Prentiss County Geology

WILLIAM SCOTT PARKS

Ground-Water Resources

B. E. ELLISON AND E. H. BOSWELL

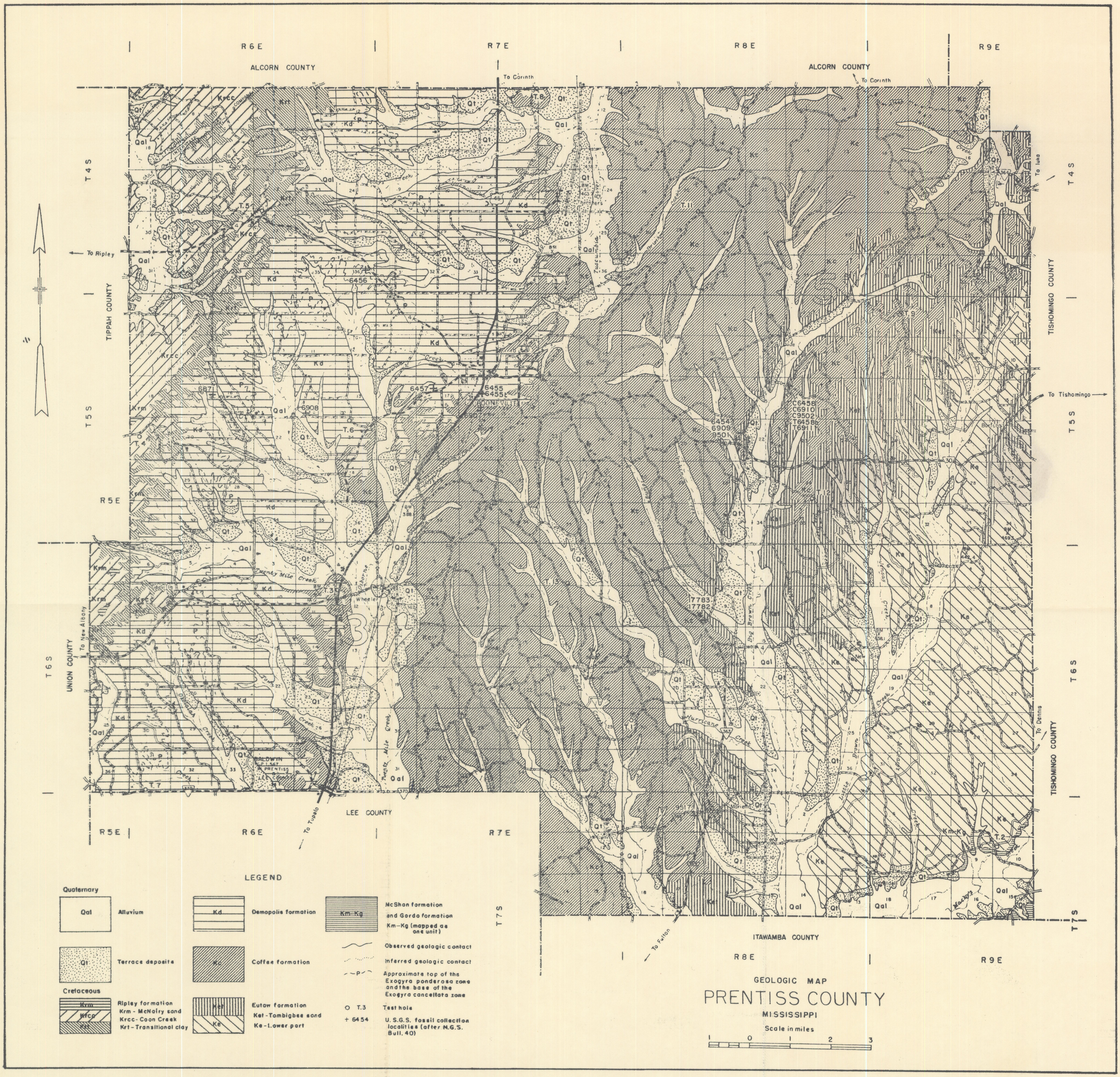
(U. S. Geological Survey)

Prepared by the United States Geological Survey in cooperation with the Mississippi Board of Water Commissioners and the Mississippi Geological Survey.

BULLETIN 87

MISSISSIPPI STATE GEOLOGICAL SURVEY
TRACY WALLACE LUSK
DIRECTOR AND STATE GEOLOGIST

UNIVERSITY, MISSISSIPPI
1960


GEOLOGIC MAP
PRENTISS COUNTY
MISSISSIPPI
Scale in miles
1 0 1 2 3
LEGEND
Quaternary
Qal Alluvium
Qt Terrace deposits
Cretaceous
Ripley formation
Krm - McNairy sand
Krcc - Coon Creek
Krt - Transitional clay
Kd Demopolis formation
Kc Coffee formation
Eutaw formation
Ket - Tombigbee sand
Ke - Lower part
Km-Kg McShan formation and Gordo formation
Km-Kg (mapped as one unit)
Observed geologic contact
Inferred geologic contact
Approximate top of the Exogyra ponderosa zone and the base of the Exogyra cancellata zone
O T.3 Test hole
+ 6454 U.S.G.S. fossil collection localities (after M.G.S. Bull. 40)
ALCORN COUNTY
TIPPAH COUNTY
UNION COUNTY
LEE COUNTY
ITAWAMBA COUNTY
TISHOMINGO COUNTY
R5E
R6E
R7E
R8E
R9E
T4S
T5S
T6S
T7S
To Corinth
To Ripley
To New Albany
To Tupelo
To Fulton
To Iuka
To Tishomingo
To Dennis
Twenty Mile Creek
Big Brown Creek
Hurricane Creek
BOONEVILLE
BALDWYN
Wheeler
Marietta

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STATE OF MISSISSIPPI

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LETTER OF TRANSMITTAL

Office of the Mississippi Geological Survey
University, Mississippi
January 12, 1960

Hon. James R. Park, Chairman, and
Members of the Geological Survey Board

Gentlemen:

Herewith is Mississippi Geological Survey Bulletin 87, Prentiss County Geology, by William Scott Parks, staff geologist, and Ground-Water Resources, by B. E. Ellison and E. H. Boswell, U. S. Geological Survey. Each part could be treated as a separate report, however, in the interest of economy and completeness both are included under a single cover.

The ground-water part of the bulletin was submitted for publication by Mr. Joe W. Lang, District Geologist, Ground-Water Branch, U. S. Geological Survey, through their cooperative program with the Mississippi Board of Water Commissioners. "This report includes among other things a tabulation of data for 370 wells, chemical analyses of water samples from 24 selected wells throughout the county, and a map showing the location of the wells."

The geological study of Prentiss County was made possible through the cooperative efforts of the County Board of Supervisors. They are to be commended for their interest in obtaining factual information on the county which is the proper method to upgrade the general prosperity. And it should be pointed out that without the financial assistance of the county, the survey would not have been possible.

In addition to the usual study of surface exposures, 13 test holes were drilled. Such drilling data provide information not otherwise obtainable, enabling the geologist to determine with a greater degree of accuracy the interpretations necessary for a completed report.

Several problems arose during the preparation of the manuscript concerning the names and ranks of the geological units. It is hoped that these problems were resolved to be the most practical and to best suit the profession as a whole.

Respectfully submitted,

Tracy W. Lusk

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PRENTISS COUNTY GEOLOGY

WILLIAM SCOTT PARKS

ABSTRACT

Prentiss County, in the northeastern part of Mississippi, is a roughly square area of 418 square miles. The county is accessible by several highways from almost any direction, and numerous all weather roads reach most parts of it. However, it has only one railroad. Originally part of old Tishomingo County, Prentiss County was organized in 1870. The total population, in 1950, was 19,810, and there are two urban areas, Booneville and (north) Baldwyn. The chief industry is agriculture; however, several manufacturing enterprises employ some people.

The county contains parts of three physiographic divisions: the Tombigbee and Tennessee River Hills, a rugged to rolling surface sloping generally to the west; the Black Prairie belt, a low-lying area of slight to moderate relief and gently rolling hills; and the Pontotoc Hills, a rugged to rolling upland of moderate to high relief. Numerous creeks, branches, and tributaries, that drain the area, are a part of three major river systems: the Tombigbee, the Mississippi, and the Tennessee. The climate is warm and temperate. Vegetation and soils contrast markedly among the sandy Tombigbee and Tennessee River Hills and the Pontotoc Hills divisions and the calcareous Black Prairie belt division.

Bedrock formations exposed in the county area are, for the most part, of sedimentary marine origin and are a part of the Gulf series of the Cretaceous system. These units are, in ascending order: the Gordo, the McShan, the Eutaw, the Coffee, the Demopolis and the Ripley formations.

Only a suggestion of the Gordo formation is at the surface; however, test hole records reveal that the formation consists of sand and gravel with some clay beds. The only test hole drilled through the entire Gordo found a thickness of 87 feet.

The McShan formation, which is somewhat poorly exposed, is chiefly laminated fine sands and silts with some laminae of clay. It has a maximum thickness of 28 feet in surface exposures.

The Eutaw formation is composed of two units: A lower part, generally cross-bedded glauconitic sands containing laminae of clay and some scattered chert gravel, and thin-bedded sands interbedded with laminated layers of clay-shale; and an upper mem-

ber, the Tombigbee sand, a massive, very glauconitic, more or less calcareous, in part fossiliferous sand containing some concretionary layers of calcareous sandstone. The lower part of the Eutaw ranges in thickness from 110 to 170 feet and the Tombigbee sand member from 75 to 85 feet.

The Coffee formation is made up chiefly of sands, silty sands, sandy silts, and some clay beds and shale. It contains several layers of concretionary calcareous sandstone and a few bentonite beds. Some parts are fossiliferous. It ranges in thickness from 240 to 275 feet.

The Demopolis formation is a fossiliferous impure chalk containing variable amounts of clay, silt and sand. Generally it is sandy at its base and increasingly argillaceous toward the top. It varies in thickness from 230 feet to 235 feet.

The Ripley formation is represented by three units: A basal transitional clay, consisting of fossiliferous, calcareous, sandy clay ranging in thickness from 40 to 45 feet; the Coon Creek tongue, composed of 165 to 180 feet of sands, marl, clay beds and some sandstone; and the McNairy sand member, represented by ferruginous sandstone ledges and sand ranging in thickness from 80 to 90 feet.

Surficial deposits of Quaternary age include alluvium, terrace deposits, loessal materials, colluvium, residuum, and soils.

The general structural configuration is homoclinal with a regional dip which averages 30 feet per mile to the west. No major surface faults or structures were found.

The geologic history of the rock formations is limited to the events connected with these bedrock deposits of Upper Cretaceous age.

Mineral resources of the county are bentonite, clay, chalk, sand and gravel, and possibly oil and gas.

INTRODUCTION

The field work for the present investigation began September 22, 1958 and terminated on April 17, 1959, a large part of the months of February and March being devoted to the drilling of test holes. At times weather conditions somewhat hindered field reconnaissance, and such intermittent periods were spent organizing and writing portions of the report.

The field investigation consisted of a study of the character, distribution, and thickness of the geologic units of Prentiss County. The ultimate ends in view were an up-to-date geologic map, discussion of the geologic units in detail, recognition of any structures which might give evidence of the existence of possible traps suited for the accumulation of oil and gas, and a study of any mineral reserves present within the county.

GEOGRAPHY AND CULTURE[1-3]

Prentiss County, in the northeastern part of Mississippi, is bounded on the north by Alcorn and Tishomingo Counties, on

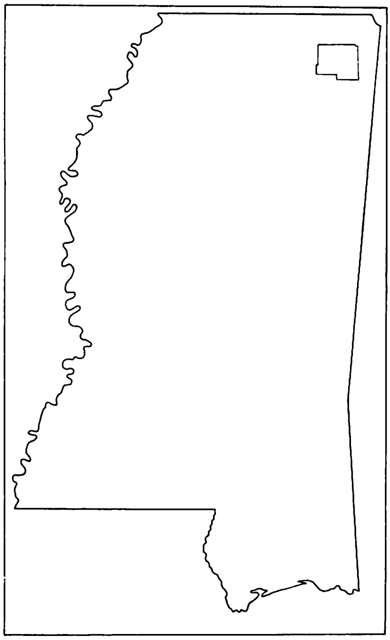


Figure 1.—Location of Prentiss County.

the east by Tishomingo County, on the south by Itawamba and Lee Counties, and on the west by Union and Tippah Counties. Its northern boundary is about 16.5 miles from the Tennessee line, and its eastern boundary is about 10 to 12 miles from the Alabama line. Most of the county lies between the parallels of 34° 25′ and 34° 45′ north latitude, and the meridians 88° 20′ and 88° 45′ west longitude. The county is an irregular, roughly square area of 418 square miles having a maximum east-west extent of 23 miles and a maximum north-south extent of 20 miles (Figure 1).

The county has two main highways: U. S. Highway 45, a paved north-south trending road through Baldwyn and Booneville, and State Highway 30, a paved east-west trending road passing through Geeville, Booneville, and Burtons. Another excellent paved road through the county which is nearing completion will be State Highway 4 which trends northwest-southeast through Jumpertown, Booneville, and New Site. State Highway 363, a paved road from Kirkville, Itawamba County, passes through Marietta and joins State Highway 4. State Highway 370 is a paved road between Baldwyn and Bethany, Lee County. A paved farm-to-market road from Booneville through the Osborne community joins U. S. Highway 45 south of Booneville. All weather gravel roads include: State Highway 362 from Wheeler east to State Highway 363 north of Marietta; State Highway 364 through the northeastern corner of the county; State Highway 365 from Burtons north to State Highway 364; and State Highway 366 from Marietta west joining with State Highway 370 to Baldwyn. Another excellent all weather gravel road is the Altitude road which trends northeasterly from State Highway 4 through Altitude to State Highway 365. Numerous other gravel farm-to-market and section-line roads provide a network which makes accessible most parts of the county.

The Gulf, Mobile, and Ohio Railroad extends through Baldwyn, Wheeler, Booneville, and Thrashers and is the only railroad which serves the county. Buses and trucks from Booneville connect with rail lines and bus lines at Corinth, Tupelo, and New Albany.

Prentiss County was originally part of old Tishomingo County, which had been organized from lands that were the hunting reservation of the Chickasaw Indians. On April 15, 1870, the legislature divided old Tishomingo County into Alcorn, Prentiss, and Tishomingo Counties, taking eighty-six sections of land from Tippah County and adding them to Alcorn and Prentiss. Prentiss County received its name in honor of Sargent Smith Prentiss, the gifted statesman, jurist, and orator.

The population of Prentiss County numbered 19,810 in 1950, of whom 16.6 percent were classed as urban, 17.0 percent as rural non-farm, and 66.3 percent as rural farm populations. Booneville, the county seat, is the largest town in the county with an urban population of 3,295. Baldwyn, only part of which is in the county, is the only other closely populated area. Small villages or communities mentioned in this report are Thrasher, Altitude, Burtons, New Site, Hazeldell, Marietta, Wheeler, Geeville, Blackland, Osborne, and Jumpertown.

The chief industry is agriculture, and cotton is the leading cash crop. Other crops include corn, hay, orchard produce and small truck crops. Dairying is the most important livestock industry. Combined livestock-crop farming is of growing importance and in many cases has proved more profitable than crop farming alone. Income from poultry is of minor importance.

In 1950 fewer than 2,000 out of a total county population of 19,810 were engaged in non-agricultural activities. Manufacturing enterprises employed only 825 people, and of this total 569 worked in small garment factories, and a few were employed in food-processing businesses, including a cheese factory and a milk cannery.

Forests are a neglected resource of Prentiss County, and with proper management, they could be an important source of income.

PREVIOUS INVESTIGATIONS*

The first official geologic report of the State was prepared by Wailes[4] and published in 1854. In this report he refers to "... Cretaceous Marls of the Tombigbee and its tributaries ..." A later report, which is now considered a classic geologic report of its time, was prepared by Hilgard[5] and published in 1860. Hilgard refers to several localities within the area now known as Prentiss County. In 1907, the State Geological Survey published its first official Bulletin which was a report on the cement materials of Mississippi. In this bulletin Crider[6] briefly discusses the chalk. In 1907, Logan's bulletin on clays of northern Mississippi included a section on Prentiss County.[7]

In 1914 appeared a report by Stephenson[8] on the regional aspects of the Cretaceous, and its faunal relationships. Several

*Reports of previous investigations are limited to those references which cite specific information from localities in Prentiss County. Other specific citations which have a bearing on the geology of the county are included in the list of references. A comprehensive bibliography of the Cretaceous in the Gulf Coastal Plain is included in a recent publication, Bulletin 85, of the Mississippi Geological Survey.

fossil collecting localities are mentioned by him in Prentiss County. Logan, in 1916, in a bulletin on marls and limestone of Mississippi, mentions the chalk.[9] In 1928, Stephenson, Logan, and Waring[10] discussed the general geology and ground-water resources of Prentiss County. Bentonite deposits were described by Grim[11] in 1928, by Morse[12] in 1934, by Bay[13] in 1935, and by Vestal[14] in 1936. In 1940, Stephenson and Monroe[15] authored a report, including a geologic map, on the Upper Cretaceous deposits of Mississippi—a notable contribution to the knowledge of the Cretaceous of the State. This report contains descriptions and faunal data from localities within the county. In 1945, the Mississippi Geological Society published its geologic map of Mississippi on which unit boundaries are shown somewhat more accurately than on Stephenson and Monroe's Cretaceous map.

PHYSIOGRAPHY

Prentiss County lies within the Gulf Coastal Plain physiographic province and contains parts of three topographic divisions —the Tombigbee and Tennessee River Hills, a rugged to rolling upland sloping generally to the west; the Black Prairie belt, a low-lying area of slight to moderate relief and gently rolling hills; and the Pontotoc Hills, a rugged to rolling upland of moderate to high relief.[16]

The Tombigbee and Tennessee River Hills division includes most of the eastern two-thirds of the county. It consists of a stream dissected plateau-like area featured by hills of various shapes and sizes, from rugged to rolling. Altitudes range from 360 feet in the valleys to 640 feet on the hills. The surface slopes generally to the south and west, except for the area north of the Tombigbee-Tennessee River and Mississippi-Tombigbee River divides, which slopes generally to the north. The most rugged terrane and highest altitudes are on the south side of the divides where the headwaters of the Tombigbee River system have deeply dissected the upland. The Tombigbee and Tennessee River Hills division is developed on the sandy materials of the Eutaw and Coffee formations.

The Black Prairie division includes the major part of the western one-third of the county. It consists of a broad, rolling lowland of slight to moderate relief. Altitudes range from 370 feet in the southern part to 560 feet at several places on the Mississippi-Tombigbee River divide in the northern half of its area. The surface slopes generally to the south, southeast and north.

North of State Highway 4, which follows the Mississippi-Tombigbee River divide, is a gently rolling upland which is developed on a residuum from the chalk and a thin mantle of loessal material that locally blankets the residual material. South of the divide lies a severely dissected and eroded area which exposes the chalk along the steeper stream valley walls and as bald spots on the gentler slopes. Farther south, this grades into less eroded areas where at most places the chalk is covered by a residuum. The Black Prairie is developed chiefly on the chalk of the Demopolis formation.

