STATE OF ARKANSAS

Arkansas Geological and Conservation Commission

Norman F. Williams, Geologist-Director

WATER RESOURCES CIRCULAR NO. 5

GROUND-WATER RESOURCES OF PARTS OF LONOKE, PRAIRIE, AND WHITE COUNTIES, ARKANSAS

by

Harlan B. Counts

U. S. GEOLOGICAL SURVEY

Prepared in cooperation with the United States Geological Survey

Little Rock, Ark.

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GROUND-WATER RESOURCES OF PARTS OF LONOKE, PRAIRIE, AND WHITE COUNTIES, ARKANSAS

By Harlan B. Counts

SUMMARY

Ground water is by far the most important mineral resource in northern Lonoke, northern Prairie, and southeastern White Counties, Ark. More than 95 percent of the water used for all purposes comes from wells, and the total pumpage amounts to nearly 11 billion gallons a year. Most of this is used during the summer irrigation season, but averaged over the year it amounts to about 30 mgd (million gallons per day). Irrigation takes about 28.5 mgd, of which 24 mgd is used in the cultivation of rice and 4.5 mgd is for supplemental irrigation of row crops. Municipalities use about 0.5 mgd and other domestic uses, chiefly on farms, require about 1 mgd. Although ground water now plays a large role in the economy of the area, considerable additional development of this important resource is possible.

A study of the ground-water resources of the area was made to determine the occurrence, availability, movement, recharge, discharge, and mineral content of the ground water in an area in which the development of irrigation wells has been stimulated by 3 years of drought (1952-54). The present report should be useful to cities and towns, farmers, well drillers, and others who now operate or wish to drill wells, by helping them to determine, for any given location, the depth to water, the character of the materials that will be penetrated by the drill, the chemical quality of the water, and the quantity of water available. In short, it should aid the citizens in making the most economical development of their ground-water resources and in preventing overdevelopment.

The geologic formations serve as both the storage reservoirs and the conduits through which the ground water is slowly moving (in this area at an average velocity of about 0.3 foot per day) from places of natural recharge to places of natural discharge or to wells. For this reason the geologic map (pl. 1, p. 59) is an important key to the availability and character of the ground water.

Wells yielding about 400 to 1,700 gpm (gallons per minute) can be developed at depths of about 60 to 156 feet in the Quaternary deposits that contain basal sand and gravel (pl. 1). Test drilling disclosed the presence of this favorable condition in the eastern part of the Sand Hills area, where supplemental irrigation could benefit cotton, pastures, hay, and strawberries presently grown there and might make possible the growing of many other crops. In two areas of concentrated pumping for rice irrigation, west of Des Arc and in the south-central part of the area at the boundary, water levels have been lowered to such an extent that it is thought that any considerable increase over the present development would result in significant depletion of local ground-water resources. Elsewhere in the area of its occurrence, the principal aquifer, here defined as that part of the area of Quaternary deposits in which the basal gravel zone is present, will perennially supply many additional irrigation wells.

Test drilling also disclosed the absence of the sand and gravel deposits that compose the principal aquifer in those Quaternary deposits which lie near the Fall Line and those which occupy embayments along the larger streams that issue from the Interior Highlands. Definition of the approximate boundary between those Quaternary deposits that contain the principal aquifer and those that do not should aid in locating irrigation wells where the aquifer is present and save much fruitless drilling in areas where it is not present.

In one area of unknown but probably small extent southeast of Bald Knob, water in the principal aquifer is too salty for most uses. (See Fig. 8.)

There is some possibility that wells 100 to 600 feet deep may obtain soft water from deposits of the Wilcox formation and the Claiborne group in the areas shown on plate 1 and described on page 9. No water wells have yet penetrated those units in this area, but they offer promise of possible development for municipal and domestic supplies.

The Tertiary(?) undifferentiated deposits generally contain meager amounts of water, sufficient only for individual farm wells, but test drilling disclosed one aquifer southeast of Cabot that will supply wells having a capacity of several hundred gallons a minute each. Cross sections through this aquifer are shown on plate 6 (p. 63) and the aquifer is described on pages 10 and 11.

The cross sections shown in plates 2-4 illustrate the positions of the several aquifers and the relationships of the different formations to one another in vertical planes as the geologic map illustrates the relationships in a horizontal plane. By use of the sections and the map in connection with the table of well records, one may determine the probable ground-water conditions at the site of his well.

The characteristics of all the larger irrigation, municipal, and industrial wells in the area, as well as of many of the smaller domestic and stock wells, are recorded in table 9. Chemical analyses of water from representative wells in the different formations throughout the area are given in table 8. By the use of these tables and the index map showing locations of wells (pl. 6), one may determine the probable chemical quality of the water to be derived from the several water-bearing formations at any location in the mapped area.

INTRODUCTION

This is one of a series of reports on the ground-water resources of Arkansas made under a program of investigations by the United States Geological Survey in cooperation with the Arkansas Geological and Conservation Commission. The program has been in progress since 1946 in cooperation with several State agencies, and the areas covered by reports resulting therefrom are shown in figure 1. These reports and other pertinent literature are listed in the bibliography, page 46. Annual water-level measurements in the rice-growing area are made cooperatively by the U. S. Geological Survey and the Arkansas University Agricultural Experiment Station.

The purpose of the present report is to describe the occurrence, availability, movement, recharge, discharge, and chemical quality of the ground water in northern Lonoke, northern Prairie, and southeastern White Counties, where interest in the development of irrigation wells has been stimulated by 3 years drought (1952-54). The report should be useful to cities and towns, farmers, well drillers, and others who now operate or wish to drill wells, by helping them to predict at any given location the depth to water, the character of the materials that will be penetrated by the drill, the chemical quality of the water, and the quantity of water available. In short, it should aid the citizens of this area to make the most economical use of their ground-water resources and to prevent overdevelopment.

Reports on the ground water of this area were made by Purdue in 1905 and Stephenson and Crider in 1916. Where possible, information from these earlier studies has been used in the preparation of the present report.

The field work in the area was started in March 1954 and continued intermittently until April 1956. The work was done under the direct supervision of P. E. Dennis, District Geologist, and under the general direction of A. N. Sayre, Chief of the Ground Water Branch, U. S. Geological Survey. The chemical analyses were made by the Quality of Water Branch of the U. S. Geological Survey, at Fayetteville, under the direct supervision of J. W. Geurin, District Chemist.

ACKNOWLEDGMENTS

The writer is grateful for the cooperation and help received from many people during the investigation and in the preparation of this report, including well owners, water-well drillers, and representatives of various Government agencies. Many logs and other data were furnished by Messrs. Fred Lilly and Bob Lilly of Lilly Bros. Well Co., and by the Layne-Arkansas Co.

REGIONAL SETTING AND PHYSIOGRAPHY

The area described in this report (fig. 1) is roughly triangular and comprises about 1,200 square miles in central Arkansas. The White River on the east and the Fall Line escarpment on the northwest form natural boundaries. The southern boundary is the southern edge of T. 3 N. and was chosen because it represents the northern limit of a previous study (Engler, Thompson, and Kazmann, 1945) of the Grand Prairie region.

Physiographically the area includes a part of each of the two major provinces of Arkansas—the Interior Highland province and the Coastal Plain province (Croneis, 1930, p. 7). For convenience of description, the transition zone between the highlands and the plains is here called the Fall Line and a part of the plains that is considerably more hilly than the rest is called the Sand Hills. (See pl. 1). Only a marginal area of the Highlands province is included in this study.

Rocks of Paleozoic age, exposed in the Interior Highlands, disappear abruptly beneath rocks of Tertiary and Quaternary age at the Fall Line. The straightness of that line and its offset where it is crossed by the White River strongly suggest a fault-line scarp. However, available subsurface data on the Paleozoic rocks show no offsetting of beds, and thus no evidence of faulting or of sharp monoclinal folding. On the contrary, at least locally, the Fall Line is near the axis of a broad anticline (Caplan, 1954, pl. 9, sec. E-E').

The term "Sandhill area" was adopted, from local usage, by Purdue (1905, p. 93) for the hilly area south of Austin. The Sand Hills as used in the present report (pl. 1) include all of the hilly area and extend from Cabot to about a mile east of Hickory Plains and from Cypress Creek to Wattensaw Bayou. The core of the Sand Hills is south of Cabot and Austin in the dissected ridges that rise to altitudes generally 300 to 400 feet above sea level. Dissected in terracelike steps, the highest prominent bench is about 340 to 345 feet above sea level, the next lower is about 325 to 330 feet above sea level, and the third is

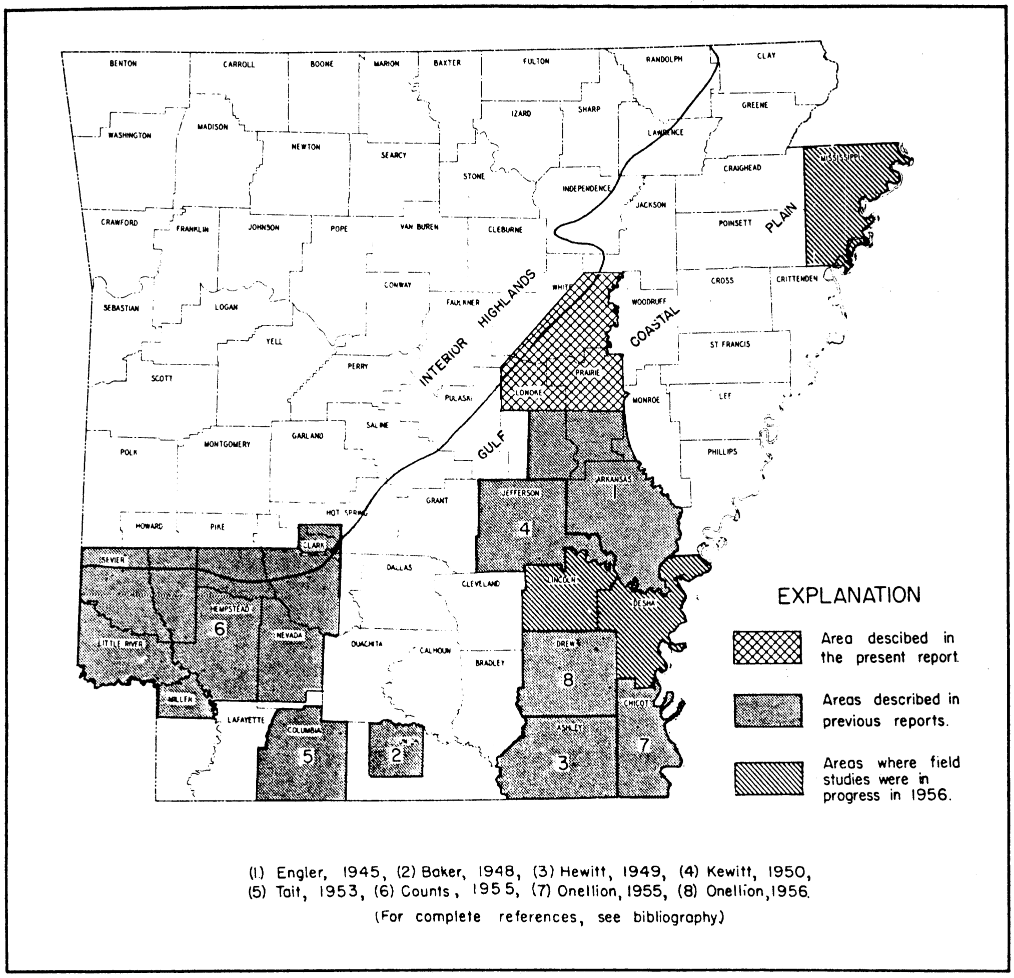

Fig. 1 Map of Arkansas showing areas in which recent ground-water studies have been made

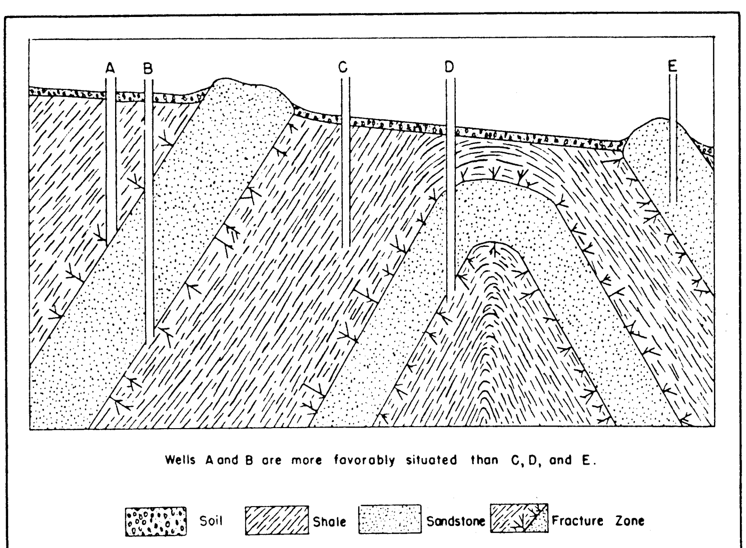

Fig. 2 Sketch showing favorableness of well locations in the Atoka formation with respect to structure

about 260 to 265 feet above sea level. East of Pigeon Roost Creek the entire area has been terraced and has a maximum altitude of about 260 to 265 feet. The Sand Hills thus are composed of two parts separated for a part of its course by Pigeon Roost Creek. The physiographic difference between them is the expression of a difference in the underlying rock materials. In the western (dissected ridge) area the Tertiary(?) undifferentiated deposits have not been removed but only dissected and terraced. In the eastern (terrace) area the Tertiary(?) undifferentiated deposits were removed to a depth of about 150 feet below the present surface and 150 feet or more of Quaternary materials were deposited. The Quaternary deposits were subsequently eroded and terraced. Both areas have been subjected to the erosion that produced the terraces at and below 265 feet above sea level.

The Coastal Plain area (pl. 1) is part of the "Advance Lowland" described by Stephenson and Crider (1916, p. 25) as a subdivision of the Gulf Coastal Plain. It consists of broad and nearly level interstream divide areas and flood plains cut from a few feet to about 25 feet below them. The bottom lands of the flood plains are characterized by numerous swamps, bayous, lakes, and abandoned stream channels.

The area is drained chiefly by the White River and its tributaries — Little Red River, Bayou des Arc, Cypress Creek, and Wattensaw Bayou.

CLIMATE

The climate in northern Lonoke, northern Prairie, and southwestern White Counties is characterized by relatively mild temperatures and by usually abundant rainfall. Winters usually are short and mild, but have occasional cold periods of a few days' duration. Summers commonly are long and hot, maximum temperatures reaching 100° F during July and August. Rainfall usually is abundant and on the average is well distributed over the year. However, in any given year a varying number of months may receive more or less than the average amount of precipitation for those months. Large deficiencies or excesses are especially common during the growing season.

According to the U. S. Weather Bureau, the normal annual precipitation recorded at Searcy, White County, is 47.79 inches, and the average annual temperature is 61.6 F. The distribution of the normal precipitation at Searcy, by months, and the average temperature are given in table 1.

TABLE 1

Normal Monthly Precipitation and Average Monthly Temperature at Searcy, White County, Ark.

Month	Precipitation (inches)	Temperature (°F)
January	4.77	40.6
February	3.50	44.9
March	4.66	52.2
April	4.84	61.2
May	4.52	69.0
June	3.98	77.6
July	2.95	81.4
August	3.60	80.7
September	2.93	74.5
October	3.13	63.0
November	4.30	50.9
December	4.61	42.8

The average frost-free growing season is 217 days. Killing frosts have occurred as late as April 20 and as early as October 9.

CULTURAL DEVELOPMENT

The population of the area decreased between 1930 and 1950, as indicated in table 2. The population density for Lonoke, Prairie, and White Counties is about 30 persons per square mile.

TABLE 2

Population of Lonoke, Prairie, and White Counties, 1930 to 1950

County	Population		
	1930	1940	1950
Lonoke	33,759	29,802	27,278
Prairie	15,187	15,304	13,768
White	38,269	37,176	38,040

Most of the people live on farms and are employed in agriculture. Cotton and rice are the principal crops in Lonoke and Prairie Counties, and cotton and strawberries are the principal crops in White County. Other crops are soybeans, oats, corn, and hay. Fish and minnow culture also is important.

The principal industries in the area are the processing of agricultural products and lumbering.

GEOLOGY AND WATER-BEARING PROPERTIES OF THE ROCKS

Ground water occurs in and moves through the generally small openings in rocks which serve both as storage reservoirs and as conduits through which the ground water moves from places of natural recharge to places of natural or artificial discharge. An understanding of the lithology and the distribution of rock formations is therefore necessary to an understanding of the occurrence and movement of the ground water.

The following generalized section (table 3) gives the names, ages, ranges in thickness, characteristics, and water-bearing properties of the rock units in the area of study, arranged in order from youngest at the top to oldest at the bottom. The cross sections (pls. 2-4) show the position of the water-bearing beds relative to one another and to the confining beds. The geologic map (pl. 1) shows the distribution of those units which are exposed at the surface.

Quaternary alluvial deposits cover a large part of the area to a maximum depth of about 156 feet. In most of the area they contain basal sand and gravel beds which make up by far the most important aquifer in the area. However, the coarse basal beds are absent in a part of the Quaternary deposits, as shown on plate 1. Beneath the Quaternary deposits in part of the southeastern half of the area, soft water may possibly be obtained from sand beds of the Wilcox formation and the Claiborne group. Although these Tertiary units do not crop out at the surface, the general area in which fresh water may be obtained from them is indicated on the geologic map (pl. 1).

The Tertiary(?), undifferentiated, deposits and the hard rocks of the Atoka formation generally are not important as water-bearing beds, although they do furnish water to domestic wells in the areas of outcrop.

The character and water-bearing properties of these rocks, beginning with the oldest, are described in the following pages.

ATOKA FORMATION (PENNSYLVANIAN)

Rocks belonging to the Atoka formation, of Pennsylvanian age, are exposed along the Fall Line, and crop out, or are covered by a thin veneer of later deposits and soil, northwestward from the Fall Line in White and Lonoke Counties. Southeastward from the Fall Line they underlie the younger deposits at progressively greater depths. The Atoka consists of interbedded shale, siltstone, and sandstone, the shale making up two-thirds to three-fourths of the thickness. The siltstone and sandstone beds generally are very tightly cemented and not uncommonly quartzitic. They range from thin lenses less than an inch thick to massive beds 4 or 5 feet thick. They generally are noncalcareous and nonfossiliferous, are tan to gray, and contain black carbonaceous markings on some bedding planes. The shale commonly is micaceous and very dense and has a superficial resemblance to low-rank slate or phyllite. It is gray to black and generally noncalcareous and nonfossiliferous.

The Atoka formation is very thick, perhaps 7,000 to 9,000 feet in its area of outcrop. However, Caplan (1954, p. 80) reports that the Lion No. 1 Nalley well in sec. 33, T. 8 N., 7 W., in White county encountered only about 935 feet of Atoka where some 2,500 feet was expected.

A system of generally eastward-trending folds is the principal structural feature affecting the Atoka formation. The folds are relatively sharp and have steeply dipping limbs near Cabot but become progressively more open northeastward. In the vicinity of Bald Knob and Bradford the beds are essentially horizontal, having dips of 1° or 2°, except near the Fall Line where the southward dips increase to 5° to 15°. Although the folds generally strike east, some divide, change direction of strike and become more sharply arched as they approach the Fall Line.

An anticline near Cabot (pl. 1) produces dips of as much as 70°, the steepest in the area. The anticlinal axis lies about midway between Cabot and Austin, and the sandstone beds on both flanks produce eastward-striking parallel ridges. On the south flank, however, the beds are flexed sharply southward at the Fall Line as if by drag along a fault in which the Highland block had shifted northeastward. West of Beebe the strike of the fold axes changes to northeast, there being a sharp anticline at and nearly parallel with the Fall Line. Those folds plunge southwestward. About 4 or 5 miles northwest of Beebe, State Highway 31 crosses a shallow almost circular structural basin. Another basin, more elongate, occurs southwest of Searcy. An anticline north of Searcy also plunges southwestward. These and other less prominent folds are shown by strike and dip symbols on the geologic map (pl. 1).

Numerous domestic wells obtain water from the Atoka formation along and near the Fall Line. Most of the wells are shallow, common-

TABLE 3

Generalized Geologic Section for Parts of Lonoke, Prairie, and White Counties, Ark.

Era	System	Series	Subdivision	Thickness (feet)	Character of Materials	Water Supply
Cenozoic	Quaternary	Recent(?)	Alluvium	0-50	Clay, commonly red, in places gray; silt, generally sandy to gravelly.	Generally non-water-bearing. Locally domestic water supplies are obtained from basal part.
		Pleistocene(?)	Alluvium and terrace deposits	0-156	Sand and gravel in basal part, commonly overlain by fine sand, silt, and clay.	Basal part is most important aquifer in this area. Irrigation-well yields are as high as 2,000 gpm.
	Tertiary(?)	(?)	Undifferentiated deposits	0-150	Sand, clayey, and sandy clay, generally yellow to reddish-brown, mottled with gray spots where reducing conditions have existed. Channel fillings of clean sand occur locally.	Clean sand beds are important locally for domestic water supplies.
	Tertiary	Eocene	Claiborne group	0-700	Sand, white to light-gray, fine to medium, and gray to tan clay and sandy clay.	May possibly yield soft water in southeastern part of area. Salty water at base. Not yet developed by wells.
			Wilcox formation	0-800	Clay, chocolate-brown or speckled light-gray and black; lignitic clay and lignitic fine sand.	Probably contains fresh water in narrow belt across area, but wells were not developed in formation at time report was written.
		Paleocene	Midway formation	0-500	Clay, dark-blue-gray to black, noncalcareous to very calcareous. A few very thin beds of white clay and dense fine-grained sandstone.	Generally non-water-bearing in this area.
Mesozoic	Cretaceous	Upper Cretaceous (Gulf)	Undifferentiated deposits	0-150	Sandstone, light-gray to white, fossiliferous, calcareous, glauconitic, overlain and underlain by sandy clay, shale, and marl.	Deeply buried where present and probably contains only salty water.
Paleozoic	Pennsylvanian	Atoka	Atoka formation	500?-1,500?	Shale and sandstone interbedded. Sandstone generally tightly cemented. "Slate-rock" of drillers.	Water bearing only in area of outcrop. Locally contains small quantities of water in joints and other fractures, generally within 150 feet of the surface. Wells commonly yield 1 to 10 gpm.

ly about 50 or 60 feet deep, because the water occurs in fractures in the rock, which become fewer and less open with depth. Water generally is obtained from the hard shale, or "slate rock" as it is called locally.

Generally the sandstone is very tightly cemented, and the most permeable zone is in the shale immediately adjacent to a sandstone bed. Differential movement between the shale and sandstone beds seems to have occurred during their deformation, producing a shattered zone near the contact.

A structure that exposes the fractured contact zone to local recharge is likely to increase the amount of water available for withdrawal from wells. For this reason the flanks are more favorable than the crests of anticlines as sites for wells, as illustrated in figure 2 (p. 4). Wells C and E have not reached a fractured zone and neither of the fractured zones penetrated by well D is exposed to local recharge.

UPPER CRETACEOUS UNDIFFERENTIATED DEPOSITS

Cretaceous formations probably do not crop out in the area studied, although they are present at the surface in southwestern Arkansas and in a narrow band along the Fall Line northeast of the White River. Cretaceous fossils were reported by Stephenson and Crider (1916, p. 40, 49) to have been obtained from wells dug into strata below the Midway formation at Cabot and Beebe. No further evidence of rocks of Cretaceous age was found in these areas during the present investigation. Electric logs of oil-test holes (pl. 4) show the Upper Cretaceous to be present in the southeastern part of the area studied and to be overlapped by the Midway near the Fall Line. The Cretaceous rocks consist chiefly of sand or crumbly sandstone overlain and underlain by sandy clay, shale, and marl. No attempt has been made in this report to differentiate the Cretaceous deposits, but all or part of the sandstone probably is the Nacatoch sand. Caplan (1954, p. 90) states that "The absence of the Nacatoch between the Fall Line and the tentative zero contour line on Plate III is attributed here to complete removal of the Upper Cretaceous section by pre-Midway erosion rather than by non-deposition." If he is correct in this view, then the rocks of Cretaceous age found by Stephenson and Crider might be isolated remnants.

Rocks of Cretaceous age are unimportant hydrologically, because any remnants near the Fall Line are likely to be small and isolated and the Nacatoch sand at depth contains only salty water in the southeastern part of the area shown on plate 1.

MIDWAY FORMATION

Rocks of the Midway formation crop out in small patches southwest of Bradford and near Cabot. The actual outcrops are far too small to be shown on a small-scale map and are therefore exaggerated on plate. 1. That the rocks of this formation are present at shallow depths throughout all or most of the area near the Fall Line is attested by their indentification in cuttings from many water wells and test holes. Southeastward (basinward) the thick shale section of the Midway formation is easily recognized in electric logs (pl. 4) of oil-test holes. The Midway unconformably overlies Cretaceous beds and is in turn unconformably overlain by the Wilcox formation. Toward the Fall Line, the Midway formation overlaps the rocks of Cretaceous age (pl. 4), and at many well locations in the Cabot area it rests directly upon the Paleozoic bedrock. Near its outcrop area the Midway formation is overlain unconformably by the Tertiary(?) undifferentiated deposits which may possibly be of the Wilcox formation but probably are to be correlated with the Claiborne group or later deposits.

In complete sections of the Midway formation as encountered in oil test holes Caplan (1954 p. 94) describes an upper unit of dark, blue-gray fissile noncalcareous shale containing sideritic concretionary layers, and a lower unit of soft, gray calcareous, fossiliferous shale containing lenses of white limestone near the base. In the Cabot area the Midway formation consists of a dark-gray to black waxy-appearing noncalcareous nonfissile clay, 10 to 50 feet thick, overlying softer blue-gray calcareous clay containing Paleocene Foraminifera. Southwest of Bradford it consists of sandy to conglomeratic fossiliferous limestone interbedded with calcareous friable sandstone.

Foraminifera recovered from a shallow dug well in Old Austin, and from a depth of 120 to 125 feet in a test hole east of Jacksonville were submitted to the Paleontology and Stratigraphy Branch of the Geologic Division, U. S. Geological Survey, for identification. A report by Ruth Todd of that Branch lists a total of 31 species, 27 from the test hole and

23 from the dug well. She states, "The fauna is very similar to a Paleocene one described from Little Rock, Arkansas (Contr. Cushman Lab. Foram. Res., v. 22, pt. 2, 1946, p. 45-65. pls. 7-11). The fauna is marine, deposited at moderate depths (probably 10 to 100 fathoms, more likely toward the deeper end of this range, although possibly shallower than 10 or deeper than 100 fathoms), and under the influence of ocean currents, as globigerinids are present."

In oil test holes (pl. 4) the Midway formation shows a remarkably uniform thickness of about 400 to 500 feet, but near the Fall Line it thins to a featheredge, probably because of removal by erosion rather than because of nondeposition.

The Midway formation is not known to yield water to wells in the area of the present study, although both the basal limestone and the interbedded sandstone are reported to furnish water to domestic wells southwest of Little Rock.

WILCOX FORMATION

The Wilcox formation is not known to crop out in the area covered by this investigation unless the rocks here designated Tertiary(?) undifferentiated deposits (pl. 1) represent that formation. In the southeastern part of the area electric logs of oil-test holes indicate that the Wilcox formation unconformably overlies the Midway formation and is overlain (probably disconformably) by deposits of the Claiborne group (pl. 4). In cuttings from test holes the Wilcox formation is found to consist of chocolate-brown lignitic clay and speckled light-gray and black sandy clay with interbedded very fine sand. Plant fragments and pieces of lignite are locally abundant. It generally is nonfossiliferous except for the plant materials. Interpretation of the electric logs indicates that the Wilcox ranges in thickness from a featheredge to about 800 feet in this area.

In eastern Arkansas and western Tennessee, where it is an important aquifer, the Wilcox contains thick sand beds known locally as the "1,400-foot" sand. According to Stearns and Armstrong (1955, p. 12-13, 17; pls. 5, 7), this sand does not appear to be present along the western edge of the embayment. However, electric logs show sand beds at the base of the Wilcox in the northern Grand Prairie region, and some of these beds probably contain fresh water in the area shown on plate 1. No water wells have yet been drilled to this formation. Test holes or wells to determine the water-yielding characteristics of the Wilcox formation should be drilled in the belt indicated on plate 1. Fresh water might be expected to occur in this formation at a minimum depth of about 100 feet and a maximum depth of about 250 feet near the northwestern boundary of the belt, at a minimum depth of about 400 feet and a maximum depth of about 600 feet near the southeastern boundary of the belt, and at intermediate depths between the boundaries. Down dip, water in the sands of the Wilcox is salty.

CLAIBORNE GROUP

Rocks of the Claiborne group are not known to crop out in the area of the present study unless the rocks here designated as Tertiary (?) undifferentiated deposits belong to that group. Electric logs of oil-test holes indicate that there is considerable sand in the rocks of the Claiborne group where they overlie the Wilcox formation in the southeastern part of the area. However, presently available information does not permit differentiation of the group into the Cane River formation, the Sparta sand, the Cook Mountain formation, and the Cockfield formation, as is possible in southwestern Arkansas. Few samples of the Claiborne are available from this area, but where known they consist generally of white to light-gray fine to medium sand with interbedded gray or tan clay and sandy clay, lignitic clay, and lignite.

Electric logs of oil-test holes indicate that the upper sand beds in the Claiborne group probably contain fresh water in the southwestern part of the area shown on plate 1. Test holes should be drilled southeast of the line shown on this map to determine the water yielding possibilities of the Claiborne in this area. Fresh water might be expected in this formation at a minimum depth of a little more than 100 feet throughout the area shown and at a maximum depth between about 250 feet near the northwestern boundary to about 500 feet in the extreme southeastern part of the area. Down dip, the water in the lower sand beds is probably salty (pl. 4).

No wells are known to obtain water from the Claiborne in this area, but irrigation, municipal, and domestic wells obtain water from that formation in the Grand Prairie region farther south.

TERTIARY(?) UNDIFFERENTIATED DEPOSITS

The rocks designated as Tertiary(?) undifferentiated deposits correspond in general with those shown as Eocene undifferentiated on the State geologic map. They constitute the surface rocks of the western part of the Sand Hills area, cover much of the area near the Fall Line, and overlap the Atoka formation up to altitudes of about 400 feet, except where they have been removed by erosion. These deposits extend up the valleys in the Highland province much farther than is shown on the map (pl. 1), where they generally are greatly eroded, partly reworked, and too thin to furnish water even to farm wells. That an erosional topography had been formed on rocks of the Midway formation before the deposition of the Tertiary(?) undifferentiated sediments is suggested by a difference of about 33 feet in the altitude of the contact between the two units in test holes less than 100 yards apart.

