

Engineers to Survey Location for Memphis Gas Line.
Gazette 7/21/28
 Special to the Gazette.
 Helena, July 20.—Engineers surveying a route for a natural gas pipe line to be built from the north Louisianan fields to Memphis by the Memphis Natural Gas Company were due in Helena today, however, up to a late hour tonight had not arrived. It is reported that their trip here is to determine the feasibility of bringing the line through Helena, and crossing the river here, which probably would supply this city with natural gas.
 Sid Stokes, formerly of Elaine, is heading the surveying party, it was learned today.

Gas Inspection Report. 9-12-29
 Gasoline inspections by the Department of Conservation totaled 8,481,953 gallons during August, and kerosene inspections, 855,690 gallons, Commissioner Parker C. Ewan announced yesterday. The totals included 876,265 gallons of gasoline inspected in Little Rock, and 24,699 gallons of kerosene.

Oil Firm Enters State. 9-12-28
 Des Arc, Sept. 8.—(Special.)—The Petrol Oil Company of Oklahoma, filed articles of incorporation to do business in this state. Ben H. Ash of Tulsa, Okla., is president of the company. The Petrol Oil Company will complete a well near Johnson chapel, 12 miles west of Des Arc, that was begun by the Powell Creek Oil and Gas Company about two years ago. The well was drilled to a depth of about 1,600 feet. This company will begin operations in the next few days.

ANOTHER GAS LINE TO BE CONSTRUCTED

Mains From El Dorado Will Supply Fuel for Little Rock. 11/2/28
Gazette

Another step in providing assurance of a sufficient gas supply for Little Rock at all times is being taken by the Arkansas Natural Gas Corporation. It was said in a communication received yesterday from J. Zeppa, secretary of the company, with headquarters at Shreveport.

Pipe has been ordered and bids have been requested from contractors today for the construction of a 12 3-4-inch welded pipe line from El Dorado to Emmet, Hempstead county. The new line will be 60 miles long and it will connect the El Dorado-Monroe line and the new gas field in the Rainbow pool, east of El Dorado with the company's main line from Pine Island to Little Rock at the Trees compressor station, located about half way between Prescott and Hope. It will have a capacity of 30,000,000 cubic feet a day.

When the line is completed gas produced in Union county will be available for the company's consumers served by its main line. It is expected that the connecting link will be finished at about the same time as the pipe line now being built between Clarksville and Little Rock, which was undertaken after an agreement had been reached by the gas company and city officials regarding an increased supply of gas by January 1.

With completion of the new work, Mr. Zeppa pointed out, the company will have a connected pipe line system drawing its gas from all the fields in the Shreveport territory, the Richland parish and Monroe gas fields, the Union county field and the new Clarksville field. This will make it possible for the company to obtain its gas from wherever it is most available and maintain an adequate supply for all its customers under all conditions.

"This latest move is in line with the promise of a never failing gas supply, made to Little Rock city officials at the conference held early in the summer," Clifton W. Gray, local attorney for the Arkansas Natural Gas Corporation, said yesterday. The cost of the new line will be approximately \$1,200,000, and the plans call for its completion by January 1. The right-of-way already has been purchased and partly cleared.

CONTRACT FOR NEW PIPE LINE IS GIVEN

Booth & Flinn to Construct El Dorado-to-Emmet System. 11/9/28
Gazette

Booth & Flinn, pipe line construction firm of Pittsburgh, Pa., has been awarded the contract for laying the new pipe line of the Arkansas Natural Gas Corporation between El Dorado and Emmet, Hempstead county, it was announced yesterday in a telegram received by the Gazette from J. R. Munce, vice president of the gas company, who had gone to Pittsburgh to close the deal.

The new line, which will be of 12 3-4 inch pipe, will connect the El Dorado-Monroe line and the new gas field in the Rainbow pool, east of El Dorado, with the company's main line from Pine Island to Little Rock at the Trees compressor station. It will have a capacity of 30,000 cubic feet a day.
 With completion of the new work, the company will have a connected pipe line system drawing its gas from fields all around Little Rock and increasing the assurance of sufficient gas for this city at all times. The contractors named in the telegram are now at work on the line that is to connect Little Rock with the Johnson county field. It will be finished next month.

TO BEGIN TESTING OF NEW PIPE LINE

Officers Hope to Have Supply From Clarksville Here by Christmas. 12/20/28
Gazette

Testing of the Clarksville end of the Clarksville-Little Rock gas pipe line, construction of which now is nearing completion, was started yesterday morning, and the supplemental supply of gas made available to Little Rock through the new line will be turned on between December 15 and Christmas, officials of the Arkansas Natural Gas Company announced yesterday.

Tests will be made under the supervision of W. H. Buckley, superintendent of the pipe lines and stations of the Arkansas Natural Gas Company, and J. H. Mobley, engineer for the company, both of Shreveport. The Little Rock end of the line is completed to a point west of Morrilton. A five-mile gap between Morrilton and Russellville remains to be closed.

The new pipe line, Mr. Buckley brought out, is being constructed primarily to supplement the supply being received in Little Rock now from the Louisiana fields. The line is of 10-inch pipe, with a capacity in excess of 15,000,000 cubic feet daily, and will make available to Little Rock a supply 80 per cent greater than that from the Louisiana line alone.

The total supply available with the new line cut in—between 40,000,000 and 45,000,000 cubic feet daily—will be considerably in excess of the anticipated demand for several years to come, Mr. Mobley said.

Project to Cost \$1,250,000.

Development of the Clarksville field and the construction of the new pipe line, the officials said, will represent expenditure of more than \$1,250,000, and with the cost of a line on which construction has started, extending from the Rainbow City field to connect with the main line between Hope and Prescott, will mean approximately \$2,500,000 now being spent by the gas company to provide a more than adequate supply to Little Rock and other points served.

The Clarksville-Little Rock line will be 94 miles long. It is the first major pipe line in the United States and, so far as is known, in the world, constructed of seamless steel pipe, the sections of which are welded together. Conway and other points between the Clarksville field and Little Rock will be supplied with gas for domestic consumption through local distributing systems.

The Clarksville gas, the officials said, is almost identical chemically and in its heating qualities with that from the Louisiana fields, and will blend readily with the Louisiana gas. It has a pressure at the wells—seven in number—of 1,100 pounds, and inasmuch as working pressure in the pipe line will be about 450 pounds, no pumps will be needed.

Two Reducing Stations.

Two reducing or regulator stations are being constructed at the Little Rock end of the line. One is at Levy, where the new 10-inch pipe connects with the 12-inch pipe of the main system. The other station will be built in Pulaski Heights, where an eight-inch line will connect with the Little Rock distributing system. This eight-inch line leaves the Clarksville main near the northwest corner of Camp Pike, crosses the river at the point about four and a half miles above the Broadway bridge, and runs thence to the reducing station.

Construction of the pipe line was begun September 12 and its completion in slightly more than three months will mark an unusual feat in pipe line laying, the officials said. Many unique problems were encountered by the contractors, Booth & Flinn of Pittsburgh, Pa., they said.

In some areas it was necessary to blast through solid rock for 300 to 400 feet in cutting the 36-inch deep ditch. In others workmen labored above their waists in mud and water. Three streams, Cadron creek, Illinois bayou and Big Pine creek, were spanned with two eight-inch lines, to provide protection against a single line being washed out during high water periods.

Materials used in construction included 200 carloads, or the equivalent of five long freight train loads of piping; 20 carloads of welding materials, such as drums, oxygen and acetylene; 10 carloads of paint for protection of the pipes against rust, and numerous other articles.

The company spent between \$400,000 and \$500,000 in wage and for materials in the Little Rock territory alone, Mr. Buckley declared.

GAS LINE TO CITY IS READY FOR USE

Main From Clarksville Will Begin Delivering Fuel in Few Days. 11/10/28
Gazette

Featuring the annual meeting of the Mid-Continental Section of the American Society of Mechanical Engineers held yesterday with the Little Rock Engineers Club at the Hotel Marion was the announcement that a 10-inch gas pipeline to Little Rock had been completed and was being "blown out" and would be ready to deliver gas in a few days.

The announcement was made by W. H. Buckley, Shreveport engineer with the Arkansas Natural Gas Company. He made a talk illustrated with a map of Arkansas and Louisiana showing the various gas lines. He said that he felt sure the gas line would be ample to take care of any industries that might be induced to come to Little Rock. This line extends from Clarksville through Levy into North Little Rock.

Alderman L. H. Griffin of the Ninth ward and a member of the Utilities Committee, last night said Pulaski Heights will have plenty of gas this winter, as an eight-inch pipeline is being constructed from the 10-inch line across the Arkansas river to Pulaski Heights. The eight-inch line will be completed by January 1. His committee was instrumental in having the line extended.

The result of this work will be that Little Rock will have an addition of 15,000,000 to 20,000,000 feet more of gas per day.

Justin Matthews addressed the engineers on factors which might attract industries to Little Rock.

Hollis P. Porter of Tulsa, who attended the meeting, expressed surprise at the large number of engineers in Little Rock. The meeting was closed with the showing of moving pictures of construction work on the Dardanelle bridge, which is nearing completion. W. Terry Field was in charge of arrangements for the meeting. W. E. Ford, president of the Engineers Club, presided.

ST. LOUIS TO HAVE NATURAL GAS SOON

New Company Formed to Pipe Fuel From Fields in Louisiana. 11/27/29

New York, Jan. 24.—(AP)—Formation of the Mississippi River Fuel Corporation, a \$30,000,000 corporation, by a group of companies headed by the Standard Oil Company of New Jersey, to pipe natural gas from Louisiana to St. Louis, was announced today.

The new company will construct a 22-inch pipe line from the Monroe and Richland gas fields in Louisiana to St. Louis, to furnish gas for industrial purposes. The pipe line will extend about 450 miles and will carry about 100,000,000 cubic feet of gas daily. It is estimated that there is an industrial market in St. Louis for about 150,000,000 cubic feet daily.

The companies interested in the Louisiana fields, together with the Standard of New Jersey which are joining in the project are the United Gas Corporation of St. Louis, the Columbian Carbon Company of New York, the Electric Power and Light Company of New York, the United Carbon Company of Charleston, W. Va., and the Palmer Corporation of Louisiana.

BIG NATURAL GAS FIRMS IN MERGER

Arkansas Corporation Is Absorbed by Pipe Line Company. 3-8-29

Shreveport, La., March 7.—Deeds for transfer of practically the entire holdings of the Arkansas Natural Gas Corporation in Louisiana and Arkansas, to the Louisiana and Arkansas Pipe Line Company, a Delaware corporation, were recorded today with the Caddo parish district clerk, marking one of the largest sales of oil properties made here recently. Both companies are members of the Southern Cities Distributing Company, the parent concern.

The Louisiana-Arkansas Pipe Line Company purchased all the pipe line and equipment of the Arkansas Natural Gas Company, beginning at the north end of Reserve Natural Gas Company's 16-inch line in De Soto parish. Running through Caddo parish into Miller county, Ark., including the main line and parallels, together with all buildings, leases, rights-of-way and equipment.

The sale also included the Pine Island "booster" station, all field lines in the Pine Island district; all rights, title and interests to the lease made by the Continental Supply Company to the Natural Gas and Fuel Corporation for 25 years, of a 10-inch line constructed by the Crusader Pipe Line Company of Arkansas, beginning in Richland parish and extending to the Arkansas state line, together with the telephone system and other equipment; the Rogers buildings and equipment, located in section 23-21-16 of Caddo parish; the Pine Island compressor station and all equipment necessary to the operation of the entire holdings.

The Louisiana-Arkansas Pipe Line Company also took title to extensive properties and leases in Caddo, Bossier, De Soto, Morehouse, Ouachita, Red River, Richland, Union, Webster and West Carroll Parishes.

MORAN INTERESTS SELL GAS HOLDINGS

Property in Louisiana, Arkansas Bought by Public Service Company. 3-8-29

Shreveport, La., March 7.—Contract for transfer of approximately 75 miles of trunk gas line and mains and connecting lines in 17 north Louisiana towns and two South Arkansas municipalities has been signed by the Empire Public Service Company, a \$50,000,000 corporation which will purchase these holdings from the Moran Corporation which has headquarters here, it was learned from an official source today.

It was learned that the price was in excess of \$500,000, part of which will be paid in cash and a part in stock of the purchasing company. The Empire owns utility plants at Minden, Alexandria and Bunkle, La. Properties to be transferred include gas franchises for the 17 north Louisiana towns and the two Arkansas points.

Towns served whose gas facilities figure in the transfer include Strong and Junction City, Ark., Belcher, Hoston, Marion, Naborton, Oil City, Gilliam, Plain Dealing and intermediate points. The Moran Corporation did not sell any of its other properties. Most of the gas used in furnishing the municipalities affected by the transfer is purchased from the Reserve Natural Gas Company, a subsidiary of the Arkansas Natural Gas Corporation. The gas furnished Oil City and Naborton is purchased from the Texas Company.

The Empire Public Service Company is one of the major utilities concerns. It is said to own the Southwest Utilities Company and other subsidiaries operating in the South and Southwest. It is headed by Floyd W. Woodcock.

SYSTEM EXTENDED BY GAS COMPANY

Arkansas Natural to Build Main From Monroe Field to Shreveport. 5/12/29

Shreveport, La., May 11.—Announcement was made today by the Arkansas Natural Gas Corporation, a subsidiary of the Cities Service Company, that it will immediately begin the construction of a 100 mile 20-inch line from the Monroe gas field to Shreveport.

The gas transported through this line will be sold to the Southern Cities Distributing Company guaranteeing

ample gas supply for consumption in Shreveport, due to the local supply falling very rapidly, it is said.

The Arkansas Natural Gas Corporation has also entered into an agreement with the Dixie Gulf Gas Company, a Moody-Seargraves Interest, to sell them gas from this line to a point near their Waskom compressor station, to be used in eastern and southern Texas.

Gas purchase contracts have been entered into by the Arkansas Natural Gas Corporation with the large gas producers in the Monroe and Richland fields, including the Palmer Corporation of Louisiana, Louisiana Gas and Fuel Company, Hope Construction Company, International Gas Company, Southern Carbon Company, Union Carbon Company, Natural Gas Producing Company of Louisiana, Industrial Gas Company and Dixie Gulf Gas Company, which, with the production owned by the Arkansas Natural Gas Corporation will make available for the use of the Arkansas Corporation gas from 250,000 acres of proven area.

Arkansas Line Sold.

Announcement also is made of the purchase by the Arkansas Natural Gas Corporation from the Industrial Gas Company of a 16-inch, 12-inch and 14-inch line, connecting the Monroe field with El Dorado and Camden, Ark., and all their gas sales contracts in that area, including the contract to supply the pulp mill of the International Paper Company, south of Camden. The consideration was not disclosed.

A contract was also entered into with the Industrial Gas Company to purchase gas from them in the Monroe field, guaranteeing an ample supply for this line for a number of years. This line also will be connected with the new 12-inch El Dorado-Emmett line of the Arkansas-Louisiana Pipeline Company, a subsidiary of the Arkansas Natural Gas Corporation, which ties in with the main 18-inch trunk line from Shreveport to Little Rock.

This connection makes a complete circuit of the entire gas system of the Arkansas Natural Gas Corporation System, and will make possible an arrangement whereby all of the towns supplied by these companies may be served by the major gas fields in this section.

In addition to the lines from Monroe to El Dorado, the franchise and

distribution system owned by the Industrial Gas Company of El Dorado has been purchased by the Public Utilities Corporation of Arkansas, a subsidiary of the Arkansas Natural Gas Corporation.

Arkansas Natural Buys Moran Gas System. 5-21-29

Shreveport, La., May 20.—The Arkansas Natural Gas Corporation late today announced purchases of the Moran Corporation's pipe lines, gas systems and franchises in 17 north Louisiana and south Arkansas towns. About 27 miles of pipe line is affected, besides the distribution systems. Junction City and Strong, Ark., are among the points served by the lines, approximately 1,250 customers are served by the system. Consideration was believed to have been about \$500,000.

Trans-State Gas Line Ready for Test Today. 9/19/29

Pine Bluff, Sept. 18.—The Mississippi River Fuel Corporation's \$20,000,000 gas line from Monroe, La., to St. Louis will be tested tomorrow or Friday, it was announced today.

Gas will be turned into the 22-inch line from Monroe to Stuttgart. Completion of 10-mile stretch through the rice fields is being held up pending the gathering of crops. With this exception the line is completed through Arkansas.

Map Prepared by State Geologist Gives Boundaries of the Upland Atoka Gas Producing Formation of Western Arkansas



Map shows the northern and southern limits of the Atoka, or gas producing formation of Western Arkansas was prepared at the offices of Dr. George C. Branner, state geologist. The structural axes, or anticlines underlying by the Atoka formation are shown in the area mapped as dotted lines. Below is a cross section of the state showing the relative elevations along the line "A-B", of the coastal plain section of the state, and the upland section in which the Atoka formation is to be found. Data on the structural formations in the area shown have been obtained from the state Geological Survey by approximately 25 companies or individuals interested in oil and gas production, and geologists representing many other companies have been or now are making investigations in the area. Several tests are drilling and new wells in proven territory are being sunk.

Oil Prospectors Are Attracted By Counties in Arkansas Valley

Many Companies Recently Have Sought Information Relative to Structural Formations of Area Through State Geological Department.

The increasing interest in the Arkansas river valley region beginning with Faulkner county and extending westward to the Oklahoma line and including 10 or more counties lying just north or south of the river, as gas or oil producing territory, is evidenced by the fact that 24 oil or gas companies have sought information from the office of the state geologist during the past year on structural formations in the area.

The requests have been made by geologists of the oil or gas companies, or leasing organizations, and in most cases have been followed by investigations and in several instances by tests. There now are 10 or more tests drilling, while other wells are being drilled in proven territory.

George C. Branner, state geologist, said that it has been indicated by geologists who have visited the offices of the state geological survey, that several new tests may be started during the summer or fall.

Oil More Eagerly Sought.

While what proven territory there is in the area has produced nothing but dry gas in commercial quantities, a glance at the list of companies whose representatives have investigated the structures indicates that oil and not gas is the more greatly sought in the territory. The counties in which there are prospects of oil or gas include Yell, Faulkner, Franklin, Logan, Madison, Sebastian, Johnson, Washington, White and Van Buren.

The companies and individuals who have sought information from the geological survey as to the oil and gas possibilities of the Arkansas river valley in western and northern Arkansas follow:

Indian Territory Illuminating Oil Company, Bartlesville, Okla.; Arkansas Natural Gas Company, Shreveport, La.; Red Bank Oil Company, Tulsa, Okla.; Magnolia Petroleum Company, Dallas, Tex.; Taylor Easterling Company, Tulsa; Standard Oil Company of Louisiana, Shreveport; Root Refineries Inc., El Dorado; Texas Company, Shreveport; Pure Oil Company, Tulsa; Transcontinental Oil Company, Tulsa; Marland Oil Company, Ponca City, Okla.; Shell Petroleum Company, St. Louis; Chester Oil Company, Chicago; Independent Oil and Gas Co., Tulsa; Madison Royalty Company, Fayetteville; Carver & Greene, Tulsa; J. A. S. Wright, Tulsa; D. W. Johnston, Clarksville; R. A. Maraz, Clarksville; M. W. Greeson, Prescott; Roy E. Anderson, Arkadelphia; Dr. J. S. Martin, Little Rock; H. V. Daugherty, Denver, Co.

Tests Under Way.

Tests now being drilled include: Faulkner county, Gold Creek Oil and Gas Company, Stermer No. 1, Section 34, 4 north, 12 west; Franklin county, Ozark Natural Gas Company, W. L. McElroy No. 6, Section 15-8N-27W; Logan county—Arkansas-Louisiana Pipe Line Company, Hanna No. 1, Section 26-8N-23W; Arkansas Natural Gas Company, W. H. Parks No. 1, Section 26-8N-27W; Madison county, Independent Gas and Oil Company, Banks & Teague No. 1, Section 6-16N-27W; Sebastian county, Lavaca Oil and Gas Company, Cason No. 1, Section 28-8N-30W; Washington county, C. H. Willoughby, Jones No. 1, Section 34-16N-30W; Lincoln Lease Holding Company, Lincoln Townsite No. 1, Section 30-15N-32W; White county, Letonia Syndicate, Letonia Townsite No. 1, Section 35-9N-8W; Van Buren county, State Development Company, Stubbfield No. 1, Section 30-19N-15W.

The Arkansas Natural Gas Company, which already has several producing wells in the Clarksville field in Johnson county, is drilling two new wells in this field. They are the Bynum No. 1, Section 12-10N-24W, and the McPherson No. 1, Section 10-10N-24W.

The gas produced by the Arkansas Natural Gas Company in the Clarksville field for several months has been piped to Little Rock to augment the city's supply from the Louisiana field, and to safeguard the city against shortage in the event of damage to the pipe-

line from the Louisiana territory.

Others in Field.

D. W. Johnston of Clarksville, representative from Johnson county during the last session of the legislature, who has approximately 100,000 acres under lease in the territory, was in Little Rock Friday and said that several companies or independent operators, not included in the list obtained from the state geologist's office, have had geologists in the field for some time, and in some cases have started drilling. Mr. Johnston, incidentally, was the pioneer in the Clarksville field, having drilled the first producing gas well in Johnson county.

Among the companies or individuals which Mr. Johnston said have been active are: the Foster Oil Company, Tulsa; the Empire Gas and Fuel Company, Bartlesville; the Gypsy Oil Company, Tulsa; Gulf Refining Company, Shreveport; Munn Brothers, geologists and oil operators, Tulsa; Blackwell Oil and Gas Company, Cushing, Okla.; John B. Ricketts, Tulsa; A. D. McDonnell, Tulsa; O. B. Henry, Wichita, Kan.; Replogle & Johnston, Oklahoma City; Farris & Taylor, Clarksville, Ia. Mr. Tegtmeir and associates now are getting equipment on the ground near Dardanelle and plan to start drilling a test soon, Mr. Johnston said.

