

# MUCH NATURAL GAS IN RIVER VALLEY

Includes Five Well Defined Producing Areas, Says State Geologist.

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A natural gas supply sufficient to keep the wheels of industry turning for many years to come is stored in Nature's tanks beneath the surface of the Arkansas river valley between Little Rock and Fort Smith, awaiting the onward march of industry that shall demand its use, according to State Geologist George C. Branner.

Information for this article was furnished by Geologist Branner, along with the accompanying map showing the rock folds that indicate the possibilities of gas in the area under consideration.

This area lies between the Ozark plateau region of northern Arkansas and the Ouachita mountain system of west-central Arkansas. The central portion of the Arkansas river valley of Arkansas and Oklahoma extends from near Searcy, White county, to near Lehigh, Okla., a distance of approximately 230 miles. The width of the valley proper is from 40 to 50 miles, while the width of the gas producing rocks which lie in this valley is about 70 miles. Between Newport, Jackson county, and Little Rock, the Arkansas valley beds pass beneath the coastal plain of eastern Arkansas, and it is probable that they extend still farther to the southeast beneath the coastal plain series and reappear in northern Alabama, since surface rocks

found there have a direct relation, geologically speaking, to those of the Arkansas river valley of Arkansas.

**Base Level Plain.**  
The region under discussion consists of a base level plain which carries the Arkansas river valley drainage system to the east and southeast. The extreme northern portion of the valley includes the Boston mountain system which constitutes the water shed between the White river and the Arkansas river drainage system of north Arkansas.

Surrounding the valley are numerous ridges which usually have an east-west trend, and rise from 50 to 100 feet above the valley plain. These ridges are related closely to the geology of the area and their continuity and character are determined largely by the inclination and hardness of the surface beds.

Geologically, the Arkansas river valley consists of a regional syncline, or trough lying between the Ozarks and the Ouachita range. At the western end of the valley the surface formations consist of productive coal measure beds of the Pennsylvania age. The productive coal measure beds extend eastward into Arkansas from Oklahoma approximately 85 miles.

**Lateral Forces Created.**  
Structural conditions of the rocks in the Arkansas river valley have been radically influenced by the Ouachita uplift lying to the south. This uplift, occurring at least partly through the Pennsylvanian times, created lateral forces which folded the rocks of the southern portion of the Arkansas river valley. These folds are, as a rule, approximately parallel to the trend of the Ouachita uplift. Some of these folds are intense and in some cases have inclinations of from 60 to 70 degrees. In some instances they have been overturned, while still other folds are inclined to the horizontal at angles as low as two and three degrees. The extreme northern portion of the Arkansas river valley is comparatively little folded, the rocks having a gentle regional dip to the south and southeast.

**Five Producing Areas.**  
There are five well defined producing areas in the Arkansas river valley. These lie in Sebastian and Crawford counties. Another area near Clarksville has been proved, but is not yet connected to mains. These areas all produce gas from the same formation—the Atoka—and the gas in the Crawford-Sebastian county areas is derived from closely related horizons. The amount of the gas used in these fields, of course, varies from time to time. The consumption at the present is about 17,300,000 cubic feet a day, distributed as follows: Alma, 2,900,000 cubic feet; Kibler, 4,000,000; Williams, 8,000,000; Mazzard-Prairie, 2,000,000; and Mansfield, 400,000.

Gas production which is available from the Kibler and Williams fields has been estimated from past records at approximately 5,500,000 cubic feet an acre, and the life of the five fields has been estimated to be between 13 and 40 years, depending upon the amount of gas taken from them.

C. D. Smith has estimated that the surface of the ground, in other words, where the drilling is begun in the Mansfield Field, is 3,000 feet below the top of the Atoka formation, and since the deepest production in the Mansfield vicinity is obtained from 2,148 feet, the Atoka formation in this area is productive to 5,148 feet below the top of the formation. The Atoka formation probably is producing gas from closely related horizons in the Alma, Kibler, Williams and Mazzard-Prairie fields, according to Severy, who estimates that the Atoka

ness of about 5,000 feet and thickens as one passes from the Crawford county fields southward.

The Smelter Field is a recent extension of the Alma Field, and its extent and subsurface conditions are not yet worked out. There also is a recent west extension of the Williams Fields, which will add to the gas reserve.