The Tertiary(?) undifferentiated deposits consist for the most part of compact sand and interbedded clay, but local induration has produced friable sandstone and interbedded shale. Most of the sand and sandstone contains considerable clay and silt, but clean sand lenses occur locally. The rocks are bright orange to dark-reddish-brown in most places. A mottled surface is very common, with gray or yellow to orange areas surrounding dark-reddish-brown patches. The reddish-brown oxides appear to have been reduced along joint and along funnel-shaped and irregularly shaped seepage channels. The sand has small white to gray masses of clay intimately mixed with the brown-stained quartz grains and in this respect has a superficial resemblance to weathered arkose. The grains generally are rounded to subrounded and, except for the clay masses, are well to moderately well assorted. The clayey character of the sand seems to have resulted from weathering of part of the individual sand grains rather than from the deposition of sand and clay together. It seems likely that the clay masses were originally sand grains composed of hard shale. The clay and silt beds generally are gray but weather to light brown near the surface. Small lenses of clay and clay balls are common in some of the sandstone. A bed of loose sand, containing angular blocks of iron-oxide cemented sandstone, occurs locally in the upper part of the sequence and caps the hills that rise to an altitude of 400 feet about a mile southeast of Cabot.

The materials of these deposits generally may be distinguished from the upper part of the Quaternary alluvium by (1) their more thoroughly indurated character, (2) the presence in them of very coarse sand and their generally more sandy character, and (3) the presence of ironstone concretions and detrital fragments of iron-oxide cemented sandstone.

A typical section of these deposits, about 50 feet thick, is exposed along the road between Austin and Old Austin and is described as follows:

Section a quarter of a mile southeast of Austin, in NW¼ sec. 9, T. 4 N., R. 9 W.

	Thickness (feet)
Sand, light-brown	3
Sandstone, in angular, detrital blocks cemented with iron oxide, and in a matrix of loose sand	1
Sand, medium, silty, reddish-brown	17
Clay, silty, gray, swells in water, lenticular beds	2
Sand, compact, medium to very coarse, mottled brown and gray; contains clay balls	5
Clay, plastic, gray	.5
Sand, silty, compact, medium to coarse, dark to orange-brown	2
Covered	5
Sandstone, friable, fine to medium, yellow to brown, containing hard gray spots	13
	48.5

The maximum thickness of the deposits thus far penetrated was at the locality of test hole 31, where about 219 feet was assigned to the Tertiary(?) undifferentiated deposits. No fossils have been found in the deposits, and the only evidence concerning their age lies in the fact that they overlap eroded beds of the Midway and Wilcox(?) formations and underlie the Quaternary deposits. Lithologically the rocks in part resemble the Detonti sand which is present southwest of Little Rock. The Tertiary (?) undifferentiated deposits cap hills up to an altitude of 400 feet east of Cabot but have been largely removed from the Atoka formation down to an altitude of about 300 feet northwest of Cabot. The deposits are quite unlike the clay and lignite beds typical of the Wilcox formation elsewhere in the embayment, and because of the uncertainty as to their age they are referred to in this report as Tertiary(?) undifferentiated deposits.

The Tertiary(?) undifferentiated deposits generally yield sufficient water for farm and household wells, but most of the aquifers are thin and lenticular and the depth of drilling or digging necessary to obtain water at any given place generally is unpredictable. In part of the Goodrum community, about 5 miles south of Cabot, these deposits are reported to contain so much clay that not even enough water for farm use can be obtained from them. On the other hand, at least one sand body of considerable size is present locally at the base of these deposits, as disclosed by test drilling 2 to 5 miles southeast of Cabot. Because of its interest in these sands as a possible source for a municipal water supply, the city of Cabot put down a number of additional test holes, a total of 9 being drilled in the area. (See logs of test holes 27-35, p. 34.)

As shown on the cross sections (pl. 6) the sand body appears to have a slope of about 75 feet per mile to the south. It is nearly a mile wide and 20 to 60 feet thick near the center. The sand crops out in Mill Creek and probably extends at least 3½ miles southward, where it was encountered by the C. C. Bratton farm well (well 174).

QUATERNARY DEPOSITS

Quaternary deposits cover most of the mapped area. They form the surface rocks of the Coastal Plain segment and the eastern part of the Sand Hills area, and extend across the Fall Line into the Interior Highlands area along the larger streams. The rocks consist of clay, silt, sand, and gravel deposited by Pleistocene and Recent streams. On the geologic map (pl. 1) the Quaternary deposits are divided into those generally containing basal beds of gravel and sand and those generally consisting only of fine-grained deposits. This distinction can be made only on the basis of subsurface data because the surficial deposits have a uniform lithology. The exact position of the line separating the two types of deposits is known in only a few places, and at many places subsequent information may shift it a mile or so one way or the other. Nevertheless knowledge of its approximate position should be helpful in guiding drilling, especially of wells for irrigation.

The reason for the presence of the basal gravel throughout most of the area and its absence near the Fall Line may be found in the difference in the size of the streams which deposited the materials in the area. The ancestral Mississippi River is thought to have excavated the Tertiary rocks between Crowleys Ridge and the bluffs west of the Arkansas River and to have partly refilled the valleys thus excavated with the Quaternary sand and gravel and later with finer sediments. However, the streams that were then tributary to the Mississippi River along the Fall Line, including the Little Red River, Cypress Creek, and Two Prairie Bayou, seem to have carried and deposited little coarse material, and the basal sand and gravel of the Quaternary deposits is present only in those areas formerly occupied by the master stream. Table 4 indicates that permeabilities in the Quaternary deposits decrease progressively toward the Fall Line, giving further evidence that the aquifer materials were deposited by the master stream and not by the tributaries.

The Quaternary deposits unconformably overlie rocks of Tertiary and Tertiary(?) age and are themselves not covered by younger materials. In the area of this study they attain a maximum thickness of about 156 feet. They consist of gray to light-brown sand and sand and gravel, reddish-brown fine sand, and gray, yellow, and red silt and clay. The basal sand and gravel beds, well shown on the cross sections A-A′, B-B′, and C-C′ (pls. 2-3), generally constitute one-third to two-thirds of the total thickness of the deposits. They tend to be finer grained at the top and grade into the overlying silt or fine red sand, which is in turn overlain in most places by red or gray clay or interbedded red and gray clay, silt, and fine sand. The red clay, interbedded red and gray clay, silt, and fine sand of the Quaternary deposits that do not contain basal sand and gravel beds appear to be identical with the material that caps the sand and gravel of the principal aquifer.

The basal sand and gravel beds of the Quaternary deposits are by far the most important source of ground water in the area. All the irrigation wells and many of the domestic wells are developed in them. The capacities of the irrigation wells vary considerably but generally they are between about 400 gpm and 2,000 gpm. Near the Fall Line these basal sand and gravel beds generally are thinner and contain a higher percentage of fine materials, and wells of large yield are less likely to be developed there than farther out on the Coastal Plain.

GROUND WATER

Occurrence of Ground Water

Only a brief discussion of the principles of occurrence of ground water will be given in the present report. A comprehensive description of principles was given by Meinzer (1923), and most of the following discussion concerns their application to parts of Lonoke, Prairie, and White Counties.

In essentially all places and at various depths, which depend on local conditions, pore spaces in the rocks are completely filled with water, and the rocks are said to be saturated. The top of the zone of saturation in deposits not confined under artesian pressure is called the water table. The condition of saturation is true of clay as well as of sand and gravel; but, because of the difference in permeability, it is possible to develop wells only in the coarser materials. The permeability of a rock is its capacity to transmit water under pressure. Permeability is determined by the size, shape, and arrangement of openings among the particles composing the rock. For example, a bed of fine silt or clay may have a high porosity, which is the percentage of the volume of rock mass consisting of pore spaces to the volume of the whole rock mass; but, because of the small size of the openings and the adherence of the water to the rock grains, the permeability, or water-yielding capacity, may be very low. Well-sorted sand or gravel containing relatively large and interconnected openings transmits water freely. Therefore, water generally is obtained from wells finished in the more permeable rocks below the water table, and such water-bearing beds are called aquifers. Beds of fine-grained material, such as clay or silt, transmit ground water so slowly that they may confine under artesian pressure the water that occurs in an underlying aquifer and thus may be referred to as "confining beds."

Where water-bearing beds are inclined and are enclosed between relatively impermeable strata, such as silt and clay, the confined water may be under artesian pressure and it will then rise in wells above the level at which it occurs in the aquifer. If the altitude to which the water will rise is greater than the altitude of the land surface, wells will flow.

On the outcrop of water-bearing beds, or where the water-bearing beds are overlain by permeable materials from the surface down the water generally is unconfined and does not rise in wells above the water table.

These principles apply in all parts of Lonoke, Prairie, and White Counties, and some of the more important features of the occurrence of ground water in the area are mentioned below. Wells tapping the Atoka formation yield water most readily from fractured shale near the contact or along the bedding planes between the sandstone and the shale. Wells finished in the Tertiary(?) undifferentiated deposits and the Quaternary deposits yield water most readily from sand and gravel beds. The principal aquifer in the area is the sand and gravel at the base of the Quaternary deposits. A bed of silt and clay overlies these beds, and Tertiary clay generally underlies them. These beds of low permeability act as confining layers, and in places the water in the aquifer is under artesian pressure; that is, the water in a well will rise above the base of the confining layer. This is true in White county and the extreme northern part of Lonoke County. Elsewhere, the water level generally is below the upper confining layer, especially during the pumping season. To avoid confusion, the term "water table" will be used when referring either to the water table or to the artesian pressure surface (piezometric surface) as it appears on the illustrations and in the text of this report.

RECHARGE, MOVEMENT, AND DISCHARGE OF THE GROUND WATER

Ground water in Lonoke, Prairie, and White Counties is derived from rainfall upon the area and upon adjacent areas. A part of the precipitation runs off into streams, a part is returned to the atmosphere by evaporation and transpiration from vegetation, and a part infiltrates to the zone of saturation after the soil moisture has reached field capacity. In the zone of saturation, ground water is slowly but steadily moving, under the influence of gravity, from areas of intake toward areas of discharge. In the more permeable rocks the water moves with comparative freedom, although the movement is very slow compared to the flow of a stream.

Where some part of the water-bearing bed is exposed at the surface or comes in contact with another aquifer, stream, or lake, the water discharged naturally or through wells can be replenished periodically. Where the aquifer is more or less completely surrounded by clay or by other relatively impermeable materials, natural recharge may be slow, and the water taken from storage in the aquifer may not be replenished each year. The initial yields of wells in aquifers that are virtually cut off from natural recharge may be as large as or larger than those of wells in aquifers having adequate recharge areas, thereby giving an erroneous impression of the amount of water perennially available. Yields of wells obtaining water principally from storage instead of from recharge tend to decline as the water in storage is depleted.

Recharge by direct penetration of rainfall occurs along the Fall Line in Lonoke and White Counties and in other parts of the area where the materials overlying the aquifers are relatively permeable from the surface down. Relatively coarse material overlies the basal sand and gravel of the Quaternary deposits nearly everywhere along the Fall Line and locally in other places, but over much of the area these deposits are overlain by clay which impedes the penetration of rainfall.

Figure 3 shows hydrographs of water-level fluctuations in wells 200 and 266 and the daily rainfall for Searcy, in White County. A general rise in water levels occurs in both wells after periods of heavy precipitation, indicating recharge by direct penetration of rain. The rises lag some 2 or 3 weeks behind the periods of maximum precipitation, suggesting that the places of recharge are some distance from the wells. The fluctuations caused by individual rains seem to be superimposed on a general seasonal trend of high water levels in winter and spring and low water levels in summer and fall, and a noticeable rise after a rain is more likely to be shown upon the rising curve of winter than upon the declining curve of summer. A much closer correlation between the precipitation and the water levels probably would be noted if a record of precipitation in or near the area of recharge were available, because there is a great variability in intensity and duration of summer thundershowers within short distances. A hydrograph (fig. 4) of well 176 tapping Tertiary (?) undifferentiated deposits shows a rapid rise in water level immediately after the heavier rains. The recharge affecting this well probably occurs in the vicinity of the well.

Recharge by water from streams and lakes probably still is of minor, although of increasing, importance in the area covered by the present report, because the regional water table (pl. 7) is nearly everywhere higher than the water levels in these bodies of surface water except during periods of flood. However, as the water level adjacent to them is lowered by pumping, to the extent that the hydraulic gradient is reversed, there probably is an increasing amount of recharge from many of the streams and lakes. Reference to plate 7 shows that there probably is some recharge from the White River in the southeastern corner of the mapped area where pumping for rice irrigation has lowered water levels below stream level.

There is very little recharge to the Quaternary deposits by subsurface inflow from adjacent formations. The Tertiary(?) undifferentiated deposits along the Fall Line and in the Sand Hills area furnish some recharge to the Quaternary deposits, but their generally fine grain greatly restricts the amount of water passing through them. The amount of recharge from the Atoka formation also is small because of the low permeability of the formation and because a variable thickness of the Tertiary(?) undifferentiated deposits generally lies between the Atoka formation and the Quaternary deposits.

The shape and slope of the water table in Quaternary deposits in parts of Lonoke, Prairie, and White Counties, during the spring of 1955, is shown on plate 7 by contours drawn on the water table. Each contour line has been drawn through points on the water table having the same altitude. The altitudes of measuring points were taken from quadrangle maps, and the contours probably would be much smoother if it were possible to run instrumental levels to the measuring points of all wells. Ground water moves in the direction of maximum slope, which is at right angles to the contours. The contour map indicates that the water table slopes regionally toward the southeast except in the southern part of the area, where it slopes toward the south into the large cone of depression formed by heavy pumping in the Grand Prairie region (Engler, Thompson, and Kazmann, 1945, pl. A). Within the area shown on plate 7 another, but smaller, cone of depression has been formed by pumping for rice irrigation west of Des Arc in Prairie County. Water is moving toward the center of this cone from all directions. The spacing of the contours over the entire area shown on plate 7 indicates an average regional hydraulic gradient of about 3.2 feet per mile.

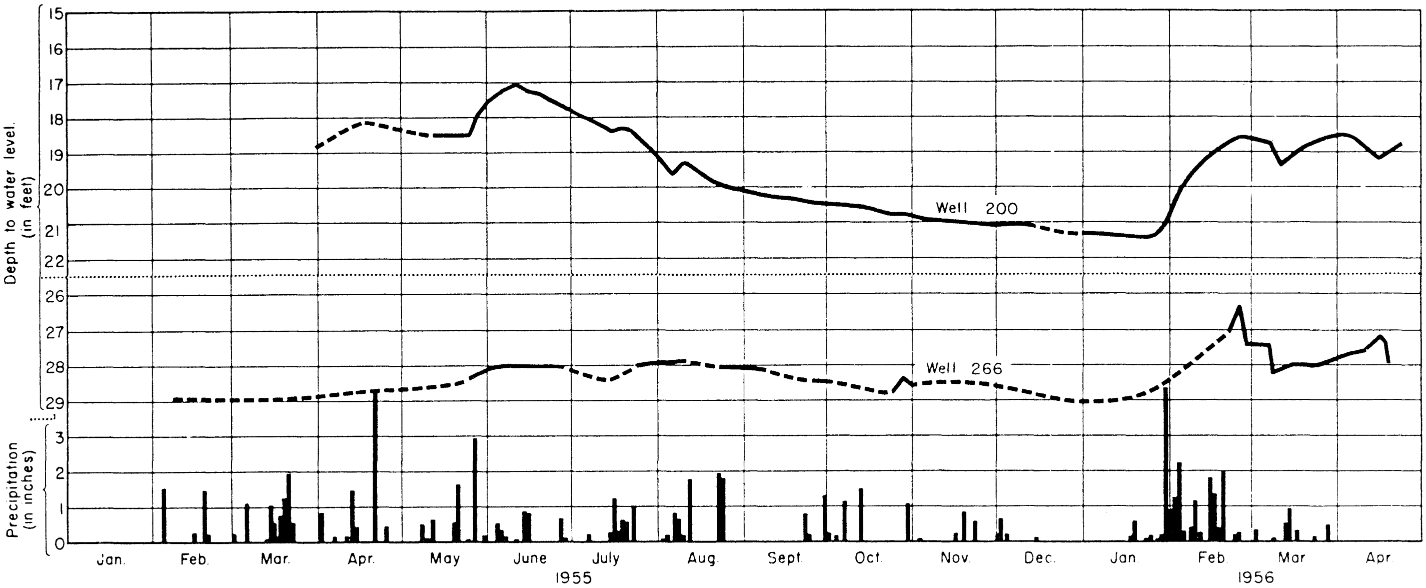

Fig. 3 Hydrographs of wells 200 and 266 in Quaternary deposits and daily rainfall at Searcy, White County, Ark.

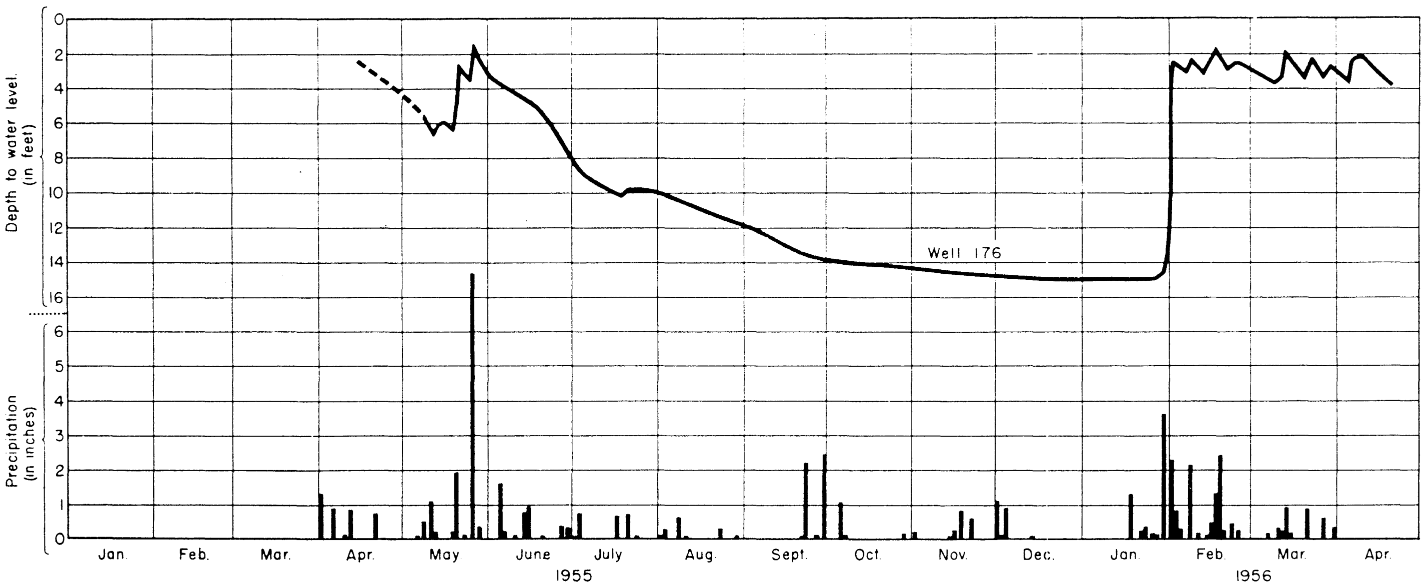

Fig. 4 Hydrograph of well 176 in Tertiary(?) undifferentiated deposits and daily rainfall at Little Rock, Pulaski County, Ark.

This hydraulic gradient, together with other known factors, can be used to determine the rate of movement of the ground water as follows. The quantity of water flowing through a given cross-sectional area of water-bearing material is computed by the formula:

$$Q = pAv = PIA$$

in which Q is the quantity of water, p is the porosity of the material, A is the cross-sectional area, v is the average velocity of the ground water, P is the coefficient of permeability, and I is the hydraulic gradient. The approximate rate of movement of the water through the gravel and sand can be obtained by application of the above formula transposed as follows:

$$v = \frac{PI}{p}$$

If P is defined in gallons per day per square foot under a hydraulic gradient of 100 percent and a temperature of 60° F (Meinzer's units), if I is given in feet per mile, and if p is given in percentage, v will be given in feet per day by the following formula:

$$v = \frac{PI}{395p}$$

The average coefficient of permeability from 7 aquifer tests in deposits of Quaternary age in the area studied is about 1,200 gpd-ft.^{2} The hydraulic gradient is about 3.2 feet per mile. For an assumed porosity of 35 percent in the area, the average velocity of the ground water can be computed by the above formula as follows:

$$v = \frac{1{,}200 \times 3.2}{395 \times 35} = 0.3 \text{ foot per day}$$

Movement of water in the Tertiary(?) undifferentiated deposits is down dip to the southeast. Movement of water in the Atoka formation is to the southeast toward the Fall Line which generally is down the dip of the beds. (See pl. 1.)

A considerable amount of natural discharge of ground water still occurs in the mapped area, chiefly by evaporation and transpiration where the water level is sufficiently close to the land surface, and by hydraulic discharge through seeps and springs. Water may be taken into the roots of plants directly from the zone of saturation or from the capillary fringe, and may then be discharged by transpiration. In the central part of the area shown on plate 7 the depth to the water table is so great that there is little or no transpiration or evaporation from the zone of saturation or the capillary fringe. However, natural discharge through seeps and springs occurs near the Fall Line from the Atoka formation and from Tertiary(?) undifferentiated deposits. Seeps and springs along the main and tributary stream channels discharge ground water from Quaternary and Tertiary(?) undifferentiated deposits and largely support the base flow of the streams. Along the Little Red River in White County and along Cypress Creek the contours shown on plate 11 bend upstream, indicating that there is discharge of ground water into the streams. The contours also indicate discharge of ground water into the White River above Des Arc. Near Des Arc the ground-water level probably is at about the same altitude as the river level under normal conditions. Thus, there probably is some movement of water into the Quaternary deposits during flood stages and some ground-water discharge into the White River during low stages. In the extreme southeastern corner of the area the water levels are below the White River, and the Quaternary deposits receive water from the river.

Much ground water is discharged from the area by subsurface flow into the large cone of depression in the Grand Prairie region. This movement is indicated by the slope of the water table (pl. 7). From the average permeability determined from aquifer tests, the average slope of the water table along the southern edge of the area from the water-table contour map, and the average aquifer thickness from the logs of wells, it is computed that about 27 million gallons of water per day flows from this area into the Grand Prairie cone of depression. This is about as much as is used for irrigation in the entire area covered by the present report.

HYDROLOGIC PROPERTIES OF THE WATER-BEARING MATERIALS

The quantity of water that a water-bearing formation will yield depends upon the hydrologic properties of the materials composing the formation. The two hydrologic properties of greatest significance with respect to rate of yield are the coefficients of permeability and storage.

Meinzer's coefficient of permeability, P, may be expressed in field terms as the number of gallons of water a day, at 60° F, that is conducted laterally through each mile of the water-bearing bed under investigation (measured at right angles to the direction of flow), for each foot of thickness of the bed and for each foot per mile of hydraulic gradient (Stearns, 1928, p. 148).

The field coefficient of permeability, as determined from aquifer tests, is the same as Meinzer's coefficient defined above except that it is measured at the existing temperature of the water in the aquifer tested.

The coefficient of storage, S, of an aquifer is defined as the volume of water it releases from or takes into storage per unit surface area of the aquifer per unit change in the component of head normal to that surface.

A simple way of visualizing this concept is to imagine an artesian aquifer that is elastic and uniform in thickness and that is assumed, for convenience, to be horizontal. If the head of water in that aquifer is decreased there will be released from storage a volume of water that is proportional to the change in head. Because the aquifer is horizontal, the full head change is effective perpendicular to the aquifer surface. Imagine, further, a representative prism extending vertically from top to bottom of this aquifer and extending laterally so that its cross-sectional area is coextensive with the aquifer-surface area over which the head change occurs. The volume of water released from storage in that prism divided by the product of the prism's cross-sectional area and the change in head results in a dimensionless number, which is the coefficient of storage. If this example were revised slightly, it could be used to demonstrate the same concept of coefficient of storage for a horizontal water-table aquifer or for a situation in which the head of water in the aquifer is increased.

RECOVERY OF GROUND WATER BY WELLS

Principles of Recovery

When water is withdrawn from a well the water level in the vicinity of the well declines and assumes a form similar to that of an inverted cone. This is called a cone of depression. The greater the rate of pumping of the well the greater the draw down (difference between static and pumping levels) and the deeper the cone of depression. As time increases, the decline in water level extends to greater and greater distances, so that water levels in wells several hundred feet to a mile or more from the pumped well may be lowered.

The specific capacity of a well is its rate of yield per unit of drawdown and generally is expressed in gallons per minute per foot of drawdown. For example, well 270 with a measured yield of 100 gpm and a drawdown of 20 feet has a specific capacity of 5 gpm per foot of drawdown. When a well is pumped, the water level drops rapidly at first and then more slowly until a condition of approximate equilibrium between discharge and inflow is reached. In testing the specific capacity of a well, therefore, it is important to pump the well until the water level remains approximately stationary. When the pump is stopped, the water level in the well rises rapidly at first and then more slowly until it reaches approximately its original position.

The character and thickness of the water-bearing materials have a definite bearing on the yield and drawdown of a well and, therefore, on the specific capacity of a well. Drawdown increases the height that the water must be lifted in a well, thus increasing the cost of pumping. If the water-bearing material is coarse and uniform in size it will readily yield large quantities of water to a well with relatively little drawdown; if the water-bearing material is fine and poorly sorted it will offer more resistance to the flow of water into the well, thereby decreasing the yield and increasing the drawdown. Other things being equal, the drawdown of a well is inversely proportional to the permeability of the water-bearing materials.

Well Construction

Driven wells generally are put down where the water-bearing material is only a few feet below the ground surface. Such wells are used extensively for domestic supplies in the White River bottoms in eastern White County. They generally are 1¼ inches in diameter and are equipped with pitcher pumps or small jet or suction pumps. Other domestic wells throughout the area are drilled by either rotary or cable-tool rigs and are cased with steel pipe or ceramic tile. Wells in the Atoka formation are cased to hard shale or hard rock and then left open through the underlying water-bearing material. Wells in unconsolidated materials of the Tertiary(?) undifferentiated deposits or in the Quaternary deposits are cased to the bottom of the hole. In some wells the casing is perforated or slotted below the water level, but in most wells a screen or strainer is used to provide a greater intake area and to inhibit movement of sand and gravel from the aquifer into the well. The tiled-cased wells generally terminate in sand and are left open at the bottom. Water enters at the bottom and through the tile joints.

Dug wells constructed for domestic supplies are common in areas where the Atoka formation and the Tertiary(?) undifferentiated deposits are relatively near the land surface. They generally are 30 to 36 inches in diameter and are 30 feet or less in depth. They are curbed with wood, tile, or concrete.

Irrigation and public-supply wells generally are drilled with hydraulic rotary rigs or with auger and sand-bucket rigs. With the latter rig the hole is augered to the water table and the screen and casing are bailed down into the water-bearing material. Many of these wells are gravel packed.

Aquifer Tests

The coefficient of permeability of the Tertiary(?) undifferentiated deposits was determined at well 220 in the western part of the Sand Hills area (pl. 5) in Lonoke County. Four other tests were made in Lonoke and White Counties to determine the coefficients of permeability in deposits of Quaternary age. Other tests were made a few miles south of the area of the present report during the period 1940 to 1944 (Engler, Thompson, and Kazmann, 1945, P. 43). The aquifer test data collected during this investigation were analyzed by means of the formula for nonsteady state flow (Theis, 1935). Table 4 summarizes the results of tests made in and near the report area.

In general the coefficients of permeability increase from the Fall Line southward into the Grand Prairie region. The lower values near the Fall Line are indicated also on the map of the water table (pl. 7) by the closer spacing of the contour lines.

An average coefficient of permeability for the Quaternary aquifer in northern Lonoke, northern Prairie, and southeastern White counties (see table 4) is about 900 gallons per day per square foot.

FLUCTUATIONS OF WATER LEVELS

The water levels in parts of Lonoke, Prairie, and White Counties are not stationary but rise and fall much like the water level in a lake or reservoir. However, over a long period of time a condition of approximate equilibrium is established between the amount of water that is added annually to ground water in storage and the amount that is discharged annually. In general, the water level rises when the amount of recharge

TABLE 4

Locations of Aquifer Tests and Computed Coefficients of Permeability

Well No.	Location	Aquifer thickness (ft.)	Field coefficients of permeability (gpd/ft.^{2})	Stratigraphic unit
220	Sec. 28, T. 4 N., R. 9 W.	12	1,000	Tertiary(?) undifferentiated deposits
201	Sec. 15, T. 4 N., R. 8 W.	75	1,200	Quaternary deposits
270	Sec. 31, T. 6 N., R. 7 W.	69	700	Do
256	Sec. 2, T. 6 N., R. 7 W.	40	500	Do
312	Sec. 20, T. 8 N., R. 5 W.	50	1,000	Do
......	Sec. 32, T. 2 N., R. 6 W.	....	1,600	Do
......	Sec. 11, T. 2 N., R. 9 W.	....	1,900	Do.
......	Sec. 17, T. 1 N., R. 7 W.	....	2,100	Do
......	Sec. 9, T. 1 S., R. 5 W.	....	1,800	Do
......	Sec. 32, T. 2 S., R. 4 W.	....	2,200	Do
......	Sec. 3, T. 3 S., R. 4 W.	....	2,000	Do
......	Sec. 18, T. 3 S., R. 2 W.	....	1,500	Do
......	Sec. 24, T. 5 S., R. 3 W.	....	1,200	Do
......	Sec. 30, T. 5 S., R. 4 W.	....	2,200	Do
......	Sec. 23, T. 6 S., R. 2 W.	....	2,300	Do

exceeds the amount of discharge, and it declines when the discharge is greater than the recharge. Thus, net changes in the water levels in wells reflect the extent of depletion or replenishment of the ground-water reservoir.

Several factors control the amount of rise of water levels in wells. The principal ones are the precipitation that passes through the soil and is added to the zone of saturation, and the influent seepage that reaches the underground reservoir from streams. The relation between the amount of precipitation and the levels at which the water stands in wells is complicated by several factors. During a long dry period the soil moisture becomes depleted through evaporation and transpiration. When a rain does occur, the soil-moisture deficiency must be replenished before any water can descend through the soil to the aquifer. Where the water-bearing formation is covered by relatively impermeable clay, as is the aquifer in the deposits of Quaternary age in parts of Lonoke, Prairie, and White Counties, the water levels are not affected immediately or strongly by seasonal or yearly changes in rainfall. Instead, there is a time lag and the magnitude of the fluctuations is not as large as that of fluctuations in unconfined aquifers elsewhere.

The principal factors controlling the decline of water levels are the quantity of water pumped from wells, the quantity of water transpired directly from the water table by plants, and the quantity discharged as effluent seepage into the streams. In the Lonoke, Prairie, and White Counties area the quantity pumped from wells is much larger than the other two factors combined. As a result, ground-water levels afford an index of the extent of withdrawal of water for irrigation. As irrigation with water from wells increases, the water levels decline until gradients are readjusted to the increased withdrawal. If the irrigation development reaches the point where the pumpage exceeds the natural ground-water recharge, the water levels show net declines from year to year. Thus water-level measurements afford a close check on the relation between the available water supply and its development.

