# History of Discovery and Development of Woodbine Oil Fields in East Texas

By C. I. ALEXANDER*

## INTRODUCTION

The purpose of this paper is to present a brief historical summary of the discovery and development of the Woodbine oil fields of East Texas. A simple listing, or tabulation of the Woodbine oil fields, with discovery dates, would be dry reading, indeed, so I will try to review the history of this important oil producing formation and area as a story — a story of lines or trends of geological thought, of lease plays and exploratory operations resulting from these lines or trends of thought; and of the changes in geological thought resulting from some of the more important developments.

From a strictly historical viewpoint, two dates stand out through the perspective of the years as of primary significance. The first of these is October, 1920, when the first Woodbine oil was brought to the surface of the ground, at Mexia. The second is March, 1927, the completion date of the discovery well of the Boggy Creek field. Mexia, of course, rates as a major discovery by any standard; of the Woodbine oil fields, only Powell, Van, East Texas and Hawkins have produced, or seem likely to produce more oil. Boggy Creek, on the other hand, ranks low in any statistical evaluation, but as I hope to demonstrate later, is second only to Mexia in historical importance.

## ANTICLINAL "TREND PLAYS"

As early as 1895 "shallow" oil was being produced in the Corsicana area. By 1912, gas had been discovered in the Nacatoch sand in the "Mexia area," which, as the term was used at that time, extended as far south as Groesbeck. Structure contour maps, using the top of the "gas-bearing" (Nacatoch) sand as a datum, showed the "Mexia structure" as an elongated anticlinal ridge.

Realizing the possibility of finding gas or oil in sands below the Nacatoch, G. C. Matson (1916, p. 104), who had mapped the Mexia-Groesbeck area in 1915 wrote:

> If a well drilled to test the lower sands should prove unsuccessful above the Austin chalk, it might be well to continue to these deeper (Woodbine) sands in order to determine whether they are oil or gas-bearing in the Mexia-Groesbeck field. In spite of the fact that these beds

*District geologist, Magnolia Petroleum Co., San Antonio, Texas.

contain potable water at Corsicana, it is worth while to test them for oil and gas in the Mexia-Groesbeck field, where the structure is exceptionally favorable for the accumulation of oil and gas. The best place to locate a well to test the deep sands in the Mexia-Groesbeck field is where the upper gas sand is high.

The first "deep" test for the "Mexia-Groesbeck structure," begun a few years later, influenced no doubt by this structural interpretation, was located on the crest of the Mexia "anticline." This well, started by the Mexia Oil and Gas Company, was taken over at 1800 feet by the late Col. A. E. Humphreys, on the advice of Julius Fohs, and for a substantial interest in the holdings of the Mexia Oil and Gas Company, was drilled to a total depth of more than 3100 feet, and completed in October, 1920, pumping about 150 barrels of oil and 35 barrels of water per day from the Woodbine. This was far from sensational production, but the Woodbine had proved productive. The foresight and courage of Matson, Fohs, Humphreys, and others associated with the venture was rewarded by the discovery of a new oil reservoir.

The second well in the Mexia field, drilled as an offset to the discovery well, was completed in the summer of 1921, as a flowing well, with an initial production of 4000 barrels per day.

A dozen or more additional Woodbine wells were completed before the significance of the faulting, now known to control the accumulation at Mexia and in the other "fault line" fields, was recognized.

In October, 1921, shortly after the completion of the second well at Mexia, a second Woodbine oil field was discovered at Currie, northeast of Mexia, in southern Navarro County. The discovery well, drilled by the Humphreys-Mexia Company, was located near the crest of a supposed anticlinal structure mapped on the surface by W. A. Reiter and checked by Julius Fohs and H. M. Robinson.

Recommendations based on the "general trend," and "suggestive topography," resulted in the discovery, in January, 1922, of the North Currie field. The first wells completed were Woodbine gas wells, but by August of 1922, oil production had been established.