The Tippah Hills represent the westward extension of the Pontotoc Hills division into Prentiss County. They are an upland area of high to moderate relief. Altitudes range from about 450 feet in the valleys to almost 800 feet on the peaks and are greatest in the southern part of the area becoming less to the north where the topography is more mature. The Tippah Hills, a part of the divide between the Tombigbee and Mississippi River Systems, are developed on the sands and sandy deposits of the Ripley formation.

DRAINAGE

The county is dissected by numerous creeks, branches, and their tributaries which are a part of three major river systems—the Tombigbee, the Mississippi and the Tennessee. Major streams flow in northward, eastward, southeastward, southward, and southwestward directions. These trunk streams have formed extensive bottom lands and terraces which cover the bed rock over considerable areas.

The north-northeastward trending Tippah Hills in the western and northwestern sections of the county form a part of the divide between the Mississippi and Tombigbee River Systems. In the northwestern part this divide assumes a trend southeasterly to Booneville. From Booneville the trend is northeasterly through the rugged uplands into the northeastern part of the county where it joins the Tombigbee-Tennessee divide, a narrow ridge across the northeastern corner of the county, and becomes the Mississippi-Tennessee divide which continues northward into Alcorn County.

Most of the central and southern parts of Prentiss County are drained by the Tombigbee River System which consists of Mackys, Little Brown, Big Brown, Donivan, and Twenty Mile Creeks and their branches and tributaries. These streams flow southward in general and join to form the East Fork of the Tombigbee River in Lee County.

The northern parts are drained by the Mississippi River System. The Tuscumbia River, which is made up of Pollys, Hornolocka, and Kings Creeks, all which are east flowing streams, flows northward into Alcorn County.

The extreme northwestern corner of the county is drained by Dry Creek and its tributaries. Dry Creek flows north-northwesterly and joins the Hatchie River in Tippah County.

The northeastern corner of the county is drained by the Tennessee River System which includes Yellow Creek, a northward flowing stream, and its tributaries.

VEGETATION[17]

Lithologies vary widely among the three distinct topographic divisions within Prentiss County, and a marked contrast exists in the topography and vegetation of the highly calcareous materials which underlie the Black Prairie belt and the more sandy materials of the Tombigbee and Tennessee River Hills and the Pontotoc Hills. Other general contrasts in vegetation reflect sandy soils as opposed to clayey soils. Therefore, changes in vegetation at geologic contacts are useful in mapping units.

The Tombigbee and Tennessee River Hills were originally covered with forests of large timber. Much of the more rugged parts remains in the forest, although nearly all of the larger trees have been removed. The most abundant trees of the hills are short leaf pine (*Pinus mitis*) and loblolly pine (*P. taeda*), representing mostly second growth. Mixed with these are various species of oak, black jack (*Quercus nigra*), post oak (*Q. stellata*), Spanish oak (*Q. falcata*), scarlet oak (*Q. coccinea tinctoria*), dogwood (*Cornus florida*), hickory (*Carya tomentosa*), and chestnut (*Castanea dentata*).

On the lower slopes of the larger valleys white oak (*Quercus alba*), red oak (*Q. rubra*), dogwood, and yellow poplar (*Liriodendron tulipifera*) are prominent tree growth.

The flood plains of Tombigbee and Tuscumbia rivers support a growth of white oak, willow oak (*Quercus phellos*), water oak (*Q. aquaticus*), basket oak (*Q. michauxii*), sycamore (*Platanus occidentalis*), river maple (*Acer dasycarpum*), sweet gum (*Liquidamber styraciflua*), and cypress (*Taxodium distichum*). In addition to these, on the higher grounds of the valleys are black locust (*Robinia pseudacacia*), hackberry (*Celtis mississippiensis*), sassafras (*Sassafras officianale*), and ash (*Fraxinus americana*).

The Black Prairie belt is practically devoid of tree growth, except for scattered clumps of crab-apple (*Pyrus angustifolia*), honey locust (*Gleditschia triacanthos*), and wild plum (*Prunus chicasa*) dotting the surface where the soil is not reduced to cultivation. Along the bluffs of streams is a more varied tree growth. In these places, where the chalk is exposed or is near the surface, are hackberry, red bud (*Cercis canadensis*), rock maple (*Acer saccharinum*), chestnut (*Castanea vesca*), and red cedar (*Juniperus virginiana*).

An entirely different assemblage is found on the higher red soils. These areas support a rather dwarfish growth of a few species which include post oak, black jack, Spanish oak, black oak (*Quercus coccinea tinctoria*), shell bark hickory (*Carya alba*), and persimmon (*Diosphrus virginiana*).

The bottoms in the chalk area support black oak, white oak, willow oak, water oak, black locust, honey locust, sycamore, yellow poplar, ash, chestnut white oak (*Quercus michauxii*) and mulberry (*Morus rubra*).

In the Pontotoc Hills area, which is represented in Prentiss County by the Tippah Hills, pines are the prevailing timber, with an admixture of post oak, black jack, Spanish oak and chestnut.

CLIMATE

Climatological data for Prentiss County for a 10-year period, 1949-1958, are shown in Table 1. The county has a warm-temperate climate, which is characterized by long summers with many hot days and comparatively short mild winters with light snowfalls and frequent short spells of cold weather. The highest temperature recorded was 108 degrees in July, and the lowest 0 degrees in February, but extremes that approach these are rare. The annual precipitation is fairly well distributed, rainfall being least during the fall months and greatest during the winter months.

Summer showers normally occur often enough to prevent serious crop losses; however, short local droughts are not uncommon. Thunderstorms are frequent in the summer and may occur any time of the year; tornadoes may visit the county now and then, more often in the spring. The average growing season is about seven months, usually from the last of March to the first part of November. Spring comes about a week earlier in the south-central part of the county than in the Tippah Hills and in the eastern hills area.

TABLE 1

NORMAL MONTHLY, SEASONAL, AND ANNUAL TEMPERATURE AND PRECIPITATION AT BOONEVILLE, PRENTISS COUNTY, MISSISSIPPI*
(ELEVATION, 504 FEET)

	Temperature			Precipitation			
Month	Average	Absolute maximum	Absolute minimum	Average	Total for the driest year	Total for the wettest year	age Aver-snowfall
	F°	*F°*	*F°*	*Inches*	*Inches*	*Inches*	*Inches*
December	45.8	78	8	5.17	0.68	13.42	0.4
January	46.8	80	10	6.41	2.91	11.58	1.3
February	49.1	78	0	5.77	2.75	10.53	0.8
Winter	47.2	80	0	17.35	6.34	35.53	2.5
March	53.7	84	17	6.08	1.73	9.81	T**
April	62.2	87	26	5.98	1.47	8.73	0.0
May	71.9	95	38	3.38	0.58	5.06	0.0
Spring	62.6	95	17	15.44	3.78	23.60	0.0
June	78.4	105	47	3.71	0.17	9.78	0.0
July	80.7	108	57	5.03	2.40	8.46	0.0
August	80.5	106	54	3.19	0.25	8.82	0.0
Summer	79.9	108	47	11.93	2.82	27.06	0.0
September	74.5	105	38	3.57	0.51	9.10	0.0
October	64.7	97	26	2.06	0.53	4.87	0.0
November	52.2	85	2	3.26	0.66	11.19	0.5
Fall	63.8	105	2	8.89	1.70	25.16	0.5
Year	63.4	108	0	53.61	14.64	111.35	3.0

*Average temperature and precipitation based on a 10-year record, 1949 to 1958; compiled from U. S. Department of Commerce, Weather Bureau Climatological Data, 1949 to 1958

**Trace

SOILS[18]

In 1957, an exhaustive study of soil types in Prentiss County was completed by the United States Department of Agriculture, Soil Conservation Service, in cooperation with the Mississippi Agricultural Experiment Station and the Tennessee Valley Authority.

Thirty-eight soil series and several miscellaneous land types were mapped within the county. They are grouped, in a broad sense, according to topographic position, as upland, colluvial, terrace, and bottomland soils. Uplands are elevated and are underlain by weathered material of the underlying rocks; colluvial lands lie at the foot of upland slopes and are derived from accumulations of materials washed from the slopes; stream terraces are water-made benches that border stream bottoms but are higher and not subject to flooding; bottom lands, adjacent to streams, are derived from water-borne material, and are subject to flooding.

Miscellaneous land types, not identifiable as series, have been mapped as Hilly land and Steep land. Most of this land is woods or brushy pasture in the uplands and to a lesser extent on the stream terraces. Where it has been severely eroded, it has been mapped as Gullied land. In the bottom lands are two types known as Local alluvium, sandy, and Local alluvium, silty, which are found most often where wash from nearby uplands has accumulated.

Of these soil series, soil associations have been established which reflect certain characteristics of topographic position and parent rock. The soils which make up an association differ from each other, but the proportions and distribution in an area are relatively uniform. The 1957 soil survey recognized ten associations in Prentiss County (Figure 2).

"1. Catalpa-Trinity-Kipling-Freeland Association

Association 1 occurs on stream bottoms and terraces. It is composed of soils developed from mixtures of silty and calcareous alluvium deposited along Osborne, Wolf, Little Wolf, Town and Okeelala Creeks in the southwestern part of the county. The acid Kipling and Freeland soils predominate on the stream terraces, and the calcareous Catalpa and Trinity on the bottom lands. Marietta, Houlka, and Beechy soils also occur in smaller areas on the bottom lands; and Dexter, Hatchie, and Almo on the terraces. Near the upland, where colluvial slopes and narrow stream bottoms predominate, there are small areas of calcareous Yonaba and Saltillo soils."

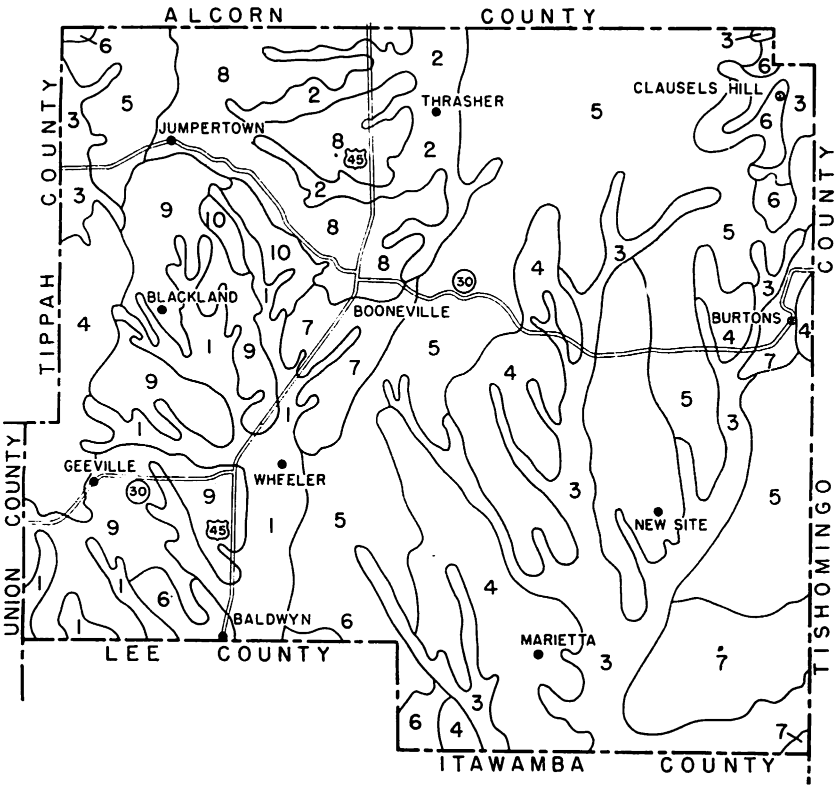


Figure 2.—Soil associations of Prentiss County. (From U. S. Department of Agriculture, Soil Survey of Prentiss County, Mississippi, Fig. 2, p. 22, 1957). Numbers are keyed to text.

"2. Houlka-Ina-Dexter-Freeland Association

Association 2 is one of terrace and stream-bottom associations in the north-central and northwestern parts of the county around Pollys Creek and the western tributaries of Tuscumbia Creek. Its soils have developed mostly from silt and sand, and all are more or less acid. The principal soils are Hymon, Ina, Houlka, and Beechy, on the bottom lands; and Dexter, Freeland, Hatchie, and Almo on the stream terraces. Small areas of soils derived from alluvium on colluvial slopes and in narrow stream bottoms are included, as well as patches of soils common to association 1."

"3. Iuka-Mantachie-Tilden-Prentiss Association

Association 3 is composed of bottom-land and stream-terrace soils. It occurs in the northwestern corner of the county, along Dry Creek, and in the eastern and southeastern parts of the county along Yellow, Big Brown, Little Brown, Hurricane, and Mackeys Creeks. The soils were derived principally from sandy materials and are somewhat poorly to moderately well drained. The principal soils of the bottom lands are the Iuka, Mantachie, Tombigbee, Ochlockonee, and Bibb; and on the stream terraces, Tilden, Prentiss, Stough, and Myatt. Soils derived from local alluvium occupy small areas on colluvial slopes and narrow stream bottoms."

"4. Angie-Shubuta-Cuthbert Association

Association 4 occupies extremely hilly and steep land. Several areas are in the southeastern part of the county, and one area occurs along the western county line in the Tippah Hills. The association is composed of upland soils derived from acid stiff clays and sandy clays that generally have a tough subsoil. Some Ora soils are included, as well as scattered spots of soils common to other associations."

"5. Ruston-Shubuta-Ora Association

Association 5 occupies steep and hilly land; the largest area extends from the northeastern corner of the county southwestward to the south-central boundary. Smaller areas lie along the east-central county line and in the extreme northwestern corner. The association is composed of upland soils having sandy, friable subsoils and sandy surface soils. The principal soil series are Ruston, Savannah, and Ora along the ridgetops, and Shubuta and Cuthbert on the sharper slopes. Limited areas of colluvial land and bottom land lie along the streams."

"6. Savannah-Ora Association

Association 6 occurs on gently undulating uplands. The small scattered areas lie along the southern boundary of the county and in the extreme northeastern and northwestern corners. Besides the predominant Savannah and Ora soils, the association includes patches of Shubuta soils on some slopes. The Savannah and Ora are fine sandy loams derived from sandy or friable materials. Between 15 and 30 inches below the surface they have a yellow or yellowish-brown siltpan or hardpan that contains shotlike dark-brown concretions. The water table is high."

"7. Ruston-Ora Association

Soil association 7 occurs on hilly wooded land characterized by narrow ridgetops and steep slopes. The largest area is in the southeastern corner of the county near Mackeys Creek. A smaller area lies in the west-central part of the county, just south of Booneville. The soils, derived from sandy Coastal Plain material, are acid, well-drained, and friable . . . . Erosion damage has been severe; deep gullies have cut into the friable or loose substratum . . . ."

"8. Dulac-Franklinton-Savannah Association

Soil association 8 occupies a gently undulating to gently rolling area north and northwest of Booneville. The soils are derived from a thin mantle of loess that overlies sandy clay, sandy loam, loamy sand, sticky clay, or marl of the Coastal Plain. Most of the loess is silt loam, moderately acid to nearly neutral, and friable or soft and floury. Except for the marl, the underlying materials are acid. Besides the Dulac, Franklinton, and Savannah series, the association includes small acreages of Tickfaw, Tippah, Falkner, and Ora soils, and patches of the soils common to soil association 2."

"9. Oktibbeha-Vaiden-Falkner Association

Soil association 9 is the most complex in the county. It includes 3 separate areas, extending southward from the Jumpertown Church-Booneville road toward the southwestern corner of the county. It is characterized by outcrops of petrified seashells (marl) and by calcareous sandy clay deposits averaging 40 inches in depth, overlain by acid intractable clays and a thin mantle of loess. The principal soils are Oktibbeha silt loam, Vaiden silt loam, Vaiden silty clay loam, and Falkner silt loam. Lesser quantities of Tippah silt loam, Yonaba, Saltillo, and Sumter soils are included."

"10. Sumter-Saltillo Association

Soil association 10, the smallest but the most spectacular in the county, lies just west of Booneville, south of the Jumpertown Church road. Composed chiefly of soils developed on chalk or marl beds, it presents a gullied, dissected panorama of dark-gray soil, exposed white marl beds, and small isolated remnants of yellow and red acid shallow clays. The principal soils are Sumter, Yonaba, Saltillo, and Oktibbeha and Vaiden clays, shallow phases."

STRATIGRAPHY

GENERAL STATEMENT

The rock strata exposed at the surface in Prentiss County are a part of the Gulf series of the Cretaceous system. The deposits are classified into 10 units consisting of 6 formations, 2 members, a tongue and a transitional unit. These formations belong to two major groups, the Tuscaloosa and the Selma, with the exception of the McShan and Eutaw formations which have not been assigned to a group. The geologic units from the base upward are the Gordo formation; the McShan formation; the Eutaw formation with its Tombigbee sand member at the top; the Coffee formation; the Demopolis formation; and the Ripley formation which consists of the transitional clay, the Coon Creek tongue, and the McNairy sand member (Table 2). The strata are of sedimentary origin and are, for the most part, marine. They consist chiefly of sand with chalk of next import and clay in subordinate amounts. The normal regional dip of the beds is to the west. The oldest sediments crop out in the southeastern corner of the county. Toward the west the sediments are successively younger, the youngest being on the higher peaks in the Tippah Hills. The approximate thickness of strata exposed is about 1150 feet in the southern part of the county; however, some units thin to the north and east. At many places the bedrock is covered by surficial deposits of Quaternary age.

TABLE 2

GENERALIZED SECTION OF EXPOSED FORMATIONS IN PRENTISS COUNTY.