A report on the Arkansas river valley territory, to be known as the "Oil and Gas Possibilities of the Arkansas Area," prepared by Carey G. Cronels, now is nearing completion and will be published soon, Dr. Branner said.

Few Deep Wells Drilled.

"The report will bring out," Dr. Branner said, "that very few deep wells have been drilled in the north portion of the Arkansas valley which have penetrated the Atoka (gas producing) formation and the information which they have supplied is meager. The fact that a few oil seeps have been found in northern Arkansas offers encouragement for prospecting the sands below the Atoka formation for oil or gas but the chances are decidedly questionable and the risk high.

"The area cannot in any sense be condemned for oil prospecting however, and drilling with an understanding of the risk involved is to be encouraged. Dry gas in varying quantities may be expected in the Arkansas valley where the structure is favorable and the sands are not impervious. The gas from producing wells of this area has all come from the Atoka formation and is entirely dry and is in no case yet reported to be associated with oil. On account of this gas production, and the fact that many of the wells drilled in the Arkansas valley in the past, which were classed as failures, yielded some gas, this particular region has received special attention, and a structural map of it showing 72 anticlines has been prepared.

"These and 59 associated synclines are discussed in detail in the report, and faulting and many other structural features are considered. The structure and stratigraphy of both the Ozark and Ouachita areas also receive considerable attention, although chances for finding either oil or gas in commercial quantities are considered to be less than average in the first named district and very poor in the second.

"The geology of the present producing areas is discussed in the report together with their production, histories and future possibilities. A number of well logs, particularly of tests made in uncertain or unproven districts, are also given. An attempt was made to sub-divide the excessively thick Atoka formation, which yields the gas in the Fort Smith and Clarksville areas, but field studies have shown it impracticable to do so.

"In the course of the work two new igneous plugs were discovered in the Arkansas valley district. These interesting geologic phenomena, and their possible effect on the gas possibilities of their vicinity, are also discussed in some detail."

Monroe-St. Louis Gas Trunk Line 20 Per Cent Complete.

Special to the Gazette. 6-29-29. Shreveport, La., June 28.—The gas trunk line now being laid by the Mississippi River Fuel Corporation from the Monroe-Richland gas fields in North Louisiana to the St. Louis industrial district is approximately 20 per cent completed.

The line to St. Louis will be the second largest gas trunk until in the United States, and will be 475 miles long. It will cost approximately \$30,000,000. More than 50 miles of this 22 inch line has been laid and back filled while 168 miles of pipe has been unloaded and is ready for the six construction crews that are laying the line.

H. L. Hunt, El Dorado, Named on Conservation Board.

H. L. Hunt of El Dorado was appointed by Governor Parnell yesterday as a member of the State Board of Conservation to succeed C. E. Harris of El Dorado, whose term had expired. Three other members of the board were reappointed as follows: T. J. Gaughan, Camden, attorney; H. H. Rachford, El Dorado, and R. A. Tillery, Smackover, oil operator. Parker C. Ewan of Clarendon, commissioner of the state Department of Conservation and Inspection, is ex-officio chairman of the board, and Chester W. Taylor of Pine Bluff, chief deputy of the department, is secretary of the board. The board was created by the legislature of 1927 to supervise and regulate oil production activities. The board is an honorary body, its members receiving no compensation except actual expenses when in session. The board meets at El Dorado or Camden monthly.

SURVEY DISCLOSES LEASING ACTIVITIES

State Geologist Believes New Fields Possible in Western Arkansas.

A survey of oil and gas leasing activities in the Arkansas river valley areas of western Arkansas, just completed by George C. Branner, state geologist, reveals that more than 1,000,000 acres in 20 counties have been leased. Mr. Branner said this is a unique situation in the history of oil and gas development in this state—to have such extensive areas under lease with comparatively little drilling in progress in the territory involved.

The state geologist said more than 2 geologists for oil and gas companies

have visited his office in the past several months to obtain information regarding the Arkansas river valley section.

Discovery of the Clarksville gas field in 1925, followed a study of the geologic structures in that area conducted by Mr. Branner, as a result of which he expressed conviction that natural gas could be found in commercial quantities in that section.

Credit Mr. Branner.

Many geologists and oil and gas operators have given Mr. Branner full credit for discovery of the Clarksville field, but he declines to accept such credit, saying it is the duty of the state Geological Department to ascertain geological facts and to make them available for the benefit of the state and its citizens.

The department has completed a detailed geological study of the Arkansas river valley area with a view of making available all possible data regarding possible oil and gas structures. This report now is in the hands of the printer and will be ready for distribution in October. The department also has completed a state geological map, which will be of great benefit to the oil and gas industries and to others interested in various kinds of mineral deposits in the state. This map is being printed and will be ready for distribution in October.

Geologist's Report.

Mr. Branner's report on leasing activities in western and northwestern Arkansas follows:

It is fairly well known that an active leasing campaign for oil and gas has been taking place in the northern portion of the Arkansas river valley during the last several months. In the history of Arkansas oil and gas development this has been an entirely new departure. Up to the present time, the campaign seems to be principally confined to leasing and so far as can be ascertained, few drilling obligations have as yet actually been entered into.

There are several factors responsible for this campaign, which apparently are as follows:

1. The discovery of the Clarksville gas field in Johnson county in 1925.
2. The construction of the Arkansas Natural Gas Corporation natural gas main from Clarksville to Little Rock and the construction of the Richland-Monroe (La.) to St. Louis line through eastern Arkansas.
3. Increased knowledge of the oil and gas possibilities particularly the gas possibilities of the Arkansas river valley.
4. The finding of small accumulations of gas in Van Buren and White counties.
5. The normal movement of the

prospecting programs of the major companies into new areas.

1,021,200 Acres Under Lease.

From our records it appears that there are approximately 1,021,200 acres in 99 blocks now under lease. Information concerning these leased blocks is incomplete and there doubtless are other blocks of which we have no information. Firms and individuals leasing these blocks of which we have record as shown on the accompanying map, are as follows:

Lincoln Lease Company, A. V. Chase, C. H. Willoughby, Fayetteville; Craver & Greene, Tulsa, Okla.; Taylor & Trumbo, Fayetteville; Patterson & Trumbo, Fayetteville; Independent Oil and Gas Company, Tulsa, Okla.; Phillips Petroleum Company, Bartlesville, Okla.; Texas Company, Shreveport, La.; Magnolia Petroleum Company, Dallas, Tex.; Red Bank Oil Company, Tulsa, Okla.; Blackwell Oil and Gas Company, Cushing, Okla.; Central States Power and Light Company; Cosden & Co., Tulsa, Okla.; Arkansas Natural Gas Corporation, Shreveport La.; Miller & Hays, Tulsa, Okla.; Roy A. Anderson, Shreveport, La.; Dr. J. S. Martin et al., Little Rock; Chester Oil Company, Chicago, Ill.; Letonia Syndicate, Root Refining Company, El Dorado; Tegtmeier & Luckett, Dubuque, Ia.; M. W. Greeson, Prescott; R. A. Maraz, Mulberry; J. O. Tillery, Muskogee, Okla.; Mr. Shatterly, Quinn Glover Jr., Little Rock; W. F. Bridwell, Little Rock; D. W. Johnston, Clarksville.

Leases by Counties.

An estimate based on the accompanying map of acreage leased in the

north Arkansas area by counties follows:

Independence county, 42,500 acres; Cleburne, 154,800; White, 74,000; Van Buren, 177,900; Stone, 4,400; Searcy, 37,700; Faulkner, 52,000; Pulaski, 15,000; Conway, 54,000; Johnson, 108,000; Franklin, 35,300; Yell, 21,400; Logan, 16,300; Pope, 75,900; Sebastian, 4,400; Crawford, 38,000; Washington, 40,000; Benton, 10,000; Newton, 16,000; Madison, 43,000. Total, 1,021,200 acres.

Drilling Activities.

Records indicate that at present the following wells are drilling or are being prepared to drill in the northern portion of the Arkansas river valley:

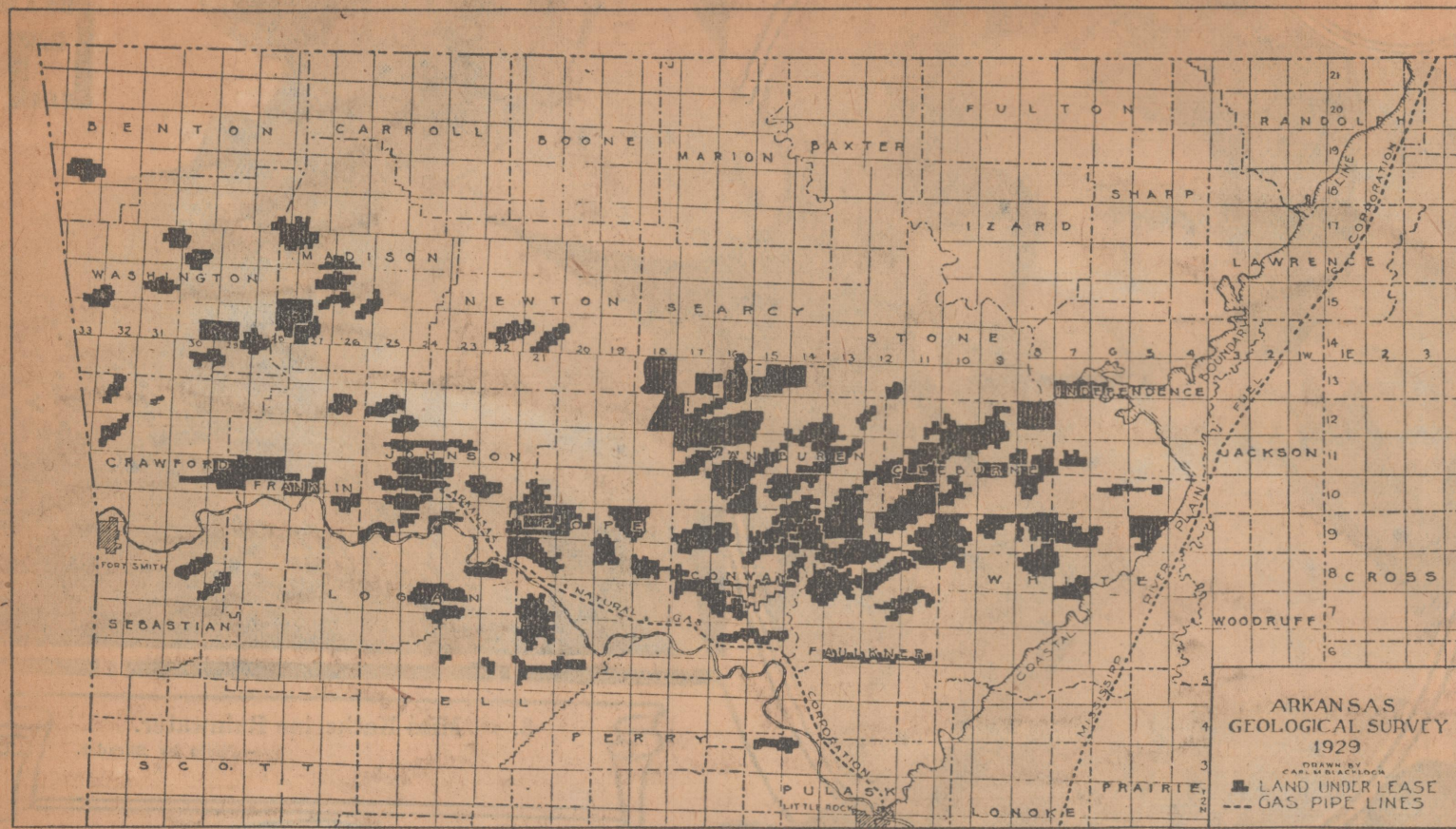
Franklin County—Ozark Natural Gas Corporation, McElroy No. 1, section 15-8N-27W.

Johnson County—Arkansas Natural Gas Corporation, Bynum No. 2, se sw sec. 12-10N-24W. Blackwell Oil and Gas Company, Wyver No. 1, sw se sec. 21-9N-25W. Depth 5,200 feet.

Logan County—Arkansas-Louisiana Pine Line Company, Hanna No. 1, nw ne sec. 26-7N-23W. Depth, 3,163 feet.

Madison County—Phillips Petroleum Company, Skinner No. 1, nw cor. se sec. 11-14N-28W.

Location of Lease Blocks in Northern Portion of the Arkansas River Valley Region, and Natural Gas Pipe Lines Shown on Map Prepared by State Geologist



Map showing location of lease blocks in the northern portion of the Arkansas River Valley region of western Arkansas together with natural gas pipe lines. Leased blocks compiled by the Arkansas Geological Survey are taken from many sources and are incomplete. Mississippi River Fuel Corporation pipe line now under construction.

Williams Field.
The Williams field was discovered in December, 1918, and makes up the southern portion of the Kibler-Williams area in southern Crawford county. The gas production is from the Atoka formation. The Williams field covers an area of about 7,600 acres and the two producing horizons are directly related to those of the Kibler field but are about 200 feet deeper. The shallow sand is encountered at approximately from 1315 to 1700 feet and the deep sand from 2,150 to 2,600 feet and have thicknesses of approximately 200 and 135 feet respectively. The initial rock pressure of the gas in this field when it was first discovered was 220 pounds in the shallow and 265 pounds in the lower sand. The estimated daily average production of this field for 1928 was about 5,500,000 cubic feet from forty wells. Gas from this field is also used in the Van Buren and Fort Smith domestic and industrial mains.

The Alma field was discovered in October, 1922, and is located about two miles north of the Kibler-Williams

area in southern Crawford county near Alma. The productive area covers about 1,500 acres and there are two producing sands. The shallow one is encountered from 1,400 to 1,936 feet and the deep sand from 2,400 to 2,800 feet. The initial rock pressure of the gas in this field was 330 pounds from the shallow sand and 420 pounds from the deep. The original open flow of the largest well in this area was 30,000,000 cubic feet per day. The estimated daily average production of this field for 1928 is 3,000,000 feet from sixteen wells. Gas is used in the domestic and industrial mains which supply Van Buren and Fort Smith.

The other small fields which are near to and closely related to the Alma, Kibler-Williams productive areas are the Shibley field, located about midway between Alma and Van Buren in T. 9 N., R. 31 W., and the East Williams or Section 10 field located in Sec. 10, T. 8 N., R. 31 W. These fields are producing about 500,000 cubic feet per day each at the present time from nine wells.

Two other areas which have not yet been fully opened are the Paris and Lavaca areas located respectively in the central portion of T. 8 N., R. 27 W., and in the southwest portion of T. 8 N., R. 30 W. Both of these fields are south of the Arkansas river and production is obtained from the Atoka formation. There are two wells in the Paris area and one in the Lavaca.

The most important development in the gas situation in western Arkansas in recent years has been the opening up of a new producing area near Clarksville, Johnson county. This field is at present confined to Sections 14, 15 and 16, all in T. 10 N., R. 24 W., a

few miles northwest of Clarksville. The discovery of this field extends major production about 43 miles east of the Alma field. Gas was first encountered in this area by the completion of the Empire Gas & Fuel Co. Russell No. 1, in the northeast corner of Sec. 14, T. 10 N., R. 24 W. This well was completed March 18, 1926. An open flow of 11,500,000 cubic feet of gas was encountered at a depth of 2,889 feet. The rock pressure was estimated at 1,000 pounds.

There are now nine wells in this area with an estimated open flow of 86,600,000 cubic feet of gas per day. Depth of the producing sands vary from 1,068 feet to 3,452 feet and rock pressure from 335 to 1,225 pounds. All the production is from the Atoka formation. The Arkansas Natural Gas Corporation has recently completed a ten-inch line which connects this field with Little Rock.

Compressors are used in the Massard Prairie, Kibler, Williams and Alma fields in the distribution of gas from these fields while gas from the Mansfield and Clarksville fields is distributed under their natural pressure.

The South Arkansas Area.
Natural gas production in South Arkansas has been incidental to the production of petroleum and at present is not a relatively important commercial factor. Considering the volume of gas tapped by wells in southern Arkansas, a very small volume has actually reached the commercial consumer. This is due largely to the fact that many of the gas wells made small quantities of oil which were recovered at the expense of larger volumes of gas which were wasted. Several large wells in the Smackover area ran un-

checked for weeks, and dissipated immense volumes of gas.

The first producing gas well in southern Arkansas was the Constantin Refining Co. Hill No. 1, located in Section 1, T. 18 S., R. 16 West. It was completed April 20, 1920, with a production of ten barrels of oil and 3,000,000 cubic feet of gas from the Nacatoch sand.

The Smackover field was discovered by the completion of the Oil Operators Murphy No. 1, located in Sec. 8, T. 16 S., R. 15 W., which was completed in May, 1922, with a yield of 30,000,000 cubic feet of gas from the Nacatoch sand. The main gas producing area of the Smackover field centered in the Norphlet area. The maximum life of the gas wells in this area before making oil was about eighteen months. The average life of the gas wells was probably not more than five months. The Smackover field has produced no gas during the past year.

Pope County—Arkansas-Louisiana Pipe Line Company, McFadden & Brooks No. 1, 660n, 660w, cen. sec. 15-9n-21w.
Sebastian County—Lavaca Oil and Gas Company, Sabra C. Cason No. 3, cen. sw se sec. 21-8n-30w.
Van Buren County—Dr. J. S. Martin, Scanlan No. 1, se nw sec. 5-9n-13w. Depth, 50 feet.
Washington County—Lincoln Lease

Holding Company, Lincoln Townsite No. 1, sw sw sec. 30-15n-32w. Depth 1,040 feet, show of shallow gas. C. H. Willoughby, Jones No. 1, sec. 34-16n-30w. Depth, 1,342 feet, show of gas at 400-500-900 feet. Shatterly well, 2 miles north of Fayetteville, depth 600 feet.

White County—Letona Syndicate, Letona No. 1, se cor. nw nw sec. 35-9n-8w. Depth, 3,460 feet, half to one and a half million feet gas at 2,950 feet.
Benton County—Well three miles northeast of Siloam Springs.

The history of the development of natural gas producing areas in western Arkansas and the more detailed knowledge of the geology of that area which is now available leads one to believe so far as the geology is concerned there is apparently nothing unique in the producing areas already discovered and that there are distinctly encouraging possibilities for finding new natural gas producing areas in the northern portion of the Arkansas river valley. It would not be surprising if several natural gas fields of major size and importance were discovered in this area.

Fields Now Producing.
The fields with their discovery dates up to the present time are:

- Mansfield field, 1902.
- Massard-Prairie field, 1904.
- Kibler field, 1915.
- Williams field, 1918.
- Alma field, 1918.
- Clarksville field, 1925.

Many of the companies taking acreage in north Arkansas have hopes of discovering oil, and although drilling for oil in the north portion of the Arkansas river valley area is a rather highly speculative venture, there exist certain possibilities which it is believed should not be ignored. This has to do particularly with those beds which lie beneath the base of the Atoka formation of Pennsylvanian age which covers the major portion of the surface of the valley area and the Ordovician dolomites which probably underlie all the northern gas belt. On the other hand, all the natural gas produced in northern Arkansas has been found in the Atoka formation and this obviously offers the greatest opportunity for successful prospecting for natural gas in commercial quantities. Up to the present time prospecting in beds lower than the Atoka for natural gas has not proved commercially successful, although small wells have been drilled.

\$20,000,000 LINE NEAR COMPLETION

Arkansas Section of Monroe-St. Louis Gas Project Virtually Finished.

Special to the Gazette.
Pine Bluff, Sept. 11.—With the exception of a 10-mile stretch through the rice belt, all the Arkansas section of the Monroe-St. Louis gas line has been completed, it was announced today at the headquarters of the Williams Bros. Construction Company here by G. E. Matt. The line will be completed in 10 days, Mr. Matt said.

The line is being constructed by the Mississippi River Fuel Corporation at a cost of \$20,000,000. The Williams Bros. Construction Company was awarded the contract to build 271 miles from Perry, La., to Newport. This work cost approximately \$10,000,000.

Work on the line in the vicinity of Pine Bluff will be completed Friday, when the sixth and final line across the Arkansas river near the Cotton Belt railroad bridge at Rob Roy is tied into the line.

Construction of the \$1,000,000 booster station at Glendale, near Star City, in Lincoln county, is practically completed, Mr. Matt said, and construction of the homes for the employees who will live near the station also has been completed.

Completion of the line will not mean immediate removal of headquarters of the Williams Bros. company from Pine Bluff, Mr. Matt said. For three months crews and machinery will be kept here to make any repairs necessary. Part of the machinery is being shipped to Alabama, where the Williams Bros. company is building a line from Monroe, La., to Birmingham.

Monroe-St. Louis Natural Gas Line 85 Per Cent Complete.

Special to the Gazette.
Poplar Bluff, Mo., Sept. 22.—The natural gas pipe line between Monroe, La., and St. Louis, is 85 per cent completed, according to local officials of the Missouri Natural Gas company. Natural gas has been turned into a line for test purposes from Louisiana to Biggers, Ark., and will be extended through the line to Fredericktown, Mo., within the next two weeks.

Belief that the line will be in use by November 1 has been expressed by local gas company officials.
F. P. Johnston, local manager of the Missouri Natural Gas company, predicted today that natural gas will be flowing through the distribution system in Poplar Bluff by December 1. This system is being rushed and a tap line is to be extended from the mains here to the large pipe line three miles west of Poplar Bluff, beginning next week.