It was in 1922, also, that the first Woodbine wells were drilled in the Groesbeck district, south of the Navasota River, on the southern end of the "Mexia anticline." Results of this southward exploration were disappointing, as the Woodbine sands were found to be thin bedded, fine grained, silty and shaley, and of low porosity and permeability. These wells, however, did serve to prove the existence of a series of small structures south of and entirely separate from the Mexia structure.

About a year elapsed after the completion of the first Woodbine gas wells at North Currie, before a fourth Woodbine oil field was discovered at Powell. The discovery well, drilled by the Corsicana Deep Well Company, was completed in January, 1923. Lahee (1929, p. 318) states that "about three years were consumed" in the drilling of this test, which would indicate that the venture was started at

about the time of, or possibly even *before* the actual completion of the first Woodbine well at Mexia! The test was located near the south edge of the "Burke pool," one of the several shallow "pools" of the Corsicana area, obviously with the intention of testing the "deeper sands" in an established producing area. The discovery well was barely within the limits of Woodbine production, at the extreme north end of the Powell field, and within 30 days of its completion, was making some salt water.

The second well in the Powell field, drilled by the J. K. Hughes Development Company, was located about one and one-half miles southwest of the discovery, and just east of the northeast end of the Witherspoon-McKie shallow pool, apparently still exploring "deeper pays" in the vicinity of established shallow producing areas. This well had an initial production of 8,000 barrels per day, from a very few feet of sand. It is interesting to observe that if the location had been but a short distance farther west, actually within the producing area of the Witherspoon-McKie shallow pool, it would have been on the

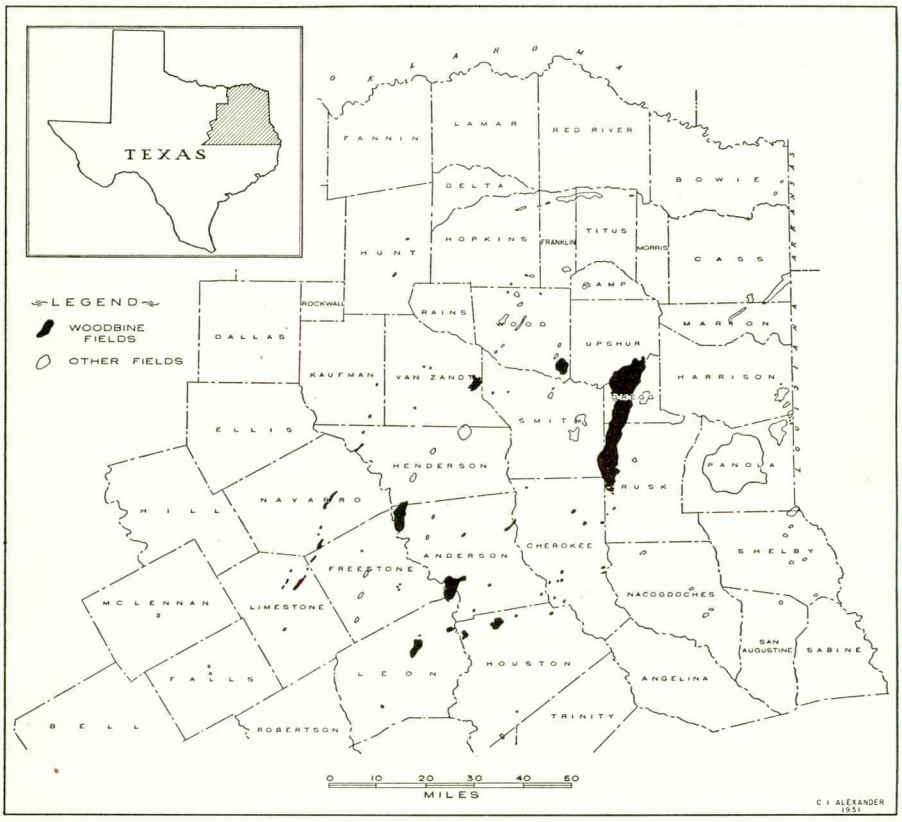


Fig. 1. Oil and gas fields of East Texas.

downthrow side of the Powell fault at the depth of the Woodbine sands, and would have been a dry hole.