System	Series	Group	Formation	Stratigraphic unit	Lithologic character	Thickness
Quaternary	Holocene and Pleistocene			Colluvium, residuum, soils	Clay, silt and sand derived from parent rocks and undergone little or no transportation	0-20
Quaternary	Holocene and Pleistocene			Alluvium	Clay, silt, sand and gravel which make up flood plains or first bottoms	0-25
Quaternary	Holocene and Pleistocene			Terrace deposits	Clay, silt, sand and gravel which make up terraces or second bottoms	0-25
Quaternary	Holocene and Pleistocene			Loess	Clay and silt, wind blown	0-5
Cretaceous	Gulf	Selma group	Ripley formation	McNairy sand member	Ferruginous sandstone and sand	80-90
Cretaceous	Gulf	Selma group	Ripley formation	Coon Creek tongue	Fine to coarse sands, marl, clay, and sandstone	165-180
Cretaceous	Gulf	Selma group	Ripley formation	Transitional clay	Calcareous, sandy, somewhat fossiliferous clay	40-45
Cretaceous	Gulf	Selma group	Demopolis formation		Fossiliferous impure chalk containing variable amounts of clay, silt and sand. Generally sandy at the base becoming more argillaceous toward the top	230-235
Cretaceous	Gulf	Selma group	Coffee formation		Fine to medium sands, silty sands, sandy silts, clay beds and shale; contains concretionary sandstone layers and some bentonite. Certain parts are fossiliferous	240-275
Cretaceous	Gulf		Eutaw formation	Tombigbee sand member	Sand, massive, fine to medium, calcareous, locally fossiliferous, very glauconitic; contains concretionary sandstone layers	75-85
Cretaceous	Gulf		Eutaw formation	Lower	Sand, usually cross-bedded, fine to coarse, glauconitic; laminae of clay, and some scattered chert gravel; thin-bedded sand interbedded with laminated layers of dark clay-shale	110-170
Cretaceous	Gulf		McShan formation		Laminated fine sand and silt, highly muscovitic; contains some thin laminae of clay	28
Cretaceous	Gulf	Tuscaloosa group	Gordo formation		Sand and gravel and some clay beds	87

TUSCALOOSA GROUP

The name "Tuscaloosa" was proposed in 1887 by Smith and Johnson[19] for the lowermost division of the Cretaceous of Alabama, typically exposed in the vicinity of Tuscaloosa. The Mississippi representatives of the Tuscaloosa had formerly been included in the basal portion of Hilgard's Eutaw formation.[20] The Tuscaloosa was first recognized in this State by Johnson[21] in 1887, and both Smith and Johnson recognized the continuation of the formation into Mississippi, as shown by their geologic map (Pl. XI, p. 134). Stephenson and Monroe[22] state that in most subsequent papers the name Tuscaloosa is applied in Mississippi essentially as proposed by Smith and Johnson. They state further that on all maps prior to 1928 the Tuscaloosa-Eutaw boundary has been drawn too far to the west, except in Itawamba County. Later works[23, 24] by the State Geological Survey were based on Stephenson and Monroe's definition of the Tuscaloosa in Mississippi.

In recent years work in Alabama[25-29] has permitted the recognition in the Tuscaloosa of four units of formational rank, and the term "Tuscaloosa" has been raised to the rank of group. These formations are, in ascending order, the Cottondale, the Eoline, the Coker, and the Gordo. Later work in Alabama and Mississippi[30-33] has permitted these divisions to be applied to Mississippi stratigraphy. It has been found that only the Gordo formation of the Tuscaloosa group is recognizable at the surface in Mississippi; the lower units are believed to be overlapped. However, it has been suggested that the Coker may be present in eastern Monroe and Itawamba Counties. Drennen[34] in 1953 concluded that the Tuscaloosa group contains only two units deserving formational rank: the Coker formation and the Gordo formation. The Coker is redefined to include the previous Coker, Eoline and Cottondale formations. The name Eoline is reserved for a member of the Coker to include the former Eoline and Cottondale formations. He also states that the Tuscaloosa beds appear to be largely marine, which is contrary to earlier belief.

GORDO FORMATION

The Gordo formation was first recognized by Conant, Eargle, Monroe and Morris[35] in 1945 and was named for exposures near Gordo, Pickens County, Alabama. Later work in Alabama and in Alabama and Mississippi has well established the Gordo as a geologic unit and made it applicable to Mississippi stratigraphy. Eargle[36] states that the Gordo formation is recognizable as far north as northeastern Tishomingo County where it pinches out and the Eutaw formation directly overlies rocks of Paleozoic age. He states further that in the northern part of the outcrop area the Gordo formation becomes thinner, that the proportion of gravel to sand and clay in the formation becomes increasingly great, and that although some purple-mottled clay and a few sand beds are found in the upper part, its lower part is almost entirely sandy chert gravel.

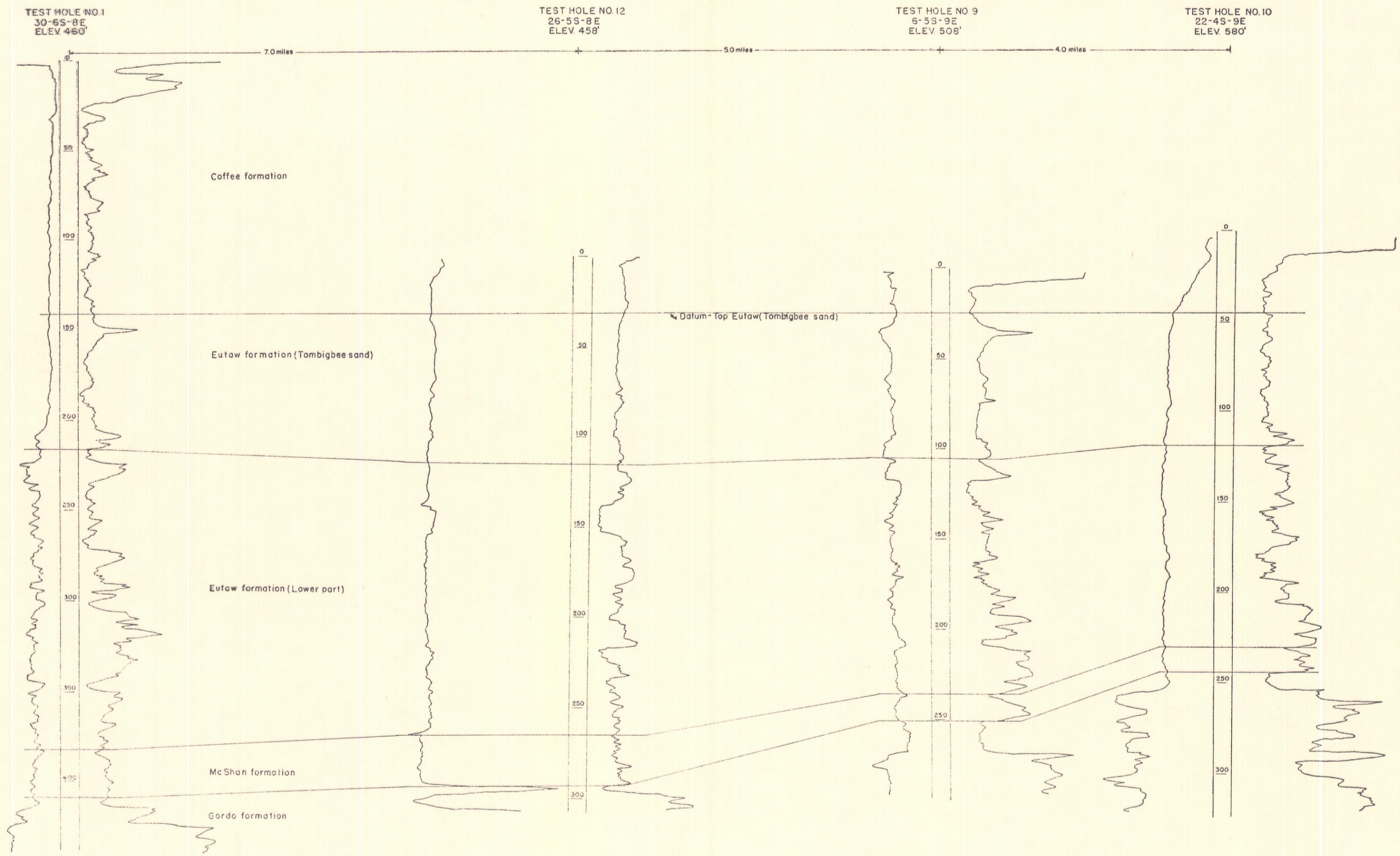
In the present report the name Gordo refers to those sediments overlying the Paleozoic basement and underlying the McShan formation.

In Mississippi the Gordo formation occupies an irregular north-south trending area which includes parts of Tishomingo, Prentiss, Itawamba, and Monroe Counties. In Prentiss County the Gordo is at the surface only on the extreme lower slopes of small creek branches flowing into Mackys Creek (Plate 1).

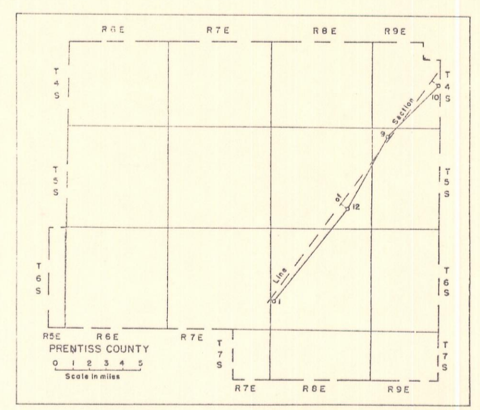
The materials of the Gordo formation underlie the eastern part of the surface of the Tombigbee and Tennessee River Hills physiographic division. In Prentiss County the Gordo is only on the extreme lower slopes of hills developed from the resistant Eutaw formation.

The contact between rocks of the Chester series of Paleozoic age and the Gordo formation belonging to the Gulf series of Mesozoic age is not exposed at the surface in Prentiss County. Test Hole 2 revealed, however, that the sandy gravels of the Gordo lie unconformably on sandstone of Paleozoic age. A few feet of kaolinitic material found at the base of the Gordo probably represents Mellen's[37] Little Bear residuum of post Paleozoic age. The Paleozoic sandstone is exposed several miles northeast of the test hole at the bridge at Bay Springs in Tishomingo County (NE.¼, SW.¼, Sec.26, T.6 S., R.9 E.).

The Gordo formation is very poorly exposed in Prentiss County. The only surface evidence of its existence is in the beds of small creek branches flowing into Mackys Creek in the southeastern part of the county. Several feet of massive, carbonaceous, gray clay is exposed in the bed of a small creek branch just east of the gravel road descending the hills into Mackys Creek bottom



STRATIGRAPHIC SECTION OF PRE-SELMA UPPER CRETACEOUS ROCKS



(SW.¼, NW.¼, Sec.10, T.7 S., R.9 E.) (Figure 3). Other exposures along creek branches in the same area are of a gray clay or a fine argillaceous gray sand.

Figure 3.—Gordo clay exposed in small creek bed just east of gravel road (SW.¼, NW.¼, Sec.10, T.7 S., R.9 E.). May, 1959.

Several deposits of gravel in Mackys Creek bottom are, in the opinion of the writer, terrace deposits derived from the Gordo gravels which should normally crop out at the surface a short distance up dip, and they have been subjected to short transportation. Reasons for considering these as terrace deposits are: (1) they are apparently local; (2) they appear to underlie terraces; (3) they appear to have a matrix of sand finer than that found with the gravels in Test Hole 2; and (4) they occupy positions structurally higher than the gravels in Test Hole 2.

Test Holes 1, 2, 9, 10, and 12 were drilled into the Gordo formation (Plate 2). In the subsurface the formation consists chiefly of interbedded sands and gravels and a few subordinate beds of clay. A gray argillaceous fine sand and (or) a gray plastic clay are well developed at the top of the formation in the eastern part of the county. Test Hole 2, the only hole drilled through the entire formation, revealed a thickness of 87 feet for the Gordo.

The Gordo formation unconformably overlies the Paleozoic basement and is overlain disconformably by the McShan formation. The Gordo is correlated with the upper Woodbine group of the Texas section and the lower part of the upper Cenomanian stage of the European section (Figure 4).

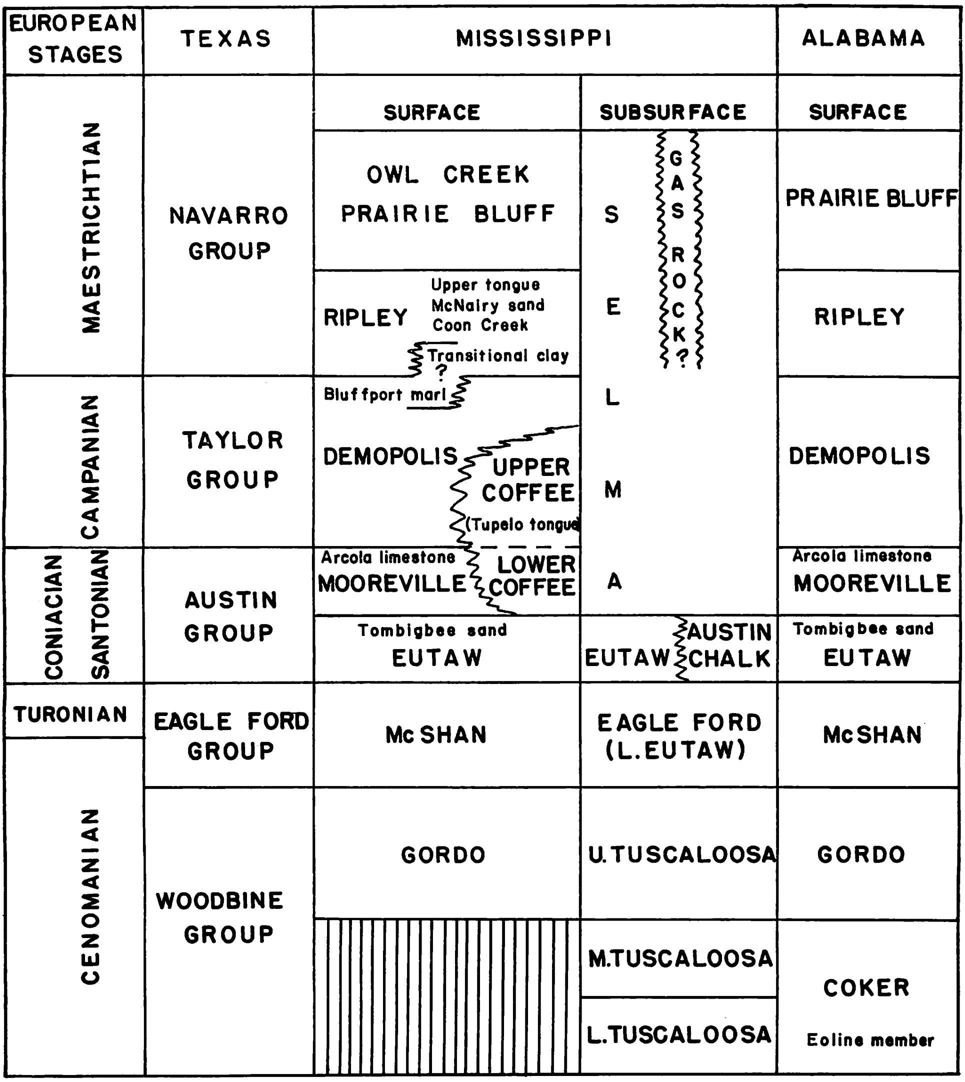


Figure 4.—Upper Cretaceous correlation chart. (Modified from Jules Braunstein; Mississippi Geol. Society, Guidebook, 14th Field Trip, 1959).

McSHAN FORMATION

The McShan formation was first recognized by Conant, Eargle, Monroe and Morris[38] in 1945 and was named for beds exposed along U. S. Highway 82 approximately 1.5 miles north of McShan, Pickens County, Alabama. Subsequent work has well established the McShan as a geologic division in Alabama, and study in Alabama and Mississippi has permitted the application of this division in Mississippi stratigraphy. Eargle[39] states that the McShan formation has been recognized as far north as Tishomingo County, where it is overlapped by beds of the restricted Eutaw formation. He states further that in most prior descriptions the McShan has been included in the Tuscaloosa in Mississippi. Eargle described the McShan in Mississippi as consisting generally of thinly laminated sand and carbonaceous clay which appear to be of shallow-water marine origin, somewhat midway in character between the Eutaw and Tuscaloosa.

In the present report the term McShan refers to those beds between the Gordo formation below and the Eutaw formation above.

In Mississippi the McShan formation occupies a somewhat narrow, irregular outcrop area which includes parts of Tishomingo, Prentiss, Itawamba, and Monroe Counties. In Prentiss County the McShan formation is at the surface only on the lower slopes of creek branches in the southeastern part of the county (Plate 1).

The deposits of the McShan formation underlie part of the surface of the Tombigbee and Tennessee River Hills physiographic division. In Prentiss County the McShan is exposed on the lower slopes of hills developed from the resistant Eutaw formation.

The contact between the Gordo and the McShan formations is not readily distinguishable on the surface in Prentiss County. Test Holes 1, 2, 9, 10, and 12 were drilled through this contact and Holes 1, 2, 10, and 12 encountered a thin layer of small chert gravel at the base of the McShan and a gray argillaceous sand and (or) gray plastic clay at the top of the Gordo. This gray argillaceous sand and (or) gray plastic clay seemed a persistent marker in the holes drilled; however, it appeared to thin greatly to the west and probably pinches out farther down dip.

The McShan formation consists of thinly laminated to finely cross-bedded, varicolored, micaceous, fine sand and silts and some thin laminae of gray clay. The sands and silts, for the most part, abound in muscovite mica; concentrations of nearly pure muscovite mica flakes are present in places along laminae. Most of the sand is finely glauconitic, but the glauconite is difficult to recognize because of its light color. Some concentrations of green glauconite are scattered along the laminae.

The sands are, in large part, finely cross-bedded or rippled and thin laminae of silt or clay are common along the bedding. Where outcropping beds are sufficiently weathered, the more clayey laminae project beyond the loose sands. A conspicuous example of this is in the ditch along the road descending the hills into Mackys Creek bottom (SW.¼, NW.¼, Sec.10, T.7 S., R.9 E.) (Figure 5).

Figure 5.—Laminae of silt and clay of the McShan projected beyond loose sand by weathering. Exposure in road ditch (SW.¼, NW.¼, Sec.10, T.7 S., R. 9 E.). May, 1959.

Several fair exposures of McShan are in Prentiss County. One of the best outcrops of typical McShan is in the cut for the gravel road descending the hills into Mackys Creek bottom and in the gully just east of the road (SW.¼, NW.¼, Sec.10, T.7 S., R.9 E.). West of this outcrop a more nearly complete section is exposed by the road cut of the road to Hazeldell on the west facing valley wall of a branch flowing into Mackys Creek (SW. ¼, NE.¼, Sec.9, T.7 S., R.9 E.). Twenty-eight feet of McShan sands and silts are overlain by weathered reddish-brown sands of the basal Eutaw.

SECTION OF ROAD CUT ON WEST FACING SLOPE OF A BRANCH VALLEY ALONG THE ROAD TO HAZELDELL (SW.¼, NE.¼, SEC.9, T.7 S., R.9 E.)

	Feet	Feet
Eutaw formation (lower part)		15.0
4. Sand, tan to red-brown, fine- to medium-grained, silty, contains scattered chert pebbles and some thin laminae of clay. Basal parts are very fine and mealy and contain some small chert gravel, clay blebs, and pieces of silicified wood. Base defined locally by thin layer of platy ferruginous material	15.0	
McShan formation		28.0
3. Sand and silt, varicolored (whitish, yellow, tan and brown), micaceous fine- to coarse-grained sand irregularly bedded with silt. Some parts are finely cross-bedded and contain thin laminae of clay along bedding. Contains indistinct light-colored glauconite and is locally carbonaceous. (Note: At top of the south-facing cut is a channel-type deposit which consists of heterogenously mixed sands and silts with ferruginous sand rock at base. This is probably a terrace deposit)	28.0	
Gordo formation (?)		12.0
2. Clay, gray splotched red and brown, sandy; becomes an argillaceous fine sand at top and contains ferruginous material	6.0	
1. Covered on outcrop to level of bridge	6.0	
Total section		55.0

A short distance farther west a section of about 22 feet is exposed in the cut for a private road to the south off the Hazeldell road (SE.¼, NW.¼, Sec.9, T.7 S., R.9 E.).