Several weeks ago the City Council granted an extension of time to the Missouri company here, on its franchise which called for distribution of gas by February 15. This extension, the company officials said, was merely to protect them against contingencies

that might arise, and they now are of the opinion it was unnecessary.
A deposit of \$5,000 has been placed in hands of the city council assuring the distribution of gas in Poplar Bluff within a six months period after February 1, as assurance of the good will of the Missouri concern.

GAS CORPORATION EXPANDING RAPIDLY

Network of Pipe Lines Being Laid Into New Areas of 10-4-29 Arkansas.

The Arkansas Natural Gas Corporation is expanding rapidly in Arkansas. Already a new network of pipe lines is being laid into three new areas of the state.

The company is completing a line to Fordyce. Natural gas should be ready for consumption there by October 15, officials declared Thursday.

Another line is en route to Stuttgart. A third was authorized this week to be built from the company's system at Okay, Ark., to Mineral Springs and Nashville, thus tapping one of the richest mineralogical areas in the South.

A dozen other Arkansas cities probably will be added to the lines within the next year, it was announced.

TWO PROVINCES ARE FOUND IN ARKANSAS

Both Western and Southwestern Sections Give Up Much Fuel.

By George C. Branner.
(Arkansas State Geologist.)

There are two natural gas producing provinces in Arkansas, (1) the area in the western end of the Arkansas Valley, east and south of Fort Smith, including parts of Scott, Sebastian, Crawford, Franklin and Johnson counties, and (2) the area in southwestern Arkansas which includes, Union, Ouachita, Columbia and Nevada counties. The gas produced in these two provinces originates in two entirely different series of rocks. The western Arkansas fields obtain gas from the Atoka shales and sandstones of Pennsylvanian age, while the south Arkansas fields are supplied from the upper and lower Cretaceous beds of the Gulf coastal series of beds. The discovery of commercial gas in the Arkansas valley area dates from the discovery of the Mansfield field in 1920. The south Arkansas production was discovered with the completion of the Constantin well in Union county on April 22, 1920.

Arkansas Valley Area.
The producing gas fields of the Arkansas valley area are known as the Massard Prairie, Mansfield, Kibler, Williams, East Williams or Section 10, Alma, Shibley, Lavaca, Paris, and Clarksville fields. All of these fields derive their production from the Atoka formation which underlies the productive coal measure beds and makes up the surface of the eastern portion of the Arkansas river valley of the state. The estimated daily average production of these fields for 1928 (excepting Clarksville) is 12,600,000 feet.

The Massard Prairie field lies about six miles southeast of Fort Smith in Sebastian county on a well-defined anticline. The field was discovered on November 5, 1904, and has been producing ever since. The field has an area of about 3,800 acres. There are two producing horizons in this area, one encountered between 1,190, and 1,402 feet which varies in thickness from 40 to 260 feet, and the second encountered between 2,100 and 2,260 feet which varies in thickness from approximately 75 to 100 feet. When this field was originally discovered, the rock pressure on the shut in wells was approximately 220 pounds in the lower sand. The estimated production of

this field for 1928 is about 1,250,000 cubic feet per day from fifty wells.

The Mansfield field lies partly in Scott and partly in Sebastian counties. The field was discovered in 1902 and covers an area of approximately 2,500 acres. Drilling in this area probably starts about 3,000 feet below what was once the top of the Atoka shale and as the wells penetrate to over 2,000 feet, the indications are that at least the first 5,000 feet of Atoka shale are good for commercial gas production. Four producing sands have been encountered. The initial rock pressure was 315 pounds (1,200 foot sand). The open flow in the largest wells in this field was about 4,000,000 cubic feet per day and the gas drawn from the field during 1928 averaged about 1,000,000 cubic feet per day; 350,000 cubic feet of this is used for domestic purposes in Huntington and Mansfield and the remainder is used for brick burning in Mansfield.

The Kibler field which makes up the northern portion of the Kibler-Williams area is located in southern Crawford county on the productive coal measure beds and derives its production from the underlying Atoka formation. The field was discovered in November 1918, and covers an area of about 5,600 acres. There are two producing sands in this area which are encountered between approximately 1,115 and 1,500 feet and 1,950 and 2,400 feet respectively. The original rock pressure was approximately 220 pounds in the shallow sand and 260 pounds in the deep sand. The open flow of the largest well from the shallow sand was about 3,000,000 cubic feet per day and from the deep sand, about 21,000,000 cubic feet per day. The estimated daily average production of this field for 1928 is 1,500,000 cubic feet from eighteen wells. The gas is used in Van Buren and Fort Smith for domestic and industrial purposes.

next page

PIPELINE SYSTEM OF ARKANSAS NATURAL GAS CORP.

A Subsidiary of
CITIES SERVICE CO.

CITIES & TOWNS SERVED BY RETAIL
 CITIES & TOWNS SERVED BY WHOLESALE
 COMPRESSOR STATIONS
 GASOLINE EXTRACTION PLANTS
 LINES UNDER CONSTRUCTION



Above is the latest map of the Arkansas Natural Gas Corporation's pipe lines, gasolants and compressor stations. It shows the 20 inch pipe line from Monroe and Richland, the second largest gas field in the world, to the company's main system near Shreveport. It also pictures the beginning of a new line into East Texas to serve eight cities. It gives view of the projected line to Nashville, Ark., through Mineral Springs. It shows new Muncie Compressor Station, the largest in the world, near Monroe, and the Barton Compressor Station El Dorado. The map demonstrates the inter-connected system from four major fields, thus assuring uninterrupted supply of gas for all purposes at all times.

Development of Natural Gas in Arkansas

By GEORGE C. BRANNER*

THERE are two natural gas producing provinces in Arkansas, (1) the area in the western end of the Arkansas Valley, east and south of Fort Smith, including parts of Scott, Sebastian, Crawford Franklin and Johnson Counties, and (2) the area in southwestern Arkansas which includes Union, Ouachita, Columbia and Nevada Counties. The gas produced in these two provinces originates in two entirely different series of rocks. The western Arkansas fields obtain gas from the Atoka shales and sandstones of Pennsylvanian age, while the south Arkansas fields are supplied from the Upper and Lower Cretaceous beds of the Gulf Coastal series of beds. The discovery of commercial gas in the Arkansas Valley area dates from the discovery of the Mansfield field in 1902. The south Arkansas production was discovered with the completion of the Constantin well in Union County on April 22, 1920.

The Arkansas Valley Area

The producing gas fields of the Arkansas Valley area are known as the Mazzard Prairie, Mansfield, Kibler, Williams, East Williams or Section 10, Alma, Shibley, Lavaca, Paris and Clarksville fields. All of these fields derive their production from the Atoka formation which underlies the productive coal measure beds and makes up the surface of the eastern portion of the Arkansas River Valley of the State. The estimated daily average production of these fields for 1928 (excepting Clarksville) is 12,600,000 feet.

The Mazzard Prairie field lies about six miles southeast of Fort Smith in Sebastian County on a well-defined anticline. The field was discovered on November 5, 1904, and has been producing ever since. The field has an area of about 3,800 acres. There are two producing horizons in this area, one encountered between 1,190 and 1,402 feet which varies in thickness from 40 to 260 feet, and

respectively in the central portion of T. 8 N., R. 27 W., and in the southwest portion of T. 8 N., R. 30 W. Both of these fields are south of the Arkansas River and production is obtained from the Atoka formation. There are two wells in the Paris area and one in the Lavaca.

The most important development in the gas situation in Western Arkansas in recent years has been the opening up of a new producing area near Clarksville, Johnson County. This field is at present confined to Sections 14, 15 and 16, all in T. 10 N., R. 24 W., a few miles northwest of Clarksville. The discovery of this field extends major production about 43 miles east of the Alma field. Gas was first encountered in this area by the completion of the Empire Gas & Fuel Co. Russell No. 1 in the northeast corner of Section 14, T. 10 N., R. 24 W. This well was completed March 18, 1926. An open flow of 11,500,000 cubic feet of gas was encountered at a depth of 2,889 feet. The rock pressure was estimated at 1,000 pounds.

There are now eight wells in this area with an estimated open flow of 71,600,000 cubic feet of gas per day. Depths vary from 1,068 feet to 3,361 feet and rock pressure from 3,351 to 1,225 pounds. All the production is from the Atoka formation. The Arkansas Natural Gas Corporation has recently completed a ten-inch

portance but the development has not progressed far enough to permit an estimation of its future value.

The recent discovery of a 50,000,000 cubic feet gasser in the Gulf Refining Co.'s No. 2, Gaddy, Section 30 T. 17 S., R. 14 W., may prove to be important.

There are no accurate figures available to show the volume of gas consumed in drilling operations or marketed to the pipe line companies of Southern Arkansas. The following, however, is a yearly production estimate based on the difference between the average Western Arkansas production figures for 1918, 1919 and 1920 (6,836,000 M. cubic feet) and the total state production figures as given by the U. S. Bureau of Mines for 1923, 1924, 1925, 1926 and 1927:

	M. Cubic Feet
1923	17,578,000
1924	29,979,000
1925	35,241,000
1926	36,929,000
1927	23,814,000

*State Geologist.

Natural Gas Production In Arkansas According to U. S. Geological Survey and U. S. Bureau of Mines

Year	Quantity M cu. ft	Value	Av. Unit Price
1917	5,609,484	\$ 315,612.00	\$0.06
1918	5,294,663	575,115.00	.11
1919	5,587,000	947,000.00	.17
1920	9,027,000	1,906,900.00	.21
1921	4,260,000	984,000.00	.23
1922	9,700,000	1,798,000.00	.19
1923	24,215,000	3,255,000.00	.13
1924	36,616,000	4,908,000.00	.13
1925	53,049,834	2,004,165.00	.04
1926	43,566,000	5,817,000.00	.05
1927	30,450,000	4,281,000.00	.00

The natural gas lines in the state total about 550 miles and may be grouped as follows:

1. Lines connecting the Mazzard Prairie, Kibler, Williams, Alma, Section 10 and Shibley area with Fort Smith and Van Buren and vicinity. (Twin City Pipe Line Co.)

2. Lines connecting the Mansfield field with Mansfield and Huntington and vicinity. (Mansfield Gas Co.)

3. The Arkansas Natural Gas Corporation State system including the line from Clarksville to Little Rock and the Southern Arkansas lines extending north from Caddo Parish, Louisiana, to Little Rock with branches to Magnolia, Hot Springs, Pine Bluff and a cross connection from Emmett, Nevada County southeast to the El Dorado East field and also lines from El Dorado to Richland Parish, Louisiana, and a line from El Dorado to Camden.

4. The Industrial Gas Co., line from Camden through El Dorado to the Monroe Field.

5. The Southwestern Gas & Electric Co., line from Caddo Parish to Texarkana.

6. The Memphis Natural Gas Co., line from north Louisiana field to Memphis which cuts across the southeast part of Chicot County for about 31 miles.

Natural Gas Gasoline

The natural gas gasoline industry has been of great importance to Southern Arkansas. The wet gas recovered during the pumping of petroleum from wells has given

an estimated average recovery from the El Dorado south field from seven to eight gallons per thousand; from the Smackover field from 1 1/2 to 10 gallons per thousand; Lisbon field, from 4 to 5 gallons per thousand. Production figures of natural gas gasoline during the past six years is given by the Bureau of Mines, Dept. of Commerce, Washington, D. C., as follows:

Year	Quantity Gallons	Value
1922	4,288,955	\$ 629,491.00
1923	16,183,000	1,916,000.00
1924	17,533,000	1,784,000.00
1925	19,686,000	2,420,000.00
1926	30,385,000	2,867,000.00
1927	36,300,000	2,281,000.00

Certificate Filed.—Certificate of incorporation for the White River Royalty Company, with offices in the Donaghey building, was filed yesterday with County Clerk W. S. Rogers. Corporators are: J. S. Cosden, J. J. Purcell and Ike A. Wynn, all of Fort Worth, Tex.; J. J. Munn and Herbert Hedick, both of Little Rock. Capital stock of 100 shares with par value of \$100 each is authorized and subscribed.

Daily average production last week by districts in Arkansas follows: El Dorado, 1,576 barrels, up 21 barrels; Calion, light, 1,966 barrels, up 22 barrels; Calion, heavy, 2,090 barrels, up 10 barrels; Smackover, light, 2,437 barrels, down three barrels; Smackover, heavy, 17,317 barrels, down five barrels; Lisbon, 284 barrels, down six barrels; Nevada county, 820 barrels, down 105 barrels; Stephens, 574 barrels, down 13 barrels; Miller county, 591 barrels, down four barrels; and Camden, 25 barrels, up five barrels.

Are Situated In South and West Sections

Supply Originates in Two Entirely Different Rock Series.

Fields Are Large

Development Expected to Greatly Increase Production.

Answering a request by the Little Rock Gas & Fuel Company, George C. Branner, state geologist, has prepared an exhaustive study of natural gas resources in Arkansas. He calls attention to the fact that the newest gas field in the state—at Clarksville, Johnson county—was discovered by the Empire Gas & Fuel Company of Bartlesville, Okla., which is a subsidiary of the Cities Service Company and a sister company to the Arkansas Natural Gas Corporation.

Mr. Branner's story follows: "There are two natural gas producing provinces in Arkansas, (1) the area in the western end of the Arkansas valley, east and south of Fort Smith, including parts of Scott, Sebastian, Crawford, Franklin and Johnson counties, and (2) the area in southwestern Arkansas which includes Union, Ouachita, Columbia and Nevada counties. The gas produced in these two provinces originates in two entirely different series of rocks. The western Arkansas fields obtain gas from the Atoka shales and sandstones of Pennsylvanian age, while the south Arkansas fields are supplied from the upper and lower Cretaceous beds of the Gulf coastal series of beds. The discovery of commercial gas in the Arkansas valley area dates from the discovery of the Mansfield field in 1920. The south Arkansas production was discovered with the completion of the Constantin well in Union county on April 22, 1920.

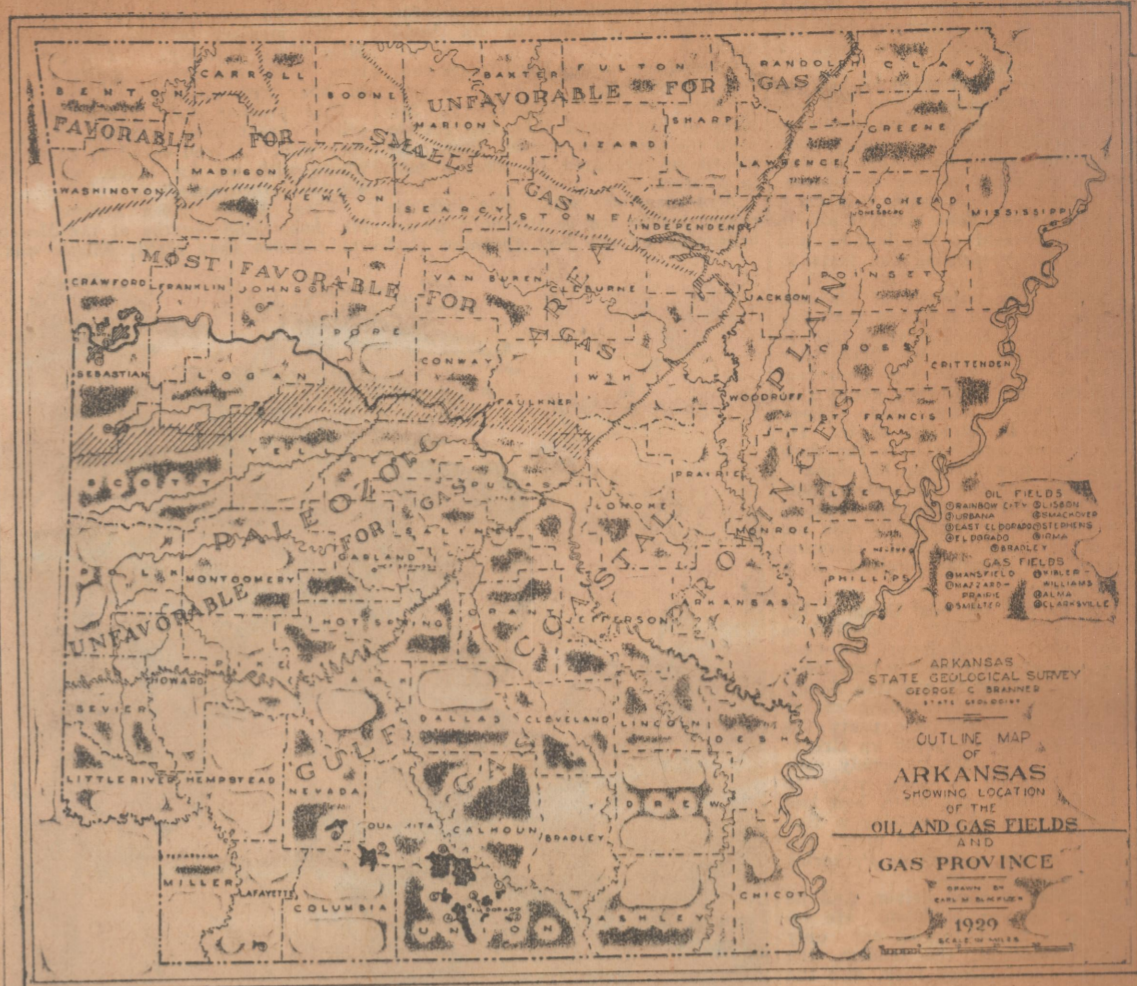
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"The Mansfield field lies partly in Scott and partly in Sebastian counties. The field was discovered in 1902 and covers an area of approximately 2,500 acres. Drilling in this area probably starts about 3,000 feet below what was once the top of the Atoka shale and as the wells penetrate to over 2,000 feet, the indications are that at least the first 5,000 feet of Atoka shale are good for commercial gas production. Four producing sands have been encountered. The initial rock pressure was 315 pounds (1,200 foot sand). The open flow in the largest wells in this field was about 4,000,000 cubic feet per day and the gas drawn from the field during 1928 averaged about 1,000,000 cubic feet per day; 350,000 cubic feet of this is used for domestic purposes in Huntington and Mansfield and the remainder is used for brick burning in Mansfield.

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Map Showing State's Two Gas Provinces



The map above shows the latest developments of the Arkansas Natural Gas Corporation and its subsidiaries. It gives in graphic form an outline of the company's pipe lines, gasoline plants and compressor stations.

It shows the company's 20-inch pipe line from Monroe and Richland,

the second largest gas field in the world, to the main system near Shreveport.

It pictures the beginning of a new line into east Texas to serve eight additional cities, and the proposed line to Mineral Springs and Nashville, Ark., to serve that rich terri-

tory. Included in the map are the Munce and Barton compressor stations. The former is the largest in the world and is situated near Monroe, La.

The map shows the interconnected system from four major fields, thus assuring an uninterrupted supply of gas for all purposes at all times.

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"Compressors are used in the Mazzard Prairie, Kibler, Williams and Alma fields in the distribution of gas from these fields while gas from the Mansfield and Clarksville fields is distributed under their natural pressure.

The South Arkansas Area. "Natural gas production in South Arkansas has been incidental to the production of petroleum and at present is not a relatively important commercial factor. Considering the volume of gas tapped by wells in southern Arkansas, a very small volume has actually reached the commercial consumer. This is due largely to the fact that many of the gas wells made small quantities of oil which were recovered at the expense of largest volumes of gas which were wasted. Several large wells in the Smackover area ran unchecked for weeks, and dissipated immense volumes of gas.

"The first producing gas well in southern Arkansas was the Constantin Refining Co. Hill No. 1, located in Section 1, T. 18 S., R. 16 West. It was completed April 20, 1920, with a production of 10 barrels of oil and 3,000,000 cubic feet of gas from the Nacatoch sand.

"The Smackover field was discovered by the completion of the Oil Operators Murphy No. 1, located in Section 8, T. 16 S., R. 15 W., which was completed in May, 1922, with a yield of 30,000,000 cubic feet of gas from the Nacatoch sand. The main gas producing area of the Smackover field centered in the Norphlet area. The maximum life of the gas wells in this area before making oil was about 18 months. The average life of the gas wells was probably not more than five months. The Smackover field has produced no gas during the past year.

"The South and East El Dorado fields, the Lisbon, Smackover and Champagnolle areas have all supplied the commercial mains from time to time. The Stephens and Irma fields have produced for local consumption only.

"The gas now being developed in the lower part of the Upper Cretaceous in the Rainbow City field promises to be of some importance but the development has not progressed far enough to

permit an estimation of its future value.

"The recent discovery of a 50,000,000 cubic foot gasser in the Gulf Refining Company's No. 2 Gaddy, section 30, township 17 south, range 14 west, may prove to be important.

"There are no accurate figures available to show the volume of gas consumed in drilling operations or marketed to the pipe line companies of southern Arkansas. The following, however, is a yearly production estimate based on the difference between the average western Arkansas production figures for 1918, 1919 and 1920 (6,836,000 M. cubic feet) and the total state production figures as given by the United States Bureau of Mines for 1923, 1924, 1925, 1926 and 1927:

Year	Quantity M. Cu. Ft.
1923	17,578,000
1924	29,979,000
1925	35,241,000
1926	36,929,000
1927	23,814,000

"Natural gas production in Arkansas, according to United States Geological Survey and United States Bureau of Mines:

Year	Quantity	Value	Av. Unit Price
1917	5,609,484	\$ 315,612.00	\$0.06
1918	5,294,663	575,115.00	.11
1919	5,587,000	947,000.00	.17
1920	9,027,000	1,906,900.00	.21
1921	4,260,000	984,000.00	.23
1922	9,700,000	1,798,000.00	.19
1923	24,215,000	3,255,000.00	.13
1924	36,616,000	4,908,000.00	.13
1925	53,049,834	2,004,165.00	.04
1926	43,566,000	5,817,000.00	.05
1927	30,450,000	4,281,000.00	.05

"The answer to the question of what reserve of natural gas exists in Arkansas is necessarily speculative, however, from the history of the western and southern fields, certain general conclusions may be drawn.

