the inlier the dip is about 5° northwestward and decreases southward in about a quarter of a mile to only 1°. Near the middle of the SE$\frac{1}{4}$SW$\frac{1}{4}$ sec. 33 the rocks are much jointed and dip southward and southeastward at low angles. The joints strike N. 35° E. and are regarded as indicating both the direction and the approximate location of the axis of an anticline, although this anticline may be only a part of a much larger structural feature. The southward dip continues into the E$\frac{1}{2}$NW$\frac{1}{4}$ sec. 4, where a northward dip appears and continues to the southern limit of the inlier. The anticlinal axis is shown on both plate 1 and figure 2. This anticline probably is only one of a group of anticlines in southern McCurtain County.

<u>Garvin Creek inlier</u>. The Garvin Creek inlier is in the SW$\frac{1}{4}$ sec. 19 and the NW$\frac{1}{4}$ sec. 30, T. 7 S., R. 23 E. Figure 3 shows the measurements of dip made on exposures of limestone of the Washita group along the creek. In the northernmost exposure of Washita rocks, the dips are erratic. In the next eighth mile southward the dips are northeast, southeast, and east and range from 15° to 45°, except in one small exposure where the strike is east and the dip is 90°. In the middle part of the inlier--immediately north and south of the road between secs. 19 and 30--no consistent directions of strike and dip are observable. In the southernmost exposure of the inlier, the dip is 80° south. At two places the Woodbine formation has the same strike and dip as the rocks of the Washita group. The data clearly demonstrate that folding, or faulting, or both, have occurred but they do not suffice to fix the structural trends. There is, however, a suggestion of a northeast-southwest anticlinal axis in sec. 19, and an east-west anticlinal axis in sec. 30.

<u>Perry Creek exposures.</u> The Washita group crops out much farther south along Perry Creek than the topo-