**First Clarksville Well.**  
The first Clarksville well was completed in March, 1926, to a depth of 2,892 feet in the Atoka shale, three feet of the producing sand having been penetrated. The well is located in section 14-10-24, on a small anticline. The rock pressure on the well, as reported to the state Department of Conservation, is 1,000 pounds per square inch. This extends the commercial gas area about 35 miles east of the Kibler Field. Another well is reported to have been completed in January in section 14-10-24, to a depth of 2,991 feet. Production of this well is estimated at between 3,000,000 and 5,000,000 cubic feet a day. According to newspaper reports, plans are being made to pipe the gas from these two wells to Clarksville, Russellville, Morrilton and Conway.

A well was drilled near Plumerville, in Conway county, in 1905, and the gas was used to light the streets of Plumerville for about a year. A well was drilled at Scotland, Van Buren county, and gas was encountered at approximately 1,625 feet. The well was drilled on what is known as the Little Red river monocline, and attempts to deepen the well resulted in loss of tools and the location was abandoned.

Gas possibilities of the western portion of the Arkansas river valley have been demonstrated by the development of six commercial areas. It seems possible that conditions favorable for commercial gas production may be found to the eastward and also at points probably fairly well distributed through the river valley in Arkansas.

**The Atoka Formation.**  
The Atoka formation, which produces all of the gas in western Arkansas, underlies the entire valley. As in the eastern portion of the valley, the Atoka formation in the central and western portions consists of carbonaceous shales, with some sandstones distributed through them which are variable in texture, thickness and lateral extent. The shales predominate by a large margin. There are numerous folds in these beds which are favorable for the accumulation of natural gas.

Although it seems a fairly obvious conclusion that there are distinct gas possibilities in the central and eastern portions of the Arkansas river valley, it is equally obvious that a considerable amount of detailed field work should be done to work out the surface geology of this area and make detailed maps of such structures as seem favorable for natural gas accumulation. There is very little detailed geology of this section available at present.

It is believed that such a survey should include portions of Pulaski, Faulkner, Perry, Conway, White, Cleburne, Van Buren, Pope, Johnson, Franklin, Logan, Yell and probably sections of Sebastian and Crawford counties. It is realized that this is a very considerable area covering approximately 7,000 square miles. It is quite possible, however, that a large portion of this area could be system-

atically disregarded after a preliminary examination.

Three field geologists could carry the work forward as slowly or as rapidly as the situation demanded, the total expense being estimated at about \$6,900. Such a survey normally would result in the detailed mapping of such structures as were considered favorable for gas accumulations. Following this the mineral rights on such structures could be purchased or leased as the occasion required. The area covered by such buying or leasing naturally would cover a comparatively small area, probably a few thousand acres on each structure recommended. The rights could then be held for an indefinite period while test wells were being drilled.