In the subsurface difficulty was met in distinguishing the McShan from the overlying Eutaw. The McShan appeared to be composed of finer sediments than the Eutaw and to contain much more muscovite mica. In most places a thin layer of small chert gravel was found at the base of the Eutaw. The McShan was found to contain somewhat more carbonaceous material in the subsurface than was noted in surface exposures.

Test Hole 2 revealed a thickness of about 28 feet of McShan which compares with the thickness of the McShan in the preceding measured section. Test Holes 1, 9, 10, and 12 showed that the formation thinned toward the northeast (Plate 2). Only 14.5 feet of McShan was found in Test Hole 10 near the northeastern corner of the county.

The McShan formation disconformably overlies the Gordo formation and is disconformably overlain by the Eutaw formation. The McShan is correlated with the Eagle Ford group of the Texas section and the uppermost Cenomanian and the Turonian stages of the European section (Figure 4).

EUTAW FORMATION

The name "Eutaw" was first used in 1860 by Hilgard[40] to designate all strata between the Paleozoic rocks and his Tombigbee sand group. This name was adopted as a result of his assigning formational rank to beds first examined in detail and recognized as being of Cretaceous age, by Tuomey[41] near Eutaw, Greene County, Alabama, where they are characteristically developed. In 1887 Smith and Johnson[42] accepted the name "Eutaw", but they modified its application by recognizing the Tuscaloosa formation below and by including in the Eutaw the Alabama representatives of Hilgard's Tombigbee sand group above. They also recognized the continuation of the Tuscaloosa formation into Mississippi and showed that it was distinguishable from the Eutaw type deposits.

Stephenson[43] in 1914 separated the sands that had previously been called Coffee sand in Tennessee and Tombigbee sand in Mississippi into two members, the Tombigbee sand member of the Eutaw formation below and the Coffee sand member of the Eutaw above, and showed that the Coffee sand of Mississippi is the lateral equivalent of the lower "Selma chalk." Since 1936 the Coffee has been treated as a separate and distinct formation.[44]

In this report "Eutaw" refers to strata between the McShan formation below and the Coffee formation above, and includes two distinct units, the lower typical Eutaw beds, and the Tombigbee sand member at the top.

The Eutaw formation crops out in Mississippi in a belt 15 to 20 miles wide, west of the area of outcrop of the Gordo and McShan formations and east of the area of the Mooreville or Coffee formations. The Eutaw belt includes parts of Tishomingo, Prentiss, Itawamba, Monroe and Lowndes Counties. In Prentiss County the formation is represented by an outcrop area of some 7 or 8 miles in width in the southeastern part of the county and by only a few miles of outcrop in the northeastern corner. The eastern limits of the formation are not within the county; the western extension is bounded by an irregular line extending from a point near the northeastern corner of the county to a point near where State Highway 363 crosses the Itawamba County line (Plate 1).

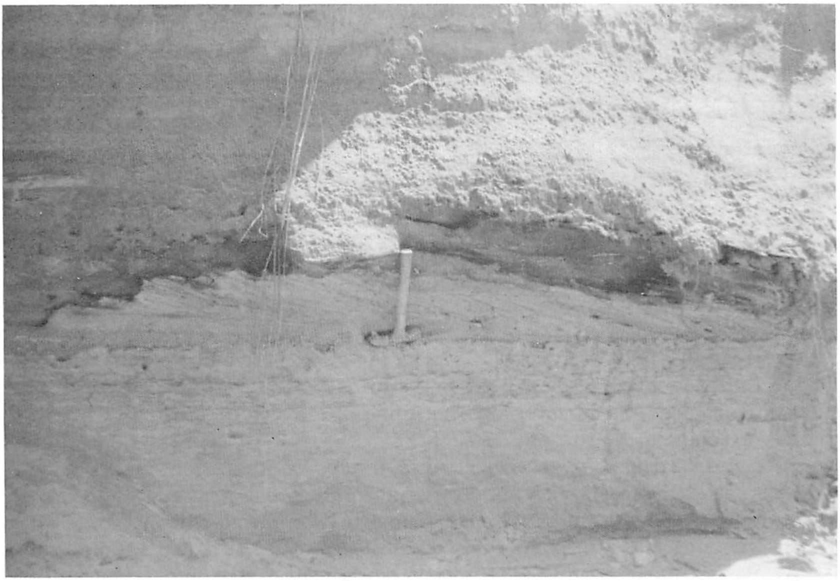


Figure 6.—Irregular contact between the McShan and Eutaw marked by a thin layer of platy ferruginous material. Exposure in gully just east of road (SW.¼, NW.¼, Sec.10, T.7 S., R.9 E.). May, 1959.

The deposits of the Eutaw formation underlie the western parts of the Tombigbee and Tennessee River Hills physiographic division in the southern and central portions of their outcrop belt, and underlie central parts of the province in the northern portions of the belt. In Prentiss County the topography is hilly, ranging from rugged to rolling, and altitudes range from 360 feet in the valleys to 550 feet on the hills. Parts of the Eutaw belt have low rounded hills which contrast with the deeply dissected terrane just south of the Tombigbee-Tennessee River divide in the northeastern part of the county. The surface slopes generally to the south and west. A deeply dissected plateau-like land form has been developed on the lower part of the Eutaw; whereas, the Tombigbee sand member has given rise to steep-sided ridges and peaks which appear more rugged, even though less dissected.

Inasmuch as the McShan formation occupies a very limited outcrop area in Prentiss County, the contact between the Eutaw and McShan formations is generally poorly exposed. The best exposure of this contact is in a gully made by a small creek branch just east of the road which descends the hills into Mackys Creek bottom in the southeast corner of the county (SW.¼, NW. ¼, Sec.10, T.7 S., R.9 E.). At this locality some 3 feet of finely cross-bedded, varicolored, very micaceous sand and silt of the McShan is disconformably overlain by sands of the Eutaw formation containing clay blebs, a fairly large silicified log, and some small chert gravel in the basal portions. A thin layer of platy ferruginous material marks the base of the Eutaw (Figure 6).

COMPOSITE SECTION (SW.¼, NW.¼, SEC.10, T.7 S., R.9 E.) IN ROAD CUT AND IN GULLY JUST EAST OF THE ROAD DESCENDING THE HILLS INTO MACKYS CREEK BOTTOM

	Feet	Feet
Eutaw formation (lower part)		74.0
10. Sand, weathered red-brown, contains scattered small chert gravel and some thin laminae of clay (exposure in road cut at top of hill)	8.0	
9. Sand and silt interlayered, irregularly bedded; contains stringers of clay blebs and small chert gravel. Platy ferruginous material along bedding and thin layer at base (exposure in road cut)	5.0	
8. Sand, varicolored (shades of yellow, tan, brown, pink) weathers tan to red-brown; fine- to medium-grained, cross-bedded, glauconitic; contains some thin laminae of clay along bedding and stringers of small chert gravel. Base marked by a layer of platy ferruginous material, and basal portions contain some small chert gravel and clay blebs. Silicified log noted several feet above base. (Upper 20 feet in road cut; lower 40 feet in gully east of road)	61.0	
McShan formation		28.0
7. Fine sand and silt interlayered, varicolored (shades of gray, yellow, tan, pink, red, purple), finely cross-bedded, very micaceous; contains indistinct, light-colored glauconite. Some laminae contain concentrations of almost pure muscovite mica, and some contain concentrations of green glauconite (exposure in gully east of road	3.0	

6. Covered on outcrop	12.0	
5. Fine sand, silt and clay, interlayered, varicolored (shades of gray, yellow, tan, pink, red, purple), finely cross-bedded, very micaceous; contains indistinct, light-colored glauconite. Some laminae of silt and clay project beyond the loose sands giving the face of the exposure an exaggerated ridged appearance (exposure in road cut)	7.0	
4. Covered on outcrop	6.0	
Gordo formation (top of Gordo 28 feet below top of McShan in Test Hole 2)		16.0
3. Covered on outcrop	7.0	
2. Clay, gray, massive, jointed, fractured, slightly sandy, stained with iron oxide along joints and fractures; contains nodules of light-gray silty clay which have carbonaceous inclusions (exposure in creek bed east of road)	4.0	
1. Covered on outcrop to level of bridge	5.0	
Total section		118.0

Figure 7.—Large silicified log near level of the McShan-Eutaw contact exposed in hillside south of Hazeldell road (NE.¼, NW.¼, SW.¼, Sec.9, T.7 S., R.9 E.). May, 1959.

Approximately one mile to the west along the Hazeldell road, the contact is exposed in the road cut on the west facing slope of a tributary of Mackys Creek (SW.¼, NE.¼, Sec.9, T.7 S., R.9 E.). At this locality the fine sand and silt of the McShan formation is overlain by weathered glauconitic sands of the Eutaw formation. The contact is marked by a thin ferruginous layer. Some small chert gravel, clay blebs, and pieces of silicified wood were noted in the basal few feet of the Eutaw. The contact was noted also at several other localities to the west; however, it is obscured by weathering. In the side of the hill several hundred feet southeast of the intersection of the Hazeldell road with a road to the south a fairly large silicified log is near the level of the McShan-Eutaw contact (NE.¼, NW.¼, SW.¼, Sec.9, T.7 S., R.9 E.) (Figure 7).

Even though the Eutaw formation is exposed at a number of places in Prentiss County, unweathered exposures are few. The lower part of the formation consists of generally cross-bedded, glauconitic, fine to coarse, sands along with thin laminae of clay and stringers of small chert gravel, and thin-bedded glauconitic sands interstratified with laminated layers of dark-gray, flaky, shale-like clay. Unweathered sands of the lower Eutaw are gray to greenish-gray, and weathered sands are various shades of yellow, tan, brown and deep reddish-brown, due chiefly to the oxidation of iron compounds contained in the glauconite which is abundant in the sediments. At places the lower Eutaw is highly carbonaceous, and some parts contain lignite.

Excellent exposures of typical lower Eutaw are in the walls of the new cuts for State Highway 4 between New Site and the Prentiss-Tishomingo County line. This highway passes through Sections 13 and 24, T.6 S., R.8 E., and Sections 27, 28, 29 and 30, T.6 S., R.9 E. The best exposures are at the following localities: (1) NW.¼, SE.¼, Sec.24, T.6 S., R.8 E.; (2) Cen. NW.¼, Sec.30, T.6 S., R.9 E.; (3) Cen. N.½, Sec.30, T.6 S., R.9 E.; (4) SE.¼, NE.¼, Sec.30, T.6 S., R.9 E.; (5) SE.¼, NE.¼, Sec.30, T.6 S., R.9 E.; and (6) SW.¼, NE.¼, Sec.29, T.6 S., R.9 E. Locality (3) provides an excellent example of thin-bedded sands interlayered with laminated layers of clay.

Good exposures of lower Eutaw are provided by the walls of several cuts on the road from Booneville to Hazeldell about 14 miles southeast of Booneville (SW.¼, Sec.1, T.7 S., R.8 E.). Lower Eutaw sands crop out in a sand pit on a road to the south off the Booneville-Hazeldell road (SW.¼, NE.¼, Sec.26, T.6 S., R.8 E.).

Another exposure of lower Eutaw sands is shown by the cut for the road from Marietta to Hazeldell approximately 3.3 miles from Marietta (NE.¼, Sec.11, T.6 S., R.8 E.). Farther along this road, about 0.1 mile east of Hazeldell, a cut exposes thin-bedded glauconitic sands interbedded with laminated layers of dark-gray flaky clay (S.½, SW.¼, Sec.7, T.7 S., R.9 E.).

On State Highway 4 about 9.8 miles from Booneville, in the road cut on the west side of Big Brown Creek Valley, is an easily accessible exposure of lower Eutaw sands (SE.¼, NE.¼, Sec.15, T.7 S., R.8 E.) (Figure 8).

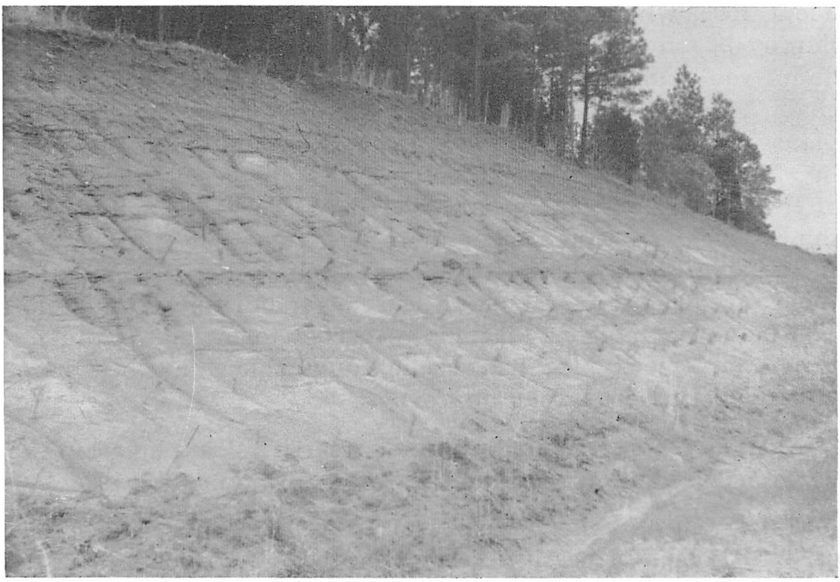


Figure 8.—Eutaw sands and thin laminae of clay exposed in cut of State Highway 4 (SE.¼, NE.¼, Sec.15, T.7 S., R.8 E.). May, 1959.

In the subsurface the lower part of the Eutaw consists of gray to greenish-gray glauconitic sands and dark-gray, flaky clay containing some small chert gravel and some lignite. Test Holes 1, 9, 10, and 12 penetrated the entire thickness of the lower Eutaw and showed a thinning of the formation to the northeast (Plate 2). A thickness of about 170 feet of lower Eutaw was encountered in Test Hole 1, whereas a thickness of only about 110 feet was passed through in Test Hole 10 near the northeast corner of the county.

TOMBIGBEE SAND MEMBER

The name "Tombigbee" was first used by Hilgard[45] in 1860 as the "Tombigbee sand group" of the Eutaw to include all strata between the "Eutaw group" below and the "Rotten limestone group" above. The name was applied to beds typically exposed along the Tombigbee River near Aberdeen, Monroe County, and at Plymouth Bluff, Lowndes County, Mississippi. Safford[46] in 1864 suggested that the Tombigbee sand of Hilgard should probably be included in the Eutaw. However, Wilmarth[47] states: ". . . the Tombigbee continued to be treated as a distinct fm. until about 1905, when the U. S. Geol. Survey and the Miss. Geol. Survey began to include it in the Eutaw fm. but continued to define the Tombigbee as including all sands up to base of Selma chalk." In 1914 Stephenson[48] separated the sands that had previously been called Coffee sand in Tennessee and Tombigbee sand in Mississippi into two members, the Tombigbee sand member of the Eutaw formation below and the Coffee sand member of the Eutaw above, and showed that the Coffee sand of Mississippi is the lateral equivalent of the lower "Selma chalk." Since 1936 the Coffee has been treated as a separate and distinct formation.[49] The name "Tombigbee" is thus restricted to include strata between the lower typical beds of the Eutaw below and the Mooreville chalk or Coffee sand above.

In this report "Tombigbee sand" refers to strata between the lower typical Eutaw beds and the Coffee formation above.

The Tombigbee sand member of the Eutaw formation consists of 70 to 85 feet of massive, very glauconitic, in part argillaceous, somewhat calcareous and fossiliferous sand. Some intervals, more strongly cemented, appear as rough layers or concretionary masses of calcareous sandstone. A discontinuous, nevertheless distinct, bed of calcareous, fossiliferous, sandstone of varying thickness was at a few localities within the county and was encountered in a number of the test holes at a position near the top of the Tombigbee. Where this sandstone is present, its stratigraphic relationships seem fairly consistent.

In Prentiss County the contact between the lower Eutaw and the Tombigbee sand member appears conformable and is in most places distinct. It is almost everywhere immediately above a band of thin-bedded, glauconitic sand interlayered with laminated dark-gray flaky clay, which contrasts strongly with the massive, calcareous, fossiliferous sand of the Tombigbee. At several localities a thin layer of ferruginous material was noted at the contact. At two places within the county, the Tombigbee sand member is fossiliferous in its lower parts and contains a zone in the basal few feet in which are abundant sharks' teeth and bone fragments.

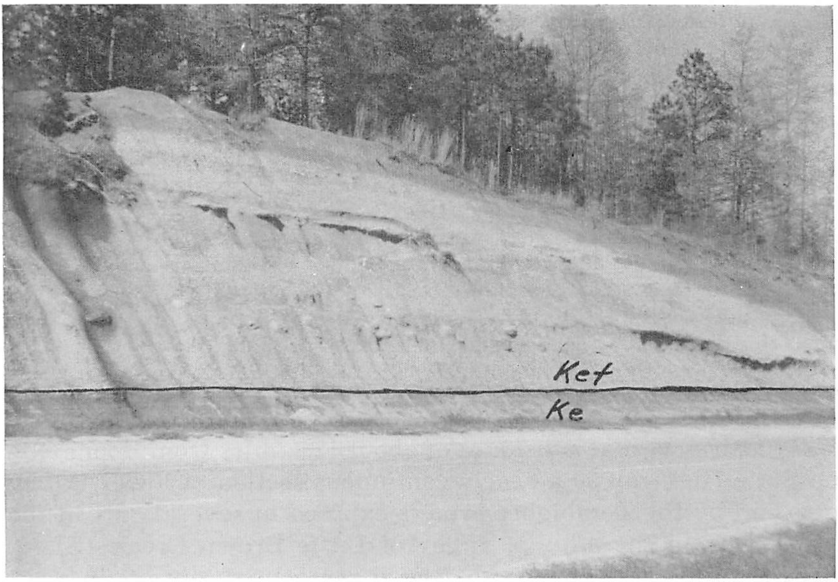


Figure 9.—Fossiliferous lower Tombigbee sand containing concretionary calcareous sandstone layers. Contact between lower Eutaw (Ke) and Tombigbee (Ket) defined by drawn line. (SE.¼, SE.¼, Sec.19, T.5 S., R.9 E.). May, 1959.

The contact is well exposed at a number of places on State Highway 30 from Booneville east through Burtons in the eastern part of the county. Several sections are revealed by highway cuts some 9 to 10 miles west of Booneville in the vicinity of New Hope Baptist Church. The best of these is shown by a cut on the east facing slope of the valley of Wesson Branch of Little Brown Creek about 10 miles east of Booneville (SE.¼, SE.¼, Sec.19, T.5 S., R.9 E.) (Figure 9). Here some 52 feet of the typical beds of the lower Eutaw are overlain conformably by 26 feet of massive, calcareous, fossiliferous sand of the Tombigbee containing concretionary calcareous sandstone layers. A zone several feet above the base of the Tombigbee is fairly prolific in sharks' teeth and bone fragments.

Section in Road Cut of State Highway 30 on the East Facing Valley Slope of Wesson Branch of Little Brown Creek 10.8 Miles East of Booneville (SE.¼, SE.¼, Sec.19, T.5 S., R.9 E.)