An extensive drilling campaign followed completion of the J. K. Hughes well, and by November, 1923, Powell, most prolific of the fault line fields, was practically drilled up.

Location for the discovery well of the Richland field, completed a few months later, in February, 1924, was made "on the trend" between Powell and North Currie.

## FAULT-LINE EXPLORATION

Probably the first of the fault line fields in which the true nature of the structure was recognized and correctly mapped *before* the discovery of Woodbine production, was Wortham. Not long after the discovery of the Mexia and Currie pools, an outcrop of the fault which is now known to control the Woodbine oil accumulation at Wortham, was recognized and mapped. The first Woodbine test, drilled by Humble in 1922, was located *east* of this outcrop, however, and was dry. Further mapping of the surface trace of the fault, by geologists of the Boyd Oil Company, led to the drilling of the discovery well of the field, located west of the surface trace of the fault and completed in November, 1924.

The Nigger Creek and Cedar Creek fields, located on small faults parallel with, but west of the main Mexia-Powell fault zone, and southwest of Mexia, were discovered in 1926 and 1927, respectively. Drilling of the discovery wells in both these fields was preceeded by surface mapping which recognized and correctly interpreted the structural conditions.

It is interesting to observe that down to this time, only three of the fault-line fields, Wortham, Nigger Creek and Cedar Creek were opened by wells located with reference to the mapped outcrops of the controlling faults. Mexia, Currie, North Currie, and Powell were all discovered by wells drilled on supposed anticlines. Discovery wells at North Currie and Richland were located on "trend plays."

When the true nature of these structures was finally recognized, and the possibility of mapping the surface traces of the faults demonstrated, an active campaign of surface mapping was conducted by geologists representing many different companies, both southward from the Groesbeck area and northward from Powell. Since the southward explorations, as previously mentioned, proved disappointing due to poor sand development in the Woodbine, the fault line "trend" north of Powell received most attention. Additional faults of this system were mapped through northeastern Navarro, western Henderson, eastern Kaufman, southern and eastern Hunt, and northern Hopkins, Titus and Franklin counties, during the succeeding years. Exploration of these fault structures north and northeast of Powell, however, proved disappointing, not, in this case, because of any defi-

ciency of sand development in the Woodbine, but through failure of apparently well-located tests to obtain production. Ten years, in fact, elapsed, following the discovery of the small Cedar Creek field, before the next Woodbine oil field of the Mexia-Powell fault system was discovered, at Flag Lake in western Henderson County.

## BOGGY CREEK DISCOVERY

In 1927, the same year in which the Cedar Creek field was opened, another discovery, at Boggy Creek, in western Cherokee County suddenly turned the attention of geologists and the companies they represented away from the fault line, and toward a new province, the middle of the big East Texas basin.

The presence of oil seeps and small amounts of oil in shallow sands in the Jarvis area, 10 miles south of Boggy Creek in east-central Anderson County, was known as early as 1887.

Mr. M. A. Davey, of Palestine, who had participated in the drilling of several shallow tests in the Jarvis area from around 1904 to 1915, was impressed by "unusual surface features" around Boggy Creek, and assembled a block of leases there early in 1924. Mr. Davey succeeded in interesting the Rio Bravo Oil Company in the prospect, and after some surface work, this company purchased 1000 acres of his block.

Following surface exploration and some core drilling, Humble purchased the remainder of Mr. Davey's block and acquired additional leases. An agreement then was made between Rio Bravo and Humble for the latter to conduct further exploration and development for a joint account of the two companies.

During 1925 and 1926 an intensive program of surface, core-drill and geophysical exploration was pursued. The geophysical work indicated the presence of salt, and the approximate outline of the salt mass.

The first two Woodbine tests, located on the east flank of the structure, were drilled from Austin chalk into Lower Cretaceous, Washita limestone, without encountering any Woodbine. The first was drilled into salt, the second abandoned when Lower Cretaceous limestone was identified.

The third test, located slightly farther down dip from the crest of the structure than the first two, on January 22, 1927, penetrated eight feet of oil-saturated Woodbine sand, and was completed March 19, 1927, flowing 62 barrels of oil per hour.