"(1) The area in which possible gas fields may be found in the north and central portions of the Arkansas river valley province underlain by the Atoka (gas producing) beds is large. The more favorable portion of the area covered by this formation includes at least 5,000 square miles. It is probable that new fields will be discovered in this area from time to time and the gas produced from such fields will probably exceed the amount already taken from the now known producing fields of this area.

"(2) The gas resources of coastal Arkansas are very much of an unknown quantity. New drilling will probably bring about the discovery of new oil producing areas and gas quantity may be expected to accompany much of the oil. This applies particularly to the south-central and southwestern portions of the coastal plain. It is possible that gas will be discovered without oil being associated with it in the southeastern portion of the coastal plain."

Engineers Visualize "Super" Natural Gas System.

164
Gazette 12-15-36
New York, Dec. 4.—(AP)—A "super" natural gas system, interconnecting all the natural gas lines in America, was seen as a possibility of the future in a paper presented to the American Society of Mechanical Engineers today.

Such a system is not more of an "idle dream" than were present-day natural gas lines five years ago, George I. Rhodes and Edgar G. Hill told the engineers.

Some chemist may even discover a means of liquefying the gas cheaply, running it through the pipe lines in that form and turning it back into gas at the market thus saving half the cost of transportation.

A 24-inch natural gas line 1,000 miles long is under construction from Texas to Chicago. It will have a capacity of more than 200,000,000 cubic feet a day. This represents the strides made in pipe-line construction since 1925, when a 100-mile line was considered long.

Longer pipe lines of greater capacity have been made possible chiefly by improvements in the pipe.

INCORPORATION MATTERS.

A Texarkana oil company, with \$300 capital stock, filed articles of incorporation in the secretary of state's office yesterday under the name of Standard of Arkansas, Inc. Incorporators were listed as K. E. Jennings, Charles C. Wine and M. M. Roberts, all of Texarkana. The articles of incorporation provide that the company may issue 200 shares of stock without par value.

The Tidewater Associated Oil Company, a Delaware corporation, filed notice of merger of the Tide Water Oil Company and the Associated Oil Company with the first named company.

Permits Issued.

Five drilling permits were issued this week by the state Conservation Commission, while two permits were issued to plug and abandon tests. Log of one well was also filed.

All of the drilling permits were issued to the Benedum & Trees Oil Company of Pittsburgh, Pa., for tests in Nevada county. Four of the tests are to be drilled on the Groves land and one on the Fincher lease.

The Groves permits are as follows: Groves Land and Timber Company No. 6, located 330 feet north and 330 feet west of the southeast corner of the southeast quarter of the northwest quarter of section 10-14-20; the Groves Land and Timber Company No. 7, located 330 feet south and 330 feet east of the northwest corner of the southwest quarter of the northwest quarter of section 10-14-20; the Groves Land and Timber Company No. 8, located 330 feet north and 330 feet east of the southwest corner of the southwest quarter of the northwest quarter of section 10-14-20; the Groves Land and Timber Company No. 9, located 330 feet south and 330 feet west of the northeast corner of the northeast quarter of the southwest quarter of section 10-14-20. The other drilling permit to Benedum & Trees was for the C. C. Fincher No. 2 test, located 330 feet north and 330 feet east of the southwest corner of the southwest quarter of the northeast quarter of section 10-14-20. All of the permits are in Nevada county.

Benedum & Trees filed log of the Groves Land and Timber Company No. 3 located in the center of the southwest quarter of the southeast quarter of the northwest quarter of section 10-14-20 in Nevada county.

Pesses & Fisher obtained permit to plug and abandon the Hardin No. 2, located in the southeast quarter of the northeast quarter of section 28-15-16 in Ouachita county.

The Gulf Refining Company obtained permit to plug and abandon the J. G. Pratt A-3, located 510 feet west and 200 feet south of the northeast corner of section 7-18-15 in Union county.

INCORPORATION MATTERS.

The following incorporation papers were filed in the secretary of state's office yesterday:

Plum Bayou Co-operative Association, formed by Stanley W. Rhodes and 19 others, to operate a co-operative association at the Plum Bayou Resettlement Administration project in Jefferson county. The association was authorized to issue 500 shares with a par value of \$1 each.

Gratitude Plan, Inc., 216 East Markham street, Little Rock, articles of incorporation to operate an advertising and sales promotion business; capital stock, 30 shares with a par value of \$10 each; Eugene T. Oliver, A. C. Gannaway and Lynn Wassell, incorporators.

Independent Oil Company, Pine Bluff, articles of incorporation; capital stock, \$25,000; Clinton K. Elliott, Lucy S. Elliott and Robert W. Etter, incorporators.

Hausman Steel Company, Toledó, O., notice of withdrawal from the state.

INCORPORATION MATTERS.

Van Buren Residue Company of Fort Smith, capitalized at \$5,000, filed articles of incorporation in the secretary of state's office yesterday. Raymond F. Orr, Ander K. Orr and R. O. Scurlock were listed as incorporators.

The Arrow Corporation, an oil concern with headquarters at Camden, filed articles of incorporation, listing capital stock at \$100,000 and incorporators as Ivan Wright, Little Rock; Maude Crumley, Camden, and Ernest L. Chamiee, Waterloo. Gazette 3-5-37

Peggy's Shops, Inc., Little Rock, filed articles of incorporation with 2,000 shares of no par value stock, and Peggy H. Gaunt, Homan E. Gaunt and Charles E. Gaunt as incorporators.

The Concrete Engineering Company of Nebraska filed notice that John W. Newman has been designated as agent

INCORPORATION MATTERS.

The Red River Stone Company, Inc., of Little Rock filed articles of incorporation in the secretary of state's office yesterday. The company will begin operations with \$1,000 capital, with A. W. Warren and R. E. Wilson of North Little Rock and A. C. Butler of Little Rock as incorporators.

The Southwestern Chemical Company of Jonesboro, capitalized at \$10,000, filed articles of incorporation, listing incorporators as Wylie T. Nash, Jesslyn Nash and Roy Penix, all of Jonesboro. Gazette 3-10-37

The Van Briggie-Donaldson Company of Helena and the Burnett-Ingham Lumber Company of Waldron filed notice of dissolution.

INCORPORATION MATTERS.

The following incorporation papers were filed in the secretary of state's office yesterday. Gaz. 3-11-37

Independent Gravel Company, Joplin, Mo., notice of entry into Arkansas; Ritchie Eaton, Sulphur Springs, agent for service. The company will use \$10,000 of its capital in operation of its business in Arkansas.

Midland Tie and Timber Company, Kansas City, Mo., notice of entry into Arkansas; Audrey Stewart, Little Rock, agent for service. The company will use \$30,000 worth of property in operation of business in this state.

Cook Paint and Varnish Company, North Kansas City, Mo., notice of entry into Arkansas; R. H. Lloyd of Fort Smith, designated as agent for service.

Fisher and Saylor, Inc., Oil Trough, notice of dissolution.

Five Drilling Permits In Arkansas Issued

El Dorado—Activity in the oil fields of Arkansas was given an additional spurt last week when five permits for new tests were issued by the state board of conservation.

The new wells are in four different counties with two of the permits for tests in the new Nevada county field. The log of the Blanche Levy No. 1 of the Lion Oil Refining Company, in section 21-15-15, Snow Hill area, was filed with the board C. E. Harris, chief conservation agent, announced.

Permits were issued for the following wells:

Davidson and Todd, Texarkana, Smith No. 1, southeast of section 1-11-25, Hempstead county.

Nivla Oil Corporation, Texarkana, M. and P. Bank No. 1, 150 feet north and west of section 18-15-26, Miller county.

Walter Lown, Smackover, Grayson No. 1, section 12-14-20, Nevada county.

Powell Briscoe, Oklahoma City, Ritchie No. 1, southeast quarter of section 10-14-20, Nevada county.

Carl B. King Drilling Company, Dallas, Texas, E. H. Wolcott No. 1, section 36-19-26, Lafayette county.

ARTICLES OF INCORPORATION.

Articles of incorporation were filed in the secretary of state's office yesterday by the Del Ray Drilling Company, Inc., of El Dorado. The filing showed Carl Jackson of Hope as resident agent, \$300 as capital with which the company will begin business, and R. L. Hobby, W. S. Miller and R. M. McCoy, all of Tyler, Tex., as incorporators.

ARTICLES OF INCORPORATION.

The West Memphis Construction Company of Tennessee filed notice of entrance in Arkansas in the secretary of state's office yesterday. E. J. White of West Memphis was named resident agent and the filing showed \$9,518.50 as value of property owned in Arkansas.

The Layton Oil Company of New York filed notice of entrance in the state, listing William Monroe Layton of Texarkana as resident agent and showing \$20,000 in outstanding capital stock represented by property owned in Arkansas.

Says Wildcat Wells Stop Short of Deep Oil Sands

United States Geological Survey's Report on South-Central Arkansas Fields Also Assert Area Is Not 1922 Condemned by Past Failures.

Of the many wells that have been drilled in south-central Arkansas for oil several apparently stopped short of the sand that yields the oil at El Dorado in Union county, and the greater number did not reach the sand that yields oil in the Haynesville field, in Claiborne parish, La., is the opinion of the United States Geological Survey, Department of the Interior. Furthermore, practically all drilling has been done with rotary tools, a method which not only yields inaccurate records of the formations penetrated, but which also frequently prevents the recognition and testing of oil sands that may be drilled through.

Several sands in northern Louisiana, below the Nacatoch have produced much more oil than the Nacatoch, and in some of the fields the Nacatoch is practically barren, in spite of the immense volume of oil in the underlying sands. The deepest formation in this region that now seems worth testing is estimated to lie 4,000 or 5,000 feet below the surface and may be below profitable drilling depth. This formation is the Trinity, which in Pike and Sevier counties, Ark., contains asphalt deposits that represent the meager remains of what were once rather large bodies of oil.

Although the character of the formations in southern Arkansas may require the use of the rotary drill, operators should realize its shortcomings and employ methods that will insure, so far as possible, detection of showings of oil and gas. Cores should be cut from all beds penetrated that yield showings and particularly from a sand near the base of the Midway formation and from sands in the Nacatoch, Marlbrook, Brownstown, Blossom, Eagle Ford, Woodbine and Trinity formations, whether or not oil showings are observed in the sludge.

The ages, relative positions and thicknesses of the formations encountered in drilling in south-central Arkansas must be determined if the search for oil is to be carried out effectively and economically. These determinations are difficult because of the similarity of the beds of the several formations, and can be made precise only with the aid of fossils. The approximate boundaries of the larger units, however, may be determined from the character of the beds as shown by well records. The following descriptions of formations encountered by drillers in Union county, Ark., are the result of a detailed study of many well records by W. W. Rubey of the United States Geological Survey, Department of the Interior. Inaccuracies in the well records may have caused like inaccuracies in the interpretation of the stratigraphy.

Probably all the rocks that cover the surface of Union county belong to the Claiborne group of the Eocene series of the Tertiary system, which in this general region is divided into two formations, the Yegua above, and the St. Maurice below.

Yegua (?) Formation.
Recent determinations of fossil plants by E. W. Berry indicate that the Yegua (?) formation is probably present in Union county, and that it comprises the surface beds over most of the county. The beds that are probably to be assigned to the Yegua ("Cockfield") formation are recorded in well records as alternating layers of sand and gumbo, some shale and calcareous material ("boulders" and "rocks"), and a little lignite. They may be distinguished from the underlying beds by their dominant sandiness. These beds probably attain a maximum of slightly more than 450 feet in the southeastern part of the county.

St. Maurice Formation.
The strata in this area which are here identified as the St. Maurice formation are commonly recorded in drillers' logs as layers of shale and gumbo with many "boulders" and "rocks" and some sandy material. The St. Maurice is much freer from sand than the formations above and below it. It probably ranges in thickness from 90 feet in the northwest corner of the county to about 200 feet in the southeastern part.

Wilcox Formation.
The Wilcox formation is generally shown in logs as thick alternating layers of sand, sandy gumbo, and shale, with some zones marked by "rocks" and "boulders," though subordinate amounts of gravel and lignite are occasionally noted. This formation can be recognized by an upper sandy group and a lower shaly group which contains less sand. Its thickness averages about 600 feet throughout Union county, but increases slightly toward the east.

Formations similar in composition to the Wilcox have yielded small quantities of oil in Louisiana and Texas, and the expectation that some oil may be obtained from this formation in restricted areas is not unreasonable. A careful watch should therefore be kept for indications of oil or gas while wells are penetrating these beds.

Midway Formation.
The beds referred to the Midway formation are recorded by the drillers as "boulders," "rocks," and layers of sand, gumbo, and shale, with more or less chalk, limestone and gypsum. Recent microscopic studies of cuttings from wells in the El Dorado field by James Gilluly of the U. S. Geological Survey have shown these beds to include some lignite. This occurrence of carbonaceous material in the Midway, although by no means widespread, is nevertheless not unusual. This formation is characterized throughout by its relative hardness.

The greatest known thickness of the Midway at its outcrop is about 260 feet, but this measurement was taken near the shore line of the embayment in which the formation was deposited. The character of the strata penetrated indicates that the formation probably attains a maximum thickness of slightly more than 500 feet in Union county.

Many wells drilled in south-central Arkansas have obtained showings of oil or gas or flows of water in a sandy bed near the base of this formation. At only a few wells, however, have tests been made to ascertain the true value of these showings. Especially in the El Dorado field has this bed remained untested.

Arkadelphia Clay.
The Arkadelphia clay of the Upper Cretaceous or Gulf series is in general easily recognized by its thickness and its freedom from sand. The strata recorded are mainly shale and gumbo, which are generally accompanied by many layers of "boulders," "rocks," in chalk, limestone, and gypsum, and in a few wells layers of sand shale. A very noticeable group of chalky or calcareous beds makes up the lower 175 or 200 feet of the Arkadelphia. The thickness of this formation averages

about 550 feet in the western part of Union county and increases eastward, possibly to as much as 600 feet near the eastern boundary.

Nacatoch Sand.
The drillers' logs record the Nacatoch sand as beds of hard sand, shale and limestone with many layers of "rocks," "boulders" and "pyrite" and some sandy and chalky material. The upper part is commonly hard and sandy; the lower varies from slightly calcareous shale to hard limestone, although it usually includes thin, sandy layers. The thickness ranges from 150 to 200 feet.

The Nacatoch has been identified by its fossils as the producing sand at El Dorado. The oil there is obtained from three or four discontinuous layers of sandstone in the upper 50 feet of the formation.

Marlbrook Marl.
The Marlbrook marl is recorded as shale, chalk, "boulders," limestone, and lesser amounts of gumbo, "rocks," and "pyrite," and some sandy shale. This formation consists typically of shale and varying amounts of calcareous material. It ranges in thickness from about 300 to nearly 350 feet.

A group of sandy shales between 400 and 500 feet below the top of the Nacatoch usually yields water wherever it is penetrated. The beds at this horizon may contain oil or gas where the structure is favorable.

Annona Tongue of the Austin Chalk (?).
Fossils obtained from one of the wells indicate the Marlbrook age of strata at least 250 feet below the base of the Nacatoch sand, and as no marked change in the character of the sediments down to the Brownstown marl is recorded, the Annona tongue of Austin chalk may be absent here. However, as this tongue, in its area of outcrop, varies from typical chalks to calcareous clays, it is probably present in Union county, but because of this lithologic variation it may not be easily distinguished from the overlying Marlbrook marl. The boundary between the Marlbrook marl and the Annona tongue of the Austin is provisionally drawn at the upper surface of a persistent limy or chalky series. As this identified the Annona tongue in Union county consists of strata recorded in logs as limy shale, gypsum and gumbo, with some "rocks," sandy shale, or chalk; its thickness ranges from 60 to 100 feet.

Brownstown Marl.
The strata referred to as the Brownstown marl are dominantly calcareous sandy shales. They are usually called sandy shale, hard shale, "rock," sand, and gumbo in drillers' logs. Subordinate amounts of limestone, "boulders," "pyrite," gypsum and chalk are frequently noted. The thickness of the Brownstown ranges from about 200 to nearly 300 feet, and apparently increases westward.

The formation is unique among those penetrated in that its thickness seems to decrease eastward across Union county. This fact is doubtless associated with a marked increase in sandiness of the Brownstown from its outcrop in Hempstead county southeastward through Union county. Any conclusions

drawn from these changes would be based on evidence furnished by records of rotary-drilled wells, but the presence of these sandy layers may well justify a thorough test of this formation.

Blossom (?) Sand.
A group of beds below the brownstone marl, consisting of about 65 feet of sandstone, shale and some calcareous layers, is probably to be correlated with the upper part of the Bingen formation of southwestern Arkansas and is therefore tentatively referred to as Blossom sand. The Bingen formation is considered by L. W. Stephenson "as the probable nearshore equivalent of the Blossom sand, the Eagle Ford clay, and part of the Woodbine sand, but these formations are probably represented in part by unconformities within the Bingen and at its base. Indeed, it is possible that the Woodbine sand is entirely represented by the unconformity at the base of the Bingen." Sandy layers in the upper part of the Blossom (?) sand commonly carry water and are thought to correspond to the oil sand or sands in the Haynesville field, in Louisiana, although the formations there have not been positively identified. The Blossom (?) sand lies from 800 to 850 feet below the top of the Nacatoch sand over most of Union county and probably about 810 to 830 feet in the productive part of the El Dorado field.

Eagle Ford (?) Clay.
The several hundred feet of calcareous or limy shales below the Blossom (?) sand that have been penetrated in Union county probably belong to the Eagle Ford (?) clay of Upper Cretaceous age. In the logs of some wells in and near Union county a few red layers are recorded from these shales (see the accompanying cross section), and in parts of the Bingen formation of southwestern Arkansas that are presumably to be correlated with the true Eagle Ford clay much reddish material has been noted, both at the outcrop and in wells.

The principal oil sands of the Caddo and De Soto-Red river districts, in Louisiana (which are commonly but erroneously called the Woodbine sand), are probably of Eagle Ford age. The horizon of these oil-bearing strata in Louisiana is estimated to lie 500 feet more or less below the top of the Blossom (?) sand in Union county, Ark., and from about 1,300 to 1,400 feet below the upper surface of the Nacatoch. So far as known, this horizon has not been reached in Union county.

Geologic Structure in the Region.
The accompanying cross section, from the vicinity of Centerpoint, Howard county, Ark., in the Caddo Gap quadrangle, to a point about 10 miles east of El Dorado, Union county, shows the general structural conditions in south-central Arkansas. The diminishing slope and the general increase of thickness of the formations as to the center of the embayment is approached is readily apparent.

The elevation of the surface as shown is based on a partial revision of a map previously published by the survey, and is included in this diagram to show the relation of outcrops to formations below the surface and the depth of the oil and gas-bearing sands. Topographic details near the wells are necessarily obscured because of the exaggerated width of the graphic logs. The records of the Nashville, Hope and Bodcar wells with correlations and the outcrops of the formations were taken from published reports.

The strata recorded in a number of the available logs of wells drilled in and near Union county were also correlated and the results are given in the descriptions of the formations. Maps showing the structure of the Nacatoch and other formations in south-central Arkansas have been prepared by Veatch. A general structural contour map of Union county has not been made, as a sufficient number of well logs for that purpose has not been obtained, but the position relative to sea level of the upper surface of the Nacatoch sand and other interesting features of the wells studied are given in the tabulation.

LOG OF DEEP WELL IN UNION COUNTY

(From U. S. Geological Survey.)
Detailed information regarding the nature of the beds penetrated may be obtained from the following record of one of the deepest wells in Union county:

Driller's record of Hammond well No. 1 of Cooper & Henderson Oil Company, in sec ¼ sw ¼ Sec. 19, Twp. 17 south, Range 15 west.

(Elevation above sea level about 204 feet. Geologic correlations by U. S. Geological Survey. All formation boundaries are fixed tentatively except that between the Arkadelphia and Nacatoch.)