## ST. LOUIS TO USE GAS FROM MONROE

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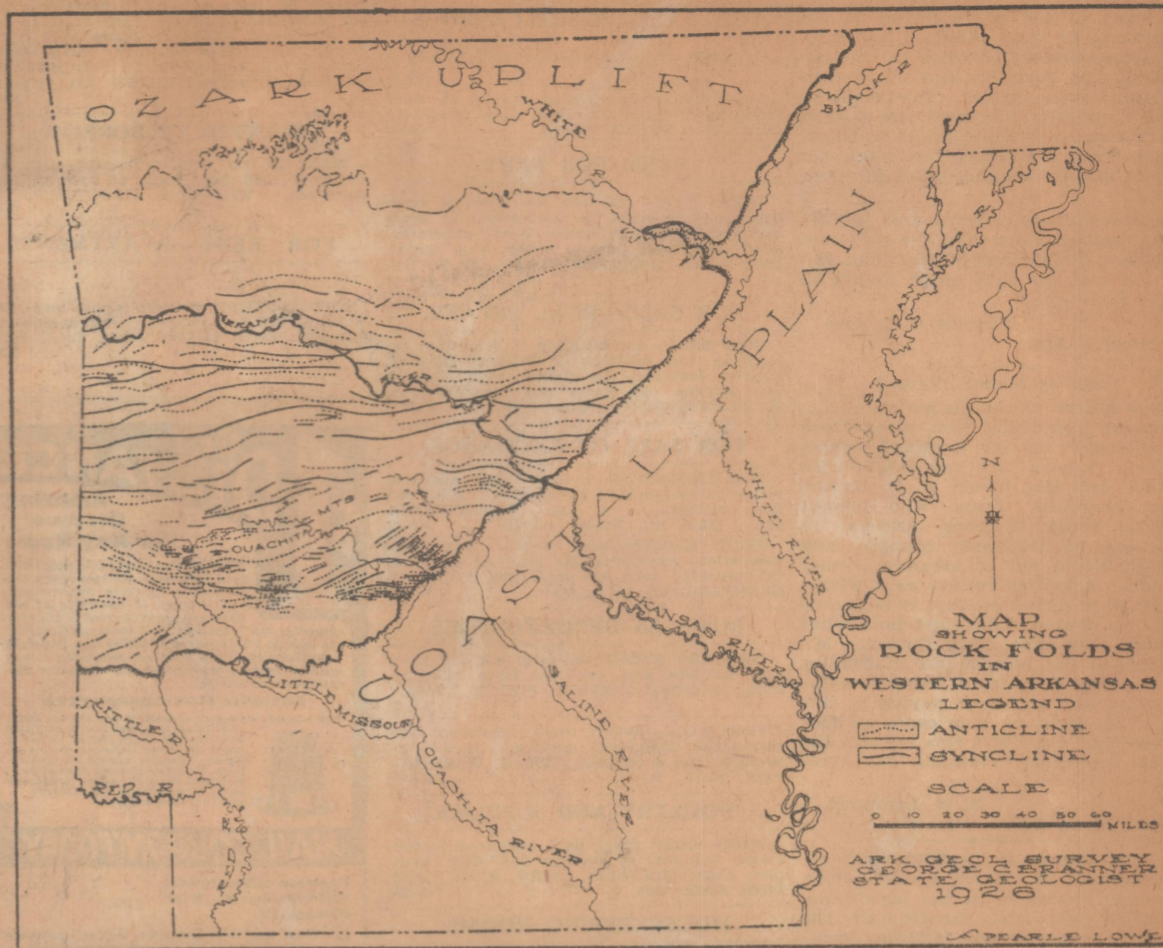
Work on Pipe Line Through Arkansas to Start Soon.

St. Louis, Mo., Nov. 15.—(A)—Natural gas from the Monroe, La., gas fields will be available to many Arkansas towns and St. Louis through a pipe line to be constructed from Monroe to St. Louis by the Moody Seagraves Corporation of Houston, Tex. A survey for the line is nearly completed and work is to be started as soon as the 24-inch pipe to be used is ready, officials of the company said.

The cost was roughly estimated at \$20,000,000 in the announcement. Work on the line is expected to start within 60 days and will be completed before spring. When finished it will handle 150,000,000 cubic feet of gas a day, it was estimated.

The gas will be sold here to local utility companies.

# Map of Prominent Rock Folds in Arkansas River Valley Favorable for Natural Gas Accumulation



The above map, prepared by Miss Pearl Lowe of the state geologist's office, shows the more prominent rock folds in the Arkansas river valley favorable for the accumulation of natural gas. Geologist George C. Branner plans a survey of practically the entire area.

DAILY OKLAHOMAN - Sunday - 7-31-27

## Dynamite Is Used to Locate Oil In South Texas Salt Dome Field

Method Not Practical In Oklahoma Because Of Limestone Strata.

Geologists are given a smack in the eye by the use of dynamite and the seismograph in certain areas of south and central Texas. However, the geologists are not tramping over the hot sands to leave those districts, and they are watching the experiments with as much interest as some of the operators who have thousands of dollars tied up in equipment.