Ten additional wells, some dry holes, others gas wells, were drilled before another oil producer was completed in February of 1928.

The Boggy Creek discovery is regarded as one of the "turning points" in the history of East Texas oil development, not, as previously suggested, because of the quantity of oil which the field has

 

produced, but because it served to direct the attention of the oil "fraternity" toward the great East Texas basin.

Exploration of the "fault line" did not cease, of course, in 1927. It continues, in fact, to this day, and during the intervening years this exploration has resulted in the discovery of such fields, as Sulphur Bluff and Talco, Paluxy producers, in 1936, Flag Lake in 1937, Mabank in 1939, Tehuacana in 1940, Weiland in 1942, and Campbell in 1943.

The important fact, however, is that at Boggy Creek, in March, 1927, not only a new field, but a whole new "province" was discovered. Into the new province swarmed geologists—and crews of geologists—mapping the surface formations, and core drill and geophysical crews, exploring the subsurface. Prior to this, Woodbine tests had been drilled in the basin, but they were few and scattered. Geological exploration, likewise, was represented by generalized regional mapping, with only a few sporadic attempts at detailing local areas.

At the time of the Boggy Creek discovery, a total of only seven "interior" salt domes, Grand Saline in Van Zandt County, Steen and Brooks in Smith County, Keechi and Palestine in Anderson County, Butler in Freestone County, and Boggy Creek, were known to be present in the East Texas basin.

By 1928 an additional five or six domes had been discovered, some by geological, some by geophysical methods, and a total of seventeen are known today.

Many of these domes were "tested" by one or more wells almost immediately after their discovery, but the result of these tests were uniformly disappointing. Most of the wells penetrated cap rock or salt at relatively shallow depths. A few, on some of the domes, reached Woodbine but no new oil discoveries resulted.

The exploratory campaign which followed the Boggy Creek discovery would have been a short-lived and unimportant incident, indeed, if it had not been directly responsible for such discoveries as Van, in 1929, Long Lake and Buffalo in 1933, Cayuga in 1934, and Hawkins, in 1940.

Boggy Creek may, in fact, be regarded as the "father" of all of the many oil and gas fields which are today producing in the East Texas basin. The exploratory operations which followed and were initiated by its discovery are responsible for all these subsequent discoveries, as suggested by Liddle (1936, p. 16) in his report on the Van field.

## VAN FIELD

The areal and structural magnitude of the Van uplift accounts, perhaps, for the fact that this sensational field became the second Woodbine discovery of the East Texas basin. As early as May of 1927, geologists of the Pure Oil Company had recognized features of drainage, topography and surface outcrop near the town of Van which induced the Pure to assign a seismograph party to detail the area.

Following the completion of the seismic survey, and a program of core-drill exploration and additional, more detailed surface mapping, location was made for the first Woodbine test on the structure.

This well encountered shows of oil at several levels, and was completed October 13, 1929, flowing 147 barrels of oil per hour from Woodbine sands topped at 2560 feet.

## WILDCAT DISCOVERY OF EAST TEXAS FIELD

The discovery of the great East Texas field in 1931, at the time and in the manner in which it occurred, must be regarded as a fortuitous occurrence.

C. M. Joiner, discoverer of the field, began his first test in the area in August of 1927, only a few months after the completion of the first Woodbine oil well at Boggy Creek. This test was simply one of many wildcat prospecting operations which, in addition to the more deliberate and planned program of geological and geophysical exploration conducted by the major companies, quickly followed the Boggy Creek discovery.

Mechanical difficulties with the drilling equipment and consequent financial difficulties are all that prevented East Texas from becoming the second oil discovery for the East Texas basin, instead of Van. The first two tests started by Joiner were junked and abandoned before reaching the Woodbine, the first at a total depth of 1,098 feet, the second at 2,518 feet. Nearly two and one-half years were consumed in the drilling of these two tests, and in the meantime the Van structure had been mapped and the discovery well drilled and completed.