Plate 7 shows a cone of depression, west of Des Arc, that is caused by concentrated pumping for irrigation. There has been a continuing decline of water levels in this area since about 1938 (Counts and Engler, 1953). There also has been an increase in rice acreage in this area from 6,000 acres in 1938 to 12,200 acres in 1954. The continuing decline in water levels seems to be caused largely by the increase in the rate of pumping and by the fact that water levels have not yet become adjusted to the new rates of withdrawal. There is little doubt that in the Des Arc area water is being withdrawn from the aquifer faster than it can flow in from present sources of recharge. The hydrographs in figure 5 show the water-level fluctuations in five rice-irrigation wells finished in deposits of Quaternary age in northern Lonoke County. The average annual water-level decline in the 5 wells has been about 1 foot. The hydrographs in figure 5 show that the water levels have fallen steadily except during the period 1932 to 1935, when rice acreage decreased from 16,000 to 12,500 acres, and the period 1950 to 1951, when the rice acreage decreased from about 43,000 to 31,500 acres.

The average decline in water levels in Lonoke County was about 2 feet from the spring of 1954 to the spring of 1955 and about 0.6 foot from the spring of 1955 to the spring of 1956. The average decline in wells in Prairie County was about 2.2 feet from the spring of 1954 to the spring of 1955, and about 0.9 foot from the spring of 1955 to the spring of 1956. The decrease in the decline from 1955 to 1956 is attributed mainly to the decrease in rice acreage during 1955. In White County there was an average water-level rise of about 0.9 foot from the spring of 1955 to the spring of 1956, but there was some decline in the heavily pumped areas. The rise occurred over the remaining part of the county after, and presumably in response to heavy spring rains.

Water levels in wells in the Tertiary(?) undifferentiated deposits and in the Atoka formation generally have shown only minor fluctuations during the 2 years of record. The wells are of small diameter and no large quantities of water are withdrawn from them; consequently, the water-level fluctuations reflect chiefly conditions of natural recharge and discharge. During the drought years 1952-54 a number of shallow wells in both formations are reported to have gone dry. Generally it is necessary only to deepen such a well to obtain domestic supplies even during years of less than average precipitation.

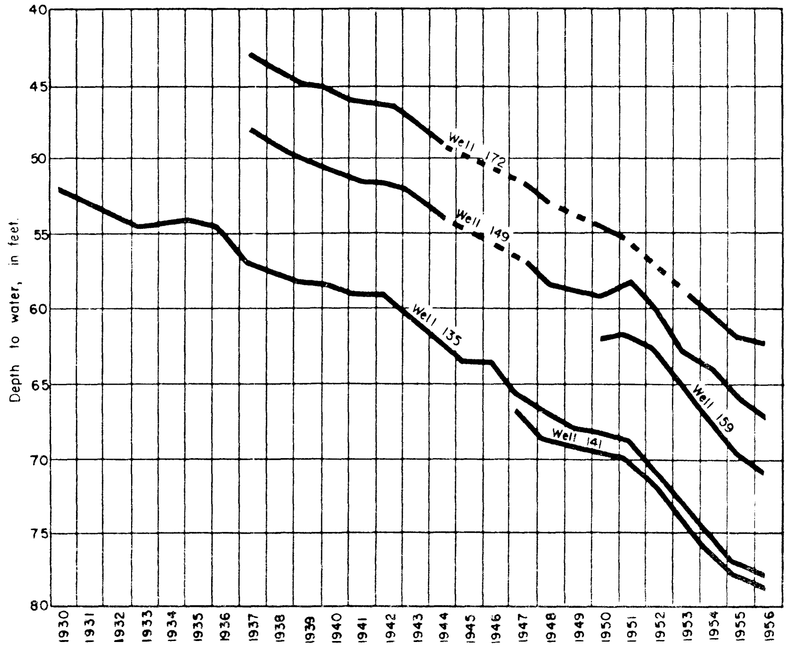

Fig. 5 Hydrographs of fluctuations of water levels in wells 135, 141, 149, 159, and 172 finished in deposits of Quarternary age in northern Lonoke County

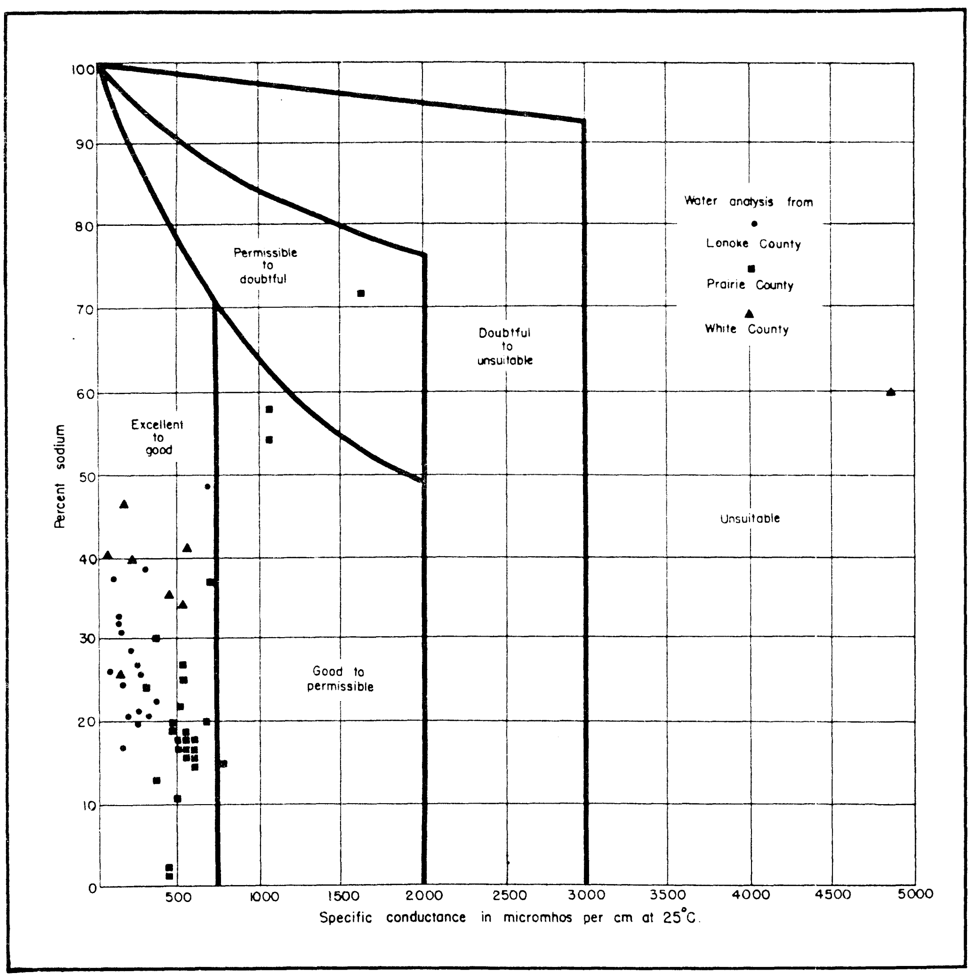

Fig. 6 Classification of ground waters for irrigation use in parts of Lonoke, Prairie, and White Counties (after Wilcox)

UTILIZATION OF GROUND WATER

The total amount of water withdrawn from wells in the area is estimated to be about 30 mgd. The rates of use, in mgd, for different purposes are: public supplies 0.5, domestic 1, irrigation 28.5, of which 24 mgd is for the irrigation of rice and 4.5 mgd for the supplemental irrigation of row crops.

These figures are based on city pumpage records, an estimated per capita consumption of 30 gpd per person for domestic use, and the acreage of rice and row crops irrigated.

Public Supplies

There are five municipalities in the area that use ground water as a source of public supply. They range in population from 720 to 1,612.

Beebe, White County. — Beebe, a community of about 1,200 inhabitants, uses water at the rate of about 150,000 gpd. It is supplied from 2 wells (236 and 237) tapping sand in deposits of Quaternary age at depths of 96 and 99 feet. Their reported yields are 1,250 and 1,850 gpm. The water is pumped from the wells, by turbine pumps driven by electric motors, into a 100,000-gallon elevated tank for distribution. A chemical analysis of water from each well is given in table 8.

Bradford, White County. — Bradford is supplied by one 6-inch well (325), 80 feet deep, which yields water from sand and gravel in deposits of Quaternary age. The water is pumped from the well by an electrically driven turbine pump into a 30,000-gallon ground reservoir. It is pumped from the ground reservoir into a 50,000-gallon elevated tank for distribution through the mains. A chemical analysis of water from the well is given in table 8.

Cabot, Lonoke County. — The city of Cabot, which has a population of about a thousand, is supplied by 2 drilled wells, 214a which is 1,700 feet deep and 214b which is 1,085 feet deep. These wells obtain water from sandstone and shale in the Atoka formation at a reported rate of about 35 gpm each. The water is pumped directly into a 50,000-gallon elevated tank, without being treated, for distribution through the mains. The wells did not supply enough water for the needs of Cabot during the summers of 1954 and 1955, and the city has tried, unsuccessfully, to obtain a larger supply from the present well field. In the fall and winter of 1955 the city drilled a number of test holes in Tertiary (?) undifferentiated deposits to outline more definitely the aquifer disclosed by the test drilling done by the U. S. Geological Survey. (See p. 10-11). The possibility of developing municipal supplies from that aquifer is discussed on page 22.

Des Arc, Prairie County. — Des Arc, a community of about 1,612, is supplied with water from an 8-inch well (51) about 120 feet deep, tapping sand and gravel in deposits of Quaternary age. The yield of the well is reported to be 450 gpm. The water is pumped from the well, by an electrically driven turbine pump, into a 100,000-gallon ground-storage reservoir and then into a 75,000-gallon elevated tank for distribution. Water is used at the rate of about 50,000 gpd. A chemical analysis of the water is given in table 8.

Kensett, White County — Water is supplied to the city of Kensett from 2 wells (292 and 293) tapping Tertiary(?) undifferentiated deposits. Well 292 is 182 feet deep and has a reported yield of about 80 gpm, and well 293 is 217 feet deep and yields 210 gpm. The wells are equipped with electrically driven turbine pumps which pump the water directly into mains that are connected to a 35,000-gallon elevated storage tank.

Domestic Supplies

Many wells in the area furnish water for domestic use. The estimated average rate of pumping for all domestic use is about 1 mgd. Most of the wells, 2 to 6 inches in diameter, are drilled and cased with steel or iron pipe. There are a few dug wells in the western part of the Sand Hills area in Lonoke County that obtain water from the Tertiary(?) undifferentiated deposits. Some of these wells go dry during extended droughts. In the northern part of White County there are many driven wells, 1¼ inches in diameter, that yield water from the upper part of the Quaternary deposits. Many of the wells are equipped with a small electrically driven jet pump and some with rope and bucket.

Irrigation Supplies

There are about 200 irrigation wells in the area considered in the present report. They are pumped at an average rate of about 28.5 mgd, for the irrigation of rice and other crops.

The average yield of the wells is about 970 gpm. Table 5 gives the yields of 75 irrigation wells characteristic of those in the area. In table 6 the same data are grouped according to whether the yields were reported, estimated, or measured. If the 29 measured wells constitute a fair sample, then the reported yields were too high and the estimated yields too low.

TABLE 5

Yields of Irrigation Wells in Parts of Lonoke, Prairie, and White Counties

Yield of wells (gpm)	Number of wells			
	Lonoke	Prairie	White	Total
Less than 600	3	3	7	13
600- 800	5	8	1	14
800-1,000	7	8	3	18
1,000-1,200	6	6	1	13
1,200-1,400	1	2	3	6
1,400-1,600	0	3	0	3
1,600-1,800	0	3	1	4
More than 1,800	1	0	3	4
Total	23	33	19	75

There are many factors that determine the yields of wells, including the method of construction, the character and thickness of the water-bearing formation, the diameter of the casing, the material used for casing, the type and size of perforations or screen and placement thereof, the quality of the water (whether noncorrosive or corrosive or whether likely to form incrusting material readily), the development and finishing of the well, the age of the well, and the distance between wells that are being pumped (mutual interference).

POSSIBILITIES OF FURTHER DEVELOPMENT

Although ground water now plays a large role in the economy of the area, considerable additional water can be developed from the several aquifers and in the different localities, as outlined in the following paragraphs.

Wells yielding about 400 to 1,700 gpm can be developed in the sand and gravel deposits of Quaternary age throughout a large part of the area (pl. 1). In two areas of concentrated pumping for rice irrigation, one west of Des Arc and the other in the central part of the area at the southern boundary, water levels have been lowered to such an extent that any substantial increase in pumping may result in local overdevelopment. In one area of unknown but probably small extent southeast of Bald Knob water in the Quaternary deposits is too salty for most uses (see p. 26 and fig. 8), but elsewhere in the area this aquifer will support many additional irrigation wells.

The areas in Arkansas that are in danger of overdevelopment, or are already overdeveloped, are certain areas of concentrated pumping for rice cultivation. According to Engler and others (1945, p. 4), it takes about 1.8 acre-feet of water per acre to grow rice in the Grand Prairie area, and probably at least 2.0 acre-feet per acre in the rest of the rice-growing areas of Arkansas where the soils are more sandy. Bartholomew and others (1945, p. 17) found that during one of the driest summers (1943) only a little more than 1 acre-foot of water per acre was required for the supplemental irrigation of such crops as cotton, corn, soybeans, and lespedeza. During most summers the supplemental-irrigation requirements for these crops are about 0.5 to 0.8 acre-foot per acre. Because much of the area covered by this investigation is considered to have a soil too sandy or a topography too rolling to be suitable for growing rice, and because much of it receives local recharge, there appears to be much less likelihood of overdevelopment of ground water than in the Grand Prairie region to the south.

TABLE 6

Average Yields of Irrigation Wells in Parts of Lonoke, Prairie, and White Counties as Reported, Estimated, or Measured

County	Number of wells	Reported yield	Number of wells	Estimated yield	Number of wells	Measured yield	Total number of wells	Weighted average yield of all wells
Lonoke	9	1,200	9	685	5	875	23	928
Prairie	8	1,350	9	860	16	935	33	1,015
White	10	1,250	1	900	8	420	19	882
Total number of wells and weighted average yield	27	1,262	19	780	29	782	75	955

Irrigation wells of moderate to large yields can be developed in the eastern part of the Sand Hills area where the basal sand and gravel of the Quaternary deposits is present (pl. 1). Test drilling disclosed the presence of the sand and gravel in places earlier thought to be outside the area in which irrigation wells could be developed. The log of test hole 13 indicates the excellent character and considerable thickness of these deposits in part of the Sand Hills area. Supplemental irrigation would most likely be beneficial to pasture, hay, and strawberries presently grown in this area and might allow the growing of many other crops.

Irrigation by wells developed in the basal sand and gravel of the Quaternary deposits in White County has been common only during the last 2 or 3 years. Although this aquifer generally is thinner and less permeable here than it is in the rice-growing areas of Prairie and Lonoke Counties, the yields of most wells are sufficient to irrigate strawberries and other small fruits and vegetables as well as cotton, corn, and soybeans. Much additional development appears to be possible in this area.

It is possible that deep wells tapping soft water in deposits of the Wilcox formation and the Claiborne group may be developed. The necessity for drilling wells in these older deposits to greater depths than in the Quaternary deposits and the generally greater drawdowns that would be caused by the pumping of quantities of water sufficient for irrigation make these units much less attractive than the shallower Quaternary deposits as sources of irrigation water. However, the softness and general absence of iron make the water especially desirable for municipal supplies. Des Arc is the only sizable community in the area, and this city and the towns and cities just south of the area along U. S. Highway 70 may wish to explore these Tertiary units. It should be emphasized that in the areas indicated on the map (pl. 1) fresh water is not known to occur in deposits of the Wilcox and the Claiborne, because no wells or water-test holes have been drilled there to that depth. The areas shown have been sketched in from the available electric logs of oil-test holes which indicate the presence of fresh water—probably soft — in these deposits.

Ground water in quantities sufficient for irrigation, municipal, and industrial uses is not generally available in Quaternary deposits that do not include the basal sand and gravel, nor in the Tertiary(?) undifferentiated deposits, nor the Atoka formation. For this reason the cities of Cabot, Austin, and Ward (pl. 1) have had difficulty in finding a source of municipal water supply. Austin and Ward have no municipal systems, largely because no adequate source could be found, and wells in the Atoka formation have proved to be inadequate to supply the municipal system at Cabot. An aquifer in Tertiary(?) undifferentiated deposits, located by test drilling south of Austin and southeast of Cabot, may be of future importance to these cities, and possibly also to Ward, as a source of municipal water.

Assuming an average thickness of 20 feet, a width of 1 mile, and a storage coefficient of 0.15, a rough approximation of the amount of water in transient storage in the aquifer may be made. If a well large enough to furnish water for a municipal supply were located near well 220, in the SE¼ SW¼ Sec. 28, T. 4 N., R. 9 W., it would draw from roughly 1 square mile of aquifer, containing approximately 600 million gallons of water. If there were no recharge to the aquifer and if three-quarters of the stored water could be recovered, then 100 gpm could be pumped for about 8 or 9 years. Practically all the water withdrawn from the aquifer would come from the north, or updip, because the aquifer dips to the south at about 60 to 75 feet per mile. There is not enough information available to estimate the recharge to the aquifer, but it is likely to be considerable because the aquifer crops out in the vicinity of Mill Creek and presumably would receive water by infiltration from the stream and its tributaries. Also, there is probably some recharge from direct penetration of rainfall through the overlying sandy beds. It appears likely that present and potential recharge would be sufficient to support several wells, each of 100-gpm capacity.

For every mile that a well is located south of well 220, the stored water available to the well is doubled. A well as far south as the site of test hole 33, in the NW¼ SE¼ Sec. 4, T. 3 N., R. 9 W., would have a storage capacity of perhaps 1,500 million gallons to draw from, or more than 20 years' supply at 100 gpm if 75-percent recovery is assumed. The amount of recharge available at this location would be somewhat greater than that at the former location.

A pumping test at well 220, the location first mentioned, indicated a coefficient of permeability of 1,000 gpd per square foot, and even with an aquifer thickness of only 12 feet at this location a yield of about 100 gpm could be obtained with a larger pump in a properly constructed well. About a quarter of a mile east, in the deeper part of the aquifer, wells of larger capacity can be developed. At the site of test hole 33 a well yielding several hundred gallons a minute could be developed.

CHEMICAL QUALITY OF GROUND WATER

The general chemical quality of the ground water in parts of Lonoke, Prairie, and White Counties is indicated by 102 analyses of water from 98 wells listed in table 8. Included are analyses of 5 water samples from wells in the Atoka formation, 15 from wells in the Tertiary(?) undifferentiated deposits and 78 from wells in the Quaternary deposits, 4 of which were sampled on 2 different dates.

The analyses give the dissolved mineral constituents, which determine the fitness of the water for municipal, industrial, agricultural, and domestic uses, without reference to the sanitary quality of the sample. From most wells a single sample is regarded as being representative of the chemical quality of the water, because the concentration of the dissolved minerals in water from individual wells seldom changes appreciably. Exceptions to this generality include very shallow wells in which the concentration is modified by rainfall, wells tapping aquifers that are subject to salt-water encroachment, or wells recharged by streams whose mineral concentration fluctuates. Four wells in Quaternary deposits (7, 23, 191, 325, table 8) were resampled to check on possible changes in mineral quality with time. The changes indicated by these analyses are minor for all constituents except iron.

Temperatures of most of the samples were taken at the time of collection; they ranged from 61° to 67° F, most of them being 63° to 64° F.

Chemical Constituents in Relation to Use

Iron.—Iron is dissolved from many rocks and soils and from pipes through which the water is pumped and distributed. The quantity of iron in ground water may differ greatly from place to place, even in water from the same formation. Large amounts of iron may interfere with efficient operation of zeolite-type water softeners and may prove as detrimental as either excessive hardness or dissolved solids. Iron in water may cause reddish-brown stains on white porcelain or enameled ware and fixtures, and on clothing or other fabrics washed in the water. The U. S. Public Health Service drinking water standards for interstate carriers specify a maximum concentration of 0.3 part per million (ppm) of iron and manganese together in potable water. Excessive iron may be removed readily from most water by aeration and filtration. Unless otherwise noted, values of iron reported in table 8 are for total iron. The iron content of water samples in this area ranged from less than 0.02 to 32 ppm. Of a total of 102 samples, 42 contained less than 1.0 ppm; 48 contained 1.0 to 5.0 ppm; and 12 samples contained more than 5.0 ppm iron.

Water from numerous wells in Quaternary deposits in several areas of Arkansas has a high iron content. This is especially surprising in water that is neutral or alkaline. The amount of iron carried in solution in the ground water varies greatly — in wells located close together, at different horizons in the same well, and with time from the same stratum of the same well. The variation of quality with time is indicated in four wells in Quaternary deposits that were resampled. Water taken from well 325 on July 28, 1955, had an iron content of 1.3 ppm; 3 months later the water contained 3.1 ppm. The initial analysis of water from well 7 indicated an iron content of 1.6 ppm and about a year later it was 0.87 ppm. In well 23 the initial analysis indicated 0.46 ppm iron; about a year later it was 2.0 ppm. Water from well 191 had an iron content of 4.9 ppm. in 1951; 3 years later the iron content was 0.12 ppm.

Calcium and magnesium.—Calcium is found in all natural water, generally in greater quantities in water that is in contact with limestone, dolomite, and gypsum. Magnesium is dissolved from many rocks, particularly dolomitic rocks. The concentration of calcium and magnesium in water largely determines the hardness of the water. These two ions react with soap to form an objectionable scum, and are largely responsible for the formation of boiler scale. The analyses show a range in calcium content from 2.2 to 264 ppm and in magnesium from 0.6 to 76 ppm.

Sodium and potassium.—All natural water contains compounds of sodium and potassium. The fitness of water for most industrial or domestic uses is not affected by moderate amounts of these two elements, though quantities larger than 50 ppm may cause foaming in steam-boiler operation. For high-pressure-boiler feed water a concentration of not more than 2 to 3 ppm has been recommended. Good irrigation water should not contain sodium in a concentration greater than 60 percent of the cations on an equivalent basis (Magistad and Christiansen, 1944, p. 8-9). The analyses indicate a sodium range of 1.8 to 901 ppm. All but 23 samples contained less than 50 ppm. Water from 7 wells had more than 60 percent sodium. The samples were not analyzed for potassium, and in table 8 the amounts of this element are included with the sodium.

Bicarbonate and carbonate.—Bicarbonate and carbonate occur in water as a result of the solvent action of carbon dioxide in rain or surface water reacting with the minerals present in the earth, such as calcite and dolomite, and forming calcium and magnesium bicarbonate. Carbonate is rarely present in appreciable quantities in natural water. Bicarbonate in moderate concentrations has no effect for most uses; however, large quantities of sodium bicarbonate will cause foaming and priming in boilers.

Bicarbonate is the chief anion in all but the most highly mineralized water in this area. It ranged from 80 to 218 ppm in water from the Atoka formation, from 6 to 231 ppm in water from the Tertiary(?) undifferentiated deposits, and from 13 to 631 ppm in water from the Quaternary deposits. Carbonate was present in only 4 samples, all from Quaternary deposits.

Sulfate.—Sulfate, when present in excessive quantities, makes the water unpalatable, and it combines with calcium to form a hard boiler scale. The concentration of sulfate is highly variable, but it is low in all formations throughout the area. Only about 16 percent of the samples had more than 15 ppm of this ion, and the range was from 0.4 to 107 ppm. Thus, the greatest concentration of this substance was far less than the upper limit of 250 ppm allowable under the U. S. Public Health Service drinking water standards.

Chloride.—Since the chlorides of calcium, magnesium, and sodium are readily soluble, chloride is normally present in most water. Sodium chloride (common table salt) in higher concentrations gives water a salty taste and also causes foaming and priming in boilers. Water high in chloride may be corrosive to plumbing and steam boilers and harmful to irrigated crops. The concentration limit recommended by the U. S. Public Health Service for drinking water is 250 ppm. The samples from wells in the area studied ranged from 2.2 ppm to 1,870 ppm, all but 7 samples having a concentration less than the recommended limit.

Nitrate.—Nitrate present in amounts greater than about 45 ppm may cause cyanosis in infants if the water is used to prepare food formulas (Maxcy, 1950, p. 271). Nitrate in natural water is commonly considered to be a final oxidation product of nitrogenous organic materials and may suggest surface pollution. Fertilizers are sometimes a source of nitrate in ground water, especially in shallow wells. Only 3 of the 102 samples analyzed contained more than 45 ppm of nitrate, and 89 samples contained less than 3 ppm.

Dissolved solids.—Dissolved solids is the residue after evaporation of the water and consists mainly of dissolved mineral matter and some organic material and water of crystallization. Water containing less than 500 ppm of dissolved solids is satisfactory for most uses. Water containing more than 1,000 ppm generally requires treatment to make it suitable for most domestic and industrial uses. Irrigation water having more than 2,000 ppm may be injurious to some plants. In the 102 water samples analyzed, the dissolved solids ranged from 45 to 3,770 ppm. All but 14 samples contained less than 500 ppm, but 6 samples contained more than 1,000 ppm.

Hardness.—Hardness probably is one of the most important factors to be considered in choosing a water supply for either municipal, industrial, or domestic use. It is easily recognized by the increased quantity of soap required to produce lather, by the formation of the insoluble curd that is objectionable in all washing processes, and by the deposits of insoluble salts when the water is heated or evaporated. In addition to its soap-consuming capacity, hard water is objectionable because it causes the formation of scale in boilers, water heaters, radiators, and pipes, with a resulting loss in flow, loss in heat transfer, and possible boiler failure.

Calcium and magnesium usually are the principal constituents causing hardness in water. Iron, aluminum and a few other constituents likewise cause hardness but generally are present in much smaller quantities than calcium and magnesium. Hardness equivalent to the bicarbonate and carbonate is called carbonate hardness; the remainder of the hardness which is generally due to sulfates, chlorides, and nitrates of calcium and magnesium, is called noncarbonate hardness.

Water that has a hardness of less than 60 ppm generally is considered to be soft. Water having a hardness ranging from 60 to 120 ppm may be considered moderately hard; although hardness in this range does not seriously interfere with the use of the water for many purposes, it does increase the amount of soap consumed, and the treatment for its reduction may be profitable for laundries and necessary for industries that require soft water. Water that has a hardness of 120 to 200 ppm is noticed by nearly everyone and is considered hard. Water with hardness greater than 200 ppm needs some softening before it can be used satisfactorily for many purposes, although it is used without treatment for domestic purposes and for irrigation.

Analyses of water from wells sampled indicate a range in hardness from 9 to 971 ppm, and water from wells in the Quaternary deposits generally has a hardness in excess of 200 ppm. Thirty-five samples had noncarbonate hardness.

Specific conductance.—The specific conductance of water, a measure of its capacity to conduct electricity, is dependent on the concentration and degree of ionization of the different minerals present. Specific conductance is an indication of the concentration of dissolved solids in water. Values for specific conductance of the samples analyzed, expressed as micromhos at 25°C, range from 33.4 to 6,220.

Hydrogen-ion concentration.—The hydrogen-ion concentration is an index of the acidity or alkalinity of water and must be known for proper treatment for coagulation at water-treatment plants. The hydrogen-ion concentration generally is expressed as the pH, which is the logarithm (to the base 10) of the reciprocal of the hydrogen-ion concentration in moles per liter. For practical purposes, the pH scale ranges between 0 and 14, denoting various degrees of acidity or alkalinity of a solution. A pH of 7 is considered to denote the neutral point. Values below 7 and approaching 0 denote increasing acidity, whereas values from 7 to 14 denote increasing alkalinity. Water having a low pH is likely to be corrosive to metal. The pH of the samples analyzed ranged from 5.0 to 8.4, but for most samples it was slightly above 7.0.

Suitability of Water for Irrigation

Because about 95 percent of the ground water in the area studied is used for irrigation, the suitability of the water for that purpose is of much interest. Among the more critical chemical characteristics of a water for use in irrigation are the percent sodium and the concentration of dissolved minerals as measured by the specific conductance. Certain trace elements that are known to be toxic to some plants, such as boron, generally are not present in the ground water of Arkansas and were not determined in the samples.

All the water samples collected from irrigation wells in Lonoke, Prairie, and White Counties are plotted (fig. 6, p. 19) on a diagram developed by Wilcox (1948), on which percent sodium is plotted against specific conductance.

Nearly all of the more than 60 samples analyzed fall within the classification "excellent to good." The three samples within the "good to permissible" classification are from wells in the extreme southeastern part of the area, where there is evidence of contamination from deeper, salty water. The one sample in the "permissible to doubtful" classification also is from a well in that area. No samples are in the "doubtful to unsuitable" classification, and only one (from well 286 southeast of Bald Knob) is in the "unsuitable" classification. This well was drilled for rice irrigation but the water proved to be much too salty for that purpose.

There is an interesting distribution of the plotted points on the diagram classifying the water from the three counties. The water from irrigation wells in Prairie County generally is more highly mineralized than that from the other counties, but it has a lower percent sodium. There is a clustering of the points in the classification between 15 and 20 percent sodium and between 500 and 650 micromhos in specific conductance. The water from irrigation wells in Lonoke County is the least mineralized, generally having a specific conductance less than 400 and a percent sodium between 20 and 40. The water from irrigation wells in White County is more variable than that from the other two counties, both in specific conductance and in percent sodium.

Most soils in this part of Arkansas are deficient in calcium carbonate and require "liming." On such soils the use of a calcium bicarbonate water for irrigation is beneficial.

Most of the water sampled from irrigation wells in the area is of the calcium bicarbonate type.

Chemical Characteristics of Ground Water in the Several Formations

Both the type and the amount of the mineral content of any ground water are determined by the kind and amount of soluble minerals in the rocks through which the water has traveled and the length of time it has been in contact with those minerals. Therefore, a close correlation exists between the mineral character and content of the ground water and the aquifer in which it occurs, the direction and rate of movement of the water in the aquifer, the character of recharge and discharge and the places where they occur, and the places where contaminating or diluting water enters from other aquifers or confining beds. Some of these relationships are shown graphically on the bar diagram (fig. 7) and others are pointed out in the following paragraphs describing the mineral quality of the water in each of the important aquifers.

Quaternary deposits.—Throughout Arkansas the water in deposits of Quaternary age is typically of the calcium bicarbonate type. In the area of the present investigation it is more or less typical, the calcium content ranging from 20 to 80 ppm and the bicarbonate from 75 to 375 ppm. The magnesium content generally ranges from 5 to 25 ppm and the sodium from 20 to 30 ppm. The sulfate content generally is low, that of most samples falling in the range of 2 to 15 ppm. The chloride content is variable but generally ranges from 10 to 30 ppm.

In the area considered in this report, water from the Quaternary deposits in Lonoke County is the least mineralized, that in Prairie County the most mineralized, and that in White County more variable but generally intermediate (fig. 7). In a general way, the degree of mineralization increases with distance from the recharge area, being least in northwestern Lonoke County and greatest in the eastern part of the area near the White River. The water from wells in Quaternary deposits near their surface contact with the Tertiary(?) undifferentiated deposits south of Cabot is notably low in dissolved minerals. On the water-table contour map (pl. 7) the crowding of contours suggests that an important amount of recharge occurs in this area, and this probably accounts for the "near-rainwater" character and mineralization of the ground water. A general increase in mineral load southeastward in the direction of movement of the ground water can be expected, because of the greater volume of sediments the water has passed through and the longer period of time it has been in contact with them. However, the relatively large and abrupt increases in salinity southeast of Bald Knob and south of Des Arc probably result from other causes.