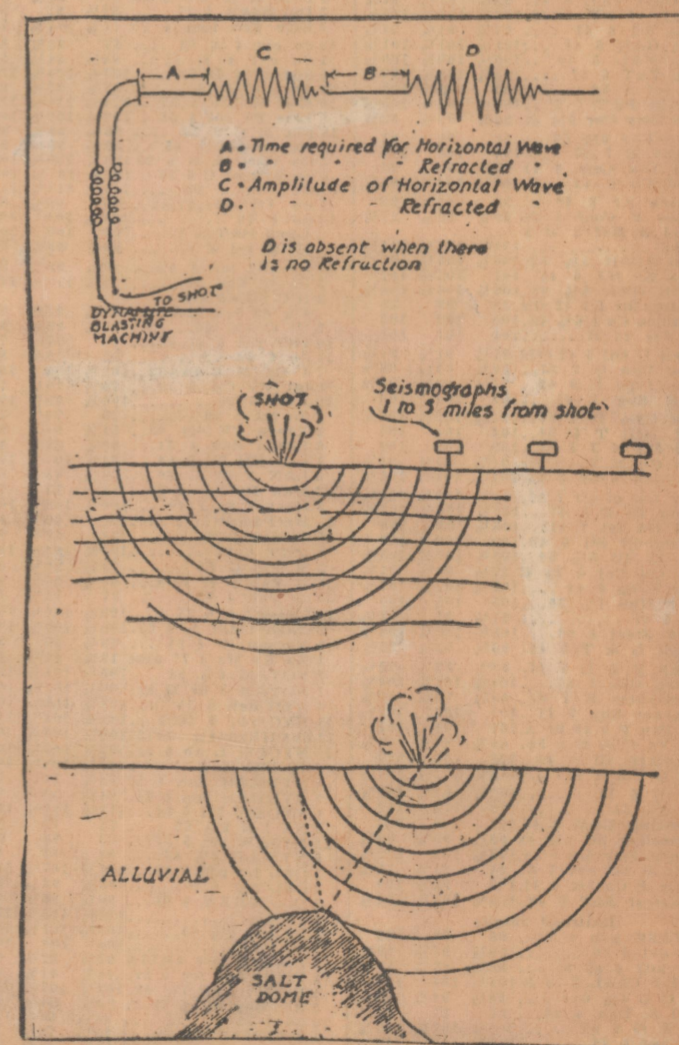
Dynamite is exploded on the surface, and the force of the explosion is reflected down in the earth to the nearest hard formation, and reflected back, the seismograph recording the throw-back. Naturally, it takes longer for the back throw to record itself where the formations are lower, or farther away from the instrument, than where the formations are high, and the high spot of the structure is thus determined.

Where the underground formations bulge up and form "domes" and structures are the most likely places to find oil, as oil lies on the high points of the earth's interior and water on the low spots, oil being lighter than water.

Hence, the chances of loss in drilling are less when high spots are drilled instead of the low, and oil fields are more easily found.

**Not Generally Practical.**  
The seismograph and dynamite is not practical, results so far obtained have indicated, except in exploring for salt domes in Texas and Louisiana. There are no hard limestone beds in the gulf coastal area between the surface and the salt domes themselves, so that a true reading of the underground salt dome is obtained without interference from an upper formation that might be erratic. In Oklahoma and Kansas, seismograph readings are of no account because upper limestone formations reflect erratic conditions that do not exist below where the oil is located.

In east Texas, in Cherokee county, where the Hubble Oil and Refining company has discovered the first productive "interior" salt dome, seismograph readings are being relied upon, and seven or eight salt domes in addition to the one found at Carey lake by the Humble caused high prices to be paid for acreage. The full benefit of seismograph readings there, however, remains to be proved. In the meantime, however, large amounts of money are



The diagram at the top shows how the seismograph is used to tell whether or not the shock of an explosion of dynamite has been refracted by striking one of the solid salt dome structures near which oil is likely to be found. Below gives an idea of the relation between the dynamite shock, the seismographs and the salt dome which is being sought.

being spent to find more domes and dynamite by the ton is going off.

According to the Hercules Mixer, a magazine devoted to developments in the field of explosives, the new method does away with the old costly hit-and-miss drilling, and also eliminates the ancient diving-rod man.

By the new method which is scientific and accurate, the prospector takes dynamite and detonates it on the surface of the ground. The earth-shock created is registered on seismographs placed certain distances away. The new method is

an outgrowth of the experience gained during the war, when the seismograph was used to locate the enemy's hidden or camouflaged heavy artillery. The process, however, is sometimes changed; for in locating the domes where they expect to find oil, the source of the shock produced by dynamite explosions is known.

There are different seismographs in use at this work. Some companies use one kind and some another. Their several advantages are being guarded carefully as company secrets. But broadly speaking,