Material.	Thickness.	Depth.
Eocene series:		
Claiborne group:		
Yegua (?) formation:		
Surface sand	30	30
Sand	20	50
Gumbo	11	61
Packed sand	8	69
Rock	3	72
Packed sand	40	110
Hard sand	45	155
Rock	2	157
Hard sand	20	177
Gumbo, set 12½-in. casing	4	181
Sand and boulders	6	187
Packed sand	8	193
Packed sand and boulders	20	213
Gumbo	25	238
Rock and sand	2	240
Packed sand	10	250
Sandrock	5	255
Sand, boulders and	8	263
gumbo	106	369

Sand and boulders	18	376
Rock	2	378
Packed sand	9	387
Rock	3	390
Gumbo	10	400
Sand and gumbo	20	420
Gumbo	22	442
Wilcox formation:		
Boulders	20	462
Boulders	42	504
Sand and boulders	14	518
Packed sand	13	531
Boulders	30	572
Sand and boulders	107	679
Sand and boulders	23	702
Gumbo	6	708
Sand and boulders	43	751
Gumbo	28	777
Gumbo	23	805
Gumbo and boulders	42	853
Rock	4	857
Gumbo	7	864
Gumbo	41	905
Rock and boulders	8	913
Gumbo and boulders	30	943
Gumbo	5	948
Gumbo and boulders	42	990
Packed sand	10	1000
Broken sandrock	6	1006
Gumbo	20	1026
Sand	18	1044
Sandrock	19	1063
Midway formation:		
Hard sand	6	1069
Gumbo	6	1075
Gummy shale	20	1095
Sand and boulders	27	1122
Gumbo	15	1137
Sand and sandrock	7	1144
Broken formation	13	1157
Broken formation	13	1170
Sandy gumbo	15	1185
Gumbo	71	1256
Shale	12	1268
Sand and boulders	11	1279
Gumbo	20	1299
Gumbo	14	1313
Rock	1	1314
Rock	2	1316
Gumbo	14	1330
Lignite	5	1335
Gumbo	14	1349
Gumbo	20	1369
Rock	3	1372
Sand	12	1384
Sand and boulders	8	1392
Gypsum	31	1423
Gumbo	8	1431
Gumbo	88	1519
Gumbo	25	1544
Rock	3	1547
Rock	3	1550
Upper Cretaceous or Gulf series:		
Arkadelphia clay:		
Gumbo	10	1560
Gumbo	23	1583
Hard shale	5	1588
Gumbo	8	1596
Gumbo	12	1608
Gumbo	20	1628
Shale	5	1633
Gumbo	9	1642
Gummy shale	4	1646
Gummy shale	60	1706
Gumbo	52	1758
Shale and gumbo	65	1823
Shale and boulders	10	1833
Shale	23	1856
Gummy shale	18	1874
Shale and gumbo	30	1904
Gumbo	27	1931
Gypsum	10	1941
Hard shale	20	1961
Gumbo and shale	27	1988
Gumbo and shale	44	2032
Hard shale and gumbo	25	2057
set 8¼-inch casing	5	2062
Gumbo	32	2094
Gumbo and shale	14	2108
Shale and gumbo	13	2121
Nacatoch sand:		
Hard lime and shale	6	2127
Gumbo	29	2156
Broken rock	3	2159
Sand	6	2165
Broken rock	2	2167
Sand	2	2169
Sand	6	2175
Rock	4	2179
Sand	2	2181
Sand	4	2185
Shale and boulders	14	2199
Gumbo	5	2204
Gummy shale	24	2228
Shale and gumbo	48	2276
Gummy shale	28	2304
Shale and lime	14	2318
Marlbrook marl:		
Shale and boulders	45	2363
Gummy shale	41	2404
Shale and boulders	14	2418
Hard shale	95	2513
Hard shale	15	2528
Saltwater sand	8	2536
Rock	2	2538
Sandrock	2	2540
Sandrock	5	2545
Sandy shale	2	2547
Gummy shale	2	2549
Rock	2	2551
Gummy shale	7	2558
Shale	4	2562
Sandy shale	4	2566
Hard shale	13	2579
Rock	2	2581
Gumbo	12	2593
Gumbo	15	2608
Gumbo	10	2618
Hard shale	20	2638
Hard shale	5	2643
Annona tongue of Austin chalk (?):		
Broken sandrock	4	2647
Broken sandrock	4	2651
Hard shale	13	2664
Gumbo	3	2667
Gumbo	9	2676
Hard sand	3	2679
Rock	4	2683
Gumbo	4	2687
Lime and shale	6	2693
Rock	25	2718
Rock	2	2720
Lime and shale	25	2745
Brownstown marl:		
Gumbo	7	2752
Rock	6	2758
Gumbo	1	2759
Gumbo	14	2773
Hard sandy shale	10	2783
Gumbo	5	2788
Sand, showing salt water	4	2792
Gumbo	12	2804
Hard gummy shale	22	2826
Rock	8	2834
Rock	3	2837
Rock	5	2842
Hard sandy shale	28	2870
Gumbo	5	2875
Hard shale	8	2883
Hard shale	9	2892
Rock	1	2893
Rock	3	2896
Shale	8	2904
Shale and gumbo	8	2912
Hard sandy shale	4	2916
Sandy shale	14	2930
Hard shale	15	2945
Blossom (?) sand:		
Sand	2	2947
Sand	14	2961
Rock	3	2964
Sand	2	2966
Sandrock	2	2968
Gumbo	20	2988
Sandy shale	8	2996
Shale and boulders	1	2997
Rock	1	2998
Sand	6	3004
Sand and gravel	7	3011

Continued on next page.

ARKANSAS SIXTH AS AN OIL STATE

Makes 50 Per Cent Increase During July Over Previous Month.

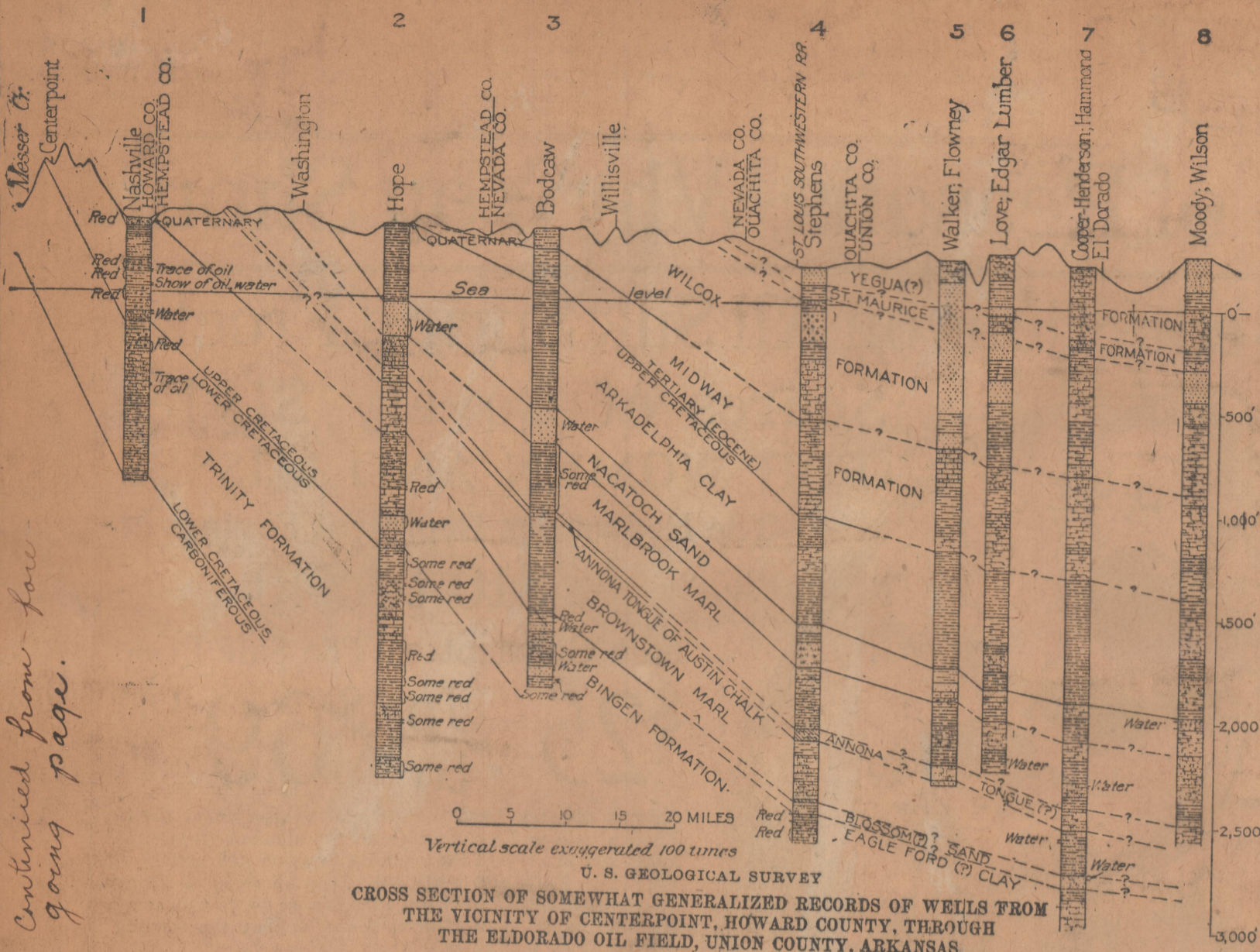
(From the Gazette's Correspondent.)
Washington, D. C., Aug. 25.—With an increase of more than 50 per cent over June, Arkansas jumped into sixth place as an oil producing state, according to figures for July made public today by the United States Geological Survey.

During July 1,400,000 barrels of petroleum were produced in the state, as against 880,000 the previous month. The production for July was a daily average of 45,162 barrels.

During the month Arkansas climbed up the ladder past Wyoming, after having left a dozen other states far in the rear during her five months as an oil producing state.

Louisiana, the next victim, finished the month with a production of 2,075,000 barrels, which showed a decline of approximately 200,000 barrels over the month of June.

Cross Section of Wells From Howard Through to Union County



Continued from far going page.

U. S. GEOLOGICAL SURVEY
 CROSS SECTION OF SOMEWHAT GENERALIZED RECORDS OF WELLS FROM THE VICINITY OF CENTERPOINT, HOWARD COUNTY, THROUGH THE ELDORADO OIL FIELD, UNION COUNTY, ARKANSAS

No change in oil prices was announced. According to figures announced by the Institute imports of petroleum (crude and refined oils) at the principal United States ports for the month of April totaled 11,313,045 barrels, a daily average of 377,102 barrels, compared with 12,976,450 barrels, a daily average of 418,595 barrels for the month of March. Imports for the week ended May 6 totaled 3,278,500 barrels, a daily average of 546,357 barrels, compared with 2,380,483 barrels, a daily average of 340,069 barrels for the week ended April 29.

REPORT OIL FIELD MAY BE EXTENDED

May 22, 1922 - Geologic Survey Shows Possibility of Increased Production at El Dorado.

UNIQUE STRUCTURE FOUND
 May 16, 1922
 Is Declared to Be Unlike That of Any Other Producing District of Similar Size.

A report just issued by the U. S. Geological Survey indicates that El Dorado oil field probably will be extended. A history of the discovery and development of the field is given, and the statement is made that the El Dorado oil field is not on an anticline. The report, which was made from field studies by W. W. Rubey, L. G. Mosburg and H. W. Hoots, follows: "The El Dorado oil field, in Arkansas, was discovered by the Constantine Refining Co. when its Armstrong No. 1 well, in section 1, T. 18 S., R. 16 W., struck an immense flow of gas, estimated at 40,000,000 cubic feet a day, and a small quantity of oil. The oil men of the mid-continent region paid comparatively little attention to this discovery for several months, although a few companies, acting on the advice of geologists, leased some land near the gas well, but when a well drilled by Mitchell & Busey in section 31, T. 17 S., R. 15 W., came in, on January 10, 1921, with a flow of about 1,500 barrels of oil a day, and perhaps ten times that much water, there was a stampede for the field. Leasing and drilling were pushed with an intensity so tremendous that in spite of several months' delay in getting an adequate pipe-line outlet for the oil produced the field was developed with remarkable rapidity. The oil sand is only about 2,150 feet below the surface, and the rocks above it are mostly beds of shale and clay that are easily penetrated by the rotary drill. Wells that gave a large output were the rule rather than the exception, several yielding more than 10,000 barrels a day, although most of these wells produced much salt water with the oil. The output reached about 82,000 barrels a day during the week ending August 20, 1921, but declined rapidly to about 32,000 barrels a day during the week ending March 11, 1922. Since then the output has increased slightly.

Geology of the Field.
 Field studies of the geologic structure were made in the summer of 1921 by W. W. Rubey, L. G. Mosburg, and W. H. Hoots, of the United States Geological Survey, Department of the Interior, and office studies were afterward made by K. C. Heald and W. W. Rubey. The primary purpose of these studies was to learn the conditions under which oil is most likely to occur in southern Arkansas. The investigation was afterward extended to ascertain the relations of the oil to the water in the strata for the information of the engineers of the Bureau of Mines, who were working in co-operation with the State.

Each oil-yielding district has its own peculiarities, and the rules that may guide prospecting in one area may not apply to another. The great number of test wells that have been drilled in southern Arkansas without finding oil in large quantity except in the El Dorado field show either that the oil pools in this region do not bear the same relations to anticlinal structure that they commonly bear elsewhere in the mid-continent oil fields or that the geologists have not learned how to locate the anticlines in this field by studying the surface formations. If the geologist is without definite rules to guide him in discovering oil pools, his usefulness is much less than it otherwise would be, and the operator must hunt for new pools blindly, so that his chances of success will be reduced and the average outlay for each new pool he may find will be greatly increased.

Structure of the Field.
 The geologic structure of the El Dorado field is unlike that of any other known field of similar size. The studies made covered only the northern part of the producing area, but there is no reason to think that the structure of the southern part is materially different. If the sand, clay and gumbo could be stripped off the producing bed in the area covered by the map no large dome

Elevations of Nacatoch sand and intervals between Nacatoch sand and Blossom (?) sand at some wells drilled in south-central Arkansas.

(1) Reported total depth of well in feet. (2) Depth to top of Nacatoch sand in feet. (3) Elevation of well in feet. (4) Depth of top of Nacatoch sand below sea level in feet. (5) Interval between top of Nacatoch sand and top of Blossom (?) sand, feet.

Company and lease.	Well No.	Section.	T. S. R. W. County	(1)	(2)	(3)	(4)	(5)
Carlton & Owens, McDough lease	1	sw ¼ sw ¼ 16	17 33	Union	2,136	a2,250	b232	a2,088
Penn-Wyoming Oil Co., Union Sawmill Co. lease	1	ne ¼ sw ¼ 21	18 13	Union	3,083	c2,386	b209	c2,177
E. M. Brown, Goodwin lease	1	nw ¼ sw ¼ 16	16 14	Union	2,634	2,150	b213	1,947
Wilson Oil Co., Moody lease	1	ne ¼ sw ¼ 16	16 14	Union	2,815	2,220	b252	1,968
South Arkansas Oil and Gas Co., McCurry lease	1	nw ¼ sw ¼ 19	17 14	Union	2,190	2,165	b210	1,955
E. M. Brown, Grace lease	1	sw ¼ ne ¼ 3	18 14	Union	2,160	a2,250	b253	a1,997
Quaker City Petroleum Co., Mittendorf lease	1	sw ¼ sw ¼ 15	17 15	Union	3,010	2,141	b192	1,949
Cooper & Henderson, Hammond lease	1	se ¼ sw ¼ 19	17 15	Union	3,200	2,111	b204	1,907
Carter & Morgan Syndicate, McKinney lease	1	se ¼ nw ¼ 4	18 15	Union	2,881	2,115	b206	1,908
Mountz et al., Tillman lease	1	nw ¼ ne ¼ 9	18 15	Union	2,580	2,140	b232	1,908
Congress Oil Co., Swilley lease	1	se ¼ ne ¼ 8	19 15	Union	2,522	c2,120	b227	c1,893
White Oil Corp., Murphy Land or Edgar Lumber Company lease	1	nw ¼ sw ¼ 22	18 18	Union	3,025	2,045	b159	1,886
Milo Drilling Co., Robins or Trimble lease	1	ne ¼ ne ¼ 1	19 18	Union	2,586	2,094	b182	1,812
Nebraska Oil Co., Gallagher lease	1	ne ¼ se ¼ 3	17 17	Union	2,110	1,938	b178	1,760
Walker Drilling Co., Flourney lease	1	se ¼ ne ¼ 5	17 17	Union	2,538	1,980	b229	d1,760
Love Petroleum Co., Darden or Edgar Lumber Company lease	1	se ¼ nw ¼ 23	17 17	Union	2,505	2,112	b256	1,856
Forest Oil Co., Mayfield lease	1	ne ¼ ne ¼ 21	18 17	Union	2,914	c2,098	e300	ce1,798
Hinton & Mattocks, Murphy lease	1	sw ¼ ne ¼ 29	19 17	Union	3,008	2,110	b234	1,876
Carter Oil Co., at Hadnett, Ark.	1	ne ¼ ne ¼ 23	14 18	Ouachita	3,240	c1,700	e300	ce1,500
Trinity Petroleum Co., Realty Colonial lease	1	nw ¼ nw ¼ 21	18 18	Union	2,800	1,967	c275	c1,692
Louisiana Oil Refining Co., Allen lease	B1	nw ¼ se ¼ 13	15 19	Ouachita	2,777	1,720	b170	1,550

(a) Nacatoch sand not reached. Depth to top estimated.
 (b) Well elevations obtained from the oil companies; fairly reliable and, except for isolated wells far from railroads, are probably correct within 20 feet. Elevations near El Dorado are based on the bench mark at the El Dorado courthouse, the true elevation of which is about 3 1-2 feet above that used for it.
 (c) The upper surface of the Nacatoch sand could not be recognized definitely from the driller's log.
 (d) Two well elevations are given in this section. Uncertainty exists as to which is the proper one.
 (e) Well elevations determined by estimation and from map in U. S. Geol. Survey Bulletin 429 (Pl. 12). May be as much as 100 feet in error.
 (f) Blossom (?) sand could not be recognized from the driller's log.
 (g) The upper surface of neither the Nacatoch nor Blossom (?) sand could be recognized definitely from the driller's log.

LESS OIL IS PRODUCED

Daily Output Shrinks During the Week Ended April 22, 1922

New York, April 27.—The daily average gross crude oil production of the United States decreased 14,100 barrels for the week ended April 22, totaling 1,396,750 barrels, as compared with 1,410,850 barrels for the preceding week, according to the weekly summary of the American Petroleum Institute. Oklahoma and Kansas showed a daily average gross production of 445,700 barrels, an increase of 1,500 barrels. North Texas came in for a decrease of 50 barrels, central Texas a decrease of 3,850 barrels; north Louisiana, a decrease of 8,600 barrels, and Arkansas an increase of 300 barrels. In Oklahoma, production of the Osage Nation was shown at 94,500 barrels, against 94,600 barrels, and the output of the Lyons-Quinn pool was 43,650 barrels against 48,100 barrels. The Mexia pool, central Texas, reported 91,000 barrels against 95,000 barrels; Haynesville, north Louisiana, 43,350 barrels against 52,100, and El Dorado, Ark., 38,250 barrels against 37,950. In the Gulf coast field, West Columbia was reported at 35,500 barrels, against 35,400 barrels, and Orange county 20,000 barrels against 21,000 barrels. Figures collected by the institute indicate the imports of petroleum (crude and refined oils) at the principal United States ports for the week ended April 22 were 2,887,850 barrels, with a daily average of 412,550 barrels, compared with 2,689,000 barrels, a daily average of 384,143 barrels for the week ended April 15.

ARKANSAS SEVENTH IN OIL PRODUCTION

February Output Was 36,786 Barrels Daily, U. S. Report Shows, 1922

(From the Gazette's Correspondent.) Washington, D. C., March 24.—Domestic production of petroleum attained a new high record during February, according to the monthly report of the United States Geological Survey. The daily average of 1,470,107 barrels was an increase of 78,462 barrels over the previous high record of January. Arkansas still ranks seventh among the states in oil production, being outranked by Texas, Oklahoma, California, Louisiana, Kansas and Wyoming in the order named. Arkansas' production during February increased from a daily average of 35,484 barrels in January to 36,786, although the total production for the month, 1,030,000, because of its being three days shorter, was less than the January production, which was 1,100,000. February production figures for the three leading oil producing states are: Texas, 10,774,000 barrels, a daily average of 384,785; Oklahoma 10,072,000, a daily average of 359,714, and California, 9,077,000, a daily average of 324,179. Only once before in the past two

years has the daily rate of production exceeded the daily rate of consumption, the survey announced. The report continues:

"Although the daily rate of consumption and of imports increased slightly, stocks of crude oil (not including consumer's stocks) increased about 12,000,000 barrels. On the last day of February, total net pipeline and tank farm stocks of petroleum east of California, gross pipeline and tank farm and producers' stocks in California and stocks of Mexican petroleum held in the United States by importers amounted to 208,000,000 barrels, equivalent to 143 days' supply at the present rate of consumption. Although this is the largest amount of petroleum ever held in storage in the United States, it is of interest to note that the 163,000,000 barrels of petroleum held in storage in 1915 at the time of the crushing over production was sufficient to meet consumption requirements for 218 days."

RATES ON OIL FROM OKLAHOMA TOO HIGH

I. C. C. Orders Reduction of Tariff on Refined Petroleum Products. 4-22-22
 (From the Gazette's Correspondent.) Washington, D. C., April 21.—Rates from Oklahoma points to Arkansas on tank car shipments of refined petroleum oils were held to be unreasonable and maximum reasonable rates were prescribed and reparation awarded Oklahoma complainant refiners in an important decision rendered by the Interstate Commerce Commission today. The decision embraced in one report the complaints of several refiners, including the Roxana Petroleum Company of Oklahoma, the National Refining, the Producers and Refiners' Corporation and the Kanotex Refining. The Santa Fe, the Rock Island, the Missouri Pacific, the Fort Smith and Western, and the Frisco were defendants in one or more of the complaints. The complainants alleged that the rates charged on various tank carloads of refined petroleum oils, including gasoline, shipped from Cushing, Pemeta, Oilton and Blackwell, Okla., to Little Rock were unreasonable, unjustly discriminatory, and unduly prejudicial, that there were overcharges on some shipments and violations of the long and short haul provision. On five carloads shipped by the Roxana from Cushing to Little Rock, the commission held that the rate of 39 cents a hundred pounds was unreasonable, in that it exceeded 19 cents, and fixed the rate for the future at 23.5 cents, awarding reparation in the amount of the difference. The commission directed the carriers to prescribe for the future rates on such shipments from Cushing, Pemeta and Oilton to Little Rock not exceeding 23.5 cents, and from Blackwell not exceeding 27.5 cents a hundred pounds, plus the general increase authorized in 1920.