The occurrence of salty water southeast of Bald Knob was called to the attention of the author by Mr. E. D. Munger, who had drilled a well (286) for rice irrigation. The well yielded 1,200 gpm, and for the first year the well water was mixed with surface water and produced a satisfactory yield of rice. The second year was drier, little surface water was available, and the rice crop was killed by the water from the well. The only other irrigation wells in the area are nearer Bald Knob, and the water from them is not salty. It is reported that several wells driven for domestic supplies also yielded water so salty that they were abandoned. Field tests for chloride were made on all domestic and stock wells in the area that could be sampled. The sampling points and the chloride content of the water, in parts per million, are shown on figure 8.

It is reported that water from shallow dug wells in this area was evaporated for salt during Civil War days. The sites of two such "salt works," in the SE¼ sec. 1, T. 7 N., R. 5 W., and in the SE¼ sec. 34, T. 8 N., R. 5 W., were visited. Depressions 4 to 5 feet deep are present where the old wells are said to have caved in, and the large iron kettles, said to have been used in the evaporating process, are being used for various purposes on nearby farms.

The source of the salt in water of Quaternary age in this area has not been determined. So far as known the Quaternary sediments were not deposited under conditions that would yield soluble saline minerals, and it seems more likely that the salt water is coming from older formations. The nearest deep oil-test holes have encountered salt water in the Nacatoch sand and in Paleozoic formations, but too little is known of the subsurface structure to locate a fault, or faults, which might permit this salt water to rise into the Quaternary deposits. That such faults may exist is pointed out by Caplan (1954, p. 38) on the basis of the suggested displacement be-

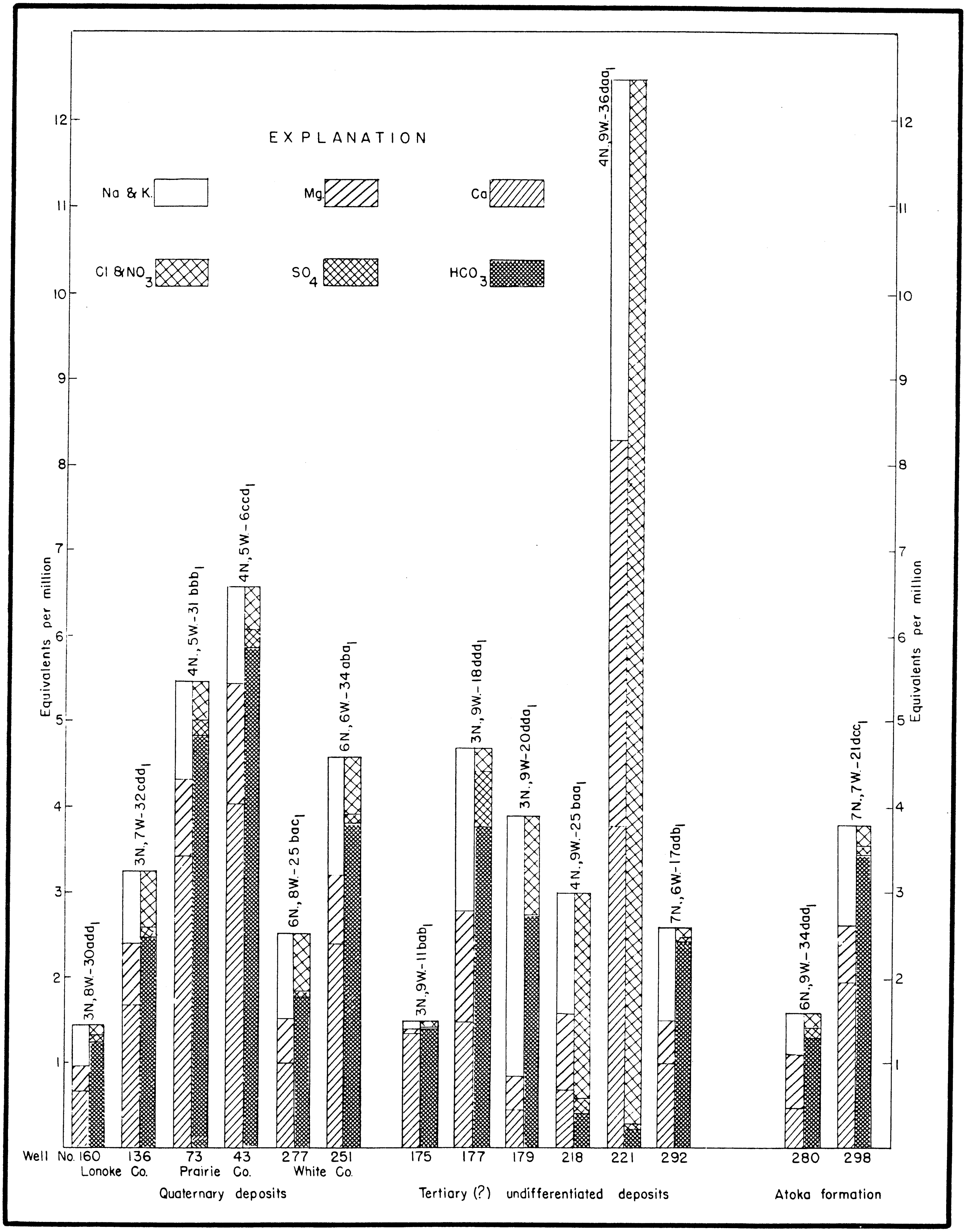

Fig. 7 Graphic representation of selected chemical analyses of ground water from the several aquifers

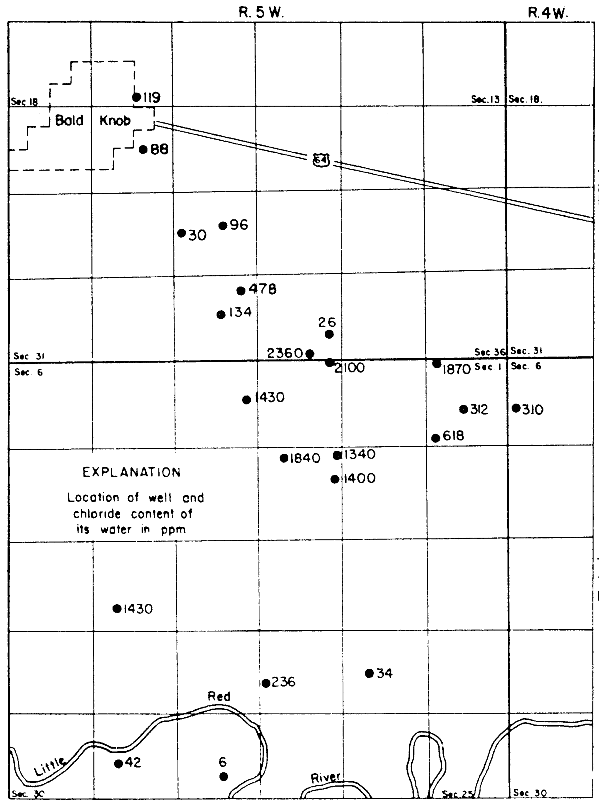

Fig. 8 Map showing sampling points and chloride content (in ppm) of water from domestic wells tapping deposits of Quarternary age in White County southeast of Bald Knob

tween the J. N. Watkins No. 1 well, sec. 18, T. 5 N., R. 2 W., and the Tatum and Watkins No. 1 Miller well, sec. 7, T. 5 N., R. 2 W., in western Woodruff County.

An electric log of the Carter Oil Co. core-test hole in the NW¼ SE¼ sec. 24, T. 5 N., R. 5 W., shows salty water at a depth of 250 feet and probably less salty water at a depth of 150 feet. Thus, all the water in Tertiary beds is probably salty in the vicinity of this test hole.

The analysis of water from the Munger well (286) and analyses of water from several of the domestic wells in that area were plotted on a logarithmic nomograph and on a trilinear water-analysis diagram. The marked difference in the shape and point of crossing of the curves on the logarithmic nomograph, and the fact that the points on the trilinear diagram did not plot on a straight line, indicate that the water is not a simple mixture from two sources only.

About 4 miles south of Des Arc a small group of irrigation wells yield water that is somewhat mineralized (see wells 5, 7, and 18, table 8). The analyses for the McGahhey wells (5 and 7) were plotted with that for the DeVore well (9), which is a normal well in Quaternary deposits about 3 miles west of the McGahey wells, on the logarithmic nomograph and on the trilinear water-analysis diagram. On the latter diagram the points fell in a straight line, and on the former the curves for all three wells were almost identical in shape and position except for the increase in sodium and chloride in the McGahhey wells. Thus, it appears that the mineralized ground water in this area is normal ground water to which sodium chloride water has been added. The presence of a reportedly unplugged oil-test well in sec. 2, T. 3 N., R. 5 W., has led local residents to attribute the salty water to contamination from the oil-test well. It seems very likely that here the water from Quaternary deposits is contaminated with salt water from deeper horizons, but whether the salt water is finding its way upward along boreholes or along faults or other natural courses has not been established.

Tertiary(?) undifferentiated deposits.—The chemical quality of water from wells in the Tertiary(?) undifferentiated deposits is highly variable, not only in concentration but in character as well, as is shown graphically in figure 7. The waters from six wells, selected as being more or less representative of this unit and classified on the basis of the concentration (epm) of a single ion or two or more ions, comprise a calcium bicarbonate water of low mineralization (well 175), a bicarbonate water of moderate concentration (well 177), a sodium bicarbonate water of moderate concentration (well 179), a sodium chloride water of moderate concentration (well 218), a chloride water of relatively high concentration (well 221), and a calcium sodium bicarbonate water of relatively low concentration (well 292). As judged by samples from the 14 wells in these deposits, the water from them cannot be typed as to character. About all that can be said is that the sulfate generally is low and the total mineralization generally is low to moderate. The concentration of dissolved solids ranged from 45 to 1,040 ppm, but only two samples contained more than 300 ppm. The pH ranged from 5.1 to 8.1 and averaged 6.9. Some of the water is reported to be corrosive to metal pipes and fixtures. Nevertheless, over much of their area of outcrop the Tertiary(?) undifferentiated deposits yield water of a satisfactory quality for farm wells.

Atoka formation.—The water from wells in the Atoka formation generally is calcium magnesium sodium bicarbonate water of low to moderate mineralization (fig. 7). The water from wells of relatively high yields generally is of better quality than that from those of low yields. Although it is difficult to find sufficient quantities of water for a good farm well in some areas, where water is found in sufficient quantity it is generally of satisfactory quality.

LOGS OF TEST HOLES AND WELLS

Listed in the following pages are logs of test holes and wells in parts of Lonoke, Prairie, and White Counties. Logs of most of the test holes were based on field and laboratory examinations of cuttings; however, logs of test holes 36 and 37 and of all the wells were reported by drillers, and the descriptions of the materials are given as they were reported. Many of the logs are either too generalized or too incomplete to be useful for the location of geologic boundaries. Altitudes were approximated where topographic maps are available and are given in feet above mean sea level. The locations of the test holes and wells are shown on plate 5 and the wells are listed in table 7 by the same numbers.

TEST HOLE 1

Location: NW¼NW¼NE¼ sec. 19, T. 4 N., R. 9 W. (Lonoke County)
Altitude: 305 ft.
Driller: Counts and McDonald

	Thickness (feet)	Depth (feet)
Tertiary(?) undifferentiated deposits:		
Clay, surface	3	3
Clay, sandy, tan	25	28
Sand, very fine	10	38
Midway(?) formation:		
Gumbo, blue	10	48

TEST HOLE 2

Location: NE¼NE¼NE¼ sec. 19, T. 4 N., R. 9 W. (Lonoke County)
Altitude: 300 ft.
Driller: Counts and McDonald

	Thickness (feet)	Depth (feet)
Tertiary(?) undifferentiated deposits and Midway formation:		
Clay, tan, and blue gumbo	28	28

TEST HOLE 3

Location: NE¼NE¼NE¼ sec. 19, T. 4 N., R. 9 W. (Lonoke County)
Altitude: 310 ft.
Driller: Counts and McDonald

	Thickness (feet)	Depth (feet)
Tertiary(?) undifferentiated deposits:		
Clay, tan	8	8
Sand, very fine, red, and tan sand	20	28
Sand, very fine, tan	15	43
Midway formation:		
Gumbo, blue, at 43 ft.		

TEST HOLE 4

Owner: H. C. Buckhead
Location: SE¼SE¼SW¼ sec. 16, T. 4 N., R. 9 W. (Lonoke County)
Altitude: 320 ft.
Driller: Counts and McDonald

	Thickness (feet)	Depth (feet)
Tertiary(?) undifferentiated deposits:		
Clay, sandy	11	11
Clay, dark	5	16
Midway formation:		
Gumbo, dark	17	33

TEST HOLE 5

Owner: H. C. Buckhead
Location: NE¼ SE¼ SW¼ sec. 16, T. 4 N., R. 9 W. (Lonoke County)
Altitude: 340 ft. (approx.)
Driller: Counts and McDonald

	Thickness (feet)	Depth (feet)
Tertiary(?) undifferentiated deposits:		
Sand, fine, silty, tan	16	16
Sand, fine, pink to tan	4	20
Sand, fine, yellowish to tan	5	25
Sand, very fine, tan, blue gumbo	18	43
Midway formation:		
Gumbo, blue, at 43 ft.		

TEST HOLE 6

Owner: H. C. Buckhead
Location: NE¼SW¼SW¼ sec. 16, T. 4 N., R. 9 W. (Lonoke County)
Altitude: 340 ft. (approx.)
Driller: Counts and McDonald

	Thickness (feet)	Depth (feet)
Tertiary(?) undifferentiated deposits:		
Silt, fine, sandy, red	11	11
Sand, fine, silty, red	14	25
Sand, fine, silty, tan	23	48

TEST HOLE 7

Owner: L. E. Talbert
Location: NW¼NE¼NW¼ sec. 20, T. 4 N., R. 9 W. (Lonoke County)
Altitude: 285 ft. (approx.)
Driller: Counts and McDonald

	Thickness (feet)	Depth (feet)
Tertiary(?) undifferentiated deposits:		
Soil, surface	3	3
Clay, tan	8	11
Clay, dark, mottled	9	20
Midway formation:		
Gumbo, dry, blue	8	28

TEST HOLE 8

Owner: Mr. Bellome
Location: NW¼SW¼SE¼ sec. 18, T. 4 N., R. 9 W.
(Lonoke County)
Altitude: 312 ft.
Driller: Counts and McDonald

	Thickness (feet)	Depth (feet)
Tertiary(?) undifferentiated deposits:		
Soil, surface	3	3
Clay, sandy, red	8	11
Clay, sandy, yellowish	22	33
Midway formation:		
Gumbo, blue	5	38

TEST HOLE 9

Owner: Mr. Doyle
Location: NW¼NE¼NW¼ sec. 18, T. 4 N., R. 9 W.
(Lonoke County)
Altitude: 287 ft.
Driller: Counts and McDonald

	Thickness (feet)	Depth (feet)
Tertiary(?) undifferentiated deposits:		
Soil, surface, and sandy silt	3	3
Clay, sandy	5	8
Clay, tan	8	16
Atoka formation:		
Shale, black	6	22

TEST HOLE 10

Owner: Dale Marshall
Location: NE¼NE¼NE¼ sec. 25, T. 4 N., R. 10 W.
(Lonoke County)
Altitude: 282 ft.
Driller: Counts and McDonald

	Thickness (feet)	Depth (feet)
Tertiary(?) undifferentiated deposits:		
Soil, surface	3	3
Clay	2	5
Sand, fine, gray	6	11
Sand, fine, tan; wet	22	33
Sand, very fine, blue	10	43
Midway formation:		
Gumbo, blue	5	48

TEST HOLE 11

Location: SW¼SW¼SW¼ sec. 22, T. 3 N., R. 10 W.
(Lonoke County)
Altitude: 250 ft.
Driller: Counts, Dennis, Edds, and Stephens

	Thickness (feet)	Depth (feet)
Quaternary deposits:		
Clay, silty, gray	5	5
Clay, red	15	20
Clay, silty, reddish grading into light-brown	5	25
Clay, light-brown	8	33
Clay, hard and tough, mottled red and brown	2	35
Clay, tough, red	3	38
Clay, tough, red and gray, interbedded with silt and very fine sand	16	54
Clay and silt, interbedded with very fine sand	14	68
Sand	5	73
Clay, dark-red	1	74

TEST HOLE 12

Location: NE¼NE¼NE¼ sec. 27, T. 3 N., R. 10 W.
(Lonoke County)
Altitude: 250 ft.
Driller: Troy Mullens & Son

	Thickness (feet)	Depth (feet)
Quaternary(?) deposits:		
Clay, silty, containing gray iron-oxide concretions	7	7
Clay, red	8	15
Clay, red, containing interbedded light-brown streaks	6	21
Clay, reddish-brown	3	24
Clay, light-brownish-gray	1	25
Clay, reddish-brown	30	55
Clay, light-greenish-gray	5	60
Clay, silt, and interbedded very fine, gray and light-brown sand	15	75
Sand, fine, and interbedded silt and clay	5	80
Sand, clay, silt, and fine gravel containing wood fragments	8	88
Midway(?) formation:		
Clay, dark-blue-gray	37	125

TEST HOLE 13

Location: NE¼NE¼NE¼ sec. 13, T. 4 N., R. 8 W. (Lonoke County)
Altitude: 247 ft.
Driller: Troy Mullens & Son

	Thickness (feet)	Depth (feet)
Quaternary(?) deposits:		
Clay, silty, light-brown and gray, mottled	4	4
Clay, red	21	25
Clay, soft, reddish-brown	15	40
Clay, light-greenish-gray	5	45
Clay, very sandy, light-greenish-gray	5	50
Sand, fine to medium, brown	40	90
Sand, medium, and fine gravel. Boulders at 124 ft.	34	124
No sample	1	125
Gravel	12	137
Boulders and gravel	3	140
Wilcox(?) formation:		
Clay, sandy, light-blue-gray	55	195
Midway(?) formation:		
Clay or shale, black, hard	30	225
Clay, sandy, gray and black	5	230

TEST HOLE 14

Location: SE¼SE¼SE¼ sec. 5, T. 3 N., R. 8 W. (Lonoke County)
Altitude: 265 ft.
Driller: Troy Mullens & Son

	Thickness (feet)	Depth (feet)
Quaternary deposits:		
Silt, light-yellowish-brown	2	2
Clay, silty, mottled brown and gray	3	5
Clay, light-gray and brown	5	10
Clay, light-gray	5	15
Clay, red	35	50
Clay, red and brown	10	60
Clay, light-greenish-gray	15	75
Clay, sandy and silty, brown	5	80
Sand, fine, clayey and silty	5	85
Sand, mostly fine to medium, brown	25	110
Sand, mostly fine, brown	10	120
Sand, mostly fine to very fine, brown	19	139
Gravel	4	143
Tertiary(?) undifferentiated deposits:		
Clay, sandy, light-bluish-gray. Rock at 153 ft. (Probably ironstone concretionary layer)	10	153

TEST HOLE 15

Location: SW¼SW¼SE¼ sec. 1, T. 3 N., R. 8 W. (Lonoke County)
Altitude: 250 ft.
Driller: Troy Mullens & Son

	Thickness (feet)	Depth (feet)
Quaternary deposits:		
Clay, silty, light-brown	2	2
Clay, mottled brownish and light-gray	3	5
Clay, light-blue-gray	5	10
Clay, soft, red; contains some organic matter	10	20
Sand, fine, pale-yellowish-brown	20	40
Clay, soft, light-red	5	45
Clay, stiff, red	5	50
Clay, sandy, brownish to reddish	9	59
Clay, sandy, pale-bluish-gray	6	65
Sand, fine to medium, brown	15	80
Sand, silty, very fine, brown	20	100
Sand, brown, mostly fine, some chert (as boulders?) at 135 ft.	35	135
Gravel, mostly pea size	10	145
Wilcox(?) formation:		
Clay, chocolate-brown, compact, containing thin layers of lignite. Stopped at 174 ft. on lignite bed	29	174

TEST HOLE 16

Location: NE¼NE¼SE¼ sec. 24, T. 4 N., R. 8 W. (Lonoke County)
Altitude: 262 ft.
Driller: Counts, Edds, Reed, and Stephens

	Thickness (feet)	Depth (feet)
Quaternary deposits:		
Silt	4	4
Clay, reddish-brown	8	12
Clay, yellowish-brown	2	14
Clay, light-gray	7	21
Sand, fine, yellowish-brown	3	24
Sand, fine, pinkish-brown	5	29
Sand, fine, yellowish-brown	10	39
Clay, red	11	50
Sand, very fine	5	55
Clay, silty, red	27	82
Sand, fine, gray	16	98

TEST HOLE 17

Location: NW¼NW¼NW¼ sec. 8, T. 3 N., R. 8 W. (Lonoke County)
Altitude: 245 ft.
Driller: Counts, Edds, Stephens, Dennis

	Thickness (feet)	Depth (feet)
Tertiary(?) undifferentiated deposits:		
Clay, silty, yellowish- to reddish-brown	3	3
Clay, silty, reddish-brown	3	6
Sand, very fine, orange-red	2.5	8.5
Clay, red	3.5	12
Clay, soft and hard, interbedded, silty, red	25	37
Clay, fine, sandy, light-reddish-brown	8	45
Clay, very sandy, soft, plastic, light-yellowish-brown	2	47
Clay, red, containing greenish-gray spots	1	48
No saturated zone in hole		

TEST HOLE 18

Location: SE¼SE¼SE¼ sec. 31, T. 4 N., R. 8 W.
(Lonoke County)
Altitude: 255 ft.
Driller: Counts, Edds, Reed, and Dennis

	Thickness (feet)	Depth (feet)
Tertiary(?) undifferentiated deposits:		
Clay, silty, yellowish-brown	8.5	8.5
Sand, silty and clayey, red	4.5	13
Sand, fine, pinkish-brown	6	19

TEST HOLE 19

Location: SE¼SE¼SE¼ sec. 32, T. 4 N., R. 8 W.
(Lonoke County)
Altitude: 250 ft.
Driller: Counts, Edds, Stephens, and Dennis

	Thickness (feet)	Depth (feet)
Tertiary(?) undifferentiated deposits:		
Silt, clayey, yellow	3	3
Clay, silty, light-brown	2	5
Clay, silty and sandy, light-brown with lighter mottling	5	10
Clay, very sandy, red	4	14
Sand, fine, pink	5	19

TEST HOLE 20

Location: NE¼NE¼NE¼ sec. 4, T. 3 N., R. 8 W.
(Lonoke County)
Altitude: 250 ft.
Driller: Counts, Edds, Stephens, and Dennis

	Thickness (feet)	Depth (feet)
Quaternary(?) deposits:		
Silt, clayey, yellow	14	14
Sand, fine, clayey, pink	3	17
Sand, fine, red	5	22
Clay, reddish-brown; contains black spots of organic matter	1	23
Sand, fine, reddish-brown	1	24

TEST HOLE 21

Location: SE¼SE¼SE¼ sec. 35, T. 4 N., R. 8 W.
(Lonoke County)
Altitude: 352 ft.
Driller: Counts, Edds, Stephens, and Dennis

	Thickness (feet)	Depth (feet)
Quaternary deposits:		
Clay, silty, yellowish-brown	2	2
Clay, silty, fine, sandy, gray	8	10
Clay, fine, sandy, pink	1	11
Clay, silty, reddish-brown	2	13
Sand, fine, clayey, orange-red	2	15
Sand, fine, orange	13	28
Clay, red; contains some interbedded sand	1	29
Clay, sandy, very calcareous, red	11	40

TEST HOLE 22

Location: SE¼SE¼SW¼ sec. 30, T. 4 N., R. 8 W.
(Lonoke County)
Altitude: 275 ft.
Driller: Counts, Edds, and Stephens

	Thickness (feet)	Depth (feet)
Tertiary(?) undifferentiated deposits:		
Silt, clayey, yellow	4	4
Clay, silty, yellow	10	14
Clay, silty, slightly calcareous, red	8	22
Sand, very fine, reddish-brown	5	27
Sand, very fine, yellowish-brown	5	32

TEST HOLE 23

Location: NE¼NW¼NW¼ sec. 36, T. 4 N., R. 9 W.
(Lonoke County)
Altitude: 300 ft.
Driller: Counts, Edds, and Stephens

	Thickness (feet)	Depth (feet)
Tertiary(?) undifferentiated deposits:		
Silt, sandy, clayey, yellow	7	7
Silt, sandy, clayey, red, mottled with light clay	4	11
Clay, silty, yellow	2	13
Clay, silty, dark	1	14
Clay, silty, slightly sandy, yellow. Wet at 30 ft.	20	34

TEST HOLE 24

Location: NE¼SE¼SE¼ sec. 29, T. 4 N., R. 8 W.
(Lonoke County)
Altitude: 240 ft.
Driller: Counts, Edds, and Stephens

	Thickness (feet)	Depth (feet)
Tertiary(?) undifferentiated deposits:		
Soil, surface	2	2
Silt, clayey, yellow	4	6
Clay, silty, yellow, mottled with light clay	5	11
Sand, very fine, silty; contains a little yellowish-tan clay	5	16
Sand, very fine, silty, light-gray	5	21
Clay, silty, yellow	2	23
Clay, slightly silty, dark-pink	11	34

TEST HOLE 25

Location: NW¼SE¼SW¼ sec. 27, T. 4 N., R. 8 W.
(Lonoke County)
Altitude: 240 ft.
Driller: Counts, Edds, and Stephens

	Thickness (feet)	Depth (feet)
Quaternary deposits:		
Silt, clayey, yellow	7	7
Silt and clay, mottled	5	12
Clay, silty, red	1	13
Clay, silty, dark-pinkish	6	19

TEST HOLE 26

Location: NW¼NW¼SE¼ sec. 26, T. 4 N., R. 8 W. (Lonoke County)
Altitude: 255 ft.
Driller: Counts, Edds, and Stephens

	Thickness (feet)	Depth (feet)
Quaternary deposits:		
Silt, clayey, yellow	6	6
Silt, clayey, light-yellow; contains grains of white sand	5	11
Sand, very fine, white; contains some yellow silt	1	12
Silt, clayey, yellow	3	15
Sand, silty, mottled, very hard	2	17
Sand, silty, clayey, mottled, hard, dry	2	19

TEST HOLE 27

Owner: E. M. Cherry
Location: NW¼NE¼SE¼ sec. 29, T. 4 N., R. 9 W. (Lonoke County)
Altitude: 325 ft.
Driller: H. L. Brown

	Thickness (feet)	Depth (feet)
Tertiary(?) undifferentiated deposits:		
Silt, clayey, yellow to brown	2	2
Clay, silty, mottled gray and brown	3	5
Clay, sandy, gray with brown sandy streaks	7	12
Ironstone	.17	12.17
Clay, silty, light-gray	2.83	15
Clay, silty, bright yellow and gray	5	20
Clay, silty, light-gray	5	25
Clay, silty, bright orange-yellow and gray	5	30
Sand, fine, with interbedded sandy clay	5	35
Clay, sandy, yellow and brown	5	40
Clay, sandy, gray	5	45
Sand, fine, and a little interbedded clay	5	50
Midway formation:		
Clay, mostly noncalcareous, very dark gray	40	90
Clay, dark-gray; contains hard, thin siliceous beds	5	95
Clay, medium-gray with thin beds of white clay	10	105
Clay, very calcareous, medium-gray; contains Paleocene Foraminifera	15	120

TEST HOLE 28

Owner: E. M. Cherry
Location: SW¼SE¼SE¼ sec. 29, T. 4 N., R. 9 W. (Lonoke County)
Altitude: 290 ft.
Driller: H. L. Brown

	Thickness (feet)	Depth (feet)
Tertiary(?) undifferentiated deposits:		
Silt, clayey, yellow	2	2
Clay, silty, mottled brown and gray	18	20
Clay, sandy, brown	5	25
Clay, silty to sandy, light-blue-gray	10	35
Clay, with a thin bed of very fine sand	5	40
Midway formation:		
Clay, mostly noncalcareous, dark-blue-gray	25	65
Clay, with hard thin sandstone beds at 68 ft., 74 ft., and 83 ft., and very thin beds of white clay	20	85
Clay, medium-gray, calcareous; contains Paleocene Foraminifera	5	90

TEST HOLE 29

Owner: McMaster
Location: NW¼ NW¼ SW¼ sec. 27, T. 4 N., R. 9 W. (Lonoke County)
Altitude: 305 ft.
Driller: H. L. Brown

	Thickness (feet)	Depth (feet)
Tertiary(?) undifferentiated deposits:		
Clay, yellow	5	5
Clay, sandy, gray and brown, fissile	2	7
Clay, sandy, interbedded gray and yellow	8	15
Clay, sandy, gray; contains some interbedded clayey sand	9	24
Clay, sandy, light-gray, speckled	16	40
Clay, gray; contains wood and bark fragments and very thin white clay beds	5	45
Sand, very fine; contains wood and lignite fragments	20	65
Sand, fine to medium	20	85
Clay, fine, sandy, light-gray	20	105
Clay, light-gray; contains thin, hard sandstone beds	15	120
Clay, light-gray	10	130
Midway formation:		
Clay, noncalcareous, very dark gray	5	135

TEST HOLE 30

Owner: Alex Poage
Location: SW¼ SE¼ SE¼ sec. 21, T. 4 N., R. 9 W. (Lonoke County)
Altitude: 305 ft.
Driller: H. L. Brown

	Thickness (feet)	Depth (feet)
Tertiary(?) undifferentiated deposits:		
Clay, noncalcareous, red	5	5
Clay, silty, red and gray mottled	5	10
Sand, fine; contains flecks of black organic material	5	15
Sand, fine to medium; contains some organic material	10	25
Sand, medium to coarse, yellowish	7	32
Midway formation:		
Clay, noncalcareous, dark-gray	23	55
Clay, dark-gray; with thin, hard sandstone bed at 58 ft.	30	85
Clay, calcareous, dark-gray; contains very thin beds of white clay and hard sandstone	5	90
Clay, calcareous, dark-gray	30	120

TEST HOLE 31

Owner: E. M. Cherry
Location: SW¼ SW¼ SE¼ sec. 28, T. 4 N., 9 W. (Lonoke County)
Altitude: 350 ft.
Driller: H. L. Brown