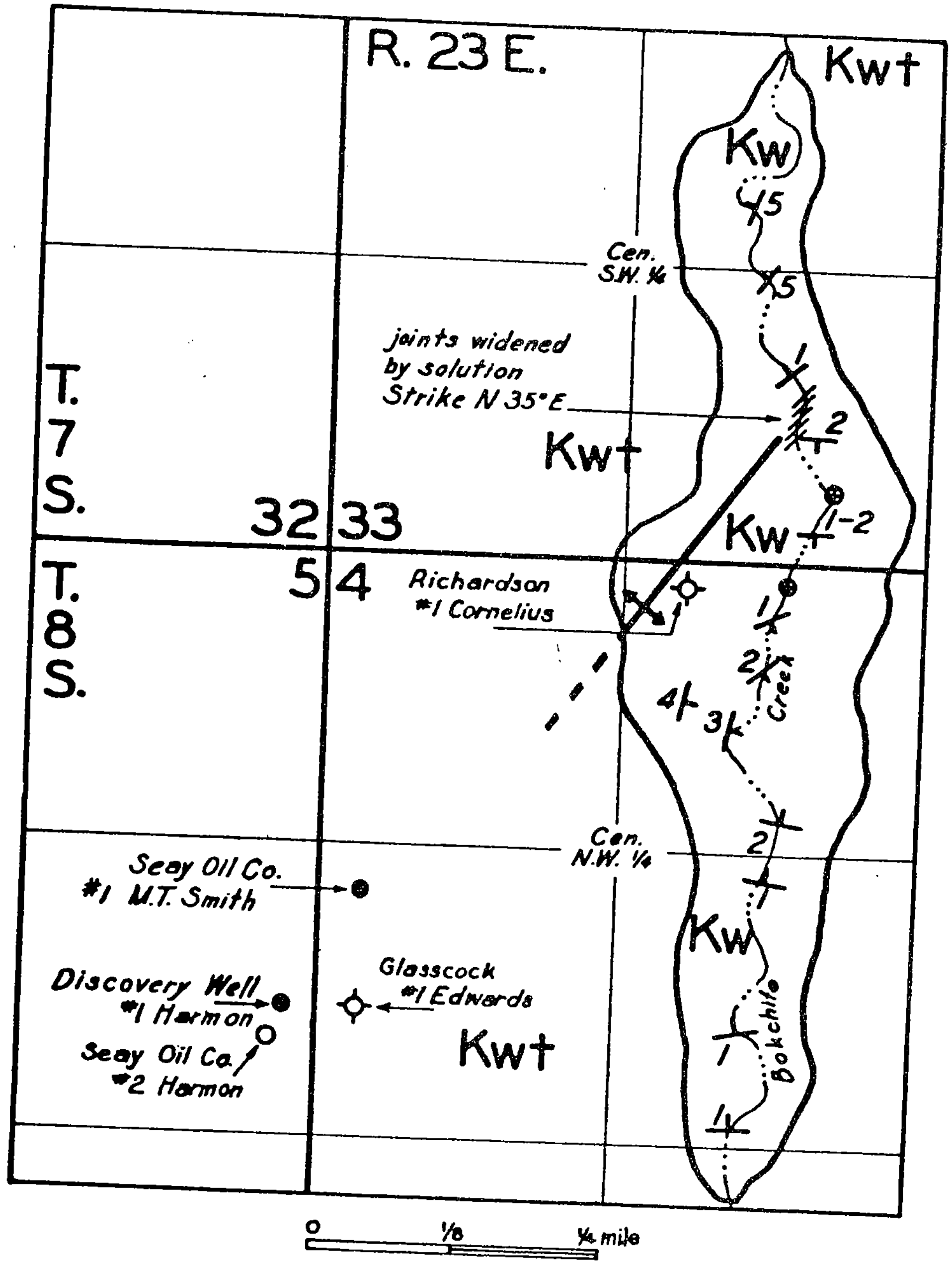

Figure 2. Structural detail at inlier of Washita group along Bokchito Creek. Kwt, Woodbine formation; Kw, Washita group.