	Feet	Feet
Eutaw formation (Tombigbee sand member)		26.0
3. Sand, dark greenish-gray to dark-gray; weathers olive drab to reddish-brown, very glauconitic, fine-grained, compact, micaceous, calcareous, fossiliferous; contains concretions of calcareous sandstone at about 4 feet and a thin concretionary lens-like bed at about 15 feet above the base of the Tombigbee. Base marked by a thin layer of ferruginous material locally. Contains *Exogyra ponderosa* Roemer, numerous borings, and poorly preserved fragments of pelecypods. A zone several feet thick at the base is abundant in sharks' teeth and bone fragments	26.0	
Eutaw formation (lower part)		52.0
2. Thin-bedded glauconitic sand interbedded with laminated dark-gray, flaky clay	28.0	
1. Sand, varicolored (yellow, tan, brown), highly glauconitic, fine- to medium-grained, cross-bedded; contains some thin laminae of clay. Grades into unit above	24.0	
Total section		78.0

Farther west at a distance of about 12.5 miles from Booneville on State Highway 30 a nearly continuous section of lower Eutaw overlain by the Tombigbee sand is exposed in several cuts in the hills up from the alluvial valley of Little Brown Creek (SE.¼, Sec.21, T.5 S., R.9 E.). Another good contact exposure is in a cut of State Highway 30 at the Prentiss-Tishomingo County line (SE.¼, Sec.5, T.5 S., R.9 E.) (Figure 10).

North of State Highway 30 in the cut of a gravel road across a branch of Little Brown Creek, is a contact exposure (NE.¼, SE.¼, Sec.8, T.5 S., R.9 E.).

About 10 miles south from Booneville the highway cut of State Highway 4 shows another excellent exposure of the Eutaw-Tombigbee contact (SW.¼, NW.¼, Sec.14, T.6 S., R.8 E.). At this locality the lower parts of the Tombigbee are fossiliferous and include a zone in the basal few feet which contains abundant sharks' teeth, mosasaur teeth, vertebrae and bone fragments.

Excellent outcrops of the Tombigbee sand are at the following localities: (1) in the road cut of State Highway 363 on the northward facing slope of Hurricane Creek valley, some 1.7 miles north of Marietta (SE.¼, SW.¼, Sec.28, T.6 S., R.8 E.); (2) in the road cut of State Highway 366 on the eastward facing slope of a small branch valley some 0.3 mile west of Marietta (South line, Sec.5, T.7 S., R.8 E.); (3) in the road cut of State Highway 4 on the east facing slope of Big Brown Creek valley some 8.5 miles southeast of Booneville (SW.¼, NE.¼, Sec.16, T.6 S., R.8 E.); and (4) in several road cuts of State Highway 4 about 0.7 mile northwest of New Site (NW.¼, Sec.13 and NE.¼, Sec.14, T.6 S., R.8 E.).

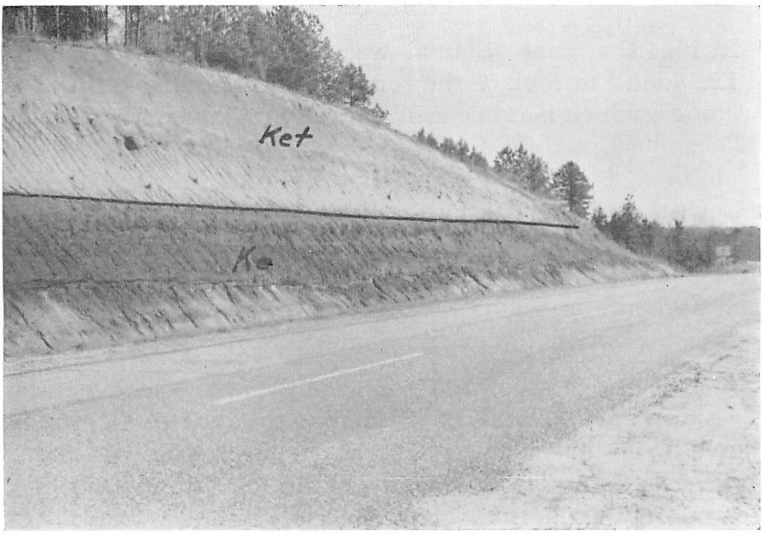


Figure 10.—Contact between lower Eutaw (Ke) and Tombigbee sand member (Ket) in cut on State Highway 30 at the Prentiss-Tishomingo County line. (SE.¼, Sec.5, T.5 S., R.9 E.). February, 1959.

Test Holes 1, 3, 8, 9, 10, 11, and 12 penetrated the entire thickness of the Tombigbee sand member. The member ranged from about 75 to 85 feet in thickness (Plate 2).

In Prentiss County the lower part of the Eutaw is comparatively non-fossiliferous; however, some sharks' teeth and bone fragments were noted in the test hole samples. The Tombigbee sand member, nevertheless, is fossiliferous in many places through its entire thickness. At the base of the member, a zone which contains abundant sharks' teeth and bone fragments was found at two localities. The most common fossil remains noted in the Tombigbee were *Exogyra ponderosa* Roemer and numerous borings. Other fossils include those listed in Figure 22.

The Eutaw formation disconformably overlies the McShan formation and is disconformably overlain by the Coffee formation. It consists of two distinct lithologic units: The lower typical beds and the Tombigbee sand member above.

The Eutaw formation is correlated with the lower part of the Austin group of the Texas section and the lower Santonian stage of the European (Figure 4).

SELMA GROUP

In 1894 the name "Selma" was proposed by Smith, Johnson, and Langdon[50] to replace the somewhat misleading term "Rotten limestone", which had been introduced in Alabama by Winchell[51] in 1857 and adopted in Mississippi by Hilgard[52] in 1860. As originally defined, the Selma included beds underlain by the Eutaw (or Coffee) and overlain by the Ripley. It derived its name from an exposure of chalk on a bluff of the Alabama River at Selma, Dallas County, Alabama. In 1937 Stephenson[53] differentiated the upper part of the Selma of Smith, Johnson, and Langdon as a separate formation under the name "Prairie Bluff chalk".

In 1945 the Mississippi Geological Society (Geologic Map of Mississippi) raised the term "Selma" to the rank of a group name to include all outcropping Cretaceous beds younger than the Eutaw. The Selma group consists of six formations: the Mooreville, the Coffee, the Demopolis, the Ripley, the Prairie Bluff, and the Owl Creek.

COFFEE FORMATION

The name "Coffee sand" was first used in 1868 by Safford[54] for beds typically exposed in a bluff of the Tennessee River just above Coffee Landing, Hardin County, Tennessee. Hilgard[55] had previously included these beds in his Tombigbee sand group. In 1914, Stephenson[56] divided the sand that had been previously called Coffee sand in Tennessee and Tombigbee sand in Mississippi into two members, the Tombigbee sand member of the Eutaw formation below and the Coffee sand member of the Eutaw formation above, and showed the Coffee sand member as the lateral equivalent of the lower part of the "Selma chalk" in Mississippi. In 1938, Wilmarth[57] states "Further work led Stephenson (in March 1936) to believe *Coffee sand* should be treated as a distinct fm., or as a memb. of the Selma chalk, into the lower part of which it grades laterally. The present classification of the U. S. Geol. Survey treats Coffee sand as a distinct fm. and restricts Eutaw fm. to beds btw. top of Tombigbee sand memb. and top of underlying Tuscaloosa fm."

In Prentiss County the Coffee formation includes all strata between the Tombigbee sand member of the Eutaw formation below and the Demopolis formation above.

The Coffee formation crops out in northeastern Mississippi in a belt about 10 miles wide west of the Eutaw formation and east of the Demopolis formation. Its area of outcrop includes small areas in western Tishomingo, eastern Alcorn, central Prentiss, northwestern Itawamba, and northeastern Lee Counties.

In Prentiss County the Coffee crops out in a south-southwest trending belt some 8 to 10 miles wide. Its eastern limit can be marked by an irregular line from a point near the northeastern corner of the county at the Tishomingo County line to a point on the westward facing slope of Donivan Creek at the Itawamba County line. Its westward limit somewhat parallels the Gulf, Mobile and Ohio Railroad and is represented by an irregular line from a point about a mile east of U. S. Highway 45 at the Alcorn County line to a point on the Lee County line at Baldwyn (Plate 1).

The deposits of the Coffee formation underlie the westward extension of the Tombigbee and Tennessee River Hills physiographic division. In Prentiss County the topography is hilly, ranging from rugged to rolling, featured by flat-topped ridges and deeply incised valleys. Altitudes range from about 360 feet in the valleys to about 640 feet at Odom Hill just north of the Tombigbee-Tennessee River divide. Relief is greatest in the northern parts of the outcrop belt, where the headwaters of the Tombigbee River System have deeply dissected the terrane. The topography is mature, and the surface slopes generally south and west, except in the northern and northeastern parts of the county, where the surface slope is generally to the north, away from the Tombigbee-Tennessee and Tombigbee-Mississippi River divides.

The contact between the Tombigbee sand member of the Eutaw formation and the Coffee formation is exposed at several places within the county. The contact is somewhat indistinct and is questionably of disconformable relation. Massive, argillaceous, glauconitic, somewhat calcareous sand of the Tombigbee appears to grade into less calcareous and finely glauconitic sandy shale-like silts and silty sand of the basal Coffee. The only evidence of a depositional break is phosphatic molds of fossils in the basal Coffee, which contains genera of fossils not common to the Tombigbee sand (Figure 22).

Figure 11.—Contact between Tombigbee sand (Ket) and Coffee (Kc) exposed in cut of State Highway 30. Note concretionary calcareous sandstone in Tombigbee. (NE.¼, Sec.27, T.5 S., R.8 E.). February, 1959.

The best exposure of the contact is in the walls of the cut for State Highway 30 on the west facing slope of Big Brown Creek Valley (NE.¼, Sec.27, T.5 S., R.8 E.) (Figure 11). At this locality about 37 feet of massive, fossiliferous sand of the Tombigbee containing a calcareous concretionary sandstone is overlain by silty sands and sandy silts of the basal Coffee. A thin discontinuous layer locally rich in ferruginous material and containing limonitic molds of fossils marks the base of the Coffee. The basal Coffee is a silty sand containing phosphatic molds and genera of fossils not common to the Tombigbee.

Section at Road Cut of State Highway 30 on the West Facing Slope of Big Brown Creek Valley (NE.¼, Sec.27, T.5 S., R.8 E.).

	Feet	Feet
Coffee formation		27.0
10. Sand, buff to red-brown, fine-grained, silty, finely micaceous (weathered Coffee)	6.0	
9. Silt, dark-gray, compact, sandy, micaceous, finely glauconitic, shale-like; contains calcareous concretionary sandstone at 16 feet above base. Grades from sandy silt to silty sand towards the top	14.0	
8. Sand, dark-gray, silty, compact, finely glauconitic, micaceous; contains abundant fossils, many of which are not common in the Tombigbee sand (*Trigonia* sp., etc.), also phosphatic molds of fossils. Contact with underlying Tombigbee indistinct; however, a discontinuous layer locally rich in ferruginous material and containing limonitic molds of fossils marks the base	7.0	
Eutaw formation (Tombigbee sand member)		43.0
7. Sand, gray to dark greenish-gray, weathers light-gray; fine-grained, compact, argillaceous, glauconitic, micaceous, fossiliferous; contains numerous borings and some lignitized wood fragments with marcasite inclusions	10.5	
6. Sandstone, gray, weathers light-gray, fine-grained, well indurated, calcareous, glauconitic, finely micaceous, fossiliferous; consists of concretionary lens-like masses up to	1.5	
5. Sand, greenish-gray, weathers tan, fine-grained, glauconitic, micaceous, splotched with iron oxide; contains borings	5.0	
4. Sand, greenish-gray, weathers tan, fine-grained, argillaceous, compact, glauconitic, micaceous, fossiliferous; contains thin lenses of very glauconitic, micaceous sand and fragments of lignitized wood	16.0	
3. Sandstone, dark-gray, weathers light-gray, hard, calcareous, glauconitic, micaceous, fossiliferous	1.0	
2. Sand, greenish-gray, weathers tan, fine-grained, glauconitic, micaceous, fossiliferous, splotched with iron oxide	3.0	
1. Covered to level of bridge	6.0	
Total section		70.0

In the same area and west of this outcrop a fossiliferous silty sand, which appears to be unit 8 of the preceding measured section, is exposed by the road cut of State Highway 30 on the west facing slope of Martin Creek Valley (SE.¼, Sec.21, T.5 S., R.8 E.). This sand contains phosphatic molds of fossils, which suggests that it is the basal unit of the Coffee; however, the contact with the underlying Tombigbee is concealed. On the east facing slope of Martin Creek Valley (NW.¼, SE.¼, Sec.30, T.5 S., R.8 E.), the strata include a calcareous concretionary sandstone which resembles unit 6 of the measured section. A large, well preserved *Placenticeras* sp. was found in the center of one of the smaller concretions. About 10 feet higher and at an altitude of 400 feet is a bed characteristically rich in ferruginous material and containing numerous limonitic molds of fossils. This zone is believed to correspond with the basal Coffee and would indicate a small structure in the Martin Creek area.

Another exposure of the contact is in the cut of new State Highway 364 on the west facing slope of Yellow Creek Valley in the northeastern corner of the county (NE.¼, Sec.22, T.4 S., R.9 E.). Here massive, glauconitic, micaceous, argillaceous, greenish-gray to gray sand of the Tombigbee is overlain by gray to dark-gray, compact, silty sands of the Coffee. The contact is at an altitude of 530 feet and is marked by a thin layer characteristically rich in ferruginous material and containing phosphatic molds of fossils altering to limonite.

Stephenson and Monroe[58] describe a contact outcrop in a road cut on the northeastward-facing slope of Youngs Creek Valley (SW.¼, Sec.9, T.6 S., R.8 E.). The section is now somewhat poorly exposed.

"SECTION ON NORTHEASTWARD-FACING SLOPE OF YOUNGS CREEK VALLEY

	Feet
Coffee sand	
Gray very finely glauconitic and micaceous very fine-grained sand weathering in upper part to streaked red, yellow, and gray sand; contains thin, lens-like partings of gray very finely sandy clay	18.0
Dark gray blocky, compact very finely sandy and micaceous shale-like silt containing prints of fossils; some parts contain abundant fine glauconitic sand and are rich in very soft fossil shells belonging to many genera; contains concretions of dark-gray sandy limestone, many of which have specimens of *Placenticeras* sp. in center; becomes coarser toward the base. About 10 feet above the base is a thin bed of phosphatic molds of mollusks and immediately below this bed is a zone rich in *Trigonia* sp. (Coll. 17783). The contact with the underlying Tombigbee sand is very indistinct; the only evidence of a break in deposition is the presence of the phosphatic molds, but the lower part of the Coffee sand contains species of fossils unknown in the Tombigbee sand	32.0

Eutaw formation (Tombigbee sand member)	
Massive gray highly glauconitic sand weathering light brown; this sand is somewhat lighter in color than the overlying Coffee	6.5
Hard calcareous, glauconitic fine-grained sandstone	1.5
Massive light-brown glauconitic sand (Coll. 17782)	8.0
	66.0"

In the same vicinity and southeast of the preceding described exposure, in the cut of State Highway 4 on the east facing slope of Big Browns Creek Valley (SW.¼, NE.¼, Sec.16, T.6 S., R.8 E.) massive, calcareous, micaceous, fossiliferous sand of the Tombigbee crops out in the lower cut and is overlain by fossiliferous silty sands of the Coffee which show in the several cuts above. The contact is weathered and obscured.

At Hare's old mill site on Big Brown Creek about 9 miles east of Booneville, Stephenson and Monroe[50] noted an 80-foot section on the steep hill east of the creek. The lower part, which is exposed in the bluff at the old mill site, is described as dark-gray, more or less calcareous, glauconitic, micaceous sand representing the Tombigbee. The upper 30 feet of the exposure, which is visible in the cut for the road leading up the hill, is described as weathered yellowish, reddish, and brownish sand probably of Coffee age. Tombigbee fossils were collected within 20 feet of the base, and Coffee fossils were collected from an 8-foot (probably 8-inch) ferruginous layer about 50 feet above the bed of the creek. The contact was not observed.

Test Holes 1, 3, 8, 9, 10, 11, and 12 were drilled through the Eutaw-Coffee contact. In general the samples exhibited a definite color change from gray to dark-gray in the Coffee deposits to greenish-gray to dark greenish-gray in the Tombigbee sand, and there was a characteristic change in the texture of the drilling mud. In Test Holes 1, 3, 8, 9, 10, and 11 a hard calcareous sandstone of variable thickness (up to 2.5 feet) was encountered near the top of the Tombigbee.

The Coffee formation consists chiefly of sands, silty sands, and sandy silts, associated with subordinate thin beds and laminae of shale and thin or thicker beds of clay. Calcareous sandstone concretions of various sizes and shapes are a common feature at intervals throughout the formation. Bentonite beds are present locally in the middle part. Some parts are fossiliferous.

Outcrops are numerous and at places show geologic features clearly. Many, however, are deeply weathered, especially in the middle and upper Coffee, and individual beds are not easily recognizable.

In the extreme southern part of the outcrop belt, a weathered, greenish-gray, fossiliferous, sandy clay occupying a position near the base of the Coffee appears to be a lateral transitional facies between the sandy beds of the Coffee and the chalk of the Mooreville formation which is exposed to the south in Lee County. The best showing of this clay is at several cuts of State Highway 366 in the south half of Sec.6, T.7 S., R.8 E.

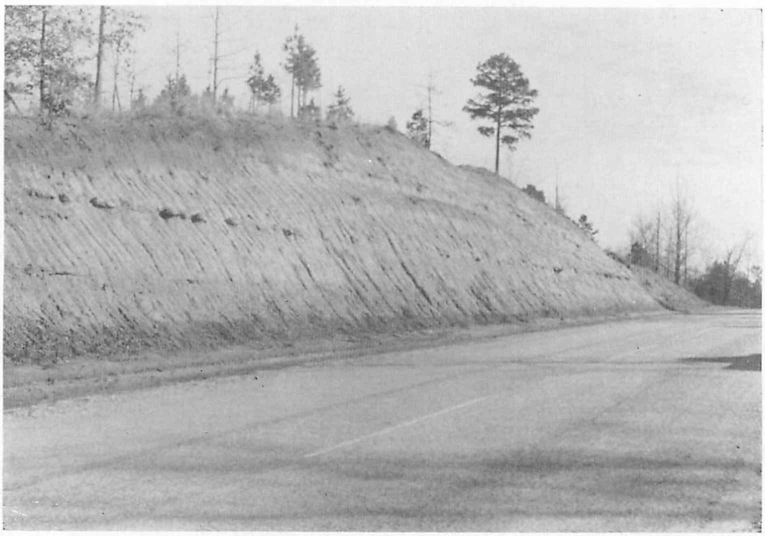


Figure 12.—Fossiliferous sand of the lower Coffee containing layers of calcareous sandstone concretions which contain excellent specimens of **Placenticeras** sp. and others. Exposure in cut of State Highway 30 (NE.¼, NW.¼, Sec.26, T.5 S., R.8 E.). February, 1959.