	Thickness (feet)	Depth (feet)
Tertiary(?) undifferentiated deposits:		
Silt, clayey, brown	2	2
Clay, gray blocks with red-stained surfaces	3	5
Clay, gray	5	10
Clay, gray, containing thin brown ironstone layers	5	15
Sand, fine, gray	5	20
Clay, silty, noncalcareous, light-gray	10	30
Clay, gray, containing thin brown ironstone layers	5	35
Clay, silty, medium-gray	5	40
Clay, containing thin brown ironstone layers	7	47
Sand, fine, gray	4	51
Clay, light-gray	4	55
Clay, sandy, gray and white speckled	5	60
Sand, fine, gray	5	65
Sand, mostly fine, some medium	15	80
Sand, fine, and interbedded sandy clay; contains much wood, bark, and other organic material	13	93
Clay, sandy	2	95
Sand, fine to medium	55	150
Sand, fine, with interbedded gray clay	25	175
Clay, sandy, soft, light-gray	5	180
Sand, very fine, and soft gray clay	15	195
Clay, medium-gray	10	205
Sand, very fine, and soft gray clay	10	215
Clay, medium-gray	4	219
Midway formation:		
Clay, noncalcareous, dark-gray	10	229
Clay, calcareous, medium- to dark-gray	6	235

TEST HOLE 32

Owner: O. J. McMillen
Location: SE¼ SW¼ SW¼ sec. 33, T. 4 N., R. 9 W. (Lonoke County)
Altitude: 295 ft.
Driller: H. L. Brown

	Thickness (feet)	Depth (feet)
Tertiary(?) undifferentiated deposits:		
Silt, clayey, orange	3	3
Clay, sandy, gray and brown mottled	2	5
Clay, sandy, gray	3	8
Clay, silty, gray and yellow	2	10
Sand, fine, light-brown	1	11
Clay, gray, containing sandy brown ironstone layers	8	19
Sand, fine	1	20
Clay, sandy, gray, containing brown layers	5	25
Sand, fine	1	26
Clay, medium-gray	1	27
Sand, fine	3	30
Sand, fine, containing interbedded sandy gray clay	15	45
Clay, sandy, light-gray and brown	4	49
Sand, fine to medium, yellow	1	50
Clay, sandy, gray	2	52
Sand, fine to medium, gray	3	55
Clay, sandy, gray	25	80
Sand, fine, and interbedded sandy clay	20	100
Sand, medium to coarse	9	109
Clay, silty; contains lignite particles and thin hard layers at 123 ft., 127 ft., 134 ft., and 140 ft.	31	140
Clay, sandy, gray; contains very thin beds of white clay and specks of lignite	27	167
Midway formation:		
Clay, noncalcareous, very dark gray	13	180
Clay, calcareous, dark-gray	5	185
Clay, soft, calcareous, light-gray	5	190

TEST HOLE 33

Owner: H. L. Mulkey
Location: NE¼ NW¼ SE¼ sec. 4, T. 3 N., R. 9 W. (Lonoke County)
Altitude: 285 ft.
Driller: H. L. Brown

	Thickness (feet)	Depth (feet)
Tertiary(?) undifferentiated deposits:		
Clay, silty, gray with bright red and yellow stains	11	11
Gravel and sand; contains ironstone detrital material	1	12
Clay, gray and yellow	3	15
Clay, sandy, olive-tan, and one thin bed of very fine sand	8	23
Clay, silty, medium-gray	6	29
Clay, sandy, soft, light-gray; contains ironstone hard spot at 32 ft.	6	35
Clay, sandy, soft, light-gray; contains a little interbedded very fine sand	25	60
Clay, compact, gray	5	65
Clay; contains a little fine sand and clay pebbles	5	70
Sand, fine, and gravel composed of clay pebbles	3	73
Clay, sandy, gray	12	85
Sand, silty, very fine, gray	20	105
Sand, medium to very coarse	15	120
Sand, medium	30	150

TEST HOLE 34

Owner: Mrs. Sanders
Location: NW¼ NE¼ NW¼ sec. 34, T. 4 N., R. 9 W. (Lonoke County)
Altitude: 300 ft.
Driller: H. L. Brown

	Thickness (feet)	Depth (feet)
Tertiary(?) undifferentiated deposits:		
Loam, sandy, yellowish-brown	1	1
Clay, gray, red-stained	4	5
Clay, gray	15	20
Clay, sandy	11	31
Sand, fine, dark-gray	.5	31.5
Clay, sandy to silty	13.5	45
Clay, sandy, soft, speckled light-gray and black; contains specks of lignite and plant fragments	31	76
Sand, very fine, dark-gray	.5	76.5
Clay, fine, sandy; contains plant fragments and lignite	13.5	90
Sand, very fine; contains interbedded clay and plant fragments	15	105
Clay, compact, light-gray,	30	135
Midway formation:		
Clay, noncalcareous, dark-gray	30	165

TEST HOLE 35

Owner: Cleo Fields
Location: SE¼ SW¼ SW¼ sec. 34, T. 4 N., R. 9 W. (Lonoke County)
Altitude: 295 ft.
Driller: H. L. Brown

	Thickness (feet)	Depth (feet)
Tertiary(?) undifferentiated deposits:		
Clay, silty, yellowish-brown	5	5
Clay, gray with yellow stains	10	15
Clay, sandy, gray and light-brown	5	20
Clay, gray	4	24
Clay, yellow, and interbedded very fine sand	6	30
Sand, very fine, and interbedded soft clay	7	37
Clay, sandy, gray	8	45
Sand, very fine; contains ironstone fragments and interbedded gray clay	5	50
Clay, sandy, light- to medium-gray	10	60
Sand, very fine, silty	1	61
Clay, silty, gray	15	76
Sand, very fine, silty	1	77
Clay, medium-gray	28	105
Clay, gray, containing thin bed hard sandstone at 108 ft.	15	120
Clay, gray	18	138

TEST HOLE 36

Owner: Henry Jayroe
Location: sec. 34, T. 5 N., R. 9 W. (Lonoke County)
Altitude: 230 ft. (approx.)

	Thickness (feet)	Depth (feet)
Tertiary(?) undifferentiated deposits:		
Soil, silt, and clay	16	16
Sand	5	21
Midway formation:		
Clay, tough, blue. Rock at 206 ft.	185	206
Atoka formation:		
Shale, blue or black. Rocks at 209 ft., with a little water	64	270

TEST HOLE 37

Location: NE¼ SW¼ sec. 25, T. 4 N., R. 10 W. (Lonoke County)
Altitude: 290 Ft. (approx.)

	Thickness (feet)	Depth (feet)
Quaternary deposits:		
Soil, surface	2	2
Clay, red	10	12
Clay, sandy	16	28
Clay, calcareous	1	29
Midway formation:		
Marl	8	37
Atoka formation at 37 ft.		

TEST HOLE 38

Location: SW¼ SW¼ sec. 8, T. 4 N., R. 8 W. (Lonoke County)
Altitude: 250 ft.
Driller: H. L. Brown

	Thickness (feet)	Depth (feet)
Tertiary(?) undifferentiated deposits:		
Silt, clayey and sandy, containing iron oxide ("buckshot") concretions	5	5
Gravel and sand, silty, brown to black	4	9
Clay, silty to sandy, yellow; contains sandy streaks	6	15
Sand, coarse, brown	1	16
Clay, buff to brown; contains interbedded coarse sand	9	25
Wilcox(?) formation:		
Sand, medium to coarse, gray	1	26
Clay, medium-gray	4	30
Clay, medium-gray; contains interbedded gray sand	14	44
Clay, hard, dark-gray	1	45
Sand, gray; contains lignite	2	47
Clay, dark-gray	7	54
Sand, medium to coarse, gray; contains dark-gray clay pebbles at base	1	55
Midway(?) formation:		
Clay, dark-gray; contains thin streaks of hard white clay and fragments of bryozoa	5	60
Clay, dark-gray	45	105
Clay, dark-gray; contains thin streaks of white clay	15	120
Clay, dark-gray; contains thin beds of white calcareous clay	105	225

TEST HOLE 39

Owner: W. W. McKnown
Location: SW¼ SW¼ sec. 12, T. 6 N., R. 8 W. (White County)
Driller: H. L. Brown

	Thickness (feet)	Depth (feet)
Quaternary(?) deposits:		
Clay, slightly silty, yellow to light-brown	8	8
Clay, light-gray and brown	6	14
Clay, light-gray with brown streaks	7	21
Clay, silty, light-gray to buff	15	36
Sand, fine to medium, buff	9	45
Sand, mostly medium, some fine and coarse, gray, but yellow at bottom	10	55
Midway(?) formation:		
Clay, very sandy, calcareous, gray; contains Paleocene Foraminifera	5	60
Sandstone and interbedded sandy clay, calcareous	5	65
Sandstone, calcareous, dark-gray; contains a little interbedded clay	10	75
Clay, calcareous, fissile in part, dark-gray; contains Paleocene Foraminifera	20	90

TEST HOLE 40

Owner: Mrs. Harold Young
Location: SE¼ SW¼ sec. 5, T. 6 N., R. 7 W. (White County)
Driller: H. L. Brown

	Thickness (feet)	Depth (feet)
Quaternary(?) deposits:		
Silt, clayey, mostly yellow but containing a little unoxidized light-gray silty clay	7	7
Silt, gray; contains brown sand streaks	23	30
Sand, fine, clayey; contains interbedded yellow clay	5	35
Clay, light-gray	23	58
Midway(?) formation:		
Clay, noncalcareous, black, dull soillike appearance	2	60
Sand, mostly fine to medium	15	75
Sand, medium to coarse; contains interbedded clay	8	83
Clay, sandy, gray	7	90
Clay; contains coarse sand and small pebbles	3	93
Sand, fine to very coarse	8	101
Clay, gray	4	105
Clay, sandy, noncalcareous, gray	14	119
Sand, very fine; contains interbedded soft gray clay	2	121
Clay, soft, sandy, glauconitic, pyritic, slightly to very calcareous, gray	13	134
Rock. No sample	1	135

TEST HOLE 41

Location: NE¼ SW¼ sec. 23, T. 6 N., R. 8 W. (White County)
Driller: H. L. Brown

	Thickness (feet)	Depth (feet)
Quaternary(?) deposits:		
Clay, gray to brown, oxidized along cracks	5	5
Clay, light-gray; contains some oxidized yellow	11	16
Clay, noncalcareous, red	9	25
Clay, noncalcareous, buff	15	40
Sand, fine, light-brown	5	45
Sand, fine to medium, dark-brown	40	85
Midway(?) formation:		
Sand, fine, dark-gray	20	105
Clay, soft, noncalcareous, blue-gray	15	120
Clay, soft, blue-gray; contains calcareous flecks	15	135
Clay, calcareous, blue-gray and green mottled; contains some hard spots	15	150
Sand, fine; contains interbedded clay	13	163
Sandstone	1	164

WELL 2

Owner: Plunket Farms, Inc.
Location: SE¼ NW¼ NE¼ sec. 3, T. 3 N., R. 4 W. (Prairie County)
Altitude: 187 ft.
Driller: Lilly Bros.

	Thickness (feet)	Depth (feet)
Quaternary deposits:		
Clay, surface	10	10
Sand, some blue clay balls	45	55
Sand, coarse, gray	20	75
Sand, light-blue	5	80
Sand and gravel, light-blue. Rocks at 106 ft.	26	106

WELL 11

Owner: W. L. Calley
Location: SW¼ SE¼ NW¼ sec. 6, T. 3 N., R. 5 W. (Prairie County)
Altitude: 207 ft.
Driller: Lilly Bros.

	Thickness (feet)	Depth (feet)
Quaternary deposits:		
Clay, surface	10	10
Clay, streaks of red sand	20	30
Clay, light-yellow	15	45
Sand, coarse, blue	55	100
Sand, coarse, blue; and gravel	16	116

WELL 12

Owner: Charles Orlechek
Location: SE¼ NE¼ SW¼ sec. 6, T. 3 N., R. 5 W. (Prairie County)
Altitude: 216 ft.
Driller: Lilly Bros.

	Thickness (feet)	Depth (feet)
Quaternary deposits:		
Clay, hard	20	20
Sand, pack	10	30
Clay, blue	10	40
Sand, coarse, blue	50	90
Sand, coarse, blue, and gravel; blue clay at 125 ft.	35	125

WELL 13

Owner: W. F. Livesay
Location: NE¼ NE¼ SE¼ sec. 6, T. 3 N., R. 5 W. (Prairie County)
Altitude: 211 ft.
Driller: Lilly Bros.

	Thickness (feet)	Depth (feet)
Quaternary deposits:		
Clay, surface	10	10
Clay, red, and sand	15	25
Sand, light-yellow	25	50
Sand, blue, a little gravel	64	114

WELL 14

Owner: J. J. Screeton
Location: SE¼ SE¼ SE¼ sec. 6, T. 3 N., R. 5 W. (Prairie County)
Altitude: 211 ft.
Driller: Lilly Bros.

	Thickness (feet)	Depth (feet)
Quaternary deposits:		
Clay, surface	15	15
Sand and clay	15	30
Clay, red	20	50
Clay, blue	15	65
Sand, blue	10	75
Sand and gravel	25	100
Sand, gravel, and rock	18	118
Sand, gray, and gravel	6	124

WELL 22

Owner: Mrs. Grady
Location: NE¼ NW¼ NE¼ sec. 18, T. 3 N., R. 5 W. (Prairie County)
Altitude: 191 ft.
Driller: Lilly Bros.

	Thickness (feet)	Depth (feet)
Quaternary deposits:		
Clay, surface	10	10
Clay, red	20	30
Sand, blue	20	50
Sand, coarse, blue, and gravel	60	110

WELL 23

Owner: J. J. Screeton
Location: SW¼ SE¼ SE¼ sec. 19, T. 3 N., R. 5 W. (Prairie County)
Altitude: 216 ft.
Driller: Lilly Bros.

	Thickness (feet)	Depth (feet)
Quaternary deposits:		
Clay, surface	15	15
Sand, pack	15	30
Clay, white	12	42
Sand, fine, blue	33	75
Sand, blue, and gravel	16	91
Sand, rocks, and clay streaks	9	100
Sand, blue, and a little gravel	10	110
Gravel, coarse, and a little sand	20	130

WELL 24

Owner: J. J. Screeton
Location: NW¼ NW¼ SW¼ sec. 31, T. 3 N., R. 5 W. (Prairie County)
Altitude: 221 ft.
Driller: Lilly Bros.

	Thickness (feet)	Depth (feet)
Quaternary deposits:		
Clay, surface	10	10
Sand, pack, yellow	10	20
Clay mixed with sand, red	25	45
Clay, blue	20	65
Sand mixed with clay and gravel, blue	25	90
Sand, coarse, blue, and gravel	17	107
Rock, cement	2	109
Sand, coarse, blue, and gravel	12	121

WELL 27

Owner: E. D. Newton
Location: SE¼ NW¼ SE¼ sec. 1, T. 3 N., R. 6 W. (Prairie County)
Altitude: 215 ft.
Driller: Lilly Bros.

	Thickness (feet)	Depth (feet)
Quaternary deposits:		
Clay, surface	10	10
Sand, yellow	25	35
Clay, white	7	42
Sand	43	85
Sand and gravel	10	95
Sand, coarse, and gravel	35	130

WELL 29

Owner: Joe Calley
Location: NW¼ NW¼ NE¼ sec. 5, T. 3 N., R. 6 W. (Prairie County)
Altitude: 220 ft.
Driller: Lilly Bros.

	Thickness (feet)	Depth (feet)
Quaternary deposits:		
Clay, surface	10	10
Sand and clay	15	25
Sand, light-yellow	30	55
Sand, blue, some gravel	35	90
Sand, blue, and gravel	10	100
Sand, blue	8	108
Sand, blue, and gravel	22	130

WELL 33

Owner: John Perry
Location: SE¼ SW¼ NW¼ sec. 28, T. 3 N., R. 6 W. (Prairie County)
Altitude: 226 ft.
Driller: Lilly Bros.

	Thickness (feet)	Depth (feet)
Quaternary deposits:		
Clay, surface	10	10
Clay, red	40	50
Sand, blue	49	99
Sand, coarse, blue, and gravel	29	128

WELL 36

Owner: E. E. Rogers
Location: SE¼ SE¼ SE¼ sec. 33, T. 3 N., R. 6 W. (Prairie County)
Altitude: 233 ft.
Driller: Lilly Bros.

	Thickness (feet)	Depth (feet)
Quaternary deposits:		
Clay	25	25
Sand, fine, quick	15	40
Sand	28	68
Sand, some clay and sand at 100 ft.	32	100
Sand, coarse, blue, and gravel	34	134

WELL 38

Owner: J. W. Miller
Location: SE¼ SE¼ NE¼ sec. 1, T. 4 N., R. 4 W. (Prairie County)
Altitude: 176 ft.
Driller: Lilly Bros.

	Thickness (feet)	Depth (feet)
Quaternary deposits:		
Clay, surface	10	10
Sand, fine	30	40
Sand, coarse, and gravel	40	80
Sand, coarse, blue, and gravel	16	96

WELL 39

Location: SW¼ NE¼ NE¼ sec. 4, T. 4 N., R. 4 W. (Prairie County)
Altitude: 181 ft.
Driller: Lilly Bros.

	Thickness (feet)	Depth (feet)
Quaternary deposits:		
Clay, surface	10	10
Clay, yellow	10	20
Sand mixed with clay, blue	10	30
Sand, coarse, blue	30	60
Sand, coarse, blue, and gravel	38	98

WELL 40

Location: SE¼ NE¼ NE¼ sec. 5, T. 4 N., R. 4 W. (Prairie County)
Altitude: 195 ft.
Driller: Lilly Bros.

	Thickness (feet)	Depth (feet)
Quaternary deposits:		
Clay, surface	4	4
Sand, fine, yellow	31	35
Sand, coarse, yellow	10	45
Sand, coarse, blue, and a little gravel	17	62
Sand, coarse, blue, and gravel	36	98

WELL 46

Owner: Earnest Pertle
Location: NW¼ SW¼ SE¼ sec. 7, T. 4 N., R. 5 W. (Prairie County)
Altitude: 209 ft.
Driller: Lilly Bros.

	Thickness (feet)	Depth (feet)
Quaternary deposits:		
Clay, surface	10	10
Clay, red	15	25
Clay, white	5	30
Sand, blue	40	70
Sand, blue, and gravel	10	80
Sand, blue	20	100
Sand, coarse, blue, and gravel	10	110
Claiborne(?) Group:		
Sand, packed, and clay	2	112

WELL 57

Owner: Tom Simmons and Son
Location: SE¼ SE¼ NE¼ sec. 18, T. 4 N., R. 5 W. (Prairie County)
Altitude: 212 ft.
Driller: Lilly Bros.

	Thickness (feet)	Depth (feet)
Quaternary deposits:		
Clay, surface	10	10
Sand, pack, yellow	15	25
Clay, red	5	30
Clay, blue	10	40
Sand, blue	20	60
Sand, and some gravel	10	70
Sand, coarse, blue, and gravel	42	112

WELL 61

Owner: J. W. Cauley
Location: NW¼ NE¼ SE¼ sec. 19, T. 4 N., R. 5 W. (Prairie County)
Altitude: 212 ft.
Driller: Lilly Bros.

	Thickness (feet)	Depth (feet)
Quaternary deposits:		
Clay, surface	10	10
Clay, light-yellow	30	40
Clay, blue	8	48
Sand, blue	27	75
Sand, coarse, blue	5	80
Sand, coarse, blue, and gravel	25	105
Sand, light-blue, with blue clay at 121 ft.	16	121

WELL 62

Owner: John Sims
Location: SE¼ SE¼ SE¼ sec. 19, T. 4 N., R. 5 W. (Prairie County)
Altitude: 212 ft.
Driller: Layne-Arkansas Co.

	Thickness (feet)	Depth (feet)
Quaternary deposits:		
Clay	50	50
Sand, blue	40	90
Sand, fine, gray	35	125
Boulders	3	128
Tertiary(?) undifferentiated deposits:		
Sand, fine, white	44	172
Clay	2	174

WELL 71

Owner: J. J. Screeton
Location: NE¼ NE¼ SW¼ sec. 30, T. 4 N., R. 5 W. (Prairie County)
Altitude: 213 ft.
Driller: Lilly Bros.

	Thickness (feet)	Depth (feet)
Quaternary deposits:		
Clay, surface	10	10
Sand	70	80
Sand, blue, and gravel	40	120
Sand, blue	11	131

WELL 72

Owner: Bell Bros.
Location: NE¼ NW¼ SW¼ sec. 30, T. 4 N., R. 5 W. (Prairie County)
Altitude: 212 ft.
Driller: Lilly Bros.

	Thickness (feet)	Depth (feet)
Quaternary deposits:		
Clay, surface	10	10
Sand, pack, yellow	10	20
Clay, white	15	35
Clay, blue	27	62
Sand, blue	22	84
Sand, coarse, blue, and gravel	31	115
Sand, coarse, light-blue, and some gravel	13	128

WELL 73

Owner: J. J. Screeton
Location: NW¼ NW¼ NW¼ sec. 31, T. 4 N., R. 5 W. (Prairie County)
Altitude: 210 ft.
Driller: Lilly Bros.

	Thickness (feet)	Depth (feet)
Quaternary deposits:		
Clay, surface	10	10
Sand, yellow	15	25
Clay, dark	22	47
Sand, blue	43	90
Sand, blue, and gravel; clay at 113 ft.	23	113

WELL 78

Owner: Grady Bros.
Location: SE¼ SE¼ NW¼ sec. 11, T. 4 N., R. 6 W. (Prairie County)
Altitude: 212 ft.
Driller: Lilly Bros.

	Thickness (feet)	Depth (feet)
Quaternary deposits:		
Clay, surface	10	10
Clay, light-red	20	30
Clay, light-yellow	5	35
Sand, pack, blue	10	45
Sand, blue	45	90
Sand, coarse, blue; gravel and rocks	15	105
Claiborne(?) Group:		
Clay, blue	5	110
Sand, coarse, blue, mixed with clay	7	117

WELL 82

Owner: Boyce Minton
Location: NE¼ NW¼ SW¼ sec. 22, T. 4 N., R. 6 W. (Prairie County)
Altitude: 215 ft.
Driller: Lilly Bros.

	Thickness (feet)	Depth (feet)
Quaternary deposits:		
Clay, surface	10	10
Sand	70	80
Sand, gray, and gravel	11	91
Sand, coarse, and some gravel	37	128

WELL 87

Owner: E. D. Newton
Location: NE¼ NW¼ NE¼ sec. 25, T. 4 N., R. 6 W. (Prairie County)
Altitude: 215 ft.
Driller: Lilly Bros.

	Thickness (feet)	Depth (feet)
Quaternary deposits:		
Clay, surface	10	10
Sand	25	35
Clay, blue	10	45
Sand, blue; coarse at 90 ft.	45	90
Sand, blue, and gravel	11	101
Rock, cement	10	111
Sand, gravel, and rocks	17	128

WELL 94

Owner: Less Newton
Location: SE¼ SE¼ SE¼ sec. 35, T. 4 N., R. 6 W. (Prairie County)
Altitude: 214 ft.
Driller: Lilly Bros.

	Thickness (feet)	Depth (feet)
Quaternary deposits:		
Clay, surface	15	15
Sand	25	40
Clay	4	44
Sand, coarse, blue, and gravel	68	112

WELL 95

Owner: J. J. Screeton
Location: NE¼ NE¼ NE¼ sec. 36, T. 4 N., R. 6 W. (Prairie County)
Altitude: 212 ft.
Driller: Lilly Bros.

	Thickness (feet)	Depth (feet)
Quaternary deposits:		
Clay, surface	15	15
Clay and sand, blue	25	40
Sand, blue	45	85
Gravel and sand, coarse, gray	7	92
Sand, coarse, and gravel	3	95
Rock, cement	5	100
Gravel and sand, coarse	10	110
Clay and gravel	2	112
Sand and gravel	8	120
Sand, coarse	8	128

WELL 98

Owner: J. E. Bell
Location: NW¼ SE¼ NE¼ sec. 2, T. 4 N., R. 7 W. (Prairie County)
Altitude: 217 ft.
Driller: Lilly Bros.

	Thickness (feet)	Depth (feet)
Quaternary deposits:		
Clay, surface	10	10
Clay, blue	32	42
Sand, blue	18	60
Sand, coarse, blue, and gravel	44	104

WELL 103

Owner: J. E. Bell
Location: NE¼ NE¼ NE¼ sec. 12, T. 4 N., R. 7 W. (Prairie County)
Altitude: 211 ft.
Driller: Lilly Bros.

	Thickness (feet)	Depth (feet)
Quaternary deposits:		
Clay, surface	10	10
Sand, yellow	20	30
Sand, blue	38	68
Sand, blue, and some gravel	32	100
Sand, coarse, blue, and gravel	23	123

WELL 113

Owner: Grady Miller
Location: SW¼ SE¼ NW¼ sec. 32, T. 5 N., R. 4 W. (Prairie County)
Altitude: 194 ft.
Driller: Lilly Bros.

	Thickness (feet)	Depth (feet)
Quaternary deposits:		
Clay, surface	17	15
Sand, pack, yellow	35	50
Sand, gray, streaks of clay	11	61
Sand, gray and gravel	24	85
Sand, coarse, gray, and gravel	17	102

WELL 114

Owner: E. P. Douglas
Location: SW¼ NE¼ SE¼ sec. 35, T. 5 N., R. 4 W. (Prairie County)
Altitude: 177 ft.
Driller: Lilly Bros.

	Thickness (feet)	Depth (feet)
Quaternary deposits:		
Clay	5	5
Clay, blue	25	30
Sand, blue, and some gravel	20	50
Sand, coarse, blue, and gravel	52	102

WELL 117

Owner: Paul Eans
Location: NE¼ NW¼ NE¼ sec. 15, T. 5 N., R. 5 W. (Prairie County)
Altitude: 205 ft.
Driller: Lilly Bros.

	Thickness (feet)	Depth (feet)
Quaternary deposits:		
Clay, surface	10	10
Sand, yellow	45	55
Sand, and some gravel	30	85
Sand, blue, and gravel	26	111

WELL 127

Owner: Earnest Bennett
Location: NE¼ SW¼ NW¼ sec. 23, T. 3 N., R. 7 W. (Lonoke County)
Altitude: 226 ft.
Driller: Lilly Bros.

	Thickness (feet)	Depth (feet)
Quaternary deposits:		
Clay, surface	10	10
Sand, yellow	30	40
Clay, blue	15	55
Sand, blue	37	92
Sand, coarse, blue	23	115
Sand, coarse, and gravel	22	137
Claiborne(?) group:		
Clay, blue, at 137 ft.		

WELL 129

Owner: M. G. Young
Location: NW¼ SW¼ NW¼ sec. 26, T. 3 N., R. 7 W. (Lonoke County)
Altitude: 227 ft.
Driller: Lilly Bros.

	Thickness (feet)	Depth (feet)
Quaternary deposits:		
Clay, surface	15	15
Sand, pack	25	40
Clay, red, white, and blue	15	55
Sand, blue	10	65
Clay, blue and yellow, with sandy streaks	20	85
Sand, coarse, yellow, and gravel	39	124

WELL 136

Owner: Stuart and Ward
Location: SE¼ SW¼ SW¼ sec. 32, T. 3 N., R. 7 W. (Lonoke County)
Altitude: 235 ft.
Driller: Lilly Bros.

	Thickness (feet)	Depth (feet)
Quaternary deposits:		
Clay, yellow	20	20
Sand, pack	89	109
Sand, coarse, with clay and gravel	31	140
Gravel, coarse, and coarse sand and rock	12	152
Claiborne(?) group:		
Sand, yellow	2	154

WELL 138

Owner: Ben Schaffer
Location: SE¼ SE¼ SW¼ sec. 33, T. 3 N., R. 7 W. (Lonoke County)
Altitude: 230 ft.
Driller: Lilly Bros.

	Thickness (feet)	Depth (feet)
Quaternary deposits:		
Clay	28	28
Sand and gravel, some rocks	125	153

WELL 139

Owner: D. L. Bennett
Location: SW¼ NE¼ SW¼ sec. 34, T. 3 N., R. 7 W. (Lonoke County)
Altitude: 226 ft.
Driller: Lilly Bros.

	Thickness (feet)	Depth (feet)
Quaternary deposits:		
Clay, red and yellow	40	40
Sand, yellow	10	50
Clay, red and yellow	25	75
Sand, coarse, yellow, and gravel	20	95
Sand, coarse, blue, and gravel	29	124

WELL 142

Owner: Joe Chambers
Location: SW¼ NE¼ SE¼ sec. 36, T. 3 N., R. 7 W. (Lonoke County)
Altitude: 234 ft.
Driller: Lilly Bros.

	Thickness (feet)	Depth (feet)
Quaternary deposits:		
Clay, surface	10	10
Sand, yellow	45	55
Clay, red and blue	25	80
Sand, blue	22	102
Sand, coarse, blue, and gravels	48	150
Claiborne(?) group:		
Clay mixed with fine sand	1	151

WELL 147

Owner: Ralph Colclasure
Location: SW¼ SE¼ SE¼ sec. 20, T. 3 N., R. 8 W. (Lonoke County)
Altitude: 248 ft.
Driller: Lilly Bros.

	Thickness (feet)	Depth (feet)
Quaternary deposits:		
Clay	15	15
Sand, yellow	35	50
Clay, red and blue	18	68
Sand, pack, yellow, and clay	38	106
Sand, yellow, and gravels	4	110
Sand, gravels, and clay mixed	6	116
Clay, blue	12	128
Sand, coarse, yellow, and gravels	28	156

WELL 148

Owner: Ralph Colclasure
Location: SW¼ SW¼ NW¼ sec. 21, T. 3 N., R. 8 W. (Lonoke County)
Altitude: 244 ft.
Driller: Lilly Bros.

	Thickness (feet)	Depth (feet)
Quaternary deposits:		
Clay, surface	12	12
Clay, red and white	48	60
Sand, yellow	49	109
Sand, yellow, and gravel	20	129
Rock, cement	2	131
Sand, coarse, gray, and gravel	14	145
Sand, coarse, yellow, and gravel	9	154

WELL 150

Owner: Clarence Lilly
Location: SW¼ SW¼ SW¼ sec. 22, T. 3 N., R. 8 W. (Lonoke County)
Altitude: 236 ft.
Driller: Lilly Bros.

	Thickness (feet)	Depth (feet)
Quaternary deposits:		
Clay, surface	10	10
Sand, yellow	70	80
Sand, blue	12	92
Sand, coarse, blue, and gravel	39	131

WELL 151

Owner: Clarence and Perry Lilly
Location: SW¼ SW¼ SW¼ sec. 23, T. 3 N., R. 8 W. (Lonoke County)
Altitude: 237 ft.
Driller: Lilly Bros.

	Thickness (feet)	Depth (feet)
Quaternary deposits:		
Sand, yellow	40	40
Clay, red	10	50
Clay, blue	10	60
Clay, blue, and sand	25	85
Sand, yellow	5	90
Sand, yellow, and gravel	46	136

WELL 153

Owner: Clarence Lilly
Location: NE¼ NE¼ NE¼ sec. 26, T. 3 N., R. 8 W. (Lonoke County)
Altitude: 234 ft.
Driller: Lilly Bros.

	Thickness (feet)	Depth (feet)
Quaternary deposits:		
Clay, surface	10	10
Sand, yellow	40	50
Clay, red	5	55
Clay, blue	10	65
Sand, blue, and clay	23	88
Sand, blue, and gravel	4	92
Clay, blue, and gravel	8	100
Sand, blue	10	110
Sand, coarse, blue, and gravel	22	132

WELL 154

Owner: E. E. Verser
Location: NW¼ SE¼ NW¼ sec. 27, T. 3 N., R. 8 W. (Lonoke County)
Altitude: 235 ft.
Driller: Lilly Bros.