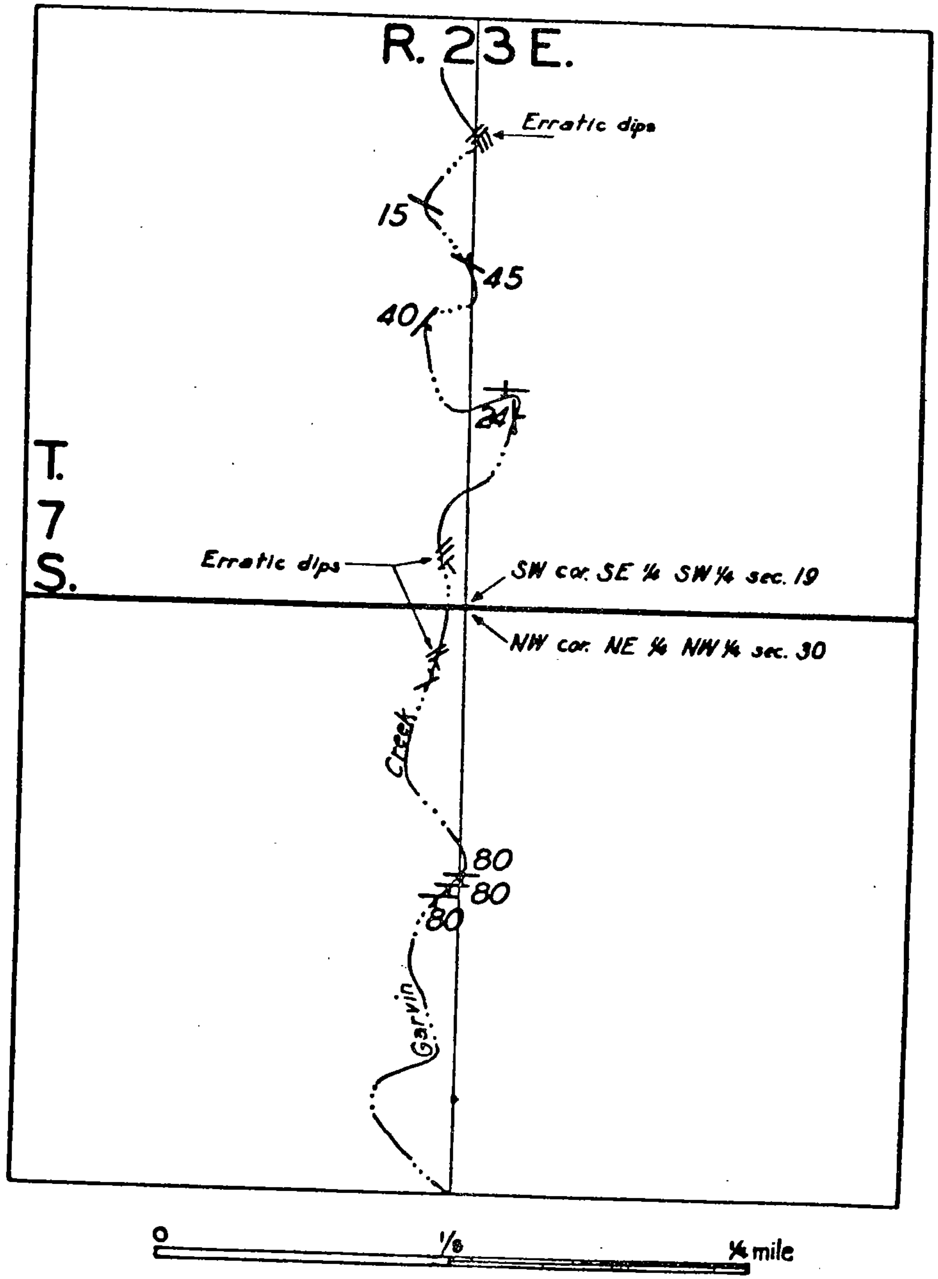

Figure 3. Strike and dip of Washita group inlier along Garvin Creek.

graphy would require if the structure of the rocks were a simple southward-dipping homocline. Some flexure of the rocks on the homocline therefore is indicated in secs. 34 and 35, T. 7 S., R. 23 E., and secs. 2, 3, 10, and 11, T. 8 S., R. 23 E. Measurements of strike and dip were made in sec. 34 and sec. 3 as shown on plate 1. Additional measurements would be needed to delineate structural axes in this area.

EXPLORATION

Prior to 1952 about 17 wells had been drilled into or through the Comanche rocks of McCurtain County in search of oil, but none yielded oil in commercial quantities, although shows of oil or gas were reported in 12 of them.

Oil was found on December 27, 1952, in a 330-foot well drilled for water by J. H. Wilson on the farm of W. O. Harmon, in the SE$\frac{1}{4}$SE$\frac{1}{4}$NE$\frac{1}{4}$ sec. 5, T. 8 S., R. 23 E. The oil was encountered just below the top of the Paluxy sand at a depth of about 325 feet below the surface. Oil was bailed from the hole at irregular intervals for several days, the total being estimated as 35 or 40 barrels. A test was then made in which the hole was bailed dry and after a 50-minute interval yielded 40 gallons of 28.6-gravity black oil.

The unexpected discovery led at once to the drilling of the W. D. Seay Oil Co. No. 1 M. T. Smith test in the NW$\frac{1}{4}$SW$\frac{1}{4}$NW$\frac{1}{4}$ sec. 4, T. 8 S., R. 23 E., which on January 10, 1953, encountered oil in the upper part of the Paluxy sand. This well is only about 600 feet from the Harmon well.

The anomalous dips of the rocks of the Washita group along nearby Bokchito Creek indicate that accumulation of oil is controlled, at least to some extent, by the structure of the rocks. Possibly the lensing of sand beds in the upper part of the Paluxy has helped to trap the oil. A sand about 5 feet thick was found in this position in the discovery well but was not found in test holes in secs. 30 and 34, T. 7 S., R. 23 E.

In the area shown on plate 1, thirteen wells have penetrated the Paluxy sand. Two of them encountered fresh water, six encountered salt water, three encountered oil, and two encountered a show of oil. Records of these thirteen wells are given in table 2, and logs of four of them are given in appendix A.

Asphaltic Sandstone

Asphaltic sandstone occurs in the outcrop area of the Paluxy sand outside the area shown on plate 1, and is an indication that oil may occur in the Paluxy at several places in McCurtain County. Two exposures of such sandstone are as follows:

In sec. 20, T. 7 S., R. 24 E., on the south side of the Little River, asphaltic sandstone about 25 feet thick in places is exposed for about half a mile horizontally.

In the SE¼ sec. 22, T. 6 S., R. 21 E., asphaltic sandstone about 10 feet thick in an area of about half an acre is overlain by 5 feet of shale, which in turn is overlain by the Goodland limestone.

Table 2. Wells penetrating the Trinity group in the area shown on plate 1.