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LATEST OIL NEWS SLUMP IN OIL OUTPUT

Production Drops for the Week Ending May 6, 1922
 New York, May 11.—The daily average gross crude oil production of the United States decreased 4,250 barrels, totaling 1,407,450 barrels for the week ending May 6, compared with 1,411,700 barrels for the preceding week, according to the weekly summary of the American Petroleum Institute. Oklahoma-Kansas had a daily average gross production of 455,450 barrels, a decrease of 900 barrels; north Texas showed a decrease of 1,900 barrels, central Texas an increase of 500 barrels, north Louisiana a decrease of 500 barrels and Arkansas an increase of 100 barrels. In Oklahoma the production of the Osage Nation was 100,000 barrels against 96,100 barrels, and the output of the Lyons-Quinn pool was 42,800 barrels against 48,050 barrels. The Mexia pool, central Texas, was reported at 91,000 barrels against 89,200 barrels, and El Dorado, Ark., 36,360 barrels against 35,950. In the Gulf Coast field, West Columbia produced 32,000 barrels against 33,800 barrels and Orange county 19,000 barrels against 18,500 barrels.

There is a lot of oil in the prosperity cake Arkansas is eating at present. The petroleum industry of the state makes a big amount of money available for general business purposes. It also, through severance and other taxation, is a heavy contributor to the public treasury. The maintenance of our oil production depends very largely, if not wholly, on the continued activity of the so-called wildcaters. These men are oil prospectors. They gamble against the biggest kind of odds for less than the traditional grubstake. They stake themselves. And before the flush flow has begun to lessen in a new field their drills are grinding down in unexplored territory.

Sinking a wildcat well is a costly venture. Naturally, before men undertake such labor and expense in unproven areas they seek all available information on their chances of striking oil or gas there. Geology furnishes the most useful information of this sort. The State Geological Department should be the repository of it. But the state has never made an oil and gas survey of its coastal plains region, and the meager reports of the national government are out of print and unavailable.

That the state which, in less than six years since the bringing in of its discovery well, has shot up to fourth place in the Union in volume of oil production neglects to make this vitally important survey is not the fault of the state geologist. Mr. Branner has pointed out repeatedly the need for an immediate survey, which would cost only \$23,000. This amount is negligible by comparison with the benefit that may be expected. One well might produce oil to that value in the course of a few days. One new field might easily return to the state more than that sum in severance taxes in a few weeks or months. The next legislature should lose no time in making adequate appropriation for a comprehensive oil and gas survey of the Arkansas coastal plains.

70.5 PER CENT OF OIL IN U. S.

Figures For 1924 Place Production In America at 713,940,000 Bbls. and Elsewhere 298,987,000

By James McIntyre.

The average American oil man thinks of foreign fields in a hazy way. He knows where they are and has read much about them, but the details are likely to escape him. If I asked whether Mexico or Texas produced the most oil last year he might have to consult the record.

As a matter of fact the comparative production of the foreign fields with that of American States is interesting. It brings out clearly the tremendous production of this country, but it also might cause a man to think how little the great work outside of the United States has been explored for oil and what immeasurable quantities of petroleum may be buried in Asia, Europe, Africa, South and Central America and the islands of the sea.

The Bureau of Mines recently issued its annual report on the gross production of crude petroleum in the United States for the year 1924 and with it the gross production of every oil producing country in the world for the same period. Using the Government's figures it is seen that the United States produced 713,940,000 bbls. while the rest of the world produced 298,987,000 bbls.

The United States produced 70.5 per cent of the world's production in 1924.

California last year produced more oil than Mexico, Russia, Persia, Venezuela, Japan and Formosa combined.

The combined production of Oklahoma and Texas was greater than the combined production of the world outside of the United States.

Mexico is counted as a foreign field, but if we exclude it for the reason that its product is owned and consumed largely by Americans, it would leave only 135,449,000 bbls. in foreign production last year and this quantity was exceeded by the production of any one of three American states, California, Oklahoma or Texas.

We hear much of the Russian oil fields. Last year the production of Arkansas exceeded that of Russia. Wyoming produced more oil than Persia. Kansas and Louisiana each produced more than the Dutch East Indies. The production of Illinois was about the same as that of Indiana or of Venezuela. The Rumanian fields were not in the same class with any of seven American States, and produced about half as much as Kansas. Pennsylvania and Kentucky were in the same producing class as Peru. West Virginia and Poland ran a close race, but West Virginia produced more than Poland. Argentine, British Borneo

or Trinidad. New York state produced more than Egypt, and New Mexico did better than Czechoslovakia. Tennessee and the Barbadoes ran a dead heat in production with 27 bbls. a day each.

The following table shows the relative standing of every petroleum division in the world in 1924. The figures for the year are taken from the bureau of Mines annual, but are rearranged as to rank, and the average daily production of each division is added for the further convenience of the reader.

Relative Importance of Producing Divisions of the World in 1924

Division and Standing	Prod. 1924 Bbls.	Daily Av. Pro. Bbls.
1—California	288,933,000	625,500
2—Oklahoma	173,538,000	474,148
3—Mexico	139,497,000	381,139
4—Texas	134,522,000	367,546
5—Arkansas	46,028,000	125,760
6—Russia	45,312,000	123,803
7—Wyoming	39,498,000	107,918
8—Persia	32,373,000	88,451
9—Kansas	28,836,000	78,787
10—Louisiana	21,124,000	57,716
11—Dutch E. Ind.	20,473,000	55,937
12—Rumania	13,303,000	36,347
13—Venezuela	8,754,000	23,918
14—Illinois	8,081,000	22,079
15—India	8,150,000	22,268
16—Peru	7,812,000	21,344
17—Pennsylvania	7,486,000	20,454
18—Kentucky	7,407,000	20,238
19—Ohio	6,811,000	18,609
20—W. Virginia	5,820,000	16,175
21—Poland	5,657,000	15,456
22—Argentine	4,669,000	12,730
23—British Bor.	4,163,000	11,374
24—Trinidad	4,057,000	11,085
25—Montana	2,815,000	7,691
26—Japan and Formosa	1,959,000	5,353
27—New York	1,440,000	3,934
28—Egypt	1,122,000	3,066
29—Indiana	935,000	2,555
30—Colorado	445,000	1,216
31—Columbia	445,000	1,216
32—France	426,000	1,164
33—Germany	406,000	1,110
34—Canada	164,000	448
35—New Mexico	98,000	268
36—Czechoslovakia	75,000	205
37—Italy	45,000	123
38—Algeria	12,000	33
39—Barbadoes	10,000	27
40—Tennessee	10,000	27
41—Cuba	4,000	11
42—England	2,000	6
All others in U. S.	13,000	36
All others (foreign)	97,000	27

Total.....1,012,927,000 2,767,560

OIL "INDUSTRY" IS NOTHING NEW HERE

Gazette. Sunday
First Business of Kind in State Was Opened 58 Years Ago.

June 26 - 1927

That Arkansas has had an oil and gas "industry" for the past 58 years is not generally known, but is vouched for by William J. Kemnitzner, California geologist, who is in Little Rock gathering material for Ralph Arnold, nationally known oil geologist and author of oil publications.

Mr. Arnold, who resides at Pasadena, Cal., is recognized by geologists and oil operators as one of the best authorities in the United States on the oil industry, according to State Geologist G. C. Branner. He plans to write a book, "Hazards of the Oil Industry," to be published within a year.

Mr. Kemnitzner is associated with him in the mechanical preparation of the book, and is making a tour of the United States gathering material. He said the first gas company in Arkansas was formed in 1870 and that the Pine Bluff Oil Company was formed in 1876. No records are available to show what success the companies had.

155 Companies Here Now.

In 1904, 10 oil companies were formed in the state. This number increased gradually until 28 were formed in 1920. The next year, the year the Arkansas field was brought in, 163 domestic oil companies were formed in the state and 61 foreign oil companies entered the state. The state now has 109 of the 163 companies formed in 1921 and 46 of the 61 foreign companies still do business in the state.

During the 58 years of the industry, 595 domestic companies were formed and 295 of them, or 50.2 per cent, failed. The first foreign oil company entered the state in 1891, and since then 302 have come into the state, of which 39.8 per cent failed.

All companies have drilled 7,402 wells in Arkansas to date, of which 1,177, or about 16 per cent, were dry holes. This is the lowest percentage of dry holes drilled in any state, Texas having 33 per cent. The average for the entire country is about 20.17 per cent dry holes out of 716,573 wells drilled from 1859 to 1926, Mr. Kemnitzner said.

The object of "Hazards of the Oil Industry" will be to show whether the industry is paying its way and to furnish technical information to geologists, drillers and operators. Mr. Kemnitzner spent three days here gathering information from the State Geological and Conservation Departments.

Arkansas Crude Follows Other Fields in Decrease.

New York, July 31.—(AP)—The daily average gross crude oil production in the United States decreased 15,600 barrels for the week ended July 28, totaling 2,386,250 barrels, says the weekly summary of the American Petroleum Institute. The daily average production east of California was 1,743,750 barrels, a decrease of 14,100 barrels.

The daily average production and difference, in barrels, follows:

Arkansas, 88,750, decrease, 2,600; Oklahoma, 589,800, increase, 1,100; Kansas, 102,600, increase, 300; Panhandle, Texas, 62,700, decrease, 350; North Texas, 91,300, increase, 6,300; West Central Texas, 56,250, decrease, 500; West Texas, 338,500, decrease, 13,250; East Central Texas, 21,250, decrease, 350; Southwest Texas, 25,050; North Louisiana, 42,150, increase, 650; Coastal Texas, 104,750, decrease, 1,500; Coastal Louisiana, 26,750, decrease, 100; Eastern Louisiana, 114,000, decrease, 1,000; Wyoming, 59,200, decrease, 3,350; Montana, 10,100, decrease, 50; Colorado, 7,900, decrease, 200; New Mexico, 2,700, increase, 800; California, 642,500, decrease, 1,500.

Daily average imports of petroleum at principal ports for the week ended July 28, totaled 233,428 barrels compared with 281,858 barrels for the previous week, and 244,714 for the four weeks ended July 28. Daily average receipts of California oil at Atlantic and Gulf coast ports for the week ended July 28, totaled 34,143 barrels, compared with 104,000 barrels for the previous week and 51,929 for the four weeks ended July 28.

Special to the Gazette.

Shreveport, La., Aug. 5.—Atlantic Oil Producing Company has issued quotations on crude oil meeting the Standard's recent changes, mostly increases in price, on Homer Haynesville and West El Dorado, leaving Smackover unchanged, and decreasing Stephens, all grades, except 32 and above, which remains at 95 cents. The new prices reduce 31 to 31.9 grade to 91 cents, a two cent cut, the two cent differential applying through below 28, which becomes 75 cents, a 10 cent decline.

Contracts for Memphis Natural Gas Pipe Line Awarded.

Memphis, Aug. 24.—(AP)—Contracts for the laying of the pipe line, building of compressor stations and completion of all work necessary to bring natural gas to Memphis from the Louisiana fields have been awarded to Ford, Bacon & Davis, New York city, it was announced today by H. G. Scott, president of the Memphis Natural Gas Company. Date for completion of the work was fixed at December 31 by President Scott, who arrived in Memphis today from New York.

Cost of the project is expected to approximate \$7,000,000. A survey has been made, calling for the pipe line to cross the Mississippi river near Greenville, Miss., and coming up through Mississippi on the east side of the river. This route probably will be used, giving Greenville, Clarksdale and other delta cities an opportunity to tap the pipe line.

Work of laying the pipe will be started as soon as enough right of way has been acquired to determine which route will be used for the line, Scott said.

Mortgage Filed to Secure Gas Piping to Memphis.

Monroe, La., Aug. 25.—(AP)—A mortgage indenture to secure a \$9,500,000 bond issue to be used in piping natural gas to Memphis was filed here today by the Memphis Natural Gas Company.

The pipe line will run from Guthrie, in the Monroe gas fields, to Lake Village, Ark., Greenville, Miss., and on to Memphis.

Plans call for completing the project by January.

Memphis Gas Company Would Serve Arkansas Towns.

Memphis, Aug. 27.—(AP)—The Memphis Natural Gas Company is ready to serve towns along its pipe line in Arkansas with gas, says a letter from the company to Judge James R. Yerger, Lake Village. The letter was made public by Judge Yerger.

The Memphis company would like to be able to serve Chicot, Eudora, Readland, Lake Village, Dermott and other towns along the route of the line, the letter said.

The company has contracted with the Arkansas Power and Light Company for distribution of gas by it to towns along the lake, it was announced.

Incorporation Matters.

The Roxana Petroleum Corporation filed a copy of its charter with the secretary of state yesterday for domestication with a notice that the charter has been amended to change the name to Shell Petroleum Corporation.

Oil Fields of Centuries Long Ago Are Recorded in History

Petroleum Collected for Use in Most Remote Ages— Japan Used Natural Gas for Heating and Lighting in Seventh Century.

Down at El Dorado and at Smackover and several other places in Arkansas oil comes up out of the ground, either with or without mechanical urging. You've heard about that.

Oil fields at Wichita Falls, Shreveport, Augusta and several towns in California and Pennsylvania and numerous points between those states also are fairly well known, and this will be the only mention made of them in this column. However, how about the good old days—the real early days—500 or 1,000 or more years ago—centuries and centuries before Teapot Dome and things like that had even been heard of? Laboring under the belief that the public at large is not so well acquainted with those periods in the development of the petroleum industry, this author herewith setteth out to provide the eager public with a consignment of knowledge relating to the foregoing.

Meaning of Petroleum.

To begin with, it wouldn't be such a bad idea to discuss the derivation of the word, petroleum. It comes from the Latin and is a combination of *petra*, meaning rock, and *oleum*, meaning oil. What could be fairer than that?

History tells us that petroleum was collected for use in the most remote ages of which there is any record. Herodotus, who was the *Pathe News* of his time, knowing all and seeing all of any consequence, described the oil pits near Ardenia and the pitch spring of Zacynthus in one of his brightest and snappiest volumes. Three ancient gentlemen named Strabo, Dioscoridis and Pliny mentioned the use of oil for illumination at Agriguntum, Sicily, and as for Plutarch, who was proprietor of so many lives—well, Plutarch committed literature about some petroleum that was found near Ectbana. Perhaps those names and places mean nothing to you, in which case you resemble closely the manufacturer of this essay, who is gaining his information from ponderous tomes in the public library.

The ancient records of China and Japan are said to contain many allusions to the use of natural gas for lighting and heating, and petroleum, which the natives called by a name that signified "Hon. Burning Water," was known in Japan in the Seventh century.

Now here comes a reference to Marco Polo, the celebrated traveler of several hundred years ago. Marco, as we like to call him, or Mr. Polo, if you prefer, had things to say of the oil springs of Baku in the early Fourteenth or late Thirteenth century. Oil was known in Bavaria in 1436 and in 1498, while Admiral Columbus was poking about in the West Indies and Central America, discovering this and that, the people of Pechelbronn, in Alsace, went out into their backyards and discovered oil for themselves. In 1506 petroleum was found in Galicia, where folks called it some consonant-laden name that literally meant "earth balsam."

Oil History of U. S.

At this point, with America safely discovered and chambers of commerce on the verge of springing up, let us span the Atlantic, as the saying goes, and delve into the petroleum history of this, our native land. The earliest mention of oil in America occurs in Sir Walter Raleigh's account of the Trinidad pitch lake, in 1595. Thirty-seven years later the record of a visit of a Franciscan, Joseph de la Roche d'Allion, to the oil springs of New York was published in Sagard's "Histoire du Canada," or History of Canada, as we would say in our blunt American manner.

In 1748, a Russian traveler, Peter Kalm, who probably had several whippers, published a book about America which contained a map showing the oil springs of Pennsylvania. At about the same time, over in Europe, oil that was referred to as "liquid bitumen" was found in Roumania.

The first commercial exploitation of importance seems to have been the distillation of the oil in Alfreton, Derbyshire, by James Young, who patented a process for the manufacture of paraffin in 1850. Derbyshire, of course, is in England.

Active growth of the petroleum industry in this country began in 1859. The Pennsylvania Rock Oil Company was founded in 1854, but its operations were not very successful and in 1858 some of its membership broke away and formed the Seneca Oil Company. Under their direction E. L. Drake started drilling a well at Oil Creek, Pa., the following year and after a depth of 69 feet was achieved the drillers struck oil. That well yielded 25 barrels a day at the start.

For 10 years Pennsylvania was the great oil producer of the globe, but since then oil fields have been found in many places. However, you might like to read a little about pipe lines and refineries. Through all those early centuries people had been using earthen jars or wooden barrels or most anything of the sort available to transport oil from hither to thither.

In 1860 a man named S. D. Karns worked out a plan for a pipe line in West Virginia, but there was some kind of a hitch in the proceedings and the idea was abandoned. Two years later L. Hutchinson of New York laid a short line from Tarr Farm wells to a refinery. The oil had to pass over a hill and the siphon principle was used to effect that feat. This pioneer pipe line was not an outstanding success, as there was too much leakage at the joints. In 1865 pipes were made with carefully fitted screw joints and the problem was disposed of. Tank cars and tank barges soon came into use for transporting oil from the refineries all over the country by rail and water. Distillation of oil for medicinal use had been carried on regularly as early as the Eighteenth century. Crude petroleum was experimentally distilled in the United States in 1833. Refining of petroleum in this country can be said to date from about 1855, when Samuel M. Kier fitted up a small refinery with a five-barrel still for treatment of oil from his father's salt wells.

MEMPHIS NATURAL COMPANY FORMED

Concern Will Build \$10,000,000 Pipe Line From Monroe to Memphis.

New York, Aug. 28.—(AP)—Announcement today of the formation of the Memphis Natural Gas Company disclosed plans for building a \$10,000,000 pipe line to transport natural gas from the Monroe fields, La., to Memphis, Tenn., and intervening territory in Mississippi and Arkansas. The project provides for construction of a 218-mile pipe line with daily rate transportation capacity of 60,000,000 cubic feet, two compressor stations and other facilities and equipment necessary to serve a population of 300,000.

The new company, which will purchase and resell natural gas wholesale has arranged a long term contract for supply from the Industrial Gas Company, subsidiary of the Electric Power and Light Corporation, and has contracts to sell it to the Memphis Power and Light Company, Mississippi Power and Light Company and Arkansas Power and Light Company.

Eight Separate Distinct Fields in The State Are Producing Oil

United States Geological Survey Shows El Dorado Field Alone Produced 37,966,360 Barrels From 1,380 Wells Up to January 1, 1926.

The first production of oil in commercial quantities in Arkansas came from the Hunter well, near Stephens, Ouachita county, late in 1920. The second well was about eight miles southwest of El Dorado, and came in about a month later. Neither well created much excitement, and the Arkansas oil boom really dates from a third well which came in about one mile south of El Dorado in January, 1921, with a daily production of 10,000 barrels. The state first appeared in the reports of the United States Geological Survey as an oil-producing state in March, 1921, and on July 1 of that year stood seventh in production. In April, 1924, it assumed fourth place.

There are seven or possibly eight producing fields in Arkansas at present, the El Dorado, East El Dorado, Lisbon, Smackover, Stephens, Irma and Bradley, with an eighth potential field near Urbana, in Union county. The El Dorado field produced 37,966,360 barrels from 1,380 wells up to January 1, 1926. The East El Dorado field reached a maximum production of 10,000 barrels daily in 1923. The Lisbon field in 1926 averaged 11,750 barrels per day. The Smackover field reached peak production of 443,950 barrels per day in May, 1925. The Stephens field, from 252 wells, now averages 1,500 per day. The Irma field, with 56 wells, produces about 1,900 barrels per day. Five small producing wells have been drilled in the Bradley field and two wells near Urbana. Total 1927 production was 37,523,650 barrels, a slight decrease of peak production previously.

As development continues in the Smackover field, in recently discovered deep sands, a flood of heavy oil is resulting. It is below 20 gravity and almost devoid of gasoline content. The outcropping quaternary rocks form a thin covering of alluvial materials on the tertiary beds along the flood plains. These beds are carbonaceous clay, marl and sandstone, dipping and thickening, to the southeast, reaching a maximum thickness of 2,000 feet.

The oil is a distinctly coastal plain oil; one-half the state of Arkansas is coastal plain. The rocks have not been altered to a degree that would injure oil accumulations, and the entire area, which was once the shore of the Gulf of Mexico, has accumulated organic matter of the sea and adjacent land. The same conditions obtain in western Tennessee and Mississippi, and it is logical, therefore, to anticipate interesting developments in these littoral beds. The foregoing information is taken from records compiled by the Little Rock Chamber of Commerce, and, since the data with regard to the number of wells changes as new wells are drilled, the sentences should be read with this fact in mind.

One of the most recent wells is that of the Ohio Oil Company in the Rainbow City field which was brought in flowing at the rate of 2,500 barrels per day. It was completed from a total depth of 2,992 feet. The well is flowing pipe line oil which tests around 33 gravity.

This well is the first producer of any importance in that section and helps to prove up the territory to the northeast of the main producing area. The Ohio well on the Carroll farm is the first of several tests in that immediate vicinity to be drilled in. The El Dorado district reported four new wells during the week ending August 11, three producers and one large gasser, all in the Rainbow City area. The four added approximately 800 barrels of oil and 30,000,000 feet of dry gas to the daily production.

The three wells are in the northwest extension of the field, while the gasser was south of the main production. The Magnolia Petroleum Company, during the week ending August 11, completed its W. K. Gregory No. 1 in the northwest of northeast of southwest of section 15-17-14 at 30,000,000 feet per day from a depth of 2,800 feet.

The Magna Producing Company completed its No. 3 Townsend in the northwest of northeast of section 10-17-14 at 300 barrels per day and the No. 7 on the same tract at 500 barrels. Both are making pipe line oil of about 35 gravity.

Hollyfield and McFarland bailed their Kelly No. 1 in the southwest of southeast of section 9-17-14, which stood 1,500 feet in oil. The well will swab more than 100 barrels per day, it is estimated.

90 Wells Now Drilling

There are now about 90 wells drilling in the Rainbow field proper, and edges, with 33 individuals and firms operating in the field.