	Thickness (feet)	Depth (feet)
Quaternary deposits:		
Clay, surface	10	10
Clay, red	50	60
Sand and clay, yellow	31	91
Clay and yellow sand streaks	14	105
Sand, yellow; gravel, clay and rock at 135 ft.	30	135

WELL 155

Owner: Raymond Schaffer
Location: SW¼ SW¼ SE¼ sec. 27, T. 3 N., R. 8 W. (Lonoke County)
Driller: Lilly Bros.

	Thickness (feet)	Depth (feet)
Quaternary deposits:		
Clay, surface	10	10
Sand, yellow	36	46
Sand, pack, and water	2	48
Clay, red and blue	20	68
Sand, fine, yellow	42	110
Clay, blue	2	112
Sand, yellow, and gravel	36	148

WELL 157

Owner: F. H. Schaffer
Location: NW¼ NW¼ SW¼ sec. 28, T. 3 N., R. 8 W. (Lonoke County)
Altitude: 248 ft.
Driller: Lilly Bros.

	Thickness (feet)	Depth (feet)
Quaternary deposits:		
Clay, surface	10	10
Sand, yellow with clay streaks	45	55
Clay, blue	20	75
Sand	10	85
Sand, coarse, yellow, and gravel	33	118
Sand, blue	5	123
Sand, coarse, blue, and gravel	30	153

WELL 158

Owner: Henry Tomlinson
Location: SW¼ SE¼ SW¼ sec. 29, T. 3 N., R. 8 W. (Lonoke County)
Altitude: 250 ft.
Driller: Lilly Bros.

	Thickness (feet)	Depth (feet)
Quaternary deposits:		
Clay, surface	10	10
Sand, yellow	30	40
Clay, red	15	55
Clay, blue	15	70
Clay, blue, and gravel	35	105
Sand, coarse, yellow, and gravel	20	125
Sand, dark-yellow, and gravel	19	144

WELL 161

Owner: Henry Tomlinson
Location: NE¼ NE¼ SE¼ sec. 30, T. 3 N., R. 8 W. (Lonoke County)
Altitude: 249 ft.
Driller: Lilly Bros.

	Thickness (feet)	Depth (feet)
Quaternary deposits:		
Clay	30	30
Clay with sand streaks	12	42
Sand, yellow, and water	4	46
Clay, red and blue	24	70
Sand, yellow	8	78
Clay, red	7	85
Sand, yellow, and gravel	15	100
Sand, coarse, and gravel, yellow	20	120
Clay, blue	2	122
Sand, yellow, and gravel	15	137

WELL 162

Owner: Henry Tomlinson
Location: SE¼ NE¼ NE¼ sec. 31, T. 3 N., R. 8 W. (Lonoke County)
Altitude: 247 ft.
Driller: Lilly Bros.

	Thickness (feet)	Depth (feet)
Quaternary deposits:		
Clay, surface	20	20
Sand, yellow	40	60
Clay, red	15	75
Sand, coarse, yellow, and gravel	83	158

WELL 164

Owner: Clarence Lilly
Location: NE¼SW¼NW¼ sec. 32, T. 3 N., R. 8 W. (Lonoke County)
Altitude: 245 ft.
Driller: Lilly Bros.

	Thickness (feet)	Depth (feet)
Quaternary deposits:		
Clay and sand	35	35
Sand and water	5	40
Clay, red and blue; clay rock at 66 ft.	30	70
Sand and gravel	19	89
Sand, yellow, and gravel	21	110
Sand, coarse	10	120
Gravel	6	126

WELL 182

Owner: Rosco Glover
Location: NE¼NE¼NE¼ sec. 24, T. 3 N., R. 9 W. (Lonoke County)
Altitude: 250 ft.
Driller: Lilly Bros.

	Thickness (feet)	Depth (feet)
Quaternary deposits:		
Clay	30	30
Sand, fine	50	80
Sand, coarse	20	100
Sand, coarse, and a little gravel; clay at 129 ft.	29	129

WELL 187

Owner: E. A. Begeman
Location: SE¼SE¼NE¼ sec. 34, T. 3 N., R. 9 W. (Lonoke County)
Altitude: 252 ft.
Driller: Troy Mullens

	Thickness (feet)	Depth (feet)
Quaternary deposits:		
Silt	20	20
Sand, fine	5	25
Clay, red and dark-brown	53	78
Sand and gravel	42	120
Gravel, sand, and boulders	10	130
Wilcox(?) formation:		
Sand, fine, gray	64	194
Clay, light-reddish-purple	1	195

WELL 191

Owner: R. S. Ayres
Location: NW¼NW¼NE¼ sec. 34, T. 3 N., R. 10 W. (Lonoke County)
Altitude: 257 ft.
Driller: Lilly Bros.

	Thickness (feet)	Depth (feet)
Quaternary deposits:		
Clay, surface	10	10
Sand, yellow	25	35
Sand, pack, yellow, and clay	5	40
Clay, red and blue	40	80
Sand, yellow	7	87
Sand, coarse, yellow, and gravel	29	116

WELL 195

Owner: E. W. Reed
Location: NE¼NW¼NW¼ sec. 2, T. 4 N., R. 8 W. (Lonoke County)
Altitude: ?
Driller: Loyd Brainard

	Thickness (feet)	Depth (feet)
Quaternary deposits:		
Silt and clay, yellowish-brown	4	4
Clay, silty, gray and reddish-brown	3	7
Clay, light-brownish-gray	1	8
Clay, red	6	14
Clay, soft, fine sandy, red	1	15
Sand, very fine, red, with silt and clay	5	20
Clay, red and gray interbedded, silty and sandy	12	32
Clay, calcareous, red	1	33
Clay, sandy, gray	1	34
Clay, silty, soft, gray, and fine sand	6	40
Sand, very fine, gray, with silt and soft clay	18	58
Sand, fine to medium	4	62
Sand, medium to coarse	8	70

WELL 201

Owner: B. R. Smith
Location: NW¼SW¼NW¼ sec. 15, T. 4 N., R. 8 W. (Lonoke County)
Altitude: 225 ft.
Driller: B. R. Smith

	Thickness (feet)	Depth (feet)
Quaternary deposits:		
Clay, gray	27	27
Sand, fine to medium	23	50
Sand and gravel	6	56
Sand	29	85
Sand, coarse, and gravel	19	104

WELL 220

Owner: E. M. Cherry
Location: SE¼SW¼SW¼ sec. 28, T. 4 N., R. 9 W. (Lonoke County)
Altitude: 325 ft.
Driller: Troy Mullens

	Thickness (feet)	Depth (feet)
Tertiary(?) undifferentiated deposits:		
Clay, with sandy streaks	98	98
Sand, fine to medium	12	110
Midway formation:		
Clay, tough, dark-blue	88	198

WELL 239

Owner: Frank C. Mitchell
Location: NW¼NE¼NW¼ sec. 21, T. 5 N., R. 8 W. (White County)
Altitude: 231 ft.
Driller: O. A. Moore

	Thickness (feet)	Depth (feet)
Quaternary deposits:		
Clay, gray	18	18
Clay, red	6	24
Clay, dark-gray	7	31
Sand, fine	42	73
Sand, medium fine	7	80

WELL 270

Owner: E. A. Durham
Location: SW¼SW¼NE¼ sec. 31, T. 6 N., R. 7 W. (White County)
Altitude: 230 ft.
Driller: Troy Mullens (log from owner)

	Thickness (feet)	Depth (feet)
Quaternary deposits:		
Clay	17	17
Sand, very fine, reddish, with a few white gravel, gets coarser downward	23	40
Sand, coarse, red, few gravel	20	60
Sand, gray, with few gravel	5	65
Sand, coarse, gray, and pea gravel	21	86
Midway formation:		
Clay, tough, black, at 86 ft.		

WELL 293

Owner: Town of Kensett
Location: NE¼SE¼NW¼ sec. 17, T. 7 N., R. 6 W. (White County)
Altitude: 224 ft.
Driller: Layne-Arkansas Co.

	Thickness (feet)	Depth (feet)
Tertiary(?) undifferentiated deposits:		
Soil and clay	32	32
Sand, fine	20	52
Sand and hard flint gravel	12	64
Gumbo	31	95
Rock	2	97
Sand, fine	21	118
Shale, sandy	33	151
Sand, fine, blue	14	165
Sand, medium, and lignite	52	217

WELL 301

Owner: Missouri Pacific Railroad
Location: NE¼SW¼SW¼ sec. 25, T. 7 N., R. 7 W. (White County)
Altitude: 219 ft.
Driller: ? (log from owner)

	Thickness (feet)	Depth (feet)
Quaternary deposits:		
Clay	30	30
Sand, fine	20	50
Sand, coarse, pebbles and cobbles	12.5	62.5

WELL 310

Owner: Missouri Pacific Railroad
Location: SE¼NW¼NW¼ sec. 20, T. 8 N., R. 5 W. (White County)
Altitude: 220 ft.
Driller: ? (log from owner)

	Thickness (feet)	Depth (feet)
Quaternary deposits:		
Clay, yellow	30	30
Sand and gravel	1	31
Atoka formation:		
Rock, hard	30	61
Rock, soft, black	9	70
Rock, hard	70	140
Rock, soft, black	12	152
Rock, hard, with 8-inch crevice at 193 ft.	73	225

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Tables of Well Records

TABLE 7

Record of Wells in Parts of Lonoke, Prairie, and White Counties, Ark.

Well number: Well number in parentheses indicates that the chemical analysis of water is given in table 8.

Location number: This number indicates the location of each well with respect to the Federal land survey used in Arkansas. The component parts of the number are the township number, the range number, the section number, and three lowercase letters which indicate, respectively, the quarter section, quarter-quarter section, and quarter-quarter-quarter section in which the well is located. The lowercase letters are assigned in a counterclockwise order, beginning with "a" in the northeast quarter, or quarter-quarter, or quarter-quarter-quarter section. Serial numbers are appended to each well located within the same quarter-quarter-quarter section in the order in which they were visited.

Stratigraphic unit: Qt, Quaternary deposits; Ter?, Tertiary(?) undifferentiated deposits; Atoka, Atoka formation.

Water level: Measured depth to water is given to nearest hundredth of a foot. Reported depth is given to nearest foot.

Use: Irr, irrigation; Dom, domestic; N, none; PS, public supply; S, stock.

Prairie County

Well no.	Location no.	Owner or tenant	Driller	Altitude above sea level (feet)	Depth of well (feet)	Diameter of well (inches)	Stratigraphic unit	Water level: Depth below land surface (feet)	Water level: Date of measurement	Type of pump	Yield (gpm)	Use
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
	T. 3 N., R. 4 W.											
1	3aab1	Plunket Farms, Inc.	Layne-Ark. Co.	187	106±	......	Qt	26.48	12-6-55	Turbine	1,500	Irr
2[1]	3abd1	do	Lilly Bros.	187	106	18–12	Qt	25.44	5-17-55	do	1,500	Irr
3	3bba1	Cleburn Petty	Able & Son	187	100	6	Qt	23.45	5-17-55	do	875	Irr
	T. 3 N., R. 5 W.											
4	2abc1	W. H. Stewart	......	205	......	18–12	Qt	39.70	3-30-55	do	......	Irr
(5)	2bbc1	E. D. McGahhey	Layne-Ark. Co.	208	179	18–12	Qt	41.60	3-30-55	do	......	Irr
6	3bdd1	do	......	208	......	18–12	Qt	46.01	3-30-55	do	......	Irr
(7)	3dbb1	do	Layne-Ark. Co.	207	......	18–12	Qt	44.05	3-30-55	do	800	Irr
8	4dca1	Clyde Stien	......	208	......	......	Qt	......	......	do	......	Irr
(9)	5ccb1	Guy DeVore	Layne-Ark. Co.	211	......	......	Qt	52.37	4-8-55	do	750	Irr
10	5cdb1	do	do	211	......	......	Qt	......	......	do	......	Irr
11[1]	6bdc1	W. L. Calley	Lilly Bros.	207	116	18–12	Qt	50.43	4-8-55	do	......	Irr
12[1]	6cad1	Charles Orlechek	do	216	125	18–12	Qt	46	1945	do	1,500	Irr
13[1]	6daa1	W. F. Livesay	do	211	114	18–12	Qt	53.14	4-8-55	do	......	Irr
14[1]	6ddd1	J. J. Screeton	do	211	124	18–12	Qt	45	1943	do	......	Irr
15	8aab1	C. D. Van Houten	Layne-Ark. Co.	212	......	18–12	Qt	53.50	3-30-55	do	......	Irr
16	9abb1	do	......	211	......	18–12	Qt	49.46	3-30-55	do	......	Irr
(17)	9bba1	do	......	211	......	......	Qt	52.61	3-30-55	do	......	Irr
(18)	10aba1	Charles Orlechek	Layne-Ark. Co.	205	......	18–12	Qt	42.56	3-30-55	do	420	Irr
19	10dbd1	E. D. McGahhey	do	202	135	18–12	Qt	40.75	3-30-55	do	......	Irr
20	11dcc1	do	do	202	......	18–12	Qt	37.63	3-30-55	do	......	Irr
21	14abb1	Gus Poda	......	200	......	......	Qt	......	......	do	......	Irr
22[1]	18aba1	Mrs. Grady	Lilly Bros.	191	110	18–12	Qt	28	1947	do	......	Irr
(23)[1]	19ddc1	J. J. Screeton	do	216	130	18–12	Qt	53.14	3-29-55	do	1,700	Irr
(24)[1]	31cbb1	do	do	221	121	18–12	Qt	63.42	3-29-55	do	1,025	Irr
	T. 3 N., R. 6 W.											
25	1bcb1	Vernon Van Houten	......	213	115+	......	Qt	50.66	3-31-55	do	......	Irr
26	1dab1	do	......	215	122	......	Qt	53.44	12-15-55	do	......	Irr
27[1]	1dbd1	E. D. Newton	Lilly Bros.	215	130	18–12	Qt	54.54	3-31-55	do	......	Irr

28	4add1	W. Scarda		215			Qt			do		Irr
(29)[1]	5abb1	Joe Calley	Lilly Bros.	220	130	18–12	Qt	48.66	4-26-54	do	950	Irr
30	6aba1	Joe Mallard		220			Qt	52.48	11-23-55	do		Irr
31	10cdc1	Ralph Otto		206			Qt	43.57	3-29-55	do		Irr
32	11aad1	Dale Greenwald	Frank Elders	205		18–12	Qt	27.38	3-31-55	do		Irr
33[1]	28bcd1	John Perry	Lilly Bros.	226	128	18–12	Qt	61.17	11-23-55	do		Irr
(34)	28dcc1	E. E. Rogers	do	226		18–12	Qt	65.74	3-29-55	do	600	Irr
35	33abc1	G. S. Hanks		228			Qt	66.08	3-29-55	do		Irr
(36)[1]	33ddd1	E. E. Rogers	Lilly Bros.	233	134	18–12	Qt	74.22	3-29-55	do		Irr
37	34cac1	Floyd Brothers	do	234	125	16–12	Qt	74.68	12-9-55	do		Irr
	T. 4 N., R. 4 W.											
38[1]	1add1	J. W. Miller	do	176	96	18–12	Qt	11.10	12-9-55	do		Irr
39[1]	4aac1		do	181	98	18–12	Qt	11.80	12-9-55	do		Irr
40[1]	5aad1		do	195	98	18–12	Qt	20.94	12-9-55	do		Irr
41	7adc1			195			Qt	27.02	5-17-55	None		N
42	12aad1			177	20	1.25	Qt	7.90	5-17-55	do		N
	T. 4 N., R. 5 W.											
(43)	6ccd1	W. E. McMullen		203		18–12	Qt	37.92	3-30-55	Turbine	1,100	Irr
(44)	7aab1	Marvin Tallent	Layne-Ark. Co.	205	116	18–12	Qt	44.84	3-30-55	do	800	Irr
45	7cdc1	Fred Rodgers		212		18–12	Qt	51.62	12-6-55	do		Irr
46[1]	7dcb1	Earnest Pertle	Lilly Bros.	209	112	18–12	Qt			do		Irr
47	8ccd1	Wayne Tate		210			Qt	57.07	12-5-55	do		Irr
(48)	8dcc1	Guy DeVore		211			Qt	52.84	3-30-55	do	530	Irr
(49)	9cdc1	W. B. Patterson	Lilly Bros.	210		18–12	Qt	48.59	3-30-55	do	600	Irr
50	10bac1	W. B. Rasberry		200			Qt			do		Irr
(51)	14aab1	City of Des Arc		200	120±	8	Qt			do		PS
(52)	16bcc1	Howard Ford		212			Qt	56.62	3-30-55	do	1,000	Irr
53	16ccb1	Mr. Norsworthy		212			Qt	56.37	12-9-55	do		Irr
54	17bab1	J. B. Sims		210			Qt	55.93	12-7-55	do		Irr
55	17ccb1	do		210		16–8	Qt	59.93	12-5-55	do		Irr
56	17ddc1	do		212			Qt	56.49	12-5-55	do		Irr
57[1]	18add1	Tom Simmons & Son	Lilly Bros.	212	113	18–12	Qt	56.93	3-30-55	do		Irr
(58)	18dda1	do		210		18–8	Qt	59.64	12-5-55	do	1,050	Irr
59	19cca1	Mrs. Delsie Bell		216		16–8	Qt	58.55	12-5-55	do		Irr
60	19ccb1	Albert Bell		215			Qt	59.05	12-9-55	do		Irr
61[1]	19dab1	J. W. Cauley	Lilly Bros.	212	121	18–12	Qt	60.11	12-9-55	do		Irr
(62)[1]	19ddd1	John Sims	Layne-Ark. Co.	212	174	18–12	Qt	58.34	3-30-55	do	870	Irr
63	20bcc1	I. L. Sims		210			Qt	60.20	12-9-55	do		Irr
(64)	21bcb1	Joe Skarda		211			Qt	55.43	3-30-55	do	850	Irr
65	21cdc1	do		211			Qt			do		Irr
(66)	21ddd1	Wayne Tate		205			Qt	44.49	3-30-55	do		Irr
67	22cbb1	do		207			Qt	46.48	3-30-55	do		Irr
(68)	28abb1	do		208			Qt			do	900	Irr
(69)	29aaa1	Dale DeVore		211			Qt	55.37	3-30-55	do	1,200	Irr
70	29bbb1	do	Layne-Ark. Co.	211			Qt	59.33	12-6-55	do		Irr
71[1]	30caa1	J. J. Screeton	Lilly Bros.	213	131	18–12	Qt			do		Irr
72[1]	30cba1	Bell Brothers	do	212	128	18–12	Qt	56.58	12-15-55	do		Irr
(73)[1]	31bbb1	J. J. Screeton	do	210	113	18–12	Qt	52.43	3-31-55	do	600	Irr
	T. 4 N., R. 6 W.											
(74)	1ccc1	S. R. Nickles		200			Qt	34.45	3-31-55	do	1,100	Irr
75	2cdc1	Earl Eoff		211			Qt	40.67	3-31-55	do		Irr
76	3ccc1	A. B. Rodgers		211			Qt	56.35	12-6-55	do		Irr
77	7cda1	E. P. Bone		213			Qt	36.15	3-31-55	do		Irr
78[1]	11bdd1	Grady Brothers	Lilly Bros.	212	117	18–12	Qt			do		Irr
79	12dbd1	S. R. Nickles		205		18–12	Qt	43.80	3-30-55	do		Irr

[1] See log

Prairie County (Continued)

Well no.	Location no.	Owner or tenant	Driller	Altitude above sea level (feet)	Depth of well (feet)	Diameter of well (inches)	Stratigraphic unit	Water level: Depth below land surface (feet)	Water level: Date of measurement	Type of pump	Yield (gpm)	Use
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
80	13bac1	...	...	207	...	...	Qt	...	...	Turbine	...	Irr
81	20add1	Dr. Mathews	Layne-Ark. Co.	215	...	...	Qt	36.10	4-20-54	do	...	Irr
(82) [1]	22cba1	Boyce Minton	Lilly Bros.	215	127	18–12	Qt	45.64	3-30-55	do	...	Irr
83	23cbc1	E. W. Brown	...	215	...	...	Qt	...	...	do	...	Irr
84	23ccd1	do	...	215	...	...	Qt	...	...	do	...	Irr
85	23cda1	do	...		...	...	Qt	...	...	do	...	Irr
(86)	24dcd1	Governor Bell	Frank Elders	215	128	18–12	Qt	54.33	3-30-55	do	1,100	Irr
87 [1]	25aba1	E. D. Newton	Lilly Bros.	215	128	18–12	Qt	54.37	3-30-55	do	...	Irr
88	25daa1	Mark Webber	H. S. Ragland	214	125	18–12	Qt	53.45	3-31-55	do	...	Irr
(89)	26ccb1	Dr. Mathews	...	215	...	...	Qt	...	...	do	...	Irr
(90)	26dcd1	Dr. Mathews	...	215	...	...	Qt	57.85	3-31-55	do	...	Irr
91	29bab1	...	...	210	...	2	Qt	35.32	6-3-55	Hand lift	...	Dom
92	30cbb1	C. W. Baldwin	...	210	42	5	Qt	32.50	6-3-55	None	...	Dom
(93)	35dcb1	Graham Childers	...	...	...	...	Qt	...	...	Turbine	700	Irr
94 [1]	35ddd1	Less Newton	Lilly Bros.	214	112	18–12	Qt	42	1945	do	...	Irr
95 [1]	36aaa1	J. J. Screeton	do	212	128	18–12	Qt	42	1943	do	...	Irr
96	36cdd1	do	...	210	...	...	Qt	...	...	do	...	Irr
	T. 4 N., R. 7 W.											
(97)	1ccc1	E. A. Stewart	...	212	122	18–8	Qt	31.81	3-31-55	do	800	Irr
98 [1]	2adb1	J. E. Bell	Lilly Bros.	217	104	18–10	Qt	35.29	3-31-55	do	1,300	Irr
99	2ccc1	M. Ballowe	...	240	118	18–8	Qt	56.99	3-31-55	do	500	Irr
100	6bcc1	...	...	228	36	5	Qt	29.03	5-16-55	None	...	Dom
(101)	7ccc1	C. S. Williams	Minor Moore	245	104	2	Qt	...	...	Hand lift	...	Dom
102	9dbb1	...	...	245	41	12	Qt	24.85	5-19-55	do	...	Dom
103 [1]	12aaa1	J. E. Bell	Lilly Bros.	211	123	18–8	Qt	32.05	5-18-55	Turbine	...	Irr
104	12acc1	C. H. Briley	...	206	...	...	Qt	...	...	do	...	Irr
105	13bbc1	do	...	216	120	18–8	Qt	34.95	5-18-55	do	...	Irr
106	25bcc1	A. C. Ziegler	...	220	...	5	Qt	22.60	6-3-55	None	...	Dom
107	30bcc1	...	...	237	24	8	Qt	8.20	7-15-55	do	...	Dom
108	32aad1	L. Glover	...	245	62	2	Qt	25.21	6-3-55	do	...	Dom
109	32dcb1	V. E. Pinson	...	220	43	8	Qt	37.39	6-2-55	do	...	Dom
110	33dca1	Mr. Furgurson	...	245	35	8	Qt	22.95	6-3-55	do	...	Dom
111	35aaa1	I. Berry	S. Beggs	220	28	8	Qt	20.28	6-3-55	do	...	Dom
	T. 5 N., R. 4 W.											
112	22aab1	...	...	183	37	1.25	Qt	4.90	5-17-55	do	...	N
113 [1]	32bdc1	Grady Miller	Lilly Bros.	194	102	...	Qt	25.53	12-9-55	...	...	...
114 [1]	35dac1	E. P. Douglas	do	177	102	18–12	Qt	10.70	12-9-55	Turbine	...	Irr
	T. 5 N., R. 5 W.											
(115)	7bbb1	W. J. Holloway	do	206	...	18–12	Qt	30.19	3-31-55	do	1,800	Irr
116	13ccd1	Louis Gehring	...	190	125+	16–8	Qt	31.00	12-5-55	do	...	Irr

(117) [1]	15aba1	Paul Eans	Lilly Bros.	205	111	18–12	Qt	37.40	4-27-54	do	1,350	Irr
(118)	23dac1	V. O. Calhoun		195		18–12	Qt	28.70	3-31-55	do	900	Irr
	T. 5 N., R. 6 W.											
119	31aaa1	E. A. Stewart	Lilly Bros.	201	110	16–8	Qt	25.38	5-16-55	do	1,800	Irr
	T. 5 N., R. 7 W.											
120	27acc1	T. Wrigley		225	85	18–12	Qt	39.20	5-16-55	None		N
121	31bcd1			223	38	5	Qt	27.14	5-16-55	do		Dom

Lonoke County

	T. 3 N., R. 7 W.											
122	4daa1	J. T. Humphries		235	18	12	Qt	3.86	6-2-55	None		Dom
123	9bcc1	T. M. White		243	24	12	Qt	9.39	6-2-55	do		Dom
(124)	14bbc1	M. G. Young	Frank Elder	226		18–8	Qt	51.33	3-29-55	Turbine		Irr
125	15abc1	do		226			Qt	51.59	3-29-55	do		Irr
126	15dbc1	W. T. McCallie		226		18–8	Qt	50.30	3-29-55	do	1,100	Irr
(127) [1]	23bca1	Earnest Bennett	Lilly Bros.	226	137	18–12	Qt	57.99	3-29-55	do	950	Irr
(128)	26bbc1	M. G. Young		224	160		Qt			do		Irr
129 [1]	26bcb1	do	Lilly Bros.	227	124	18–12	Qt	60	1944	do		Irr
130	27aba1	do	Layne-Ark. Co.	227	140	18–12	Qt	59.43	3-29-55	do	1,000	Irr
131	29cdd1	D. L. Bennett	Frank Elders	230	157	18–12	Qt	59.85	3-15-55	do	900	Irr
132	29dad1	Kermitt Bennett		230	124	18–12	Qt	62.40	12-8-55	do	900	Irr
133	30baa1	D. L. Bennett		232	133	18–12	Qt	57.36	3-29-55	do		Irr
134	30ccb1	Southern Rice Farms	Layne-Ark. Co.	232			Qt	60.90	3-15-55	do		Irr
135	31cdd1	do	do	240			Qt	77.07	4-1-55	do		Irr
(136) [1]	32ccd1	Stuart & Ward	Lilly Bros.	235	154	18–12	Qt	73.64	3-15-55	do	1,000	Irr
137	32dcc1	Wayne Stuart		228		18–12	Qt	74.97	12-9-55	do		Irr
138 [1]	33cdd1	Ben Schaffer	Lilly Bros.	230	153	18–12	Qt	69.66	12-8-55	do		Irr
139 [1]	34cac1	D. L. Bennett	do	226	124	18–12	Qt	72.00	3-29-55	do		Irr
(140)	35add1	Roy Young		232			Qt			do	885	Irr
141	35cdc1	do		234			Qt	77.85	4-1-55	do		Irr
142 [1]	36dac1	Joe Chambers	Lilly Bros.	234	151	18–12	Qt	80.40	3-15-55	None		N
	T. 3 N., R. 8 W.											
143	2ddd1	W. H. Beard		255	43	8	Qt	35.69	5-18-55	do		Dom
144	4ccc1	Harley King	Foster White	263	140	14–10	Qt	72.38	10-11-55	Turbine		Irr
(145)	5ddd1	Emmett Richey	Loyd Brainard	266	135	2	Qt	60	1953	Piston		Dom
146	7bdb1	H. E. Hoggard		257	25	8	Qt	20.58	5-18-55	None		Dom
147 [1]	20ddc1	Ralph Colclasure	Lilly Bros.	248	156	18–12	Qt	66.80	12-8-55	Turbine	900	Irr
(148) [1]	21bcc1	do	do	244	154	18–12	Qt	63.25	2-17-54	do	900	Irr
149	21cdc1	do	Layne-Ark. Co.	246	165	24–12	Qt	67.00	4-1-55	do	1,400	Irr
150 [1]	22ccc1	Clarence Lilly	Lilly Bros.	236	131	18–12	Qt	56.48	3-15-55	do		N
(151) [1]	23ccc1	Clarence & Perry Lilly	do	237	136	18–12	Qt	57.37	3-15-55	do	600	Irr
152	23ddb1	Clarence Lilly	do	235			Qt	57.53	12-8-55	do		Irr
153 [1]	26aaa1	do	do	234	132	18–12	Qt	56.73	3-15-55	None		N
154 [1]	27bdb1	E. E. Verser	do	235	135	18–12	Qt	59.30	12-8-55	Turbine	1,100	Irr
155 [1]	27dcc1	Raymond Schaffer	do	241	149	18–12	Qt	65.30	3-15-55	do		Irr
156	28bab1	E. E. Verser	do	246	145	18–12	Qt	66.35	3-15-55	do	1,200	Irr
157 [1]	28cbb1	F. H. Schaffer	do	248	153	18–12	Qt	69.40	3-15-55	do		Irr
158 [1]	29cdc1	Henry Tomlinson	do	250	144	18–12	Qt	72.30	12-7-55	do		Irr
159	30aad1	Walter Rochelle		257			Qt	70.57	4-1-55	do		Irr
(160)	30add1	Henry Tomlinson		249	160	18–12	Qt	68.98	3-15-55	do	800	Irr
161 [1]	30daa1	do	Lilly Bros.	249	137	18–12	Qt	64.63	2-25-55	do		N
(162) [1]	31aad1	do	do	247	159	18–12	Qt			do	1,050	Irr
163	32aab1	Mrs. Henry Tomlinson	do	250	125	18–12	Qt	68.95	2-24-54	do	1,200	Irr
164 [1]	32bca1	Clarence Lilly	do	245	126	18–12	Qt	56	1943	do		Irr

[1] See log

Lonoke County (Continued)