To the north the lower parts of the Coffee consist of dark-gray, argillaceous, fine sands and sandy shale-like silts. An excellent exposure of lower Coffee is in the cut for State Highway 30 about 8.2 miles east-southeast of Booneville (NE.¼, NW.¼, Sec.26, T.5 S., R.8 E.). Here the 30 feet more or less of fossiliferous, dark-gray, silty sand contains layers of calcareous concretionary sandstone at two separate intervals. Several of the concretions were found to contain excellent specimens of *Placenticeras* sp., and *Inoceramus* sp., *Mortoniceras* sp., *Trigonia* sp., and others were noted (Figure 12).

On the west facing slope of Martin Creek Valley in the ditch along State Highway 30 (SE.¼, Sec.21, T.5 S., R.8 E.), numerous well preserved fossils of the lower Coffee have been weathered from the sands.

A section of lower Coffee is described by Stephenson and Monroe[60] from a road cut exposure on the road from Booneville through Altitude (NW.¼, SW.¼, Sec.29, T.4 S., R.8 E.).

"SECTION IN IUKA ROAD, 13 MILES EAST BY NORTH OF BOONEVILLE

	Feet
Coffee sand	
Weathered reddish and brownish micaceous sand	10
Greenish-gray compact micaceous cross-bedded sand, with yellow and purple streaks, and with several thin layers of drab laminated clay; contains numerous crusts of ferruginous sandstone	15
Dark-gray compact argillaceous, micaceous sand	3
Partly weathered light greenish-gray massive, compact micaceous sand	8
Dark-gray compact very micaceous finely laminated sand	5
	41"

Locations of other good outcrops of lower Coffee are:

(1) in a road cut on the west facing slope of a branch of Big Brown Creek (SE.¼, NW.¼, Sec.26, T.4 S., R.8 E.);

(2) in the road cuts to the west, south and east from Blue Hill (Secs.29 and 30, T.4 S., R.9 E.);

(3) in several places on the Booneville to Altitude road (Secs. 8 and 9, T.5 S., R.8 E.);

(4) in the road cut on the northeast facing slope of Hurricane Creek Valley (SW.¼, NE.¼, Sec.12, T.6 S., R.7 E.);

(5) in the cut of State Highway 366 on the east facing slope of Donivan Creek Valley (SW.¼, NE.¼, Sec.34, T.6 S., R.7 E.); and

(6) in the road cut on the east facing slope of Donivan Creek Valley (SW.¼, NW.¼, Sec.12, T.7 S., R.7 E.).

In the lower part of the upper half of the Coffee a cross-bedded, fine- to medium-grained sand is exposed at two sand pit localities. An excellent outcrop of white and yellowish, fine- to medium-grained, cross-bedded sand with laminae of gray clay along the bedding is shown by a sand pit on the south side of a gravel road (NE.¼, NE.¼, Sec.35, T.5 S., R.8 E.).

Another exposure of fine- to medium-grained, cross-bedded sand is in a sand pit west of a gravel road which traverses the east half of Section 19 (NW.¼, SW.¼, Sec.19, T.5 S., R.8 E.).

Several deposits of bentonite are present locally in lower part of the upper half of the Coffee. Exposures and thicknesses noted are:

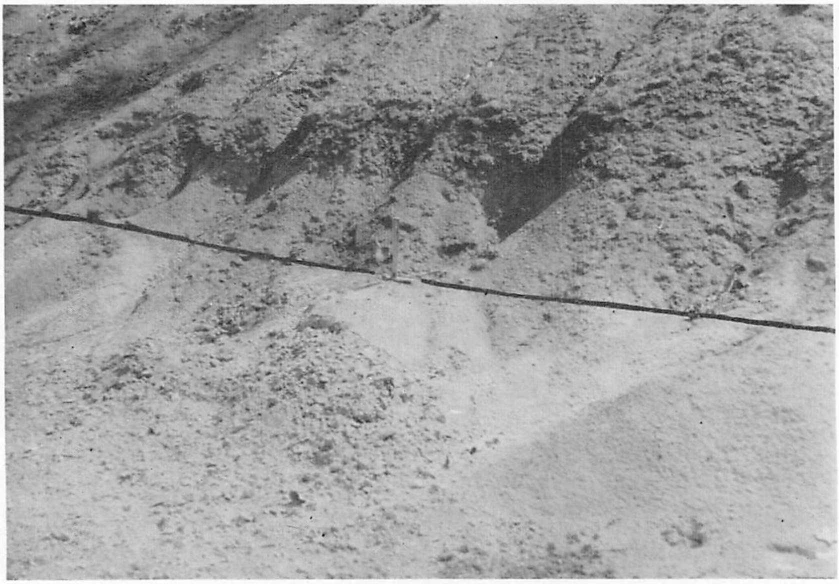


Figure 13.—Bentonite exposed in bottom of excavation on the W. D. Ward property. Drawn line at upper limits of bentonite and hammer (center picture) on top of bed. (E.½, Sec.11, T.6 S., R.7 E.). May, 1959.

(1) a two- to three-foot bed of bentonite in excavations on the S. M. Wroten property (E.½, Sec.36, T.5 S., R.7 E.) and on adjoining properties (W.½, Sec.31, T.5 S., R.7 E.);

(2) a two- to three-foot bed of bentonite in excavations on the W. D. Ward property (formerly John Duncan) (E.½, Sec.11, T.6 S., R.7 E.);

(3) several inches of bentonite in the road cut of a gravel road on the C. W. McElroy property (SW. cor. Sec.36, T.5 S., R.7 E.);

(4) several inches of bentonite in the road cut of a private road northeast of State Highway 4 (NE.¼, Sec.25, T.5 S., R.7 E.);

(5) two lens-like bodies of bentonite a foot or more in width and several inches thick in the cut for State Highway 30 (SW.¼, NE.¼, Sec.18, T.5 S., R.8 E.);

(6) a nodule of bentonite a few inches in diameter in a road cut on the southeast facing valley slope of Martin Creek (SE.¼, SE.¼, Sec.21, T.4 S., R.8 E.); and

(7) a nodule of bentonite a few inches in diameter in a road cut northwest of Mt. Olive church (NW.¼, SW.¼, Sec.22, T.4 S., R.8 E.).

The best exposures of thicker bentonite deposits are in excavations on the W. D. Ward property (Figure 13). Also an outcrop showing the stratigraphic relations of the bentonite is in a gully just northwest of the barn.

SECTION IN GULLY JUST NORTHWEST OF THE BARN ON THE W. D. WARD PROPERTY (E.½, SEC.11, T.6 S., R.7 E.).

	Feet	Feet
Coffee formation		30.0
11. Soil and subsoil (derived from Coffee)	2.0	
10. Sand, light-gray, mottled with iron oxide, micaceous, glauconitic, silty	3.0	
9. Clay, dark-gray, waxy, thinly laminated, sandy, finely micaceous, carbonaceous, iron stained along laminae	3.0	
8. Bentonite, cream colored, conchoidal fracture, iron stained along fractures	2.0	
7. Sand, light-gray to tan, fine-grained, silty, micaceous, very glauconitic; contains borings and an abundance of limonitic molds of fossils	1.0	
6. Sand, light-gray to tan, fine-grained, cross-bedded, micaceous, glauconitic; iron stained along bedding	7.5	
5. Sand, dark-gray, fine-grained, argillaceous, compact, micaceous, glauconitic, laminated	3.5	
4. Sand and clay interbedded. Light-gray to tan, fine-grained, micaceous, glauconitic sand irregularly bedded with a dark-gray, waxy, laminated clay	2.0	
3. Sand, light-gray to tan, fine-grained, glauconitic, micaceous	3.0	
2. Sand and silt, light-gray to brown, irregularly bedded, finely micaceous, finely glauconitic; iron stained along bedding; contains some limonitic prints of pelecypoda	1.0	
1. Sand, light-gray to tan, mottled with iron oxide, fine-grained, silty, finely micaceous, finely glauconitic	2.0	
Total section		30.0

The bentonite deposits on the Wroten and Ward properties are probably remnants of one original deposit, as they are at comparable structural and stratigraphic levels and are similar in general appearance. They occupy topographically high positions and if they were at one time connected, the remainder of the original body has long since been eroded. Some of the outlying patches appear to indicate a thinning of the original deposit to the north and west.

The small accumulations exposed to the north appear to follow a similar structural trend; however, they are extremely localized, and may or may not be of stratigraphic significance. The two lens-like bodies exposed in the cut for State Highway 30

Figure 14.—Lens-like bentonite several feet below ferruginous bed containing limonitic molds of fossils exposed in cut for State Highway 30 (SW.¼, NE.¼, Sec.18, T.5 S., R.8 E.). April, 1959.

were deposited with a sand, and at a position several feet above is a thin ferruginous ledge which contains limonitic molds of fossils (Figure 14). The nodular deposits are associated with a somewhat iron rich bed; however, no molds of fossils were found.

South of the Ward deposit a ferruginous layer forms a slight ledge in the cut of a gravel road on the east facing slope of Casey Creek Valley (North line, NE.¼, Sec.23, T.6 S., R.7 E.). This layer appears to be at the same stratigraphic and structural level as that at which the bentonite would be expected to be exposed, and it contains limonitic molds of fossils.

According to Stephenson and Monroe,[61] the bentonite of the Wroten deposits appears to be at the same stratigraphic position as the Patch Creek bentonite in Lee County, and both may be a few feet above the Arcola limestone. If this correlation is correct, the above mentioned features could possibly be a part of a poorly preserved record of the diastem between the Mooreville and Demopolis formations, which is evident to the south in Lee County.

Near surface materials of the upper part of the Coffee are, in most instances, deeply weathered. The few good exposures include: (1) those in several road cuts along a north-northeast trending gravel road through Secs.19, 20, and 30, T.4 S., R.6 E., about 4.5 to 6.0 miles northeast of Booneville; (2) one in the road cut on the northwest facing valley slope of Mile Branch about 1.5 miles northeast of Booneville (NE. cor., Sec.11, T.5 S., R.7 E.); (3) one in the road cut on the north facing valley slope of a tributary of Hurricane Creek (NE.¼, SW.¼, Sec.28, T.5 S., R.7 E.); and (4) one in a road cut on the west facing slope of the valley of a tributary of Twenty Mile Creek (SE.¼, Sec.8, T.6 S., R.7 E.).

A section of the upper part of the Coffee is described by Stephenson and Monroe[62] from the westward-facing bluff of a small branch of Boyer Creek about three-quarters of a mile south of the railroad station at Booneville.

"SECTION IN BLUFF OF SMALL BRANCH THREE-QUARTERS OF A MILE SOUTH OF BOONEVILLE.

	Feet
Coffee sand	
Brown sandy loam	2
Weathered brown slightly indurated sand	4
Stratified loose yellow glauconitic sand	5
Compact laminated dark-gray finely micaceous, glauconitic sand and clay, containing occasional small pieces of lignite	7
Dark-gray compact finely micaceous, slightly glauconitic sand, in part massive and in part finely laminated; poorly exposed in the lower 2 feet	16
Harder layer of massive greenish-gray finely micaceous, slightly glauconitic sand; forms bed of the branch	1
	35"

At the top of the Coffee formation is a glauconitic, conspicuously cross-bedded, fine- to medium-grained sand containing laminae and streaks of dark-gray waxy clay. This sand is exposed in several sand pits: (1) in the hillside east of the road from Booneville to Thrashers, about 1.5 miles from Booneville (NW.¼, SE.¼, Sec.2, T.5 S., R.7 E.); (2) in the hillside just north of the Osborne road about 2 miles southwest of Booneville (SW.¼, SE.¼, Sec.18, T.5 S., R.7 E.); and (3) in the hillside of the cut of a gravel road about half a mile north of the intersection of U. S. Highway 45 with State Highway 30 west of Wheeler (SW.¼, SW.¼, Sec.1, T.6 S., R.6 E.). This sand is persistent at the top of the Coffee and was encountered in Test Holes 3, 4, 5, 6, 7, 8, and several water wells logged by the writer. Test Hole 3 revealed a thickness of 26 feet for the sand in the vicinity of Wheeler, and Test Hole 8 showed 21 feet near the Alcorn County line.

Test Holes 3 and 8 were drilled through the entire Coffee and showed a thickness of about 240 to 275 feet for the formation.

At a few places the Coffee is abundantly fossiliferous, especially in its lower part. Many of the fossils are well preserved; however, many are fragile and hard to remove from the beds. Excellent specimens of *Placenticeras* sp. and *Inoceramus* sp. were collected. The basal Coffee contains a facies fauna which is not common to the Tombigbee and this was used as a criterion for separating the units (Figure 22).

The Coffee formation disconformably overlies the Tombigbee sand member of the Eutaw formation and is overlain conformably by the Demopolis formation. The Coffee is the lateral equivalent of the Mooreville formation and the lower part of the Demopolis formation, up to and including the *Diploschiza cretacea* zone of the chalk section to the south in west-central Mississippi. It is correlated with the upper part of the Austin group and the lower part of the Taylor group of the Texas section and is the equivalent of the upper part of the Santonian stage and the lower part of the Campanian stage of the European section (Figure 4).

DEMOPOLIS FORMATION

The name "Demopolis" was first applied (in a broad sense) in 1888 by Smith[63] to rocks mapped between the Eufaula (Ripley) above and the Eutaw below. Later (1903) Smith[64] attempted to subdivide the Alabama chalk into three parts on the basis of relative amounts of lime and clay. In his original description he used "Demopolis" (in a restricted sense) for his middle division of the chalk, which he found to be less argillaceous and fossiliferous than either the chalk above or that below. The name "Demopolis" was thus derived from its type locality, a bluff on the Tombigbee River at Webb and Sons Cotton Warehouse in Demopolis, Marengo County, Alabama.

Stephenson and Monroe[65] found that Smith's concept of three divisions of the "Selma" could not be practically applied in middle and northern Mississippi, because of the lateral change in lithology and faunal content. The chalk beds of northern Mississippi are more argillaceous and sandy and have a prolific fauna at places. Monroe[66] uses Demopolis chalk as a member of the "Selma chalk" to include all chalky or marly beds between the diastem above the Arcola limestone member and the Ripley formation. In 1945 the Mississippi Geological Society (Geologic Map of Mississippi) raised the term "Selma" to the rank of group to include all outcropping Cretaceous beds younger than the Eutaw formation. The Demopolis chalk was given formational rank.

In this report "Demopolis formation" refers to those chalk beds between the Coffee sand below and the transitional clay of the Ripley formation above.

In Mississippi the Demopolis formation occupies a north-south trending belt which varies in width from about 5 miles at the Tennessee State line, Alcorn County, to 16 miles at the Alabama State line, Noxubee and Kemper Counties. It crops out in parts of Alcorn, Prentiss, Union, Lee, Pontotoc, Chickasaw, Monroe, Clay, Oktibbeha, Lowndes, Noxubee and Kemper Counties.

In Prentiss County the Demopolis crops out in a belt some 2.5 to 8.0 miles wide through the western half of the county. Its eastern limit roughly parallels the Gulf, Mobile and Ohio Railroad and is represented by an irregular line from a point on the Alcorn County line about a mile east of U. S. Highway 45 through the eastern limits of Booneville to a point on the Lee County line at Baldwyn.

The approximate western extension of the chalk is limited by an irregular line extending south-southwesterly from a point 5 miles west of the northwest corner of the county on the Alcorn

Figure 15.—Contact between Coffee and Demopolis exposed in sand pit northwest of Wheeler (SW.¼, SW.¼, Sec.1, T.6 S., R.6 E.). May, 1959.

Figure 16.—Close up of Coffee-Demopolis contact in sand pit exposure. Contact at head of hammer. (SW.¼, SW.¼, Sec.1, T.6 S., R.6 E.). May, 1959.

County line to a point about half a mile north of State Highway 30 on the Union County line (Plate 1).

The surface developed on the Demopolis is a rolling lowland area of slight to moderate relief which is typical of the Black Prairie Belt. The topography is characterized by low rounded hills or cuestas, and the surface slopes generally north, south and southeast away from the Mississippi-Tombigbee River divide.

Soils are thin or absent in areas of greatest relief and bald spots are a common feature. In areas of less relief black soils overlie a deeply weathered residuum consisting of variable amounts of sand and clay.

The chalk cuestas are separated by wide alluvial bottom lands, and terraces or second bottoms have been developed along the downstream low relief ridges and blend with the rolling topography. In places (where streams have swung close to the valley walls) short steep slopes have resulted.

The Demopolis surface has an average relief of from 50 to 80 feet, but altitudes range from 560 feet at several places along Mississippi Highway 4 to about 370 feet on Okolalah Creek west of Baldwyn — a maximum relief of 190 feet.

In Prentiss County the Demopolis conformably overlies the Coffee formation. To the south in Lee County, a consolidated shell conglomerate is present at a number of places at the Coffee-Demopolis contact.[67] In Prentiss County this shell conglomerate was found at the surface only in the area west of Wheeler. Half a mile north of the intersection of State Highway 30 with U. S. Highway 45 (SW.¼, SW.¼, Sec.1, T.6 S., R.6 E.), the contact is exposed in a sand pit on a gravel road which crosses Twenty Mile Creek. Cross-bedded glauconitic sands and gray carbonaceous clays of the Coffee are overlain by a shell conglomerate composed chiefly of *Gryphaea convexa* (Say) and *Exogyra ponderosa* Roemer (Figures 15, 16).

SECTION (SW.¼, SW.¼, SEC.1, T.6 S., R.6 E.) IN A SAND PIT ON A GRAVEL ROAD HALF A MILE NORTH OF THE INTERSECTION OF STATE HIGHWAY 30 WITH U. S. HIGHWAY 45 WEST OF WHEELER.

	Feet	Feet
Demopolis formation		3.0
6. Brown sandy loam derived from chalk	1.0	
5. Shell conglomerate, consolidated, sand matrix; composed chiefly of *Gryphaea convexa* (Say) and *Exogyra ponderosa* Roemer	2.0	
Coffee formation		13.0
4. Sand, whitish to tan, fine- to medium-grained, glauconitic, splotched with iron oxide	1.5	
3. Clay, gray, waxy, lignitic, interbedded with thin stringers and pods of sand. Iron stained along bedding	1.5	
2. Sand and clay interbedded. Fine- to medium-grained, cross-bedded, glauconitic sand, and gray, waxy clay	2.5	
1. Sand, varicolored (yellow, tan and brown), fine- to medium-grained, micaceous, conspicuously cross-bedded, very glauconitic (banding in sand due to concentrations of glauconite); contains thin laminae of clay along cross-bedding and thin streak of clay	7.5	
Total section		16.0

Stephenson and Monroe[68] noted a calcareous sandstone about a foot thick at the base of the "Selma" in the road ditch some 2.5 miles southwest of Booneville on the Geeville road. They referred to this sandstone as the probable equivalent of the prominent fossiliferous ledge at Guntown which corresponds to the shell conglomerate near Wheeler. Near the sandstone outcrop, a sand pit discloses some 14 feet of varicolored, fine- to medium-grained, conspicuously cross-bedded, very glauconitic sand of the Coffee overlain by argillaceous, calcareous, sandy residuum of the Demopolis (SW.¼, SE.¼, Sec.18, T.5 S., R.7 E.).