During the week ended August 11 interest was shifted to the older part of the field in spite of the completions to the southwest. In sections 1-17-14 and 6-17-13, which join each other, there are six wells now being drilled and at the testing stage, all of which are prospective producers.

In section 1-17-14 in the original discovery area three wells are drilling. The Lion is starting up on its R. A. B. Smith No. 2 and the Magnolia Petroleum Company is drilling on the Nos. 4 and 5 Carroll. Operators believe that wells in this field will be of long life. One of the oldest wells in the field, the Magnolia Carroll No. 2 near where Nos. 4 and 5 are now being drilled, was brought in 10 months ago and is flowing 280 barrels per day, having dropped off only a small amount from its flush production. The Carroll well of the Arkansas Drilling Company in the same section is bringing about 125 barrels and there are several other small producers.

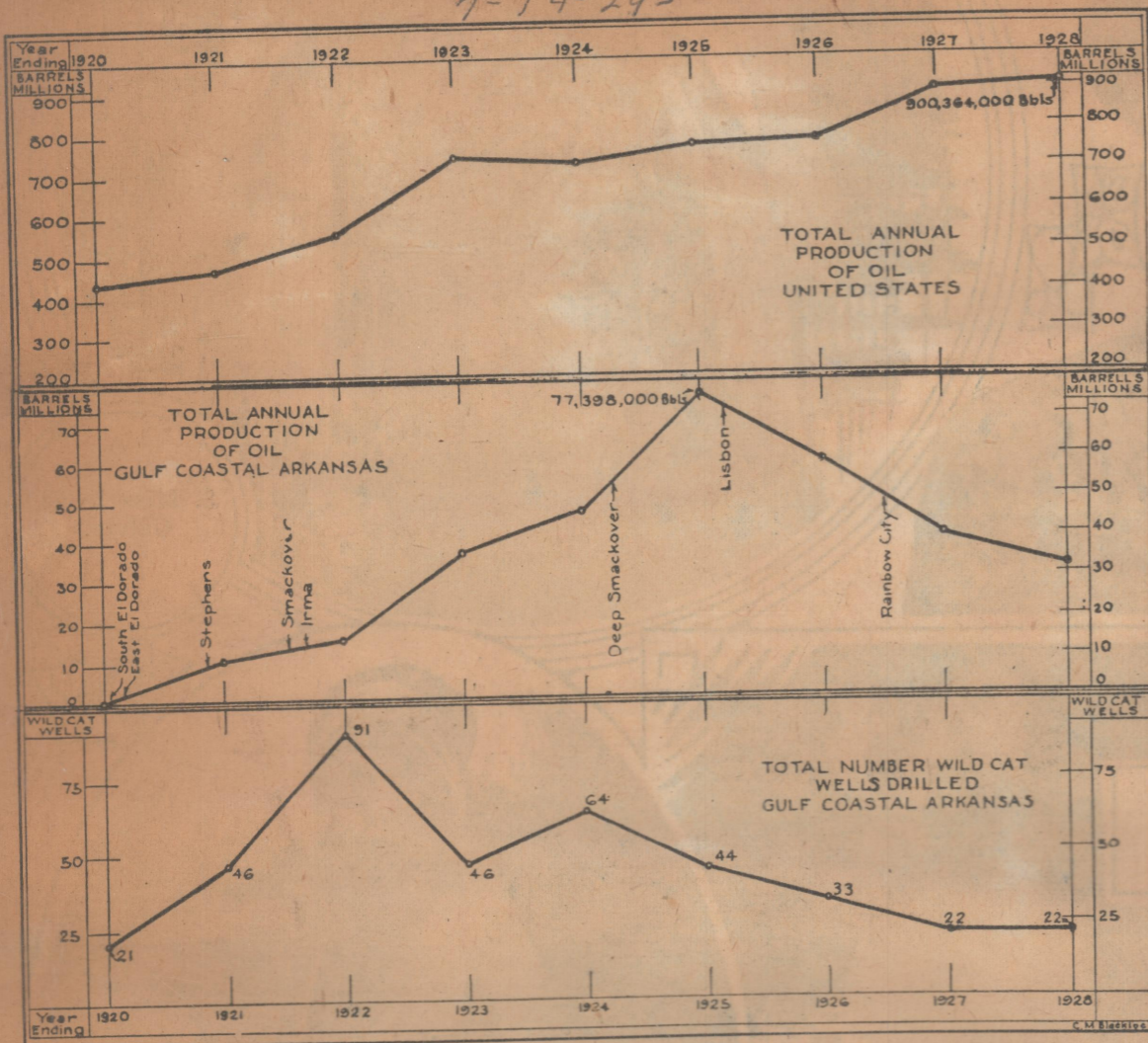
The Elliott Core Drilling Co. of California entered the state as a foreign corporation, certifying assets of \$390,896 and liabilities of \$49,961. J. E. Elliott of Los Angeles is president, and the capital stock is \$100,000.

Articles of incorporation were received from the Petrol Oil and Gas Company of Oklahoma. Ben H. Ashe president, which will do business in Des Arc. It is a \$50,000 concern.

Drilling Permits Issued.

The Department of Conservation and Inspection issued three permits last week to drill new oil wells in Cleveland and Union counties. Four permits to abandon wells in Ouachita and Union counties were granted. The new wells were: Arkansas Natural Gas Corporation, Mrs. D. J. Tate No. 1, in section 4-9-11, Cleveland county; Lion Oil Refining Company, Rowland No. 5, in section 15-17-14, and Sinclair No. 3 in section 16-17-14, Union county.

Relationship Between United States and Arkansas Total Oil Production, 1921-28, Illustrated in These Curves



The above curves illustrate the relationship between the total United States production and Arkansas production of oil and the total number of wildcats drilled in Arkansas during the years 1921-1928, inclusive.

Survey to Be Made of Oil and Gas Deposits in North Arkansas.

Special to the Gazette.
Fort Smith, Aug. 5.—C. E. Harris of El Dorado, assistant in the state department for the conservation of oil and gas, announced today that an extensive oil and gas survey would be started soon in North and Central Arkansas.

Harris said that the survey would be started in Crawford county, the center of the largest of the Arkansas Natural Gas Company fields in this section. Washington county is next in line, and Harris will work the country with headquarters at Fayetteville.

The object of the survey is to gather an intelligent, and as complete as possible, collection of data on oil and gas deposits. This information will be used to offset misleading propaganda of promoters and to interest legitimate prospects of oil and gas resources.

LEASES BOUGHT BY MAGNOLIA COMPANY

Oil, Gas and Mineral Rights in Six Counties Are Acquired.

Oil, gas and mineral rights on many tracts in Pulaski, Perry, Faulkner, Pope Yell and Johnson counties have been acquired in recent weeks by the Magnolia Petroleum Company, it was announced here yesterday through inquiries concerning seven such leases filed Thursday in the office of Circuit Clerk B. T. Hoff.

A total of 644 acres in Pulaski county is under lease by the Magnolia company, the mineral deeds and royalty conveyances showed. The land includes five 80-acre tracts, one containing 130 acres and another of 114 acres. All are Bayou Meto township in the north-eastern part of the county, about 20 miles from Little Rock.

The conveyances were executed to the Magnolia company by William B. Vance of Russellville, who obtained leases from owners of the property. He is employed for that purpose by the oil company, it was said. Similar work is being done by Mr. Vance for the company in Faulkner, Perry, Yell and Pope counties, investigation disclosed.

Additional acreage still is being sought by the Magnolia company, it was indicated. M. McKay, formerly employed by the Magnolia Petroleum Company at El Dorado has moved to Conway and is directing the leasing of land for the firm. Neither Mr. Vance nor Mr. McKay, when questioned by telephone yesterday, would reveal the extent of his activities. The latter explained that progress of the work might be retarded if the figures were made public.

He said that, as far as he knew, the Magnolia company has no immediate plans for drilling in the territory. The leases will remain in force for 10 years, and it is expected that before the expiration of that period prospecting will be undertaken. Heretofore, drilling activities of the company have been carried on in south Arkansas, where it has brought in several producers, it was said. Headquarters of the Magnolia company is at Dallas, Tex.

Many companies and individuals are reported to have leased oil, gas and mineral rights on acreage in counties between Little Rock and Fort Smith. The Arkansas Natural Gas Corporation has piped gas from wells in Johnson county.

OIL PRODUCTION OF ARKANSAS DECLINES

53,000-Barrel Drop During August Reported by Bureau of Mines.

By Paul C. Yates.
(Special Correspondent of the Gazette.)
Washington, Oct. 30.—Production of crude oil in Arkansas showed a decline of 53,000 barrels during September as compared to August, the Bureau of Mines of the Department of Commerce revealed today.

Production for the first nine months of 1929 as compared to the same period in 1928 declined by 4,871,000 barrels.

Figures for September and August of 1929 were 1,953,000 barrels and 2,056,000 barrels respectively. Totals for the first three-quarters of 1929 and 1928 were 19,424,000 barrels and 24,305,000 barrels.

Production during September dropped in Texas, California and Oklahoma.

Natural gasoline production held steady in Arkansas, at the rate of 2,800,000 gallons per month. During the first nine months of the year, Arkansas produced 24,100,000 gallons of the casing-head product.

Daily Crude Oil Production in U. S. Shows Increase.

New York, Nov. 26.—(AP)—The daily average gross crude oil production in the United States increased 13,250 barrels for the week ended November 23, totaling 2,633,250 barrels, says the weekly summary of the American Petroleum Institute. The daily average production east of California was 1,933,750 barrels, a decrease of 11,750 barrels.

Refineries representing 95.4 per cent of the estimated daily potential refining capacity, operating at 75.5 per cent of their capacity, reported daily average run of crude oil to stills as 2,649,100 barrels. Daily average the previous week was 2,655,900 barrels for refineries, representing 94.9 per cent of potential capacity operating at 76. per cent of their capacity.

Daily average production—Barrels: Oklahoma, 643,050, decrease 2,900; Kansas, 110,650, increase 1,000; Panhandle, Texas, 102,600, increase 2,250; North Texas, 89,300, decrease 1,300; West Central Texas, 56,850, decrease 650; South Texas, 357,250, decrease 6,000; East Central Texas, 17,350, decrease 250; Southwest Texas, 74,650, increase 950; North Louisiana, 36,450, decrease 100; Arkansas, 63,950, increase 700; Coastal Texas, 148,350, decrease 1,850; Coastal Louisiana, 23,300, decrease 1,650; Eastern (not including Michigan), 118,900, decrease 100; Michigan, 15,000, decrease 1,100; Wyoming, 52,500, decrease 350; Montana, 10,500, decrease 100; Colorado, 5,100, decrease 350; New Mexico, 8,000, increase 50; California, 699,500, increase 225,000; totals, 2,633,250, increase 13,250.

Daily average imports of petroleum at principal ports for the week ended November 23 were 258,285 barrels, compared with 312,857 for the previous week, and 270,071 for the four weeks ended November 23.

Daily Crude Oil Production Shows Decrease.

New York, Feb. 4.—(AP)—The daily average gross crude oil production in the United States decreased 20,600 barrels for the week ended February 1, totaling 2,595,000 barrels, says the weekly summary of the American Petroleum Institute. The daily average production east of California was 1,884,400 barrels, a decrease of 29,000 barrels.

Refineries representing 95 per cent of the estimated daily potential refining capacity, operating at 71.4 per cent of their capacity, reported daily average run of crude oil to stills as 2,477,000 barrels. Daily average the previous week was 2,511,300 barrels for refineries representing 95.5 per cent of potential capacity at 72.0 per cent of their capacity.

Daily average production in barrels: Oklahoma, 612,000, decrease 43,550; Kansas, 110,400; Panhandle Texas, 87,800, decrease 350; North Texas 81,050, increase 700; West Central Texas, 55,950, decrease 800; West Texas 342,800, increase 100; Southwest Texas 67,050; decrease 400; North Louisiana 36,500, decrease 650; Arkansas 67,250, increase 400; Coastal Texas 174,000, increase 4,850; Coastal Louisiana 21,050, decrease 200; Eastern (not including Michigan) 123,900, decrease 700; Michigan 14,750, decrease 350; Wyoming 54,000, increase 7,000; Montana 9,350, decrease 550; Colorado 4,900, increase 300; New Mexico 10,400, decrease 250; California 710,600, increase 8,400. Total 2,595,000, decrease 20,600.

Daily average imports of petroleum at principal ports for the week ended February 1 were 208,571 barrels compared with 322,857 for the previous week and 269,786 for the four weeks ended February 1.

Receipts of California oil at Atlantic and Gulf coast ports for the week ended February 1 were

56,857 barrels, compared with 108,000 for the previous week, and 91,964 for the four weeks ended February 1.

Arkansas Oil Production Falls Sharply During 1929.

(From the Gazette Correspondent.)
Washington, Feb. 21.—Crude oil production in Arkansas decreased sharply during 1929, as compared to 1928, it is shown in figures released today by the Bureau of Mines of the Department of Commerce. The 1929 production was 25,076,000 barrels. The 1928 production was 32,096,000 barrels. Most of the decline is represented by comparative figures of the last four months of the two years.

Arkansas ranked fifth in 1929 among oil producing states. For the second consecutive year Texas took first rank, followed by California, Oklahoma, Kansas and Arkansas. Louisiana production was about 5,000,000 barrels below that of Arkansas. Total domestic production for the year was 1,005,598,000 barrels, a gain of nearly 100,000,000 barrels over 1928.

South Arkansas Independent Oil Producers to Washington.

Special to the Gazette.
El Dorado, Feb. 21.—A party of South Arkansas oil men, representing the independent producers, will leave El Dorado at 6:40 tomorrow night for St. Louis, where they will join a large delegation from the Southwest and go to Washington for a conference on the proposed tariff on foreign oil. Approximately 20 are expected to go from here, and several hundred will make the trip from Texas and Oklahoma.

South Arkansas oil men recently met here and formed the Arkansas Independent Petroleum Association, a branch of the Independent Petroleum Association of America, which has for its object the fixing of a \$1 tariff on imported oils and a duty on by-products of petroleum.

SIX-DAY WEEK FOR OIL INDUSTRY URGED

Conservation Board Suggests Rest on Sunday to Curb Production.

Washington, March 4.—(AP)—Elimination of Sunday refinery operation was recommended today by the Federal Oil Conservation Board to the oil industry to curb increasing gasoline stocks.

The board, composed of the secretaries of interior, war, navy and commerce, pointed out that refining capacities are increasing faster than consumption.

Aid of the governors of the three great oil producing states, Texas, Oklahoma and California, was solicited to persuade the industry to adopt a six-day week.

Statement by the board that "there is coming to be too much gasoline" was matched by figures of the Bureau of Mines showing that 10,000 barrels of refined stock have been placed in storage since the beginning of the year.

Unofficial estimates of excess production indicated that nearly 53,000,000 barrels of gasoline are on hand at refineries in addition to unsold stock held by distributors.

"Stocks are higher than they have been since 1927," the board reported, "while the domestic demand is only up to the level of 1928."

The Bureau of Mines indicated a new high record for production, with revised figures placing the total petroleum and natural gasoline output in 1929 in the country at 1,005,598,000 barrels.

This was 104,500,000 barrels more than the American output of petroleum and natural gasoline in 1928, which was previous high figure established in the industry.

The 12 per cent gain in 1929 over 1928 production, was made in spite of persistent curtailment efforts during most of 1929 under leadership of the American Petroleum Institute.

The increasing output has been due to the new extensions of oil territory both on the Pacific coast and in the Midcontinent field, the bureau reported. Increased efficiency in cracking of oil was blamed by the board, "Which," it said, "Combined with the seven-day week, is raising gasoline stocks to a level where there will be a large element of waste."

RADIO BANDS FOR DETECTION OF OIL

Federal Board Reserves Five Frequencies for Petroleum Industry.

Washington, March 29.—Use of radio in the detection of oil deposits below the earth's surface has resulted in a net saving of over \$1,000,000 to oil interests during the last several years. These facts were revealed in testimony brought out at hearings before the Federal Radio Commission, and as a result the board adopted a general policy for the granting of licenses for geophysical purposes.

The commission has set aside five short wave frequencies, which will be allocated to all "responsible applicants" for scientific exploration. The order specifies a maximum of 10 watts power for transmitters used, which are of the portable type, except in cases in which it can be shown that atmospheric conditions exist which require greater power. In such instances the maximum power shall not be in excess of 50 watts.

Heretofore there has been no set policy on the allocation of wave lengths for use of scientific purposes. Members of the commission have been undecided whether or not the assignment of channels for geophysical purposes was in "general interest," and whether the licenses, if granted, should be issued to oil companies or to public utilities which would make the scientific search for the industry.

Methods of determining oil deposits below the earth's surface by means of radio are one of the latest applications of short wave transmission. Although both radio engineers and geophysicists have been working for a number of years seeking accurate methods of using radio for this purpose, it was not until about three years ago that it had been definitely proven that detection of rich deposits could be accomplished.

Since that time oil companies have developed apparatus, and have found the radio method of geophysical search has resulted in the finding of oil many thousand feet below the earth's surface. Savings of more than \$1,000,000 have resulted, by virtue of large reduction in the costs of prospecting.

Gas Is Abundant in River Valley Field

By TRUMAN E. CARTER.

With wells in the Arkansas river valley already supplying ample gas to accommodate towns between Fort Smith and Conway, several large firms are completing their lease campaigns in the hope that in a year or so lines will be covered from the valley wells to the large trunk line extending from Texas fields into Northern cities, especially Chicago.

The days of wildcatting have passed in this section of the state, and competition is becoming keen among gas companies. Geologists representing these firms have trod the valley from one end to the other, until they are acquainted with at least a part of every section. Invariably they have reported favorably, and many agents have invaded the territory, eager to get the landowners' names on their leases first.

Crews are at work at many points trying to get the main under the surface from Coal Hill to Ozark via Atlas and Alix within a few days, and across the river the line from Etna to Paris is also being rushed in hope of releasing gas into the lines by the time the Coal Hill-Ozark main is completed. The gas field north of Clarksville is supplying that city, Russellville, Fayetteville, and many other towns in the valley and in northwest Arkansas.

As soon as the Etna-Paris system has been installed, a line will be extended from Clarksville to Booneville. The Prairie View field furnishes heat and light for towns further east in the valley on the south side of the river.

According to Garland D. Hamm of Ozark, hundreds of thousands of acres of untouched land form valley holdings of various companies, and a determination is being expressed by company representatives to reach the gas, if it is within reasonable drilling distance. Hamm has been the principal agent of several large companies in this section during the last two years, and is said to be better acquainted with the gas situation in the valley than any other one man.

Seven large firms and three individuals hold the bulk of leases through the valley. The firms are: Daniel Brooks, Inc., El Dorado, Ark.; Arkansas Natural Gas Co., Shreveport, La.; Central States Power and Light Co., Dubuque, Ia.; River Valley Gas and Pine Line Co., with district headquarters at Paris, Ark.; Ohio Gas and Fuel Co., Cleveland, O., with district headquarters at Oklahoma City; Arkansas Western Gas Co., Fayetteville, Ark.; and the Red Bank Co., Tulsa, with district offices at Fort Smith. The last named firm controls over 100,000 acres in Franklin county.

E. C. Farris of Clarksville, D. W. Johnson, also of that place, and Hamm of Ozark are the three individual lease holders.

Several years ago the Blackwell Oil and Gas Co., an Oklahoma firm, secured leases to about 1,000 acres, and, after bringing in gas at their well about one mile south of Coal Hill, sold their interests in valley holdings to the River Valley Gas and Pine Line Co. Besides the Coal Hill well, which is located on the Winn farm, more than 1,000 acres figured in the deal. At present the company is sinking another hole about one-half mile west of the Winn well, on the Hoing farm.

The Ohio firm took over about 8,000 acres in the western part of Johnson county two years ago. Persistent rumors that the supply of natural gas in the Ohio field was about depleted rushed speculation in Arkansas, for it was thought that unless new areas were de-

veloped the city of Chicago would be forced to manufacture artificial gas for its own use.

Most of the gas companies took over holdings on 10-year leases, paying landowners 25 cents an acre for the first year, and 25 cents each year following, in case the company wishes to renew. Terms have varied from this contract, however, some receiving 10 cents per acre for renewal, and some as high as 50 cents, while a few of the staunch holdouts received 50 cents for the first year and 50 cents for renewal for five-year periods. In case a well is capped for future use, \$10 a year is paid until the gas is released and royalty is considered. Renewal is left to the volition of the company.

The well north of Russellville is the largest in the state considering its depth. It produces about 36,000,000 feet per day and is only 1,064 feet deep. It has not been capped yet.

According to Hamm, a gas company will cap a well that is bringing in less than 2,000,000 feet a day, provided the gas is coming from dry sand formations where the installation of a separator is not necessary. Where this is done, 4,000,000 feet pressure is the minimum.

The Red Bank's well No. 1, three miles north of Altus, has been attracting state-wide attention during the last three or four weeks. The rigging being used is considered the most complete in the state, being the only one of its kind ever installed in Arkansas. The steel derrick is 85 feet high and is capable of lowering the bit to about 8,000 feet. The bit is nearing the 2,400 foot mark and is now bringing in a large force of gas, not yet estimated in millions of feet. Water and mud is being blown over the top of the derrick, and under-reaming has been started by the crew. Operations will continue until the bit strikes St. Peter's sand.

Lavaca is also becoming an important gas town. Eleven wells ranging from 2,000,000 to 20,000,000 feet pressure already have been brought in, and operations are being continued with the expectation of bringing in more. It is said that four wells have been drilled on the Cason farm, two miles north of the town, each bringing in enough gas to pipe profitably. These wells are controlled by the Twin City Pipe Line Co., Fort Smith. All are connected to one main extending from Lavaca to Fort Smith, supplying Greenwood en route. Wells in this field average about 3,000 feet in depth. As in the case of Franklin and Johnson counties, thousands of acres have been leased for prospective drilling purposes, but as yet have not been touched.