Name of well	Location	Date completed	Depth (feet)	Remarks
	T. 7 S., R. 23 E.			
McCurtain Lime Co.	NW¼NW¼NW¼ sec. 23	June 1949	201	Fresh water in Paluxy sand See detailed log on page 19.
Gray-Ware No. 1 Britt	SE¼SW¼SE¼SE¼ sec. 29	1-31-53	344	Had good oil show in upper Paluxy. Abandoned as dry hole. Goodland limestone 243-308 feet
H. F. Wilcox	SW¼SW¼SE¼ sec. 30	7-27-37	1,380	Show of oil at 300 feet; show of gas at 1,225 feet; show of oil at 1,284 feet. Abandoned and plugged. See detailed log on page 21.
U. S. Geol. Survey	NW cor. sec. 34	5-30-51	347	Stratigraphic test hole. Fresh water in Paluxy. Plugged. See detailed log on page 23.

Table 2. (Continued)

Name of well	Location	Date completed	Depth (feet)	Remarks
	T. 8 S., R. 23 E			
Sam Allen	SW cor. sec. 4	.....	313±	Reported to yield salt water from Paluxy sand. No well record available.
W. D. Seay No. 1 Smith	NW cor. SW¼NW¼ sec. 4	1-10-53	343	Show oil in Paluxy sand. Waiting on orders. Goodland limestone 226 - 288 feet. See detailed log on page 26.
Glasscock No. 1 Edwards	NW¼SW¼NW¼ sec. 4	2 - 53	396	Abandoned as dry hole. No samd present in upper Paluxy. Goodland limestone 224 - 290 feet
Richardson No. 1 Cornelius	NW¼NE¼NW¼ sec. 4	2-..-53	319	Reported salt water in upper Paluxy sand. Abandoned. Goodland limestone 203 - 273 feet.

(Discovery well) W. D. Seay No. 1 Harmon	SE¼SE¼NE¼ sec. 5	12-27-52	330	Oil from upper part of Paluxy sand bailed at about 25 bbls. per day; gravity 28.6 No well record available.
W. D. Seay No. 2 Harmon (Twin to No. 1)	SE¼SE¼NE¼ sec. 5	3-6-53	1368	Drilled to Paleozoic rocks and cased to bottom. Oil in Paluxy sand. Well data not released as of March 5, 1953.
Glasscock No. 1 May	NE¼NE¼SE¼ sec. 5	1-31-53	425	Abandoned as dry hole. No sand present in upper Paluxy. Goodland limestone, 264 - 316 feet.
Shirley No. 1 Tittle	NW¼NE¼NW¼ sec. 8	2-..-53	508	Abandoned as dry hole in Paluxy sand. Base of Goodland limestone 323± feet.
Eureka No. 1 Dameron	NW¼NW¼NW¼ sec. 16	2-..-53	1598	Drilled to Paleozoic rocks. Abandoned as dry hole. Goodland limestone 410 - 470 feet.

CONCLUSIONS

Showings of oil or gas previously recorded in the logs of at least 12 wells in southern McCurtain County, coupled with the recent discovery of oil in secs. 4 and 5, T. 8 S., R. 23 E., appear to indicate that the petroleum possibilities of this part of Oklahoma have not been thoroughly explored.

Erosion and folding at the end of Comanche time are suggested by anomalous thicknesses of rocks of the Washita group recorded in well logs. Structural movement during or after Gulf time is indicated by folding and faulting that involve rocks of both the Gulf and Comanche series. Anticlines favorable to the accumulation of petroleum have resulted from these structural movements. Within the Trinity group, stratigraphic traps probably have resulted from the northwestward and westward overlap of younger over older beds.

In the area of outcrop of the Woodbine and Tokio formations, it is difficult to map structurally owing to cross-bedding and poor exposures, but some indication of the structure may be disclosed by close study of the areal distribution of these formations.

APPENDIX A

Logs of wells

McCurtain Limestone Co. No. 1 Carder
NW cor. sec. 23, T. 7 S., R. 23 E.
Drilled for water with cable tools; completed June 1949