Well no.	Location no.	Owner or tenant	Driller	Altitude above sea level (feet)	Depth of well (feet)	Diameter of well (inches)	Stratigraphic unit	Water level: Depth below land surface (feet)	Water level: Date of measurement	Type of pump	Yield (gpm)	Use
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
165	32dcc1	do	do	250	......	......	Qt	74.33	12-7-55	do	......	Irr
(166)	33bcc1	Francis Schaffer	do	245	180	18–12	Qt	70.46	3-15-55	do	1,050	Irr
167	33cbd1	Lawrence Hauk	....	246	184	24–12	Qt	70.32	12-7-55	do	2,000	Irr
168	34adc1	Raymond Schaffer	....	241	240 ?	......	Qt	69.10	12-9-55	do	......	Irr
169	34ddd1	Francis Schaffer	....	243	......	......	Qt	......	......	do	......	Irr
170	35bcc1	Ben Schaffer	....	238	......	24–10	Qt	69.08	12-7-55	do	......	Irr
(171)	35ccc1	Francis Schaffer	....	242	......	......	Qt	70.42	3-15-55	do	600	Irr
172	36bab1	D. K. Bennett	....	235	......	......	Qt	61.87	4-1-55	do	......	Irr
173	36ddc1	R. W. Hollis	....	235	......	......	Qt	72.45	12-8-55	do	......	Irr
	T. 3 N., R. 9 W.											
174	9dba1	C. C. Bratton	V. C. White	275	125	8	Ter?	11.95	4-14-55	Jet	16	Dom
(175)	11bab1	Mt. Zion Meth. Church	....	290	13	36	Ter?	3.60	4-14-55	Pitcher	......	PS
176	17bca1	Pleasant Hill Bap. Church	....	296	26	30	Ter?	2.51	4-14-55	None	......	N
(177)	18ddd1	J. M. Cothran	C. B. White	318	136	6	Ter?	85	1951	Jet	......	Dom
178	19acc1	Junior Witcher	....	297	24	30	Ter?	10.65	4-28-55	None	......	N
(179)	20dda1	Chris Gertsch	Troy Mullens	285	395	4	Ter?	38.06	4-14-55	None	......	N
180	20dda2	do	do	285	400	4	Ter?	11	1955	Turbine	22	Dom
(181)	21ccd1	Tom Barrett	Mr. Holland	263	28	8	Ter?	11.75	10-4-54	None	......	Dom
182[1]	24aaa1	Rosco Glover	Lilly Bros.	250	129	18–12	Qt	54.93	3-15-55	do	......	N
183	24add1	do	....	254	......	......	Qt	61.11	3-15-55	Turbine	......	Irr
(184)	31cbc1	William Cole	Frank Elders	257	105	18–12	Qt	......	......	do	700	Irr
185	31cbc2	do	do	257	......	......	Qt	36.85	3-15-55	do	......	Irr
(186)	33cbd1	Minnie Hicks	Charley Robertson	260	32	8	Qt	30.25	3-10-55	None	......	Dom
187[1]	34add1	E. A. Begeman	Troy Mullens	252	195	8	Qt	65	1955	Turbine	......	Irr
188	35bbc1	C. H. Clement	Charley Robertson	250	140	20–12	Qt	70.82	4-7-55	do	......	Irr
(189)	35dcc1	Louis Baldwin	....	248	......	......	Qt	53.79	3-15-55	do	400	Irr
	T. 3 N., R. 10 W.											
190	22cdc1	Aaron Taylor	....	251	12	24	Qt	10.26	5-2-55	None	......	N
(191)[1]	34abb1	R. S. Ayres	Lilly Bros.	257	116	12–6	Qt	30.60	3-15-55	Turbine	450	Irr
	T. 4 N., R. 8 W.											
192	1bcc1	C. H. Byard	....	237	28	6	Qt	21.35	5-19-55	None	......	N
193	2bba1	E. W. Reed	....	233	25	8	Qt	19.12	5-19-55	do	......	Dom
194	2bba2	do	Loyd Brainard	......	61	6	Qt	37.02	8-9-55	......	......	N
195[1]	2bba3	do	do	......	70	2	Qt	......	......	Jet	......	Dom
196	8dca1	P. H. Norman	Mr. Stanley	265	32	8	Ter?	16.59	5-13-55	do	......	S
197	9cbc1	....	....	245	50	8	Ter?	44.06	5-13-55	do	......	Dom
198	9dbb1	J. H. Bland	Rale & Williams	240	54	6	Ter?	32.48	4-28-55	do	......	Dom
199	10caa1	L. S. Gartrell	....	221	30	6	Qt	13.95	4-15-55	do	......	N
(200)	15bcb1	B. R. Smith	Ed. Kirk	224	35	6	Qt	18.17	4-15-55	do	......	N
(201)[1]	15bcb2	do	B. R. Smith	225	104	10	Qt	21	1955	Turbine	450	Irr

202	17dad1	.....	.....	265	58	6	Ter ?	52.05	5-13-55	None	.....	Dom
(203)	17dda1	Robert Young	Marion Williams	270	140	2	Ter ?	50	1950	Piston	.....	Dom
204	17dda2	do	.....	270	54	6	Ter ?	50.21	4-28-55	None	.....	N
205	18ccc1	A. Lederman	.....	300	43	6	Ter ?	26.70	5-13-55	do	.....	Dom
206	20bbb1	.....	.....	265	52	6	Ter ?	13.24	5-18-55	do	.....	Dom
207	22daa1	J. C. Toone	Mr. Stanley	247	50	8	Qt	28.54	5-17-55	do	.....	Dom
208	23bbb1	L. Riegal	Mr. White	230	80	4	Qt	28.90	5-17-55	Jet	.....	Dom
209	24ddc1	J. M. Glover	.....	262	40	8	Qt	33.06	5-17-55	None	.....	Dom
210	28dbd1	.....	.....	255	30	6	Qt	21.52	5-17-55	do	.....	Dom
211	31cbb1	.....	.....	275	48	6	Ter ?	20.64	5-18-55	do	.....	Dom
	T. 4 N., R. 9 W.											
212	1ddd1	Marion Williams	Warren Rowell	256	335	3	Ter ?	3.78	5-21-55	do	.....	Dom
(213)	5cbb1	R. L. Horn Jr.	.....	.....	120	8	Ter ?	18.90	7-20-55	Jet	.....	Dom
214	6daa1	Cooper Estate	.....	.....	24	10	Ter ?	11.71	7-20-55	None	.....	Dom
214a[2]	7acc1	City of Cabot	.....	280	1700	8	Atoka	.....	.....	Turbine	.....	PS
214b	7bdd1	do	.....	280	1085	10	Atoka	.....	.....	Turbine	25	PS
215	10cba1	.....	.....	285	14	30	Ter ?	0.00	4-15-55	do	.....	N
216	17ddd1	.....	.....	330	25	10	Ter ?	15.86	4-28-55	do	.....	N
217	18acc1	.....	.....	292	26	36	Ter ?	3.77	4-15-55	do	.....	N
(218)	25baa1	G. W. Cathey	Charley Elan	300	43	6	Ter ?	31.13	4-14-55	do	.....	Dom
(219)	25baa2	do	Mr. Huff	300	73	6	Ter ?	33.10	8-18-54	Piston	.....	Dom
(220)	28ccd1	E. M. Cherry	Troy Mullens	325	198	6	Ter ?	23.52	10-17-55	Turbine	50	Dom
(221)	36daa1	Oak Grove	.....	290	32	30	Ter ?	19.58	4-14-55	None	.....	PS
	T. 4 N., R. 10 W.											
(222)	26bdc1	E. L. Daniel	Holland Bros.	260	67	6	Atoka	3.5	1954	Jet	.....	Dom
	T. 5 N., R. 8 W.											
223	30cdd1	.....	.....			6	Qt	9.42	5-13-55	None	.....	Dom
224	32ada1	.....	.....	220	29	6	Qt	12.35	5-13-55	do	.....	Dom
	T. 5 N., R. 9 W.			216	20							
225	36daa1	W. H. Dove	.....	224	29	8	Qt	8.07	5-13-55	do	.....	Dom

White County

	T. 5 N., R. 6 W.											
226	4aac1	E. B. McConnaughhay	Frank Elder	207	112	20–12	Qt	29.70	3-11-55	Turbine	1,400	Irr
227	4adc1	do	do	206	109	20–12	Qt	28.39	3-11-55	do	2,000	Irr
	T. 5 N., R. 7 W.											
228	5ddd1	S. W. Crook	.....	210	32	6	Qt	19.67	3-10-55	None	.....	S
229	6adc1	Mr. Halmock	.....	.....	24	6	Qt	14.00	3-10-55	do	.....	Dom
230	17acd1	Sid Guyot	.....	208	23	6	Qt	16.82	3-10-55	do	.....	Dom
	T. 5 N., R. 8 W.											
231	2bab1	.....	.....	219	15	6	Qt	4.26	3-11-55	do	.....	Dom
232	8bac1	.....	.....	248	48	6	Ter ?	30.74	3-10-55	do	.....	N
233	9dbc1	Harry Cannon	.....	231	32	6	Qt	23.97	3-10-55	do	.....	Dom
234	14daa1	C. Lashlee	.....	215	32	6	Qt	1.83	3-10-55	do	.....	N
235	15cac1	Bill Short	.....	224	32	8	Qt	19.80	3-10-55	do	.....	Dom
(236)	17aba1	Town of Beebe	Layne-Ark. Co.		96	10	Qt	.....	.....	do	1,250	PS
(237)	17aba2	do	do		99	12	Qt	.....	.....	do	1,850	PS
238	18dcc1	.....	.....	221	25	8	Qt	3.04	3-11-55	do	.....	S
(239)[1]	21bab1	Frank C. Mitchell	O. A. Moore	231	80	2	Qt	23.84	4-29-55	Jet	.....	Dom
240	23dcc1	Johnnie Dowing	Foster White	211	78	14–8	Qt	14.98	3-10-55	Turbine	900	Irr
241	24abb1	C. Tyndall	.....	206	33	6	Qt	12.68	3-10-55	None	.....	Dom
242	28abb1	.....	.....	214	26	6	Qt	9.95	3-10-55	do	.....	Dom
	T. 6 N., R. 4 W.											
(243)	18cab1	R. E. Schaffer	.....	195	30	8	Qt	23.74	6-17-55	do	.....	Dom
	T. 6 N., R. 5 W.											

[1] See log [2] Old oil test

White County (Continued)

Well no.	Location no.	Owner or tenant	Driller	Altitude above sea level (feet)	Depth of well (feet)	Diameter of well (inches)	Stratigraphic unit	Water level: Depth below land surface (feet)	Water level: Date of measurement	Type of pump	Yield (gpm)	Use
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
244	4daa1	......	......	196	......	1.25	Qt	7.40	6-17-55	Pitcher	......	Dom
245	11bdb1	......	......	190	......	1.25	Qt	14.10	6-17-55	None	......	Dom
	T. 6 N., R. 6 W.											
246	11cbb1	Claud Talbot	Frank Elder	215	95±	20–12	Qt	30.23	3-10-55	Turbine	......	Irr
(247)	12ccc1	J. N. Hamilton	Baker Machine Co.	215	98	18–12	Qt	......	......	do	900	Irr
248	18cbc1	......	......	211	22	6	Qt	13.02	3-11-55	None	......	S
249	21aaa1	......	......	215	33	6	Qt	25.14	8-17-54	do	......	N
(250)	32bdd1	Frank Senko	Frank Elder	212	98	20–12	Qt	33.89	3-11-55	Turbine	570	Irr
(251)	34aba1	J. B. Collinsworth	do	212	127	20–12	Qt	32.33	3-11-55	do	1,700	Irr
(252)	34baa1	do	Baker Machine Co.	212	117	20–12	Qt	29.05	3-11-55	do	900	Irr
253	34caa1	E. B. McConnaughhay	Frank Elder	210	125	20–12	Qt	30.80	3-11-55	do	2,000	Irr
	T. 6 N., R. 7 W.											
254	1dab1	Baker Nursery	......	214	......	6	Qt	14.45	3-11-55	......	......	Irr
255	2cbc1	......	......	215	34	8	Qt	14.80	3-16-55	None	......	Dom
256	2dcc1	Ralph Woodall	C. B. White	215	65	......	Qt	12.27	5-11-55	Turbine	160	Irr
257	2dcc2	do	......	215	23	6	Qt	11.11	5-11-55	None	......	S
258	5dab1	......	......	230	27	6	Qt	7.63	3-11-55	do	......	S
259	7ddd1	......	......	221	20	6	Qt	9.14	3-11-55	do	......	Dom
260	14aab1	......	......	205	20	6	Qt	6.03	3-11-55	do	......	N
261	14ddd1	Mr. Johnson	......	205	22	8	Qt	2.19	3-11-55	do	......	Dom
262	15cdd1	M. A. Hicks	......	203	28	6	Qt	12.98	3-11-55	do	......	Dom
(263)	17bdc1	A. J. Neel	T. J. Mullet	220	80	6	Qt	13.49	3-11-55	Turbine	60	Irr
264	26cbb1	......	......	210	32	8	Qt	17.65	3-10-55	None	......	S
265	28aaa1	G. Noble	......	213	41	8	Qt	23.73	3-10-55	do	......	Dom
266	30bca1	Jim Bergam	Mullens	233	87	6	Qt	28.97	3-11-55	do	......	N
267	30cbc1	Ted Lyon	Foster White	223	79	12	Qt	18.60	3-11-55	Turbine	......	Irr
268	31acc1	E. A. Durham	......	230	40	6	Qt	23.50	8-7-55	None	......	N
269	31acc2	do	Troy Mullens	230	86	6	Qt	23.40	8-7-55	None	......	N
(270)[1]	31acc3	do	do	230	86	6	Qt	23.30	8-6-55	Turbine	100	Irr
271	31bca1	Doyle Cook	Mullens	230	87	6	Qt	24.40	3-11-55	do	500	Irr
272	32ada1	McDaniel	......	215	28	6	Qt	19.40	3-10-55	None	......	Dom
273	34cdd1	......	......	206	30	6	Qt	16.48	3-10-55	do	......	Dom
	T. 6 N., R. 8 W.											
(274)	1dbb1	Wayne Cramford	......	220	53	6	Ter?	6.90	3-11-55	do	......	S
275	14ddd1	......	......	204	25	6	Qt	15.39	3-11-55	do	......	Dom
276	21cbb1	Othel Morris	......	......	21	24	Ter?	13.12	7-21-55	None	......	N
(277)	25bac1	Ted Lyon	Foster White	236	84	12–6	Qt	25.25	3-16-55	Turbine	......	Irr
278	34cba1	W. Durm	......	226	28	6	Qt	8.80	3-11-55	None	......	Dom
	T. 6 N., R. 9 W.											
279	32aaa1	W. E. Stamps	......	......	130	6	Atoka	4.02	4-15-55	Jet	......	Irr
(280)	34dad1	Carrol Johnson	Carl White	......	42	5	Atoka	4.75	10-25-55	None	......	Dom
281	34dad2	do	......	......	10	28	Atoka	5.87	10-25-55	do	......	N
	T. 7 N., R. 4 W.											
(282)	6cbb1	E. N. Butler	E. N. Butler	......	38	1.5	Qt	......	......	Jet	......	N
	T. 7 N., R. 5 W.											

(283)	1bbb1	Stanley Merrell				1.5	Qt			Pitcher		
(284)	1caa1	Thomas Brinkley			42	1.5	Qt			do		N
(285)	1ccc1	D. Farnsworth				1.5	Qt			do		Dom
(286)	4add1	E. D. Munger	Jack Bartley	205	86	16–12	Qt	15.88	5-24-55	Turbine	1,200	N
(287)	12daa1			195		1.25	Qt	18.44	6-15-55	Pitcher		Dom
288	13dcd1			205		6	Qt	17.96	6-15-55	None		Dom
289	24cbc1			205		1.25	Qt	16.47	6-15-55	None		Dom
(290)	29cab1	G. Williams		215		8	Qt	27.62	6-17-55	do		Dom
	T. 7 N., R. 6 W.											
(291)	15caa1	E. Cranfill		220	26	8	Ter?	15.80	6-16-55	do		Dom
(292)	17adb1	City of Kensett	Layne-Ark. Co.	224	182	8	Ter?	18.90	12-20-55	Turbine	80	PS
(293)[1]	17bda1	do	do	224	217	6	Ter?	26.62	9-28-54	do	210	PS
(294)	18dbc1	O. L. Ballard		225	34	4	Qt	16.70	3-16-55	Centrifugal	50	Irr
295	23cda1			212		8	Qt	26.19	6-17-55	None		Dom
296	33cdd1			220		6	Qt	8.17	5-26-55	do		N
	T. 7 N., R. 7 W.											
(297)	14cab1			242	52	6	Ter?	4.10	3-11-55			S
(298)[3]	21dcc1	Church			11	30	Atoka	4.87	6-21-55	Pitcher		Dom
299	22baa1			285	25	24	Ter?	11.30	5-11-55	None		N
300	23ccc1			235	20	6	Ter?	5.03	3-11-55	do		Dom
301[1]	25cca1	Mo. Pac. R.R.		219	62	8	Qt					N
302	26ada1			220	22	6	Qt	8.83	3-11-55	do		Dom
303	33abb1	Dewey Word		242	24	6	Ter?	3.32	3-11-55	do		Dom
304	35bcc1			225	30	6	Qt	14.59	3-11-55	do		S
305	36bdb1	E. Hopper		212	19	6	Qt	7.77	3-11-55	do		Dom
	T. 8 N., R. 4 W.											
306	19bdd1			210			Qt	15.28	4-21-55	do		N
307	30bcc1	W. O. Wallace		205	42	1.25	Qt	13.22	6-15-55	None		N
	T. 8 N., R. 5 W.											
308	1aba1			218			Qt	18.37	4-21-55	Pitcher		N
(309)	2aaa1	T. J. Childers		217	47	8	Qt	10.68	4-21-55			Dom
310[1]	20bbd1	Mo. Pac. R.R.		220	225	12–6	Atoka					N
311	20ccc1	U. of A. Exp. Sta.		212	46	2	Qt	11.64	4-19-51	Centrifugal		Irr
312	20ccc2	do		212	47	2	Qt			do	150	Irr
313	20ccc3	do		212	46	2	Qt	11.70	4-19-51	do		Irr
314	20ccc4	do		212	46	2	Qt	11.68	4-19-51	do		Irr
(315)	20dbb1	H. V. Huntsman		213	103		Qt	17.64	12-20-55	Turbine	1,400	Irr
(316)	28cbb1	A. P. Moodey	Burks	205	60	48–12	Qt	9.15	5-24-55	do	700	Irr
317	28cbb2	do		205	20	1.25	Qt	7.60	5-24-55	None		N
	T. 8 N., R. 6 W.											
318	31ccc1			225	24	8	Ter?	11.27	3-16-55	do		S
319	35aad1			225		6	Ter?	24.10	5-24-55	do		N
	T. 8 N., R. 7 W.											
320	25cca1	R. Whitlow			59	6	Atoka	38.27	3-16-55	do		Dom
321	26abb1	B. Liles			28	8	Atoka	0.75	3-16-55	do		S
(322)	36ccd1	Dewey Manning	Taylor	205	141	6	Atoka	25.44	3-16-55	do		S
	T. 9 N., R. 4 W.											
323	1cdd1	R. Johnson	L. Luther	215	40	1.25	Qt	19.26	6-16-55	do		Dom
(324)	8aca1	U. L. Hickman		232	45	6	Qt	34.86	6-16-55	do		Dom
(325)	8bda1	Town of Bradford		225	80	10–6	Qt?	37	1937	Turbine		PS
326	17ccc1			225		1.25	Qt	16.44	6-16-55	Pitcher		Dom
327	19cab1			225		24	Qt	27.76	4-21-55	None		Dom
328	23bbb1			202		1.25	Qt	9.46	6-16-55	do		Dom
(329)	28aaa1			200		1.25	Qt	7.32	6-16-55	Pitcher		Dom
330	30dbb1			215			Qt	23.20	4-21-55	None		Dom
	T. 9 N., R. 5 W.											
(331)	25dba1	Roy Cole		226			Qt	28.80	4-21-55	do		Dom
332	36acd1			221			Qt	8.79	4-21-55	do		N
333	36dcd1	L. W. Mayfield		218	70	1.25	Qt	20.30	4-21-55			Dom

[1] See log [3] Developed spring

TABLE 8

Chemical Analyses of Water from Wells in Parts of Lonoke, Prairie, and White Counties
(Analyses in parts per million except as indicated)

Prairie County

Well number	Date of collection	Temperature (°F)	Iron (total) (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Carbonate (CO_3)	Bicarbonate (HCO_3)	Sulfate (SO_4)	Chloride (Cl)	Nitrate (NO_3)	Dissolved solids	Hardness as $CaCO_3$: Total	Hardness as $CaCO_3$: Non-Carbonate	Percent sodium	Specific conductance (micromhos at 25°C)	pH
5	11-2-54	64.0	1.7	63.0	17.0	267.0	0	265	4.1	400.0	0.4	1,930	227	10	72	1,690	7.4
7	8-10-54	65	1.6	64	13	138	0	276	1.4	210	.8	604	213	0	58	1,070	7.3
7	9-2-55	64	.87	66	17	129	0	286	2.4	192	.6	598	234	0	54	1,050	7.4
9	8-10-54	64	1.6	70	14	23	0	300	8	22	.6	329	232	0	18	538	7.3
17	9-2-55	63	.58	67	17	23	0	297	8.6	20	.9	324	237	0	17	511	7.5
18	9-2-55	63	.67	67	14	93	0	309	3.8	114	1.0	483	224	0	47	826	7.5
23	8-10-54	64	.46	84	16	31	0	324	19	39	.1	403	276	10	20	660	7.2
23	9-2-55	63	2.0	88	19	32	0	330	21	46	1.0	419	298	27	19	662	7.4
24	9-2-55	63	1.4	114	24	31	0	336	50	63	.2	535	383	83	15	819	7.4
29	8-10-54	63	1.4	67	12	22	0	281	16	18	.2	329	216	0	18	509	7.2
34	8-1-54	64.5	1.3	56	16	33	0	185	63	50	.1	372	206	54	26	551	8.0
36	9-2-55	63	2.3	87	12	23	0	342	8.2	14	.3	345	266	0	16	562	7.3
43	9-2-55	63	.39	81	17	26	0	358	5.4	14	.5	360	272	0	17	566	7.5
44	9-2-55	63	1.2	59	16	25	0	274	6.2	12	.7	314	213	0	20	480	7.4
48	9-2-55	64	1.6	102	14	25	0	392	10	19	.2	407	312	0	15	635	7.4
49	8-17-54	64.5	.80	66	15	64	0	349	3.8	52	.3	412	226	0	38	693	7.3
51																	
52	8-1-54	63.5	2.2	91	19	29	0	376	8.0	30	.2	404	305	0	17	649	7.9
58	9-2-55	63	.67	87	20	27	0	374	16	17	.6	398	299	0	16	620	7.4
62	9-2-55	64	1.8	72	14	24	0	314	5.0	16	.2	331	237	0	18	518	7.3
64	8-1-55	63	1.7	79	18	28	8	345	5.2	18	0.0	370	271	0	18	590	8.4
66	9-2-55	63	.37	81	16	28	0	361	3.8	18	.3	418	268	0	19	581	7.4
68	9-2-55	63	2.1	81	16	26	0	353	4.8	16	.6	371	268	0	17	569	7.5
69	8-1-55	63.5	1.8	42	14	23	0	222	4.0	17	.2	244	162	0	24	385	8.1
73	9-2-55	64	1.5	69	12	24	0	294	6.2	14	.7	296	222	0	19	493	7.2
74	8-10-54	63	1.2	68	14	21	0	307	10	8.8	.4	322	227	0	17	506	7.6
82	8-10-54	65	.46	61	15	29	0	264	16	32	.1	339	214	0	23	526	8.0
86	8-10-54	64.5	1.7	71	14	26	0	318	4.6	22	.2	335	234	0	19	564	7.3
89	9-2-55	63	1.9	36	11	26	0	150	9.4	40	.6	242	135	12	30	383	8.2
90	9-2-55	62	1.1	67	15	23	0	287	6.0	21	1.0	305	228	0	18	501	7.2
93	9-2-55	64	3.5	77	13	24	0	271	19	35	.3	358	246	24	17	558	7.3
97	8-10-54	....	2.1	55	13	18	0	236	7.4	17	.4	265	191	0	2	424	7.3
101	6-23-55	62	.05	50	13	14	0	237	3.8	9.0	.0	254	178	0	14	389	7.8
115	8-17-54	64.5	2.1	78	16	27	0	367	2.2	18	.0	371	260	0	18	604	7.2
117	8-17-54	63.5	2.7	58	7.8	18	0	228	4.6	22	.4	274	177	0	2	430	7.8
118	9-2-55	63	5.4	52	23	41	0	278	49	24	.2	376	224	0	28	561	8.1

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124	9-1-55	63	2.7	45	7.5	18	0	195	3.0	11	.5	208	143	0	21	328	7.7
127	8-10-54	63.5	2.3	51	9.2	21	0	229	6.8	13	.1	246	165	0	21	398	7.2
128	9-1-55	....	.62	41	10	16	0	194	2.6	8.5	.7	203	143	0	20	332	7.4
136	8-9-54	64.5	6.5	34	8.6	20	5	146	3.6	23	.1	208	120	0	26	319	8.4
140	9-1-55	65	.51	55	15	25	0	242	24	18	.6	283	198	0	22	451	6.7
145	6-24-55	....	4.4	12	6.5	12	0	48	1.4	28	.0	156	57	17	31	184	6.3
148	8-9-54	64	.33	34	8.5	15	0	150	5.2	18	.4	191	120	0	21	302	7.9
151	8-9-54	63.5	.87	25	7.0	14	3	134	2.8	3.5	1.0	168	91	0	25	232	8.4
160	8-9-54	64	.0	13	3.6	11	0	76	1.4	3.8	1.9	118	47	0	33	147	6.6
162	9-1-55	64.5	4.3	13	4.2	11	0	76	2.2	7.0	.3	116	50	0	32	145	6.6
166	9-1-55	64	1.8	16	4.3	10	0	88	2.6	2.5	1.7	129	58	0	27	167	7.2
171	8-9-54	65	2.5	33	7.1	19	0	174	3.0	6.0	.2	186	112	0	27	299	7.6
175	8-18-54	....	.87	27	.6	1.8	0	86	1.0	2.2	.5	100	70	0	5	154	8.1
177	4-28-55	....	2.6	29	16	43	0	231	32	8.5	.6	299	138	0	40	443	7.2
179	8-9-54	....	.07	9.4	4.5	69	0	165	.4	41	.1	224	42	0	76	392	7.5
181	8-18-54	....	.12	15	2.9	31	0	58	1.0	48	2.1	195	49	2	57	314	6.7
184	8-9-54	65	1.1	33	8.3	12	0	150	3.2	10	.6	181	116	0	18	273	6.8
186	8-18-54	....	.08	2.2	1.1	10	0	13	1.6	6.5	11	88	10	0	68	74.4	5.6
189	8-9-54	63	5.6	22	4.6	14	0	99	12	10	.0	158	74	0	29	214	7.6
191	8-6-51	64	4.9	....	....	....	0	46	2	9.5	.3	......	28	0	....	112	6.3
191	8-9-54	65	.12	7.3	4.1	11	0	46	2.4	16	.3	104	35	0	38	124	7.4
200	8-10-54	63	.12	37	14	68	0	94	6.0	148	.4	419	150	73	49	658	6.4
201	9-1-55	62	.33	25	7.7	28	2	84	5.2	52	.5	242	94	22	39	319	8.3
203	4-28-55	....	32	24	16	9.2	0	159	3.2	10	.0	210	126	0	13	325	6.9
213	7-20-55	....	.74	15	6.0	36	0	8	5.6	54	68	255	62	56	56	346	5.3
214a	5-16-46	....	1.1	27	11	53	0	218	7.0	30	.5	257	113	....	....	429	7.6
218	8-18-54	....	.05[1]	14	11	31	0	25	9.0	78	12	294	80	60	45	383	5.8
219	8-18-54	....	32	8.7	6.1	11	0	70	3	11	.1	94	47	0	34	145	7.9
220	10-17-55	62.5	.02	2.6	.6	3.7	0	12	3.4	3.5	1.7	45	9	0	43	33.4	6.4
221	8-18-55	....	.04[1]	75	54	104	0	15	2.6	450	1.0	1,040	409	396	35	1,530	6.5
222	4-15-55	....	1.4	17	8.4	7.7	0	110	1.2	2.5	.6	122	77	0	18	185	8.2

White County

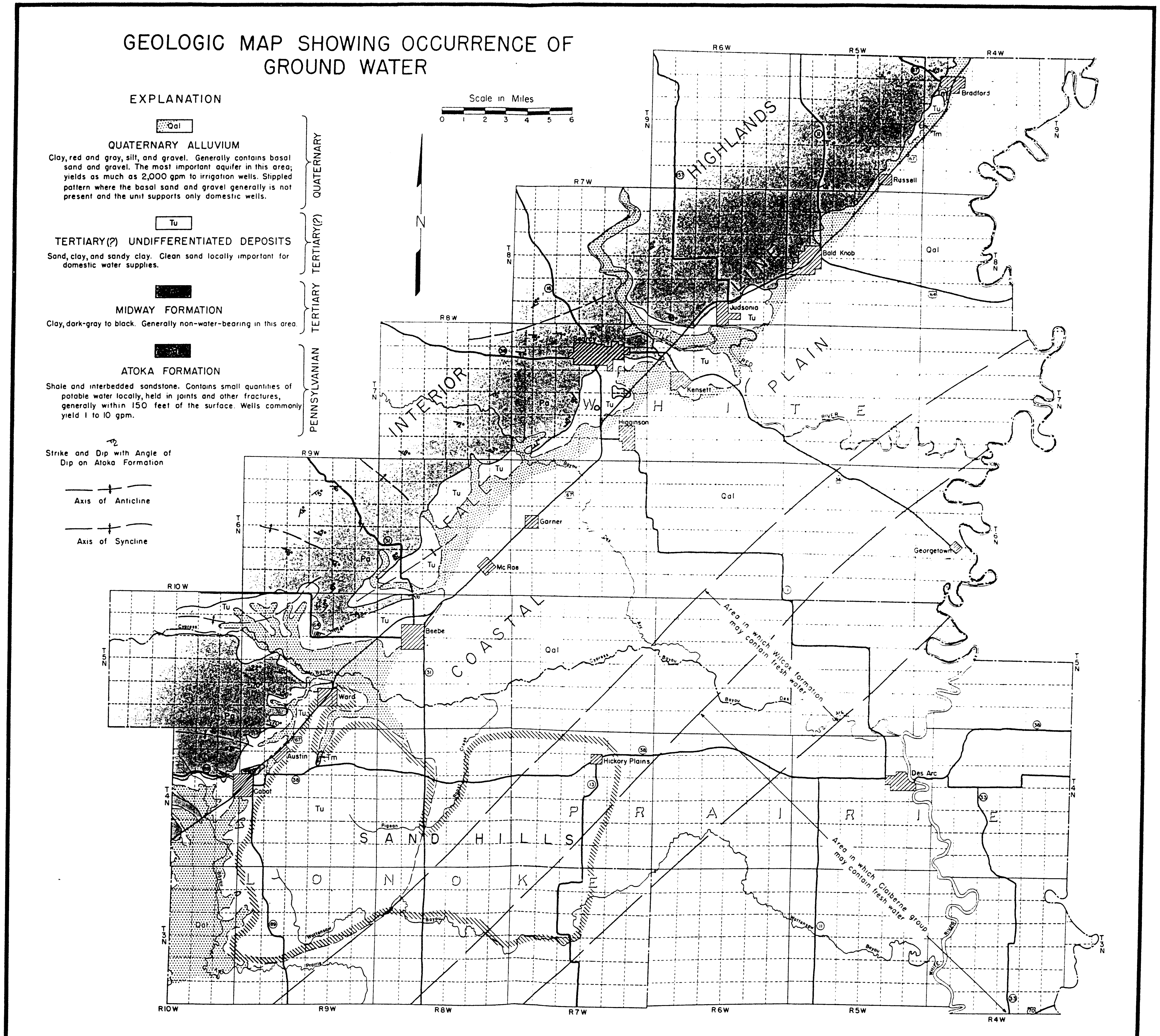
236	10-26-55	....	0	18	6.4	23	0	24	1.0	57	21	216	71	52	41	293	6.0
237	10-26-55	....	.21	30	9.2	39	0	34	14	94	24	327	113	85	42	450	6.3
239	9-7-55	66	.12	24	5.2	22	0	144	2.8	4.2	.1	170	81	0	37	251	6.8
243	9-7-55	63	.08	110	36	55	0	461	39	69	27	636	422	44	22	992	7.3
247	8-17-54	64	3.0	16	6.7	11	0	80	3.8	18	.2	146	67	2	26	204	6.5
250	9-17-55	62	7.5	35	8.8	58	0	154	4.0	88	.0	314	124	0	51	518	7.7
251	8-1-55	62	2.1	48	10	32	0	233	3.2	24	.1	290	161	0	30	430	7.3
252	8-17-54	63	1.6	42	10	39	0	243	3.4	22	.0	276	146	0	37	445	7.2
263	9-7-55	63	10	39	13	37	0	52	2.2	134	.0	384	151	108	35	539	6.8
270	8-8-55	62	.22	42	14	54	0	175	3.0	98	.0	368	162	19	42	570	6.7
274	9-7-55	64	.11	8.1	6.5	22	0	8	2.8	48	19	188	47	40	50	226	5.2
277	9-7-55	63	.79	20	6.3	23	0	109	1.6	24	.4	188	76	0	40	254	6.6
280	4-15-55	63	2.5	9.7	7.5	9.6	0	80	5.2	6.2	.6	121	55	0	27	159	6.8
282	7-27-55	....	14	152	53	105	0	446	1.8	310	1.0	1,010	597	232	28	1,680	6.9
283	7-27-55	....	18	264	76	901	0	280	.6	1,870	1.0	3,770	971	742	67	6,220	6.9
284	7-27-55	....	2.7	59	24	343	0	630	12	312	1.5	1,120	246	0	75	1,910	7.8
285	7-27-55	64	.48	118	74	430	0	631	107	618	3.4	1,720	599	82	61	2,960	7.4
286	8-17-54	63.5	5.4	243	72	615	0	245	.4	1,430	1.2	2,870	902	702	60	4,850	6.9
287	9-6-54	63	2.6	108	35	55	0	452	1.4	104	.5	586	414	43	22	972	7.6
290	9-7-55	64	6.5	28	12	26	0	124	11	42	.2	245	119	18	32	350	8.2