On a local road west from the Osborne road some 3.8 miles southwest of Booneville (SW.¼, SW.¼, Sec.24, T.5 S., R.6 E.) weathered chalk of the Demopolis containing abundant shells is exposed on the hillsides, and a weathered reddish-brown sand of the Coffee crops out in a valley.

Two-tenths mile south and west of the intersection of Mississippi Highway 370 with the Baldwyn-Geeville road (SE.¼, SW.¼, Sec.35, T.6 S., R.6 E.), a brown sandy clay, which is probably residuum from the Demopolis, overlies weathered sand of the Coffee.

Elsewhere the contact between the Demopolis and the Coffee is obscure. The shell conglomerate has either broken down or is not present, and the chalk or residuum from the chalk lies directly on the Coffee. At places where weathering has been intensive, only a change in soil character is evident. The contact is covered in many areas by alluvium, terrace deposits of loessal materials.

Figure 17.—Shell beds in chalk of the Demopolis exposed in cut of State Highway 370 on Northeast facing valley wall of Okololah (SW.¼, SE.¼, Sec.33, T.6 S., R.6 E.). February, 1959.

Test Holes 3, 4, 5, 6, 7, 8, and several water wells observed by the writer were drilled through the contact. The records of these drillings reveal that the chalk becomes increasingly sandy toward the base and contains numerous shell beds, one of the more prominent being the shell conglomerate at the base of the Demopolis which is present at several localities.

At many places outcrops of Demopolis in Prentiss County are generally good. The formation consists of a dark-gray to bluish-gray impure chalk which weathers glaring white to buff. The chalk is typically massive; however, some of the more clayey and sandy parts exhibit distinct bedding planes. Calcium carbonate is the main constituent of the chalk; subordinate constituents are variable amounts of sand, silt and clay. Generally the chalk is sandy in basal intervals and becomes increasingly more argillaceous in upper parts. At places the chalk contains scattered irregular nodules of marcasite which are altering to limonite. Muscovite mica and gypsum or selenite are common accessory minerals.

Locally fossil shells of mollusks are found in layers and form an important part of the lithologic content of the chalk (Figure 17).

Figure 18.—Bald spots of chalk on southward facing slope of the Mississippi-Tombigbee River divide south of State Highway 4. February, 1959.

The best exposures of Demopolis are on the southward facing slopes of the Mississippi-Tombigbee River divide. At places the chalk is severely eroded and bald spots and gullys are common (Figure 18). Good exposures are shown by the cuts of gravel roads to the south of State Highway 4 which traverses the divide from Booneville into the Tippah Hills.

North of this divide the Demopolis is deeply weathered and concealed by a mantle of sandy residual clay which is under a thin cover of loessal material locally.

Excellent outcrops are scattered over an area several miles wide along the western margin of the outcrop belt south of Mississippi Highway 4. This territory is of moderate relief and dissected by streams which have their head-waters in the more resistant Ripley formation of the Tippah Hills.

Considerable tracts in the eastern half of the outcrop belt are covered by terrace deposits and alluvium, which blend with the low rolling to nearly flat topography.

A fair section near the base of the Demopolis, noted by Stephenson and Monroe,[69] has been revealed by the cut of the Gulf, Mobile and Ohio Railroad south of the station at Booneville. The exposure is described as consisting of about 35 feet of light-gray compact argillaceous chalk becoming sandy at the base.

Even though few sections of chalk are exposed north of Mississippi Highway 4, one of the best in the county is in a new north-south cut in the south valley wall of Pollys Creek Valley some 5 miles west and north of Booneville (SE. cor., NE.¼, SW.¼, Sec. 24, T.4 S., R.6 E.). At this locality about 72 feet of material is exposed by the road cut and the west ditch and shows several associated weathering zones.

SECTION (SE. COR., NE.¼, SW.¼, SEC.24, T.4 S., R.6 E.) IN A NEW ROAD CUT IN THE SOUTH VALLEY WALL OF POLLYS CREEK.

	Feet	Feet
Demopolis formation		72.0
4. Sand, various shades (whitish to tan to brown), splotched with iron oxide, fine-grained, sparingly micaceous, argillaceous (questionably residuum from chalk)	9.5	
3. Sandy clay, tan to brown, calcareous, micaceous; contains some unaltered remnants of chalk and fragments of fossils (residuum from chalk)	6.0	
2. Chalk, white to buff, hard, fossiliferous; contains selenite crystals	8.0	
1. Chalk, dark-gray, weathers glaring white to bluish-white, hard, fossiliferous; contains *Exogyra cancellata* Stephenson, *Anomia tellinoides* Morton, and others	48.5	
Total section		72.0

Another good exposure noted by Stephenson and Monroe[70] is on the northeastward facing slope of Osborne Creek Valley (SE.¼, NE.¼, Sec.2, T.5 S., R.6 E.) on a road from Booneville to Walnut Grove School. This section is described as consisting of some fifty feet of hard, argillaceous chalk containg *Exogyra cancellata* Stephenson, *Anomia tellinoides* Morton, and other common fossils in the upper part.

Other prominent outcrops which are good fossil collecting localities and are easily accessible by improved roads are:

(1) bald spots and gullies near State Highway 4 some 3 to 3.5 miles northwest of Booneville (Sec.36, T.4 S., R.6 E.);

(2) gullied exposures some 2.5 to 3.0 miles west and north of Booneville on a road to the south from State Highway 4 (SW.¼, Sec.6, and NW.¼, Sec.7, T.5 S., R.7 E.);

(3) on the east-facing valley wall of Osborne Creek along a gravel road some 2 miles southwest of State Highway 4 (SE.¼, NW.¼, Sec.12, T.5 S., R.6 E.);

(4) in a road cut on the northwest-facing valley wall of a branch of Wolf Creek (SE. cor., NE.¼, SE.¼, Sec.10, T. 5 S., R.6 E.);

(5) in a road on the west-facing valley wall of a branch of Little Wolf Creek some 1.2 miles north and west of Blackland (SE.¼, NE.¼, Sec.17, T.5 S., R.6 E.);

(6) gullied terrane just north of Oak Hill Baptist Church some 1.6 miles south of Blackland (NW.¼, NE.¼, Sec.28, T.5 S., R.6 E.);

(7) in a cut of a section-line road on the north-facing valley wall of Twenty Mile Creek some 2.7 miles west and north of Frankstown (NW. cor., SW.¼, SW.¼, Sec.3, T.6 S., R. 6 E.);

(8) on the northeast-facing valley wall of Okolalah Creek in a road cut some 2.7 miles north and west of Baldwyn (SE.¼, SE.¼, Sec.29, T.6 S., R.6 E.);

(9) in the cut for State Highway 370 on the northeast-facing valley wall of Okolalah Creek some 1.7 miles west of Baldwyn (SW.¼, SE.¼, Sec.33, T.6 S., R.6 E.);

(10) in the cut for State Highway 370 on the east- and west-facing valley walls of Campbelltown Creek some 2.3 to 2.9 miles west of Baldwyn (South line Sec.32, T.6 S., R.6 E.); and

(11) in the cut for State Highway 370 on the west-facing valley wall of Tishomingo Creek about 0.4 mile north of Bethany, Lee County (SE.¼, SW.¼, Sec.36, T.6 S., R.5 E.).

Test Holes 4 and 5 were drilled through the entire Demopolis and showed a thickness of about 230 to 235 feet for the formation in Prentiss County.

The Demopolis chalk has a prolific fauna in many places; some strata consist almost entirely of shell remains. Stephenson and Monroe[71] have established faunal zones in the Upper Cretaceous, two of which are represented in the Demopolis in Prentiss County.

Exogyra ponderosa Roemer, which first appears in the Tombigbee sand member of the Eutaw and continues through the Coffee sand, gives way at about 110 feet above the Coffee to *Exogyra cancellata* Stephenson and *Exogyra costata* Say. *Exogyra cancellata* Stephenson and *Anomia tellinoides* Morton constitute a subzone throughout the upper 120 feet of the chalk and possibly inclusive of the transitional clay which has been placed in the Ripley formation. *Exogyra costata* Say continues into the Ripley and has been found to range throughout the upper part of the Cretaceous.

Additional fossils commonly found which have long range in the Cretaceous are *Ostrea plumosa* Morton, *Ostrea falcata* Morton, *Ostrea (Gryphaeostrea) vomer* (Morton), *Gryphaea convexa* (Say), *Gryphaea mutabilis* Morton, *Anomia argentaria* Morton, and *Paranomia scabra* (Morton) (Figure 22).

In Prentiss County the Demopolis chalk conformably overlies the Coffee sand and is conformably overlain by the Ripley formation.

The Demopolis chalk is the correlative of the Taylor group of the Texas section and is the equivalent of the Campanian stage of the European section (Figure 4).

RIPLEY FORMATION

Hilgard,[72] in 1860, first used the name "Ripley" in a group sense. The term was intended to include all strata between the top of the "Rotten limestone" and the base of the overlying Tertiary deposits. No specific type locality for the Ripley was designated by Hilgard but beds exposed in the vicinity of Ripley, Tippah County, were so named. Harris,[73] in 1896, recognized that Hilgard had erroneously included in the Ripley a few feet of limestone and overlying sand and clay now known to belong to the

Clayton formation of Midway age (Paleocene). In 1937, Stephenson and Monroe[74] showed that beds designated Owl Creek marl by Hilgard and included in the Ripley, rest disconformably on the underlying beds. The Owl Creek was thus treated as a separate geologic unit of formational rank. The name "Ripley" is now restricted to that part of Hilgard's Ripley group which lies between the Demopolis formation below and the Owl Creek and Prairie Bluff formations above.

"Ripley formation" in this report refers to all those beds above the Demopolis and consists of three units: the transitional clay, the Coon Creek tongue, and the McNairy sand member.

The Ripley crops out in Mississippi in a general north-south trending belt which is about 17 miles wide at the Tennessee state line, Alcorn and Tippah Counties, and narrows to the south to about 2 miles in width at the Alabama state line, Noxubee and Kemper Counties. It is exposed in parts of Alcorn, Tippah, Prentiss, Union, Pontotoc, Chickasaw, Clay, Oktibbeha, Noxubee and Kemper Counties.

The Ripley formation crops out diagonally across the northwestern part of Prentiss County, and has a maximum width of about 5 miles in the northern part of the outcrop belt. Only the lower Ripley (transitional clay and Coon Creek tongue) and scattered outliers of the middle Ripley (McNairy sand member) are exposed in the county; the middle and uppermost parts are at the surface to the west in Tippah and Union Counties. The approximate eastward extension of the Ripley is limited by an irregular line extending south-southwesterly from a point in the vicinity of Pisgah School about 5 miles east of the northwest corner of the county at the Alcorn County line, to a point about half a mile north of State Highway 30 at the Union County line (Plate 1).

The Ripley formation underlies a series of high to moderate relief, rugged to rolling hills in the western and northwestern parts of Prentiss County. These hills, known locally as the Tippah Hills, represent the eastward extension of the Pontotoc Hills physiographic division.

In the western part the Tippah Hills rise abruptly above the low rolling topography developed on the calcareous materials of the Demopolis formation and reflect the presence of the more resistant sandy materials which compose the Ripley. Some of the higher peaks are capped by ledges of ferruginous sandstone of the McNairy sand member. Altitudes range from about 500 feet to almost 800 feet. Relief is greatest in the southern and central parts of the outcrop belt and becomes less to the north, where topography is more mature.

The contact between the Demopolis formation and the Ripley formation is conformable and is marked by beds which have been considered a separate unit, "transitional clay", and included in the Ripley by previous authors.

The contact between the transitional clay above and the impure chalk of the Demopolis below is gradational, and its exact position is primarily a matter of personal judgment. In Prentiss County exposures are poor and in most cases deeply weathered and the contact is indefinite.

Despite its thickness and relatively great relief, the Ripley is generally very poorly exposed. Because of ground-water conditions, the sandy materials are greatly altered by weathering, and outcrops are chiefly of iron-stained rock mixtures not easily separated into individual beds. Roads into the Tippah Hills are few; therefore, road cut exposures are not numerous. Unit boundaries were determined chiefly by a few scattered outcrops and by topographic position.

TRANSITIONAL CLAY

The transitional clay has previously been mapped as such by Conant[75, 76] in Tippah and Union Counties and by Priddy[77] in Pontotoc County. It is a gray, calcareous, sandy, somewhat fossiliferous clay of about 40 to 45 feet in thickness and crops out at the base of the Tippah Hills. Where weathered it is plastic, olive gray clay which forms a reddish soil. Generally erosion of this clay leaves broad, low, rounded hills which appear slightly more resistant to erosion than the hills underlain by the chalk on the east. Where capped by the sandier Coon Creek deposits, the hills are somewhat steeper. Both weathered and unweathered outcrops of transitional clay closely resemble those of the Demopolis.

The best exposure of transitional clay in Prentiss County is in the cut of the Blackland-Jumpertown road about 1.8 miles north-northwest of Blackland (SE.¼, NE.¼, Sec.8, T.5 S., R.6 E.).

At this locality, a 45- to 50-foot section reveals transitional clay overlain by weathered reddish-brown sandy materials of the Coon Creek.

Kennedys bluff, on the west side of Tishomingo Creek just inside Union County (NW.¼, SE.¼, Sec.14, T.6 S., R.5 E.), affords a 40- to 50-foot exposure of unweathered fossiliferous gray material which exhibits the gradation from the Demopolis at its base into the sandier transitional clay above.[78]

Test Holes 4 and 5 show a thickness of about 40 to 45 feet for the transitional clay.

COON CREEK TONGUE

The name "Coon Creek" was first used by Wade,[79] in 1917, for exposures along the banks of Coon Creek, McNairy County, Tennessee. Later (1926) Wade[80] redefined the Coon Creek tongue of the Ripley formation as those beds underlying the McNairy sand member and overlying the "Selma formation." Stephenson and Monroe,[81] in 1940, applied the name "Coon Creek" to the lower part of the Ripley where overlain by the McNairy sand member. Conant[82, 83] mapped the Coon Creek in Tippah County; and in Union County, he designated those beds below the McNairy sand member as Coon Creek. In this report the name "Coon Creek" refers to those beds immediately above the transitional clay and below the McNairy sand member.

The separation of the transitional clay from the overlying Coon Creek is made solely on the basis of sand content. In a personal communication to Conant,[84] Monroe suggests that the contact between the transitional clay and the Ripley be considered the level where the sandy constituents of the Ripley become noticeable.

The Coon Creek tongue of the Ripley formation in Prentiss County consists of beds of sand, marl, subordinate beds of clay, and some thin beds of sandstone. An exposure of about 12 feet of dark-gray, fossiliferous marl crops out in a cut of State Highway 4 some 6.3 miles northwest of Booneville (SW.¼, NE.¼, Sec.28, T. 4 S., R.6 E.). The marl is also exposed in the highway cut about half a mile to the west (NW.¼, SW.¼, Sec.28, T.4 S., R.6 E.).

Another outcrop of dark-gray marl is in a road ditch on a county road into the Tippah Hills some 2.8 miles southwest of Blackland (NW.¼, SE.¼, Sec.20, T.5 S., R.6 E.).

Test Hole 4 revealed 20 feet of blue to dark-gray, fossiliferous marl at the base of the Coon Creek.

Stephenson and Monroe[86] describe a section which shows the character of some of the Ripley sands in Prentiss County. Their location of this section is somewhat indefinite; however, an exposure in the cut of a county road which crosses the ridge some 4.3 miles southwest of Blackland (SE.¼, NE.¼, Sec.19, T.5 S., R.6 E.) consists of the lower sand and hard calcareous sandstone of their section with the upper sand unit poorly exposed.

"SECTION ON ROAD ON SOUTHEASTWARD-FACING SLOPE ABOUT 8½ MILES WEST BY SOUTH OF BOONEVILLE (SEC.19, T.5 S., R.6 E.)

	Feet
Ripley formation	
Greenish-gray and light brown argillaceous sand containing calcareous nodules	17.0
Hard calcareous sandstone	0.5
Finely cross-bedded medium-grained sparingly glauconitic white sand with yellow streaks; some parts are cemented with brown iron oxide	23.0
	40.5"

About 0.3 mile west of this locality (Cen. NW.¼, Sec.19, T.5 S., R.6 E.), the hard calcareous sandstone is well exposed in a road cut (Figure 19). This sandstone forms a continuous bed that shows at several other places; however, it seems to be a local feature and probably can not be traced many miles north or south.

Another good section of Coon Creek sands is revealed by a sand pit on the southeast face of Geeville Mountain north of State Highway 30 about 0.8 mile southwest of Geeville (NE.¼, SE.¼, Sec.7, T.6 S., R.6 E.) (Figure 20).

SECTION IN SANDPIT ON SOUTHEAST FACE OF GEEVILLE MOUNTAIN NORTH OF STATE HIGHWAY 30 ABOUT 0.8 MILE SOUTWEST OF GEEVILLE (NE.¼, SE.¼, SEC.7, T.6 S., R.6 E.)

	Feet	Feet
Colluvium		8.0
4. Sand, tan to red-brown splotched light-gray, fine-to medium-grained, clayey, micaceous; contains tabular pieces of ferruginous material	8.0	
Ripley formation (Coon Creek tongue)		42.0
3. Clay, gray, plastic	0.5	
2. Sand, varicolored (white, yellow, tan, brown, red-brown), loosely consolidated, medium- to coarse-		

Figure 19.—Hard calcareous sandstone in the Coon Creek tongue exposed in road cut (Cen. NW. ¼, Sec. 19, T.5 S., R.6 E.). April, 1959.

Figure 20.—Coon Creek sands exposed in sand pit on southeast face of Geeville Mountain (NE. ¼, SE. ¼, Sec.7, T.6 S., R.6 E.). February, 1959.

grained, cross-bedded, slightly glauconitic, micaceous, splotched and streaked with iron oxide; contains some layers up to 1.0 foot thick which are loosely cemented with iron oxide and protrude as slight ledge. Thin ferruginous layer at base	35.5	
1. Sand, varicolored (yellow, tan, brown), fine- to medium-grained, slightly glauconitic, micaceous, splotched and streaked with iron oxide; contains some thin laminae of clay, clay blebs, and some manganiferous galls (start section at base of pit)	6.0	
Total section		50.0

A fair showing of Coon Creek sands and weathered clays is in a cut on a road crossing the Tippah Hills ridge and passing through Secs.5 and 6, T.5 S., R.6 E. some 10 miles west of Booneville (SE. cor. NE.¼, Sec.6, T.5 S., R.6 E.).

Test Hole 4 was drilled through Coon Creek sands, clays and marl.

In Prentiss County the thickness of the Coon Creek is estimated from the exposure on Lebanon Mountain (Sec.12, T.6 S., R.5 E.). The top of the "mountain" is about 300 feet above the Demopolis-Ripley contact at its base. Allowing approximately 80 to 90 feet for the McNairy at the top of this elevation, and a thickness of from 40 to 45 feet for the transitional clay at its base, an interval of from 165 to 180 feet remains for the Coon Creek deposits.