Sample log	Thickness (feet)	Depth (feet)
Surface soil, black	4	4
Washita group (undifferentiated)		
Limestone	1	5
Clay, yellow; with limestone shells	7	12
Clay, yellow; shell fragments	3	15
Clay, hard, blue; shell fragments	3	18
Clay, hard, blue	3	21
Clay, medium hard, blue	3	24
Limestone shell, yellow to blue	3	27
Limestone, gray; with clay lenses	3	30
Clay, soft, blue	3	33
Limestone, light to dark gray	3	36
Clay, soft, blue	3	39
Clay, hard, dark gray	3	42
Clay, soft, gray	3	45
Clay, hard, dark gray	3	48
Clay, gray	3	51
Clay, hard, gray	19	70
Limestone, medium gray to tan, composed of shell fragments. Some identified as *Gryphea* sp.	10	80
Clay, medium soft, blue	6	86
Clay, gray; abundant shell of *Gryphea* sp.	7	93
Clay, blue; some shell material	7	100
Limestone, gray to tan, composed of *Gryphea* sp. shell fragments	5	105

Fredericksburg group		
Goodland limestone		
Limestone, buff to white	6	111
Limestone, buff to white, oolitic	9	120
Limestone, buff to white, with shades of blue, oolitic	9	129
Limestone, blue-gray	3	132
Limestone, light blue-gray	3	135
Limestone, gray to white	6	141
Limestone, light to medium gray	6	147
Limestone, light to medium gray, some pyrite	3	150
Limestone, light to medium gray	11	161
Trinity group		
Clay, soft, dark gray to black	1	162
Clay, soft, sandy, dark to medium gray	2	164
Sand, light to medium gray, very fine grained quartz grains, clear, fine medium angular, well sorted; pyrite particles	4	168
Clay, soft, brick red with blue streaks	3	171
Clay, maroon and blue	6	177
Clay, sandy, red to brown; pyrite crystals	3	180
Clay, red, blue, brown	3	183
Shale, sandy, red, gray, black	2	185
Sand, incoherent quartz grains, fine clear; water rose to 100-foot level	16	201

H. F. Wilcox No. 1 Newman
SW¼SW¼SE¼ sec. 30, T. 7 S., R. 23 E.
Drilled as oil test with cable tools;
completed as dry hole July 1937

Driller's log

	Thickness (feet)	Depth (feet)
Soil and red bed	25	25
Rock, red, water-bearing	15	40
Shale, gray	30	70
Lime, hard	42	112
Shale, blue, water-bearing	3	115
Quicksand, HFW	3	118
Shale, blue	7	125
Lime, hard (hole caved in)	2	127
Shale, blue	9	136
Lime, hard	24	160
Lime, white, hard	15	175
Slate, gray	5	180
Lime	10	190
Shale, gray	10	200
Lime, white	8	208
Shale, blue	2	210
Lime, white	15	225
Shale, blue, soft	22	247
Lime	3	250
Shale, blue	10	260
Lime, hard	2	262
Shale, blue (show of oil at 300 feet)	61	323
Shale, gray (caving badly)	24	347
Lime, white, hard	48	395
Rock, red	55	450
Shale, gray	25	475
Sand, water-bearing	60	535
Shale, gray	5	540
Sand, hard	10	550
Shale, blue and gray	10	560
Shale, blue	15	575
Sand, water-bearing	20	595
Lime, hard	2	597

Lime, white, water-bearing	16	613
Shale, red and blue	47	660
Shale, red	15	675
Sand, water-bearing	21	696
Lime, white, hard	4	700
Mud, redish-yellow, soft	30	730
Sand and red rock	24	754
Mud and shale, red	16	770
Sand, white	50	820
Shale, blue	5	825
Sand, white, water-bearing (fresh)	29	854
Mud, blue	18	872
Sand	18	890
Shale, blue	5	895
Slate and charcoal, black	5	900
Shale, sandy, gray	10	910
Sand, white, water-bearing	25	935
Shale, blue	20	955
Sand, water-bearing, gray	15	970
Shale, sandy	13	983
Lime, brown, hard	2	985
Sand	5	990
Lime, brown, hard	5	995
Lime, gray, hard	5	1000
Lime, sandy	13	1013
Shale, blue	5	1018
Shale and lime shells, blue	22	1040
Lime	5	1045
Sand, water-bearing	8	1053
Slate and lime shells, blue	28	1081
Shale, gray	4	1085
Shale, blue	10	1095
Shale, red	10	1105
Sand, water-bearing, gray	19	1124
Lime, hard	3	1127
Sand, yellow and brown	4	1131
Lime and pyrites, black, hard	2	1133
Coal or charcoal	1	1134
Sand, gray, hard	6	1140
Lime, sandy	25	1165
Sand, white, water-bearing	25	1190