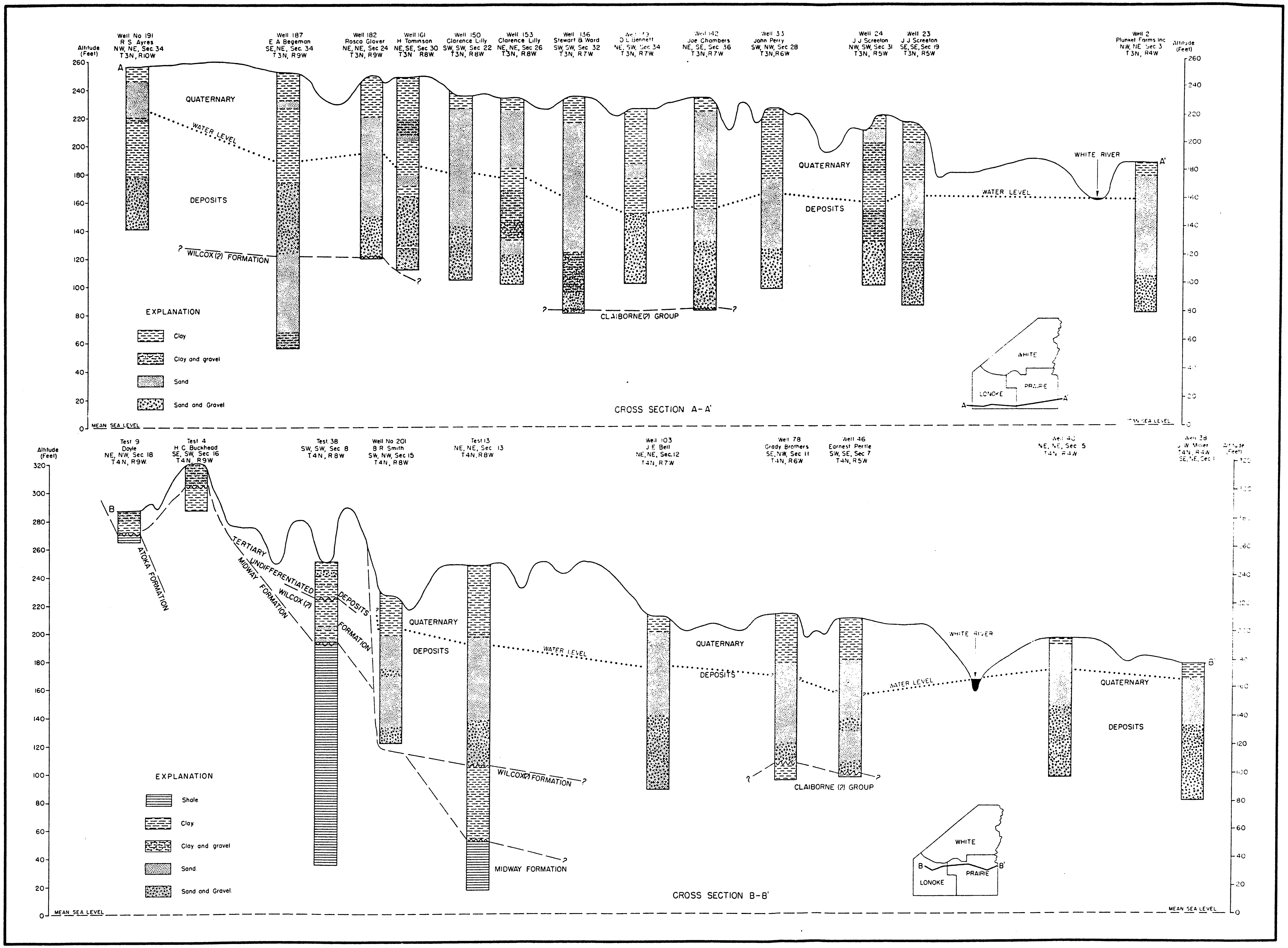
[1] Iron in solution.

White County (Continued)

Well number	Date of collection	Temperature (°F)	Iron (total) (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Carbonate (CO_3)	Bicarbonate (HCO_3)	Sulfate (SO_4)	Chloride (Cl)	Nitrate (NO_3)	Dissolved solids	Hardness as $CaCO_3$ Total	Hardness as $CaCO_3$ Non-Carbonate	Percent sodium	Specific conductance (micromhos at 25°C)	pH
291	9-7-55	64	.28	28	15	72	0	6	6.6	96	170	489	132	126	54	655	5.1
292	8-29-50	65	.51	20	6.2	21	0	150	.6	4.8	.7	161	75	0	36	244	7.1
293	9-28-54	....	3.7	21	4.8	17	0	129	.8	3.0	1.5	142	72	0	33	213	6.9
294	9-7-55	63	.05	4.0	1.6	5.4	0	14	1.6	5.0	12	72	17	5	41	71.7	5.8
297	9-7-55	66	1.0	21	12	39	0	162	3.4	36	1.1	225	102	0	45	370	7.2
298	6-21-55	61	.31	39	8.7	26	0	210	5.0	6.0	.8	214	133	0	30	351	8.2
309	9-6-55	67	.10	7.6	2.7	70	0	20	32	38	104	374	30	14	84	424	7.4
315	8-17-54	63	.12[1]	63	16	52	0	253	5.4	88	.1	426	223	16	31	681	7.2
316	8-17-54	....	3.8	12	3.6	18	0	44	6.2	30	.9	142	45	9	46	203	7.5
322	9-6-55	65	8.8	11	6.5	12	0	86	3.4	5.0	1.9	108	54	0	33	158	6.6
324	9-6-55	64	1.2	45	16	49	0	237	13	60	1.0	354	178	0	37	586	6.9
325	7-28-55	63	1.3	101	20	47	0	265	94	83	.0	540	334	117	23	836	7.3
325	10-26-55	63	3.1	104	21	50	0	263	105	88	.2	563	346	130	24	844	8.0
329	9-6-55	63	17	27	7.2	7.9	0	113	9.4	8.0	.8	148	97	4	15	211	6.4
331	9-6-55	67	.16	17	4.7	51	0	114	38	18	20	259	62	0	64	345	6.6

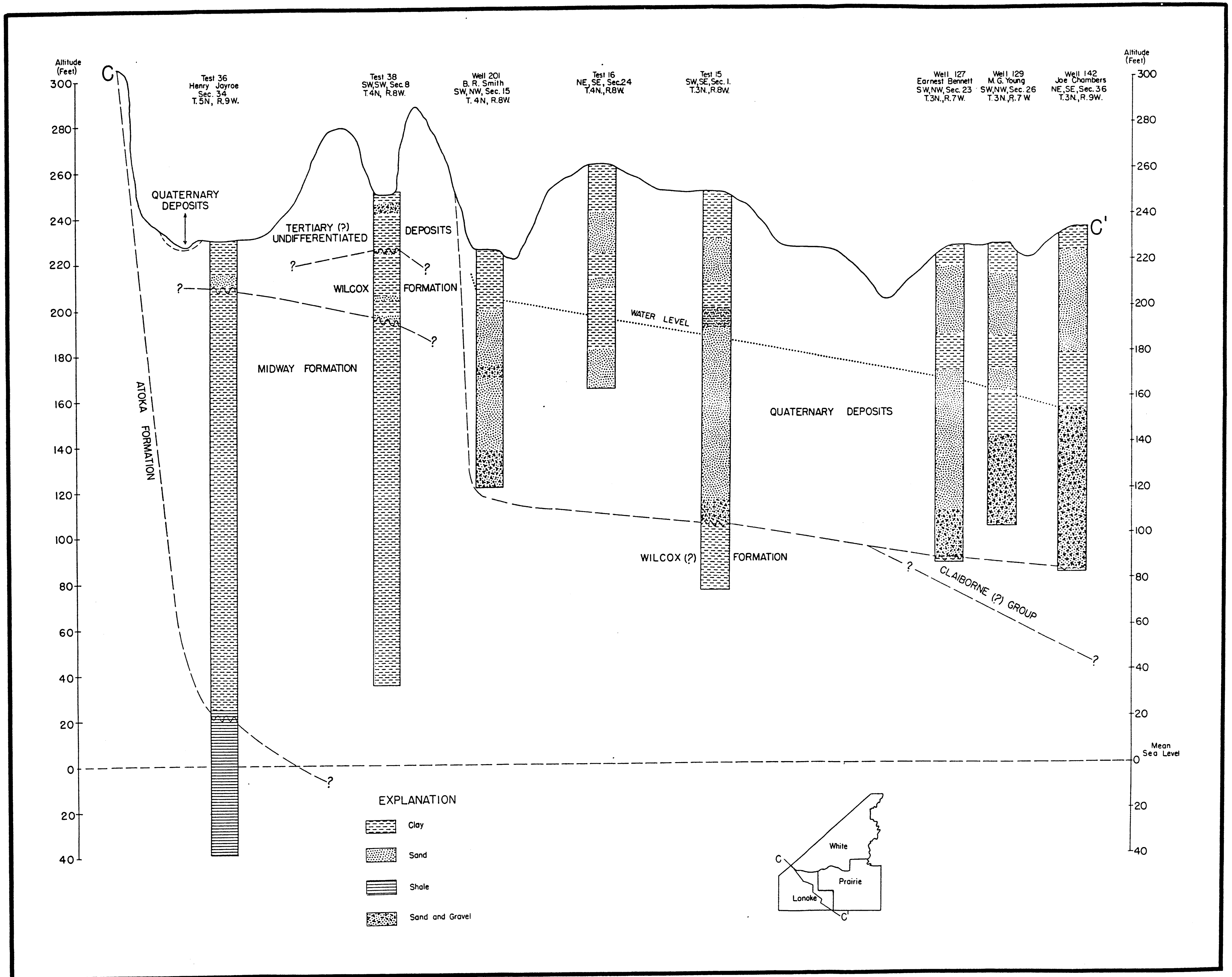
[1] Iron in solution.


GEOLOGIC MAP SHOWING OCCURRENCE OF GROUND WATER
EXPLANATION
Qal
QUATERNARY ALLUVIUM
Clay, red and gray, silt, and gravel. Generally contains basal sand and gravel. The most important aquifer in this area; yields as much as 2,000 gpm to irrigation wells. Stippled pattern where the basal sand and gravel generally is not present and the unit supports only domestic wells.
QUATERNARY
Tu
TERTIARY(?) UNDIFFERENTIATED DEPOSITS
Sand, clay, and sandy clay. Clean sand locally important for domestic water supplies.
TERTIARY(?)
MIDWAY FORMATION
Clay, dark-gray to black. Generally non-water-bearing in this area.
TERTIARY
ATOKA FORMATION
Shale and interbedded sandstone. Contains small quantities of potable water locally, held in joints and other fractures, generally within 150 feet of the surface. Wells commonly yield 1 to 10 gpm.
PENNSYLVANIAN
Strike and Dip with Angle of Dip on Atoka Formation
Axis of Anticline
Axis of Syncline
Scale in Miles
0 1 2 3 4 5 6
N
R10W
R9W
R8W
R7W
R6W
R5W
R4W
T9N
T8N
T7N
T6N
T5N
T4N
T3N
HIGHLANDS
INTERIOR
FALL
COASTAL
PLAIN
WHITE
PRAIRIE
SAND HILLS
LONOKE
Bradford
Russell
Bald Knob
Judsonia
Kensett
Higginson
Searcy
Garner
McRae
Beebe
Ward
Austin
Cabot
Hickory Plains
Des Arc
Georgetown
Qal
Tu
Tm
Pa
Area in which Wilcox formation may contain fresh water
Area in which Claiborne group may contain fresh water
Cypress
Bayou
Des Arc
Pigeon
Wattensaw
River



CROSS SECTIONS A–A' AND B–B'

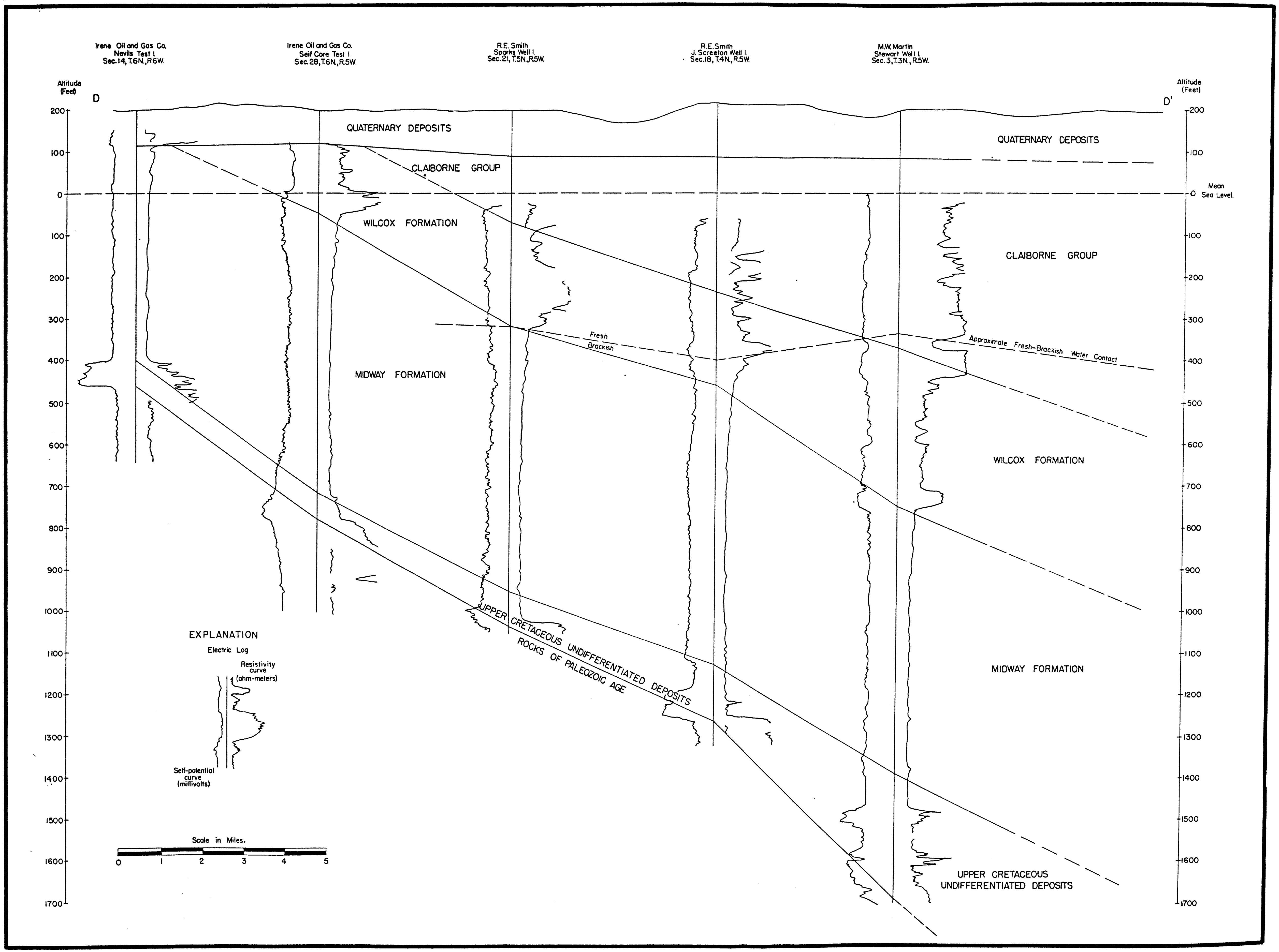
SCALE IN MILES
0 1 2 3 4 5



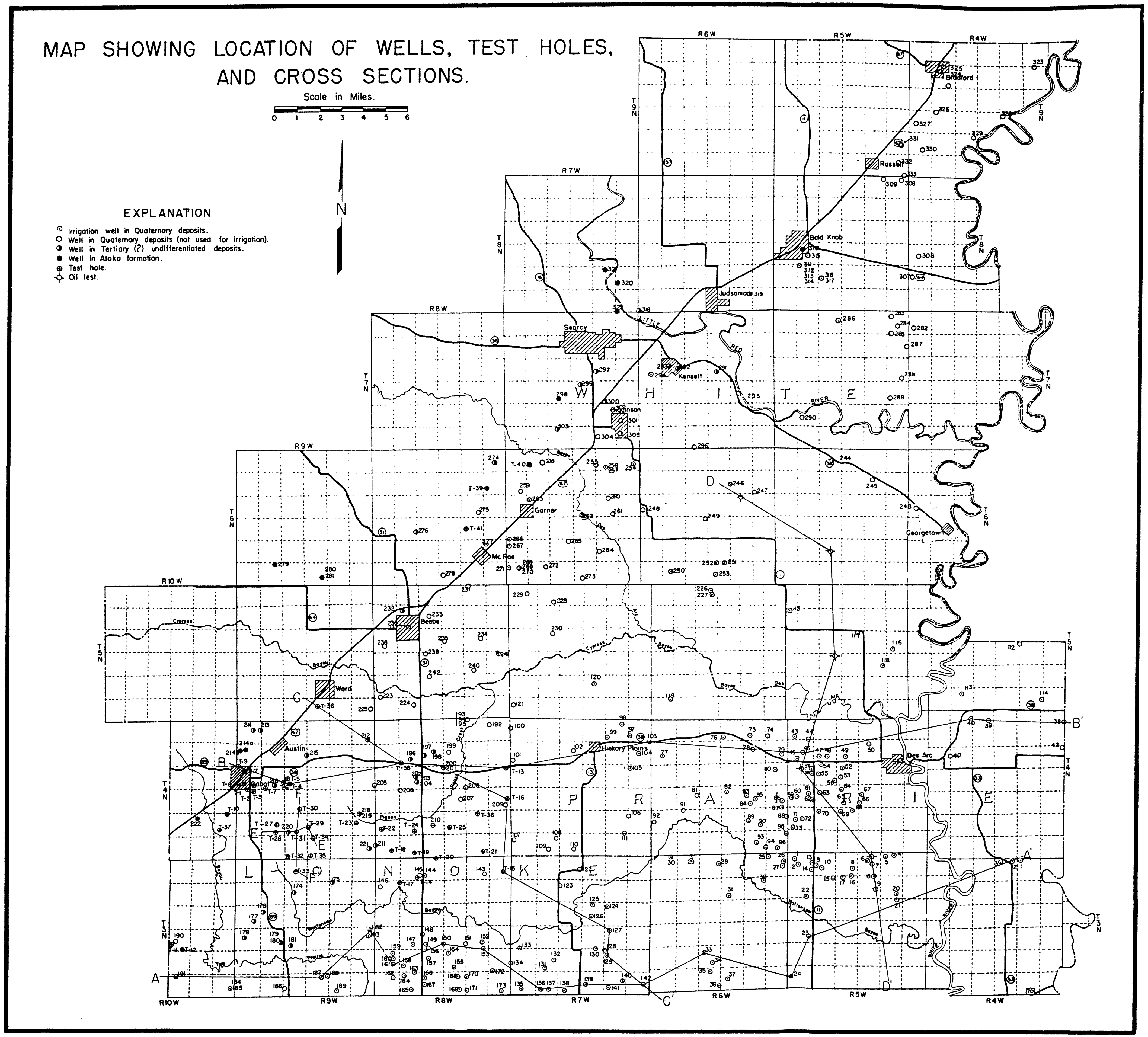
CROSS SECTION C-C'

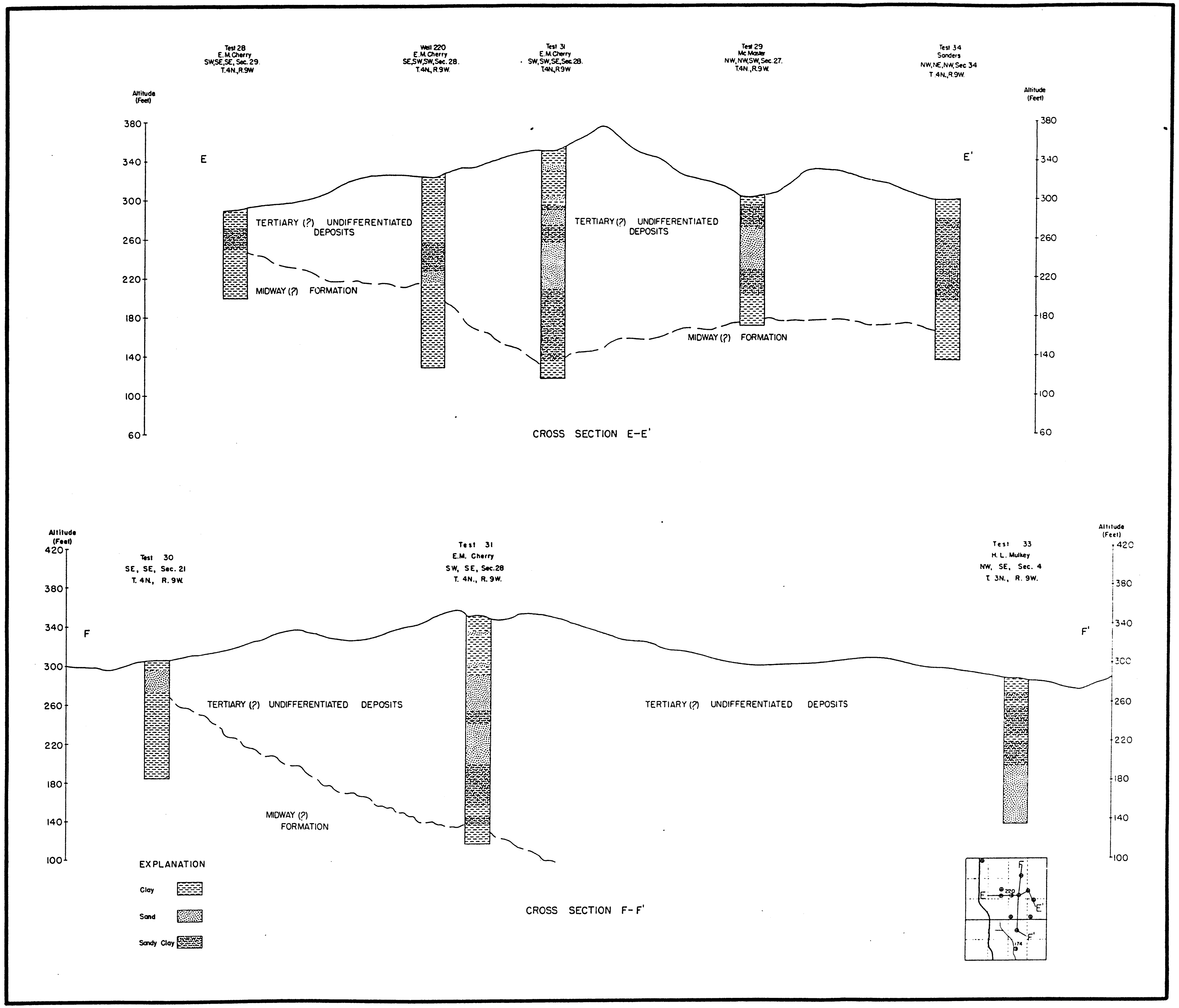
Scale in Miles.

0 1 2 3 4 5



CROSS SECTION D-D'

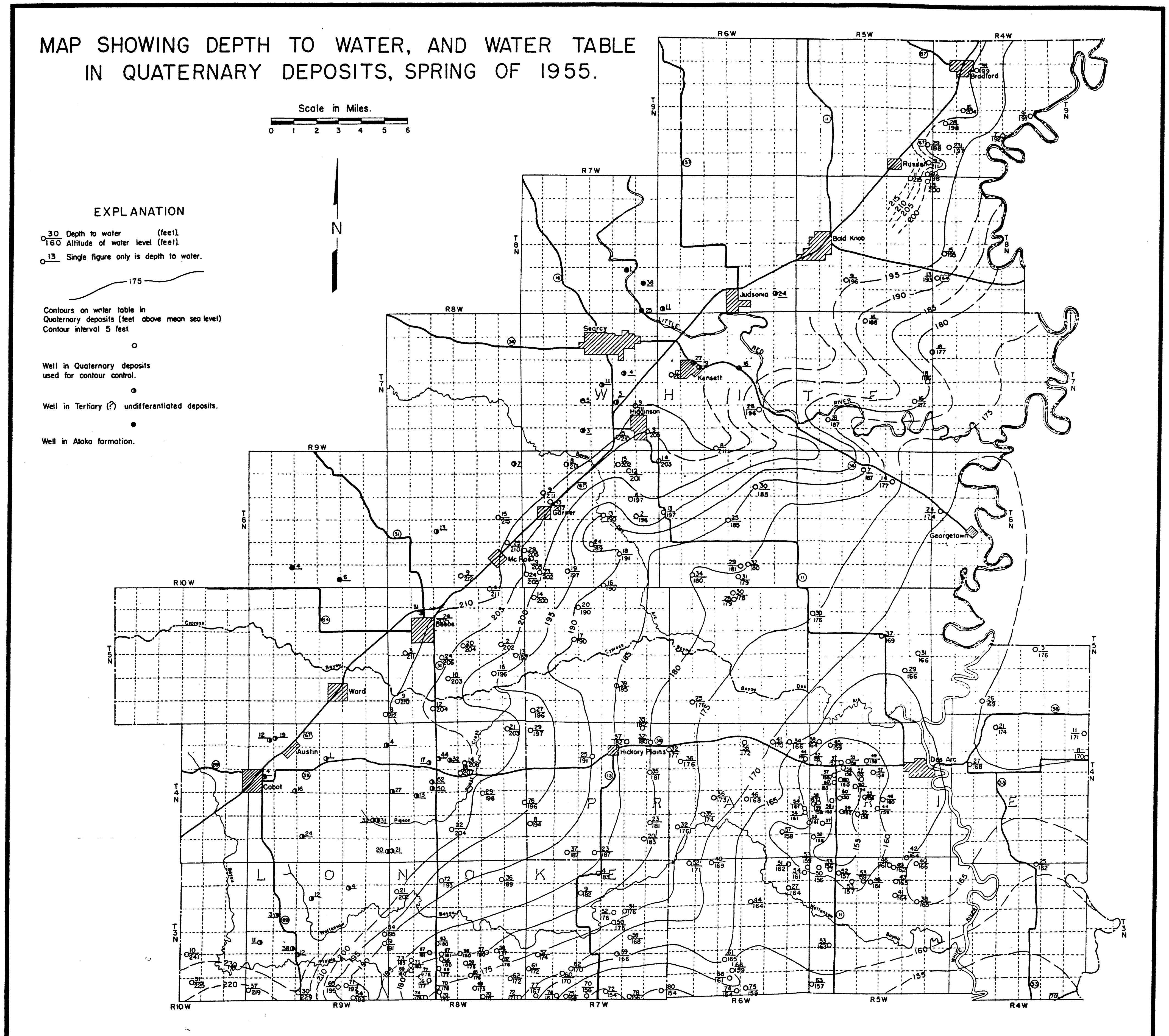

MAP SHOWING LOCATION OF WELLS, TEST HOLES, AND CROSS SECTIONS.
Scale in Miles.
0 1 2 3 4 5 6
N
EXPLANATION
Irrigation well in Quaternary deposits.
Well in Quaternary deposits (not used for irrigation).
Well in Tertiary (?) undifferentiated deposits.
Well in Atoka formation.
Test hole.
Oil test.
R6W
R5W
R4W
R7W
R8W
R9W
R10W
T9N
T8N
T7N
T6N
T5N
T4N
T3N
Bradford
Russell
Bald Knob
Judsonia
Searcy
Kensett
Garner
McRae
Beebe
Ward
Austin
Lonoke
Hickory Plains
Des Arc
Georgetown
W H I T E
P R A I R I E
L O N O K E
LITTLE RED RIVER
A
A'
B
B'
C
C'
D
D'



CROSS SECTIONS E–E' AND F–F'

Scale in Miles

0 1/8 1/4 3/8 1/2


MAP SHOWING DEPTH TO WATER, AND WATER TABLE
IN QUATERNARY DEPOSITS, SPRING OF 1955.
Scale in Miles.
0 1 2 3 4 5 6
N
EXPLANATION
30 Depth to water (feet).
160 Altitude of water level (feet).
13 Single figure only is depth to water.
175
Contours on water table in Quaternary deposits (feet above mean sea level) Contour interval 5 feet.
Well in Quaternary deposits used for contour control.
Well in Tertiary (?) undifferentiated deposits.
Well in Atoka formation.
R6W
R5W
R4W
R7W
R8W
R9W
R10W
T9N
T8N
T7N
T6N
T5N
T4N
T3N
Bradford
Russell
Bald Knob
Judsonia
Searcy
Kensett
Higginson
Garner
McRae
Beebe
Ward
Austin
Cabot
Hickory Plains
Des Arc
Georgetown
W H I T E
L O N O K E
P R I E
LITTLE RED RIVER