Gas companies are very optimistic over the possibilities of the valley. Despite the fact that many wells have been brought in and networks of lines have been spread throughout the area, the period of development has just begun. More lands have been taken over by firms during the last three months than ever before, and test holes are showing up to expectations.

Landowners are more than pleased. Some of them are elated. They live in hope that some day their plow-worn acres will be generously dotted with derricks fanned from below. If the gas companies will only start the hole, they feel that no steam will be wasted in lifting out the bit. Gas pockets will blow it out. A well of 4,000,000 feet pressure at one-eighth royalty would net the landowner about \$35 a day, and the thought of a fair producer of three times that much gas and a derrick decorated with "No smoking" signs dominates every lease-giver's dream.

June 19, 1930

Natural Gas and Its Future in the South*

By

EDGAR G. HILL,

Vice-President and General Manager,
Southern Natural Gas Corporation,
Birmingham, Ala.

TO many of this gathering, the natural gas business is an old story. Others of you, from Memphis, New Orleans and Atlanta, have lately emerged from the throes of changing over your distribution systems from manufactured to natural gas, and are rapidly becoming acquainted with the new fuel. To most of you, however, the subject of natural gas, particularly its distribution and utilization, is an unfamiliar one, but one of more than passing interest at this time of gigantic natural gas developments the country over, in which the Southeastern states are sharing to a great extent. * * *

I will now proceed to the meat of this paper, namely, the reasons for bringing it to the Southeastern States, and what it should and will accomplish there toward the improvement of social and industrial conditions. * * *

The rapidly growing sales of natural gas, even in sections where competition of other fuels is keen, proves this statement of mine, I think, beyond question.

In the home natural gas is sold at rates for cooking and also for hot water heating, that are highly attractive. Many of you have been disturbed by the increasing inroads made by the electric power companies on your cooking load. Natural gas is your way out. There are only 3413 BTU in a kilowatt of electric energy. A thousand cubic feet of natural gas contains approximately one million BTU. Simple arithmetic shows that 293 kilowatts are therefore required to furnish the heat units which in natural gas are usually sold for not over two dollars and a quarter, including the service charge for the first thousand feet. Assuming equal efficiency in the appliance, electric current must be sold for a minimum of something less than eight mills per kilowatt hour to compete with even the first 1000 cubic feet of natural gas. With manufactured gas of 550 BTU per cubic foot, selling at the same price including the service charge, electricity at one and one-half cents per kilowatt-hour is competitive on a heat unit basis. Ridiculous statements of the increased efficiency of electric over gas-burning appliances are often made, which have undoubtedly had weight in building the electric cooking load at the expense of the Gas Company, but today the gas appliance industry offers you ranges of high efficiency, including the insulated oven and thermostatic control, which have been the main talking points of the electric

*Extracts from an address made June 11 before the Southern Gas Association at Savannah, Ga.

available for house heating at reasonable rates and properly served, the people of the United States will use it, in spite of all the efforts of dealers in competing fuels. Not only will they use it, but they will pay up to 75 cents per thousand cubic feet for it, almost regardless of coal prices. * * *

Why do people like to heat their homes with natural gas? The answer is easy. Quick heat available at the turn of a valve, or the click of a thermostat, no soot or dirt from solid or liquid fuels or from ashes, no furnace tender tramping into and out of the house at unseasonable hours, lowered laundry and cleaning bills, no storage of fuel necessary, and additional room available in the basement, which was formerly occupied by competitive fuel. * * *

Fuel oil is sometimes mentioned as a competitor for househeating. We in the natural gas business do not give it such recognition, because it offers no advantages, and is hopelessly at a disadvantage from a cost standpoint, both as to the fuel itself and the equipment required to store and burn it.

Now as to the other great field for this commodity, its uses in industry, there are two general industrial spheres where natural gas is almost invaluable, in the steel business and in the ceramic industry generally. Natural gas for special process work in steel is selling in Ohio and Pennsylvania at almost domestic prices. It is sold in great quantities at lower prices for fuel in open hearth furnaces and soaking pits. At Birmingham, the great plants of the Tennessee Coal, Iron and Railroad Company, under normal business conditions use far more natural gas than the whole city of Atlanta.

Brick and tile manufacturers eagerly await natural gas, as it is an ideal fuel for their needs, its use resulting in a better product, with less spoilage, at generally a lower cost per thousand. The lime kiln operator finds that he can produce better lime at lower cost with natural gas, even in the Birmingham district, than he was able to turn out before natural gas was available.

As a boiler fuel, natural gas, while ideal, must be sold at lower rates than it commands in other industrial fields. My company is selling it for this use, but only until such time as the domestic load builds up to a point where the further sale of boiler gas would imperil domestic service. When that point is reached, we will stop selling boiler gas except on an off-peak basis in the summer months. * * *

salesman. Undoubtedly some antiquated and poorly adjusted manufactured gas ranges have been replaced by electric stoves to the advantage of the householder, especially as the electric company's service charge is brought forward as applying also to current for lighting and so a necessary expense in any event, which is usually the case. The cost comparison which I have just made assumes that all cooking will be done with the first thousand cubic feet of gas, the price of which includes the usual service charge. This is not always true.

A large family will use more than this first thousand feet for cooking, securing the second and third thousands at prices usually about half that of the first thousand, in which case, the saving by the use of natural gas becomes still more obvious.

When we come to domestic water heating, we find a field of service in which natural gas stands almost alone. The modern natural gas fired automatic storage water heater is in a class by itself from every standpoint. Durable, reliable, operating at low cost, it is the modern family's most valuable servant. It has largely replaced the old-fashioned coal type heater, which gave trouble in many localities due to scale from hard water forming in the coil, and modern production methods have brought the price within reach of all. * * *

Once a consumer heats his house with natural gas, burned either in a modern, well designed conversion unit in his old furnace, or better still, in a furnace designed for gas, and is given good service by the utility at reasonable rates, he becomes that utility's greatest asset, a lifelong friend. In offering natural gas for this service, the utility must first make sure that its distribution plant, service lines and meters are adequate to handle the load. It must then push the sale of its commodity vigorously, truthfully and fearlessly, using intelligent, trained men only, and sell and install only apparatus of proven merit and high efficiency. * * *

In Dallas, Houston and Fort Worth, Texas, the use of natural gas for domestic and commercial heating is well nigh universal, with gas selling at about 65 cents per 1000 cubic feet for this purpose. These facts, I think are almost unanswerable. If natural gas is made

Natural Gas Big Factor in State Growth

Industries Ever on the
Alert for Cheap
Fuel.

Large Area Served

Arkansas Natural Corpo-
ration Furnishes Prod-
uct to 100 Cities.

Like the ever-spreading roots of a great tree, stretching out in all directions, are miles and miles of pipe beneath the earth in Arkansas, Louisiana and Texas—reaching into the home and business life of countless families—making existence more comfortable, happier and more economical. Unseen and silent, these pipes are transporting natural gas to scores of cities, towns and villages in these states.

The outstanding leader in the development of the natural resources and subsequent increase in modern advantages in this tri-state area is the Arkansas Natural Gas Corpora-

tion, subsidiary of Cities Service Company.

This company, which is one of the youngest Cities Service Corporations, was formed in 1928 when the parent company acquired control of numerous gas properties and pipe lines and these were merged into the present corporation. These properties included Natural Gas & Fuel Corporation, the Arkansas Natural Gas Company, the Industrial Gas Company and the gas system of the Southwestern Gas & Electric Company. The above companies formed a nucleus which has expanded into a powerful organization and which, through its strong financial backing, has bought new properties and developed the existing system.

In Heart of South.

The Arkansas Natural is in the heart of the south, which today is considered one of the most prosperous sections of the country. The natural resources of this area, which includes northwest Louisiana, northeast Texas and Arkansas, are almost unlimited, so great is the wealth of mineral deposits. Among the industries which are results of these splendid natural resources are the wood pulp mills and bauxite quarries.

These natural resources, coupled with the availability of cheap gas, labor and transportation, are becoming a magnet to the industries in other sections of the country. Manufacturers are realizing what splendid facilities are offered to them in the way of factory sites and other factors which determine the location of great industries.

An industrial area, three hundred miles long and over a hundred miles wide, extending southward from Lit-

Natural Gas Executives



D. W. HARRIS



R. W. CURRAN

Mr. Harris, whose offices are at Shreveport, is vice president and general manager of the gas corporation. A graduate of Georgia Tech, he has been with the Doherty interests for years, serving in various capacities. He is one of Shreveport's leading citizens, being a director of the Y. M. C. A. and Chamber of Commerce and a member of the executive committee of the Boy Scouts and Rotary Club. Mr. Curran, whose offices are in Little Rock, is general manager of the Arkansas distribution properties of the corporation. He also has been with Mr. Doherty for years. At the spring convention of the Arkansas Utilities Association, he was elected president of the organiza-

tion, subsidiary of Cities Service Com-
pany. The two are growing, fe-
pands only as rapidly
pective growth of the
it serves.

180-Mile Right-of-Way Leased for Chicago-Texas Gas Line.

(Chicago Tribune-Arkansas Gazette Special.)

Chicago, Dec. 29.—Steady progress is being made in the big project of bringing natural gas to Chicago from the Texas fields through a 1,000-mile pipe line. It was announced today that the Chicago, Rock Island and Pacific railroad has leased its right of way between Rock Island and Chicago, a distance of about 180 miles, to the Continental Construction Company for the laying of two 24-inch pipe lines.

The Continental Construction Company was organized jointly by the Insull interests, which largely control the distribution of gas in Chicago and adjacent territory, the Cities Service Company, the Standard Oil Company of New Jersey, the Texas Corporation and other utility interests. The pipe lines not only will bring natural gas to Chicago and vicinity but also will serve intermediate territory.

The deal with the Rock Island provides that the pipe lines will follow the railroad right of way as far as possible and that the railroad shall receive an annual rental of \$25 a mile for each line laid. The pipe lines will carry natural gas at a high pressure, thus greatly increasing their load capacity. In Chicago and adjacent territory the gas will be distributed by the Insull companies after being mixed with artificial gas now being made at their plants.

tle Rock to Shreveport, is served by the Arkansas Natural Gas Corporation. The pipe line system furnishes gas for approximately one hundred communities with an estimated population of nearly one-half million.

In 1929, four main pipe line systems were added to the already large systems of the Arkansas-Louisiana Pipe Line Company, transportation subsidiary of the Arkansas Natural Gas Corporation.

New Line is Added.

An important development of the year was the completion of a 12-inch line from Emmett to El Dorado, Ark. This permitted a tying up of this line with a ten-inch leased line from El Dorado to Richland parish, Louisiana, where some of the largest gas wells in the world are located and where the Arkansas Natural has considerable acreage. It is from here that a great proportion of the company's gas enters the lines.

A still greater expansion was made when the company built a 137-mile pipe line running directly west from the Richland field to Waskom, Texas. Fifty miles of eight-inch line were laid to serve eight new towns in East Texas with natural gas. The

list of these towns includes Jefferson, Daingerfield, Gilmer, Mount Pleasant, Mount Vernon, Winnsboro, Pittsburg and Avinger.

Shreveport, which is served by the Southern Cities Distributing Company, subsidiary of the Arkansas Natural Gas Corporation, is an important petroleum center and many oil companies have their offices there. It is also the largest fertilizer manufacturing center in the southwest.

Little Rock has a population including North Little Rock of more than 100,000. The distributing company for the Arkansas Natural in this city is the Little Rock Gas & Fuel Company. The city produces finished material annually valued at \$150,000,000. Other cities served by the distributing companies of the Arkansas Natural and who have enjoyed splendid growth in the last decade are Pine Bluff, El Dorado, Texarkana, and dozens of others. Supervising the activities of the gas distribution properties in Arkansas is R. W. Curran, whose headquarters are in Little Rock.

In New Home.

Last October, the Little Rock Gas & Fuel Company moved into its beautiful new home at Capitol avenue and Center street. For many years, it had been located in the Arcade Building at Seventh and Louisiana streets. But necessary expansions and the addition of a new business (merchandising) department made larger quarters imperative.

The Arkansas Natural Gas Corporation has three wholesale cities, Hot Springs, Camden and Clarksville, to which it furnishes gas at the town borders to independent companies.

This gas company also enters actively into the production of natural gasoline. All such plants are situated at advantageous points. Three plants are operated in the El Dorado field, one in Richland field and one in Caddo field, south of Shreveport. Another plant, independent of any pipe line connection is operated at Homer in Claiborne parish, Louisiana.

Back of the corporation is a personnel of capable men who are able to carry all of its projects through to a successful conclusion. One of the greatest forces in the organization is D. W. Harris, vice-president and general manager of the Arkansas Natural Gas Corporation. Mr. Harris has been connected in executive capacities with Cities Service Company for many years.

The Arkansas Natural's development is made possible by its unflinching belief in the territory served

CAPITOL UTILITY COMPANIES MERGER DISCLOSED

Joining of Gas Distributing
Corporations Declared Move
to Simplify Operations.

Dec 29, 1934
Merger of four public utilities concerns operating in Arkansas, all subsidiaries of Cities Service, Inc., into one company to be known as the Arkansas-Louisiana Gas Company, was revealed yesterday when a copy of the merger agreement, approved at a stockholders' meeting in New York a month ago, was filed in the secretary of state's office. The new company, incorporated under the laws of Delaware, is capitalized at \$12,000,000.

The companies merged into the new company were:

Arkansas-Louisiana Pipe Line Com-

pany.

Southern Cities Distributing Com-

pany.

Public Utilities Corporation of Ar-

kansas.

Reserve Natural Gas Company of

Louisiana.

Headquarters at Shreveport.

All the companies were incorporated under the laws of Delaware and had operating headquarters at Shreveport, where the new company will maintain headquarters.

The consolidation was effected by

merging three companies with the Southern Cities Distributing Company and changing the name of the latter to Arkansas-Louisiana Gas Company.

Stock of the new corporation was exchanged for outstanding stock of the discontinued companies and all real estate, equipment and other holdings of the four companies were transferred to the new.

Local Company Not Included.

R. W. Curran, manager of the Little Rock Gas and Fuel Company and a director in the new corporation, said last night that the Little Rock Distributing Company and the Arkansas Natural Gas Company, Cities Service subsidiaries, will not be affected by the merger. He said the consolidation will simplify operation of Cities Service gas properties in Arkansas, Louisiana and Texas and will leave only three corporations in this territory, where six have been maintained.

The Southern Cities Distributing Company furnished natural gas to several cities and towns in northern Louisiana, eastern Texas and at Texarkana.

The Public Utilities Corporation of Arkansas operated distributing plants at Russellville, Dardanelle, Ashdown, Mineral Springs, Nashville, El Dorado, Smackover, Norphlet, Louann, Strong, Junction City and other towns.

The Reserve Natural Gas Company and the Arkansas-Louisiana Pipe Line Company operated exclusively as pipe line companies.

The Arkansas Natural Gas Company will continue to distribute gas at Pine Bluff, Sheridan, Arkadelphia, Hope, Magnolia and several other towns in that section of the state.

The new company's Delaware charter authorized it to issue 240,000 shares of stock with a par value of \$50 each.

Papers qualifying the new company to operate in Arkansas and withdrawing the dissolved corporations will be filed soon, it was said.

Hearing Postponed.

A hearing on a citation issued by the Arkansas Corporation Commission several weeks ago to require the Arkansas-Louisiana Pipe Line Company to show cause why it should not be penalized for failure to file a schedule of rates for gas sold to distributing companies in Arkansas was reset recently for January 15 to await completion of the merger plan.

Officials of the commission said yesterday that the citation had no bearing on the merger, but that the schedules the commission desired filed now will be available in rate schedules of the new corporation. It was not known yesterday, officials said, what disposition will be made of the citation hearing.

Bonus for Finding Oil Field Proposed

Dec 12, 1934
A bill which would cause the state to offer \$5,000 to any person discovering a new oil field will be recommended in the biennial report of George C. Branner, state geologist, he said yesterday. The bonus offer would be intended to stimulate developments in the oil industry, he said.

Counties in the recognized oil area in south Arkansas would be excluded from the offer, he said. About six counties would be excluded.

HISTORY OF ARKANSAS OIL FIELD

Mississippi Oil Review
Jan 7-1931



The history of the Arkansas oil field begins with the blocking of acreage in Union County in 1919. As a result of these efforts the Constatin Oil & Refining Company completed a thirty million cubic feet gas well on April 12th, 1920. The well was located two miles south of El Dorado. Located one mile west of El Dorado the first producing well was drilled by local capital. The well was completed on January 10th, 1921, with an estimated flow of 5,000 barrels of oil. Arkansas now has over 4,000 oil wells with a daily production of approximately 80,000 barrels.

During the year of 1921 El Dorado, Arkansas, field produced ten million, one hundred ninety thousand barrels of oil. In 1923 produced thirty-one million, one hundred thirty-one thousand barrels of oil. For the eight years, inclusive of 1923, there was produced in Arkansas three hundred thirty-six million, one hundred seventy-one thousand barrels of oil and based on the average price of \$1.00 per barrel for the crude product has brought into the state over three hundred and thirty-six million dollars, from which the state government has received in taxes over eight million dollars.

Arkansas production of gasoline in 1928 was 110 million gallons, the gasoline tax paid by the consumers to the State of Arkansas was several million dollars.

Records of the Lion Oil Refining Company of El Dorado, Arkansas, show that during 1928 it shipped petroleum and its products into twenty-five states of the Union, the Dominion of Canada and to many foreign ports.

It is estimated that there is invested in Arkansas by the producing, refining and pipeline companies over 250 million dollars.

The highest quality of anti-knock gasoline from Smackover crude oil is manufactured by the El Dorado, Arkansas, refineries, and in addition they manufacture gasoline, naphtha, kerosene, tractor distillate, furnace distillate, gas oil, fuel oil, road oil, fluxing oil, tie treating oil, transmission oil, asphalt, petroleum coke and casing head gasoline.

Of the 4,440 producing oil wells in

Arkansas the average daily production per well for 1928 was approximately 19 3-4 barrels. As compared to the average daily production of wells in the entire United States of eight barrels. By this comparison it is seen that the average production per well each day in Arkansas during 1928 was more than twice as great as the average daily well production for the entire United States.

The Smackover oil pool which is about twelve miles north of El Dorado, Arkansas, was first discovered in 1922. In 1925 a deeper sand was encountered which had at one time a peak production of over 450,000 barrels of oil per day, and is considered one of the largest oil pools ever discovered. Competent authorities are inclined to believe that still deeper oil production will be encountered in this pool or adjacent territory.

There are seven major pipeline companies transporting oil from the Arkansas field with 450 miles of lines in Arkansas and a combined daily capacity of over 100,000 barrels.

In Union County Arkansas there are sixteen cashinghead plants with a value of several million dollars and which produced over forty million gal-

lons of cashinghead gasoline in 1928. These plants have a daily capacity of 96,000 gallons.

In Arkansas there are from the figures of the Arkansas Natural Gas Company over 624 miles of lines transporting natural gas to 34 towns and communities serving 44,000 customers. Arkansas has an abundance of natural gas and offers wonderful opportunities for industries seeking cheap fuel.

When oil was discovered in El Dorado, Arkansas, in 1921, it was a country town of about 3,500 people but it now has a settled population of over 30,000 and has developed into a first class modern city with a constantly growing population of high class citizens.

Smackover was merely a cross roads. It is now a thriving town of over 5,000 people.

It is felt that the oil and gas reservoirs of Arkansas have been only scratched and that the future will develop many oil fields that should enrich the state and the investors in Arkansas.

Jackson, Miss.
S. T. WSBY
Petroleum Geologist
Office 454 West Capitol
Telephone 5332

Capitol Street Phone 5366
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NATURAL GAS IS SEEKING NEW WORLDS TO CONQUER.
Bazette 5-16-31
A single natural gas company in Texas has 1,400 industrial plants on its lines, according to a speaker at the natural gas convention held this week at Memphis. We are told that the industrial development of that state has paralleled "in a very significant manner" the extension of pipe lines offering factories abundant cheap fuel for power and heat producing purposes. Natural gas, this speaker said, has played a large part in building up Texas industries concerned with the numerous by-products of cotton and cotton seed. The clays of the state are converted into brick and tile by the use of this same convenient and easily controlled fuel, and Texas gypsum, sulphur and other materials are being sent to market in the finished state through the medium of natural gas. *Hazette 5-16-31*

Similar applications of natural gas to industrial development are to be observed in Louisiana and Oklahoma and to some degree in Arkansas, particularly at Fort Smith and in the big cement plant at Okay. Besides lying close to the Texas, Louisiana and Oklahoma fields, we have rich gas resources of our own, which are rightfully one of our important natural assets.

These natural gas men are looking for the traditional new worlds to conquer. They are seeking to develop the greatest possible number of new users of gas, and they have found some surprising ways to expand consumption. One project is to give farmers one or several additional cuttings a year from their alfalfa fields by using gas heat instead of the sun for drying the hay. Drying cotton to make it gin better and yield better

staple and grade is being tried in Texas, following earlier experiments in the Far West. Last winter in the Rio Grande valley citrus growers saved their crops from frost by installing gas pipes and burners at regular intervals in their orchards. But perhaps the most striking project is one to give natural gas companies a more equal summer and winter load by applying to house cooling purposes by general refrigeration during the warm months the same gas supply that in winter time is used to keep the occupants warm and cozy. Aesop wrote a fable about the person who blew hot and cold with the same breath. That is precisely what the natural gas people are hoping to do with the breath of their pipe lines.

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