Clay, blue and red	30	1220
Sand, white, hard (show of gas at 1,225 feet)	25	1245
Rock, red	11	1256
Granite wash	3	1259
Sand, soft	2	1261
Lime and pyrite, hard	7	1268
Rock, red	4	1272
Shale	3	1275
Sand, green, hard (show of oil at 1,284 feet)	48	1323
Shale and shells, blue	22	1345
Shale and lime shells, blue and hard	35	1380

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United States Geological Survey Test Hole No. 3
310 feet east of the NW cor. sec. 34, T. 7 S., R. 23 E.
Drilled with cable tools; completed May 19, 1951

Sample log	Thickness (feet)	Depth (feet)
Gulf series		
Woodbine formation		
Clay, yellow, silty and sandy	5	5
Clay, red, silty, tuff stringer at 7 feet	5	10
Comanche series		
Washita group (undifferentiated)		
Limestone and shale, interbedded dirty white limestone and gray shale, some shell fragments	9	19
Limestone and shale, gray	2	21
Limestone, gray to white, gray clay stringer at 25 feet, some shell fragments	5	26
Limestone, gray to brown, very fossiliferous, many echinoid spines	4	30

Limestone and shale, gray, interbedded shale is clayey	6	36
Limestone, hard, gray, with gray clay stringers	4	40
Limestone, gray, hard, fossiliferous	14	54
Limestone, hard, gray, fossiliferous, clay stringers	2	56
Limestone, soft, fossiliferous	2	58
Shale, soft, blue gray	3	61
Limestone, hard, gray	2	63
Limestone and shale, hard, light gray, fossiliferous limestone and shale in 3-inch stringers	2	65
Limestone, gray, very fossiliferous	4	69
Shale, silty, clayey, gray	9	78
Shale, gray brown	5	83
Limestone, gray	2	85
Limestone, gray, fossiliferous	3	88
Shale, black	2	90
Shale, gray	2	92
Limestone, gray, soft, fossiliferous	20	112
Shale, dark gray	20	132
Limestone, gray, fossiliferous	4	136
Shale, gray	6	142
Limestone and shale, gray	3	145
Shale, soft, gray	31	176
Limestone, very hard, fossiliferous	11	187
Shale, gray	9	196
Limestone, gray	2	198
Shale, gray	7	205
Limestone, hard, gray, fossiliferous, 1 foot shale break at 209 feet	7	212
Fredericksburg group		
Goodland limestone		
Limestone, very light gray to white, shell fragments and calcite crystals	64	276
Limestone and shale, light gray limestone and gray clay shale	3	279

Trinity group		
Shale, brownish gray, clayey	3	282
Shale, brown, clayey	8	290
Shale, gray, mottled reddish brown to greenish brown, silty to clayey	38	328
Sand, fine grained, brown to white, contains water	4	332
Sand, medium grained, brown to white, contains water	15	347

Only a slight amount of water was encountered above the Trinity group (estimated at about 1.5 g.p.m.). The Paluxy sand of the Trinity group yielded 21.5 g.p.m. of fresh water in 15 minutes of bailing time, but further testing was stopped by sand caving and heaving in from the bottom of hole. During the test period about 20 feet of sand came into the hole.

W. D. Seay No. 1 M. T. Smith
NW$\frac{1}{4}$SW$\frac{1}{4}$NW$\frac{1}{4}$ sec. 4, T. 8 S., R. 23 E.
Drilled as oil test with rotary tools;
completed January 1953

Driller's log	Thickness (feet)	Depth (feet)
Gulf series		
Woodbine formation		
Sand and shale	58	58
Comanche series		
Washita group (undifferentiated)		
Limestone and shale	22	80
Limestone	7	87
Shale, limy	14	101
Limestone	5	106
Shale, limy	5	111
Limestone, limy shale interbeds	17	128
Shale, limy	22	150
Limestone	10	160
Shale, limy	35	195
Limestone	9	204
Shale, limy, streaks of limestone	19	223
Fredericksburg group		
Goodland limestone		
Limestone, massive	37	260
Shale, limy	6	266
Limestone	22	288
Trinity group		
Shale	13	301
Oil sand	6	307
Shale, silty	36	343

UNITED STATES DEPARTMENT OF INTERIOR
GEOLOGICAL SURVEY
W. E. WRATHER, DIRECTOR

OKLAHOMA GEOLOGICAL SURVEY
W. E. HAM, ACTING DIRECTOR