Joiner's third test, begun late in 1929, was located only 300 feet south of his first venture. Like the first two, this third attempt was beset by mechanical and financial difficulties, and at times seemed doomed to failure. When the well, with total depth at 3,592 feet, encountered a show of oil, money was not available to purchase a string of casing! A drill stem test, which yielded considerable amounts of oil and gas, was necessary in order to persuade a supply company to furnish the casing necessary to complete the well. On October 30, 1930, Joiner was rewarded for his perseverance and determination when his Daisy Bradford No. 3 was completed flowing 300 barrels of oil per day.

It is now established, of course, that this, the discovery well, was located near the extreme eastern edge of the East Texas field, where only the basal few feet of the Woodbine sand are present.

With exploration and prospecting already fanned to a feverheat by the prolific Van field, it is not strange that the Joiner discovery attracted a swarm of wildcatters to the new area. Other "discoveries" followed in rapid succession.

The first of these, drilled by the Deep Rock Oil Company and completed December 4, 1930, flowing 3000 barrels of oil per day was

only a mile west of the Joiner well and was recognized as an "extension" to the "Joiner pool."

A few days later, on December 28, 1930, the Bateman-Crim No. 1, ten miles to the northwest was completed flowing 10,000 barrels per day from a depth of 3,652 feet, and on January 16, 1931, Farrel and Moncrief completed their Lathrop No. 1, fifteen miles north of the Bateman-Crim, flowing 500 barrels per hour with total depth at 3,587 feet. At this stage, it was the general belief that three separate "pools" had been discovered. It was not until further drilling closed the gaps between these "discoveries" that the almost incredible magnitude of the East Texas field came to be fully realized.

Within the next four years, continued exploration, conducted in spite of the virtual collapse of the oil-price structure under the flood of oil from the East Texas field, resulted in the discovery of Woodbine oil fields at Long Lake, Rusk, and Cayuga, Woodbine gas at Buffalo and Red Lake, and the Kittrell and Camp Hill fields, producing from the Carrizo and Eagle Ford formations, respectively.

Although the discovery of the Hawkins field did not come until much later, in 1940, it is interesting to note that the Humble's first leases in the Hawkins area were taken in 1934, following the mapping of a surface structure of small proportions.

## PRE-WOODBINE OBJECTIVES

In 1935 the attention of operators in the East Texas area was suddenly and forcibly directed to objectives deeper than the Woodbine by the discovery of oil in the lower Glen Rose, at Rodessa, in northwestern Louisiana.

Woodbine tests which had failed to produce, but which had established the presence of favorable structural conditions now bore fruit as deeper tests were drilled on these old Woodbine prospects. Such discoveries as Sulphur Bluff and Talco in 1936, Opelika in 1937, Chapel Hill in 1938, Pittsburg in 1940, Coke and Quitman in 1942, and Manziel in 1943, had all been mapped as prospects and tested by from one to several Woodbine wells before production was established in the deeper formations.

While deeper drilling, both on old and new prospects, became the accepted order of the day, exploration for Woodbine oil did not cease, and while the Hawkins field, discovered late in 1940 is the only one of latter day Woodbine fields to deserve listing among the major oil fields, other discoveries, such as Grapeland, Navarro Crossing, Ponta, Mabank, and East Long Lake resulted.

Since most of the structures which have yielded production from either the Woodbine or from deeper formations in East Texas have been discovered as a direct result of explorations initiated, first, by the discovery at Mexia, in 1920, and second, at Boggy Creek in 1927, the statement, made in an early paragraph of this paper, that these two events are of primary significance in the history of East Texas oil development, seems justified.

## REFERENCES CITED

MATSON, G. C.
1916. Gas prospects south and southeast of Dallas. U.S.G.S. Bull. 629, pp. 77-119, map.

LAHEE, F. H.
1929. Mexia and Tehuacana fault zones. Structure of Typical American Oil Fields, Am. Assoc. Pet. Geologists, Vol. I, pp. 304-388, 32 figs.

LIDDLE, R. A.
1936. The Van oil field, Van Zandt County, Texas. Univ. Texas Bull. 3601, 82 pp., 27 pls. incl. geol. maps.