MC NAIRY SAND MEMBER

The term McNairy was first applied by Stephenson,[86] in 1914, to beds exposed in a cut of the Southern Railroad 1.25 miles west of Cypress Station, McNairy County, Tennessee. As first defined the member included beds of the Owl Creek formation at the top and ferruginous clays of the Coon Creek at the base. Wade,[87] in 1926, redefined the member as those beds between the Coon Creek tongue below and the Owl Creek formation above. Stephenson and Monroe[88] mapped the McNairy sand member of the Ripley formation in Mississippi; and Conant [89, 90] later did detailed work on the McNairy in Tippah and Union Counties.

The McNairy in Prentiss County is represented by strongly indurated ferruginous sandstone ledges and sands which cap the higher peaks of the Tippah Hills. The best exposure is within the top 80 to 90 feet of Lebanon Mountain (Sec.12, T.6 S., R.5 E.) (Figure 21).

Conant[91] estimates the thickness of the McNairy as 100 feet in Union County, thickening to the north to about 200 feet in Tippah County.

That part of the Ripley formation which crops out in Prentiss County has a maximum thickness of about 300 feet.

Figure 21.—Indurated ferruginous sandstone of the McNairy on top slope of Lebanon Mountain (Sec. 12, T.6 S., R.5 E.). April, 1959.

No faunal collections were made from the Ripley in Prentiss County. The transitional clay and some beds of the Coon Creek are sparsely fossiliferous. The fossils are, in most part, poorly preserved and found only in a few scattered exposures. Faunal relations were not established; however, beds which appear to be transitional clay contain *Exogyra cancellata* Stephenson.

The Ripley formation conformably overlies the Demopolis formation and is disconformably overlain by the Owl Creek and Prairie Bluff formations. Russell[92] suggested a similarily and possibly equivalence of the transitional clay with the Bluffport marl member of the Demopolis formation. The Ripley formation is correlated with the Navarro group of the Texas section and is the equivalent of the Maestrichtrian stage of the European section (Figure 4).

PLEISTOCENE AND HOLOCENE DEPOSITS

The more recent deposits, which cover the bedrock in considerable areas, presumably were laid down or formed as a part of the Pleistocene series and Holocene series of the Quaternary system. These sediments are of several types: alluvium, terrace terrane, loessal materials, colluvium, residuum and soils. The larger alluvial and terrace deposits were mapped with the aid of the recent soils maps of the county[93] (Plate 1).

Perhaps the most prominent of these depositional types is the alluvium, which is present in the channels and beneath the flood plains or first bottoms of the major streams. The flood plains, where well developed, are broad, relatively flat low areas underlain by alluvial materials consisting of sand, silt, clay and some gravel. The flood plain alluvium is the result of deposition following periods of considerable rainfall and erosion, at which time the streams carry maximum loads and may swell beyond their banks (before flood control) spreading a veneer of sediments over the valley floors. Many successive floodings eventually bring about a partial filling of the valleys, and a broad alluvial plain is developed away from the natural channel. The flood plains are most extensive along streams which have cut broad valleys in less resistant rock formations and which have progressed to some degree of maturity. They are narrow or absent in most areas of outcrop of the more resistant formations, and the topography is in a somewhat more youthful stage.

Terrace or second bottoms, which have been left along several or the larger streams, represent old flood plain surfaces of an earlier stage in stream development. The deposits underlying these surfaces are of the same general constitution as the alluvial deposits; however, they may contain somewhat coarser materials, because the streams would normally have greater transporting power during their earlier stages. This variation in constitution is, nevertheless, largely dependent on the source of material.

Flood-plain and terrace deposits are well developed along Yellow, Mackys, Little Brown, Big Brown, Donivan, Twenty Mile, and Dry Creeks, and the Tuscumbia River. They extend some distance up the tributaries of some of the streams named.

In the northern part of the Black Prairie belt north of State Highway 4, a thin blanket of loessal material caps some of the hills. It is a fine silt loam containing some disseminated fine sand

and clay. These deposits are believed to have accumulated as a result of wind transportation of fine materials derived from flood plain deposits laid down during the great flooding which accompanied Pleistocene glaciation. These materials were presumably spread over the land surface by west prevailing winds.

Colluvial deposits are on the slopes of many of the hills, particularly those which have only a sparse cover of vegetation, and are the expression of landslides, soil creep, slope wash, and slump; all which are local features associated with the present erosional cycle. Much of the land wasting and erosion has been checked by work done by the Soil Conservation Service.

Over large areas of the land surface, weathering has created a residual blanket which now covers the bedrock. Much of this material was probably included in Hilgard's "Orange Sand formation," which he described as covering the bedrock in most parts of the State.[94]

Because of its clay content, the most important residuum is the clay, silt and sand which overlies the Demopolis formation in considerable areas north of State Highway 4 and in other areas in the western and southern parts of the county. This mantle ranges from 0 to 20 feet in thickness. Elsewhere a residual layer is present on the sandy materials which make up the Tombigbee and Tennessee River Hills and the Pontotoc Hills. It is characterized by iron oxide stained sands and clays which are somewhat altered from their original bedrock form, due to subaerial weathering and ground-water conditions. The distinction of residuum from soils is hardly practical; the only difference is that the residuum extends to depths greater than those normally reached by soils or subsoils.

Soils are developed on the land surface from the disintegration of parent rock, and they support plant growth. Soil types vary from place to place and depend chiefly on the parent rock and the topographic expression for their character in a region.

FOSSIL LOCALITIES

The following localities are described by L. W. Stephenson and W. H. Monroe in Mississippi Geological Survey Bulletin 40 (Figure 22).

Species of fossils	Demopolis formation, Exogyra costata / E. cancellata zone			Demopolis formation, Exogyra ponderosa zone			Coffee formation (upper part)		Coffee formation (lower part)		Tombigbee sand, Eutaw formation		
	6871 - Blackland, 1 mi. W	6456 - Booneville, 3 1/2 mi. NW	6908 - Blackland, 1/2 mi. E	6457 - Booneville, 1 1/2 mi. SW	6455 - Booneville	6455b - Booneville	6907 - Booneville 3/4 mi. S	17783 - Booneville 7 1/2 mi. SE	6454 etc. - Booneville 6 mi. E	6458 etc. - Hares old mill	9517 - Marietta	6458b etc. - Hares old mill	17782 - Booneville 7 1/2 mi. SE
Vermes:													
Serpula cretacea (Conrad)									X				
Hamulus onyx Morton					X								
Mollusca:													
Pelecypoda:													
Nucula aff. N. percrassa Conrad								X					
N. aff. N. stantoni Stephenson									X				
N. cf. N. perequalis Conrad									X				
Idonearca aff. I. carolinensis Gabb									X	X			
I. aff. I. wadei (Imlay)								X					
Gervilliopsis aff. G. ensiformis (Conrad)										X			
Inoceramus (several species)				X							X		
Ostrea plumosa Morton		X		X	X	X	X		X		X	?	X
O. whitei Stephenson													X
O. tecticosta Gabb		X											
O. panda Morton		X											
O. falcata Morton		X		X	X								
Gryphaea mutabilis Morton	X	X		X	X								
G. convexa (Say)			X		X	X							
Gryphaeostrea vomer (Morton)		X		X	X	X							
Exogyra costata Say (wide costae)	X												
E. cancellata Stephenson	X	X											
E. ponderosa Roemer			X	X	X			X			X	X	X
E. ponderosa erraticostata Stephenson				X		X							
E. aff. E. upatoiensis Stephenson										X			
Trigonia n. sp.								X	X	X			
Pecten (Neithea) casteeli Kniker												X	
P. (Camptonectes) aff. P. (C.) bellisculptus Conrad										X			
Anomia argentaria Morton		X		X	X	X						X	
A. tellinoides Morton		X											
Paranomia scabra (Morton)		X		X	X	X		?					
Veniella conradi (Morton)									X				
Etea carolinensis Conrad									X	X			
Crassatella sp.								X	X	X			
Cardium (Trachycardium) carolinense Conrad							X						
C. (Granocardium) aff. C. (G.) alabamense (Gabb)									X				
C. (G.) aff. C. (G.) dumosum (Conrad)										X			
C. (Pachycardium) aff. C. (P.) spillmani Conrad							X						
Cyprimeria aff. C. alta Conrad								X	X				
Corbula crassiplica Gabb									X				
Panope aff. P. decisa Conrad										X			
Scaphopoda:													
Cadulus aff. C. obnutus (Conrad)									X				
Gastropoda:													
Gyrodes aff. G. abyssinus (Morton)								X					
Turritella trilira Conrad								X		X			
T. quadrilira Johnson								X	X	X			
Cephalopoda:													
Baculites sp.									X				
Placenticeras aff. P. planum Hyatt										X			
Mortoniceras sp.										X			

Figure 22.—Species of fossils collected and identified from localities in Prentiss County. (From distribution charts by L. W. Stephenson and W. H. Monroe, M. G. S. Bull. 40).

Eutaw formation (Tombigee sand member)

"9517.—A quarter of a mile west of Marietta on the Baldwyn road, Prentiss County.

6458b.—Near Hare's old mill site on Big Brown Creek, 9 miles east of Booneville, Prentiss County.

17782.—Northeastward-facing slope of Youngs Creek Valley (Sec.9, T.6 S., R.8 E.) 7½ miles southeast of Booneville, Prentiss County."

Coffee formation (lower part)

"17783.—Road cut on the northeastward-facing slope of Youngs Creek Valley (Sec.9, T.6 S., R.8 E.), Prentiss County.

6454, 6909, 9501.—Six miles east of Booneville on road to Hare's old mill site, Prentiss County.

6458, 6910, 9502.—Hare's old mill site on Big Brown Creek, 9 miles east of Booneville, Prentiss County."

Coffee formation (upper part)

"6907.—Bluff of small branch of Boyer Creek, ¾ mile south of Booneville, Prentiss County."

Demopolis formation (*Exogyra ponderosa* zone)

"6908.—Bald spots near public road, half a mile east of Blackland, Prentiss County.

6457.—Bald spots near Geeville road, 1½ miles southwest of Booneville, Prentiss County.

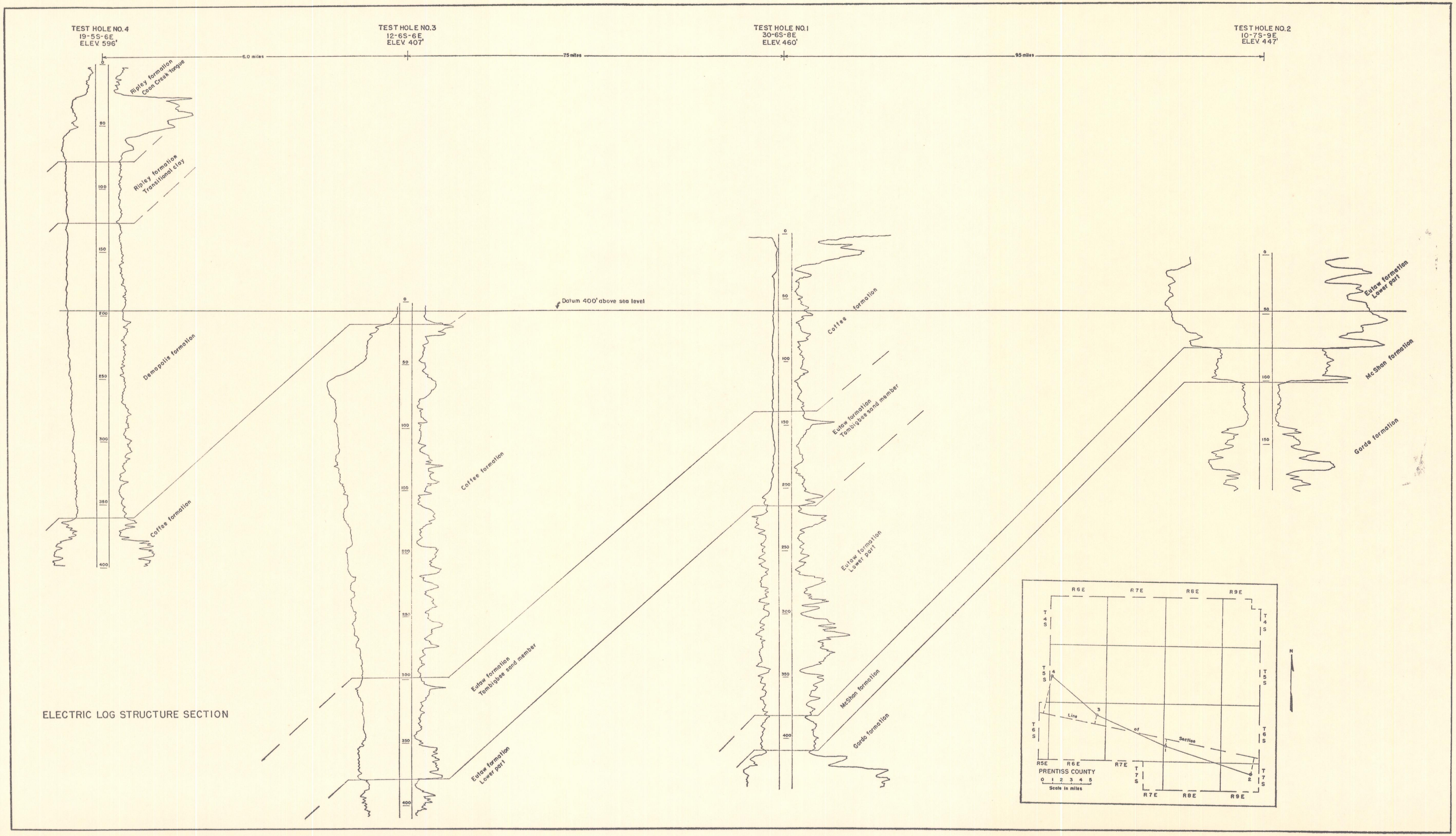
6455.—Above track level in the cut of the Mobile and Ohio Railroad south of the station at Booneville, Prentiss County.

6455b.—Below track level in the cut of the Mobile and Ohio Railroad south of the station at Booneville, Prentiss County. Base of Selma chalk just above the Coffee sand."

Demopolis formation (*Exogyra cancellata* zone)

"6871.—Bald spots near public road a mile west of Blackland, Prentiss County.

6456.—Bald spots and gullies near Ripley road, 3½ miles northwest of Booneville, Prentiss County."



ELECTRIC LOG STRUCTURE SECTION

STRUCTURE

The general structural configuration of the bedrock strata in Prentiss County is homoclinal; regional dip averages about 30 feet per mile to the west. Plate 3 shows the general structural and stratigraphic relations of the sediments and the Widco electrical character of the subsurface units.

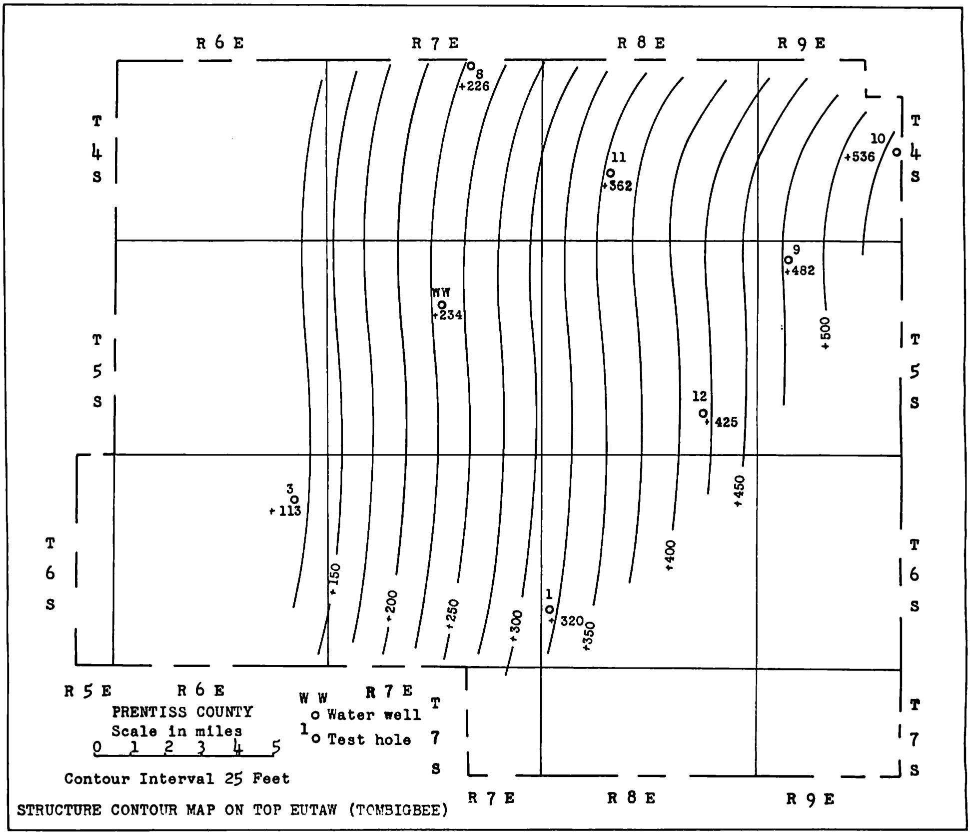


Figure 23.—Structure contour map of top Eutaw (Tombigbee).

No major surface faults or other structures were found in the county; however, it is believed that a small fault exists in the Martins Creek area on State Highway 30 east of Booneville (Sec.30, T.5 S., R.8 E.). On the west facing slope of Big Brown Creek Valley in the cut of State Highway 30, the contact between the Tombigbee sand member and the Coffee formation is well exposed at an altitude of about 400 feet (NE.¼, Sec.27, T.5 S., R.8 E.). Here a concretionary calcareous sandstone in the Tombigbee is exposed at a position 10.5 feet below the contact. The basal Coffee is a silty sand which contains numerous fossils, some of which are not common to the Tombigbee (*Trigonia* sp., etc.), and phosphatic molds of fossils. The base of the Coffee is marked by a thin discontinuous layer rich in ferruginous material and containing limonitic molds of fossils. West of this exposure, in the cut of State Highway 30 on the west facing slope of Martin Creek Valley, the fossiliferous basal Coffee crops out in the road ditch (SE.¼, Sec.21, T.5 S., R.8 E.). This outcrop also shows fossils not common to the Tombigbee, and the presence of phosphatic molds of fossils seems to indicate that it is near the Tombigbee-Coffee contact. The exact contact is concealed or obscured; however, on the basis of the preceding measured section the contact is assumed to be at an altitude of 375 feet, which is in accordance with the normal dip of the area. On the east-facing slope of Martin Creek Valley is a section which is similar to the Big Brown Creek Valley section (NE.¼, SW.¼, Sec.21, T.5 S., R.8 E.). It also contains a calcareous concretionary sandstone in the Tombigbee which appears to be the same sandstone as that of the Big Brown Creek Valley section. About 10 feet above the sandstone is a bed characteristically rich in ferruginous material and containing numerous limonitic molds of fossils. This layer, at an altitude of about 400 feet, appears to be the base of the Coffee. If the above interpretation of the structural relations is correct, there would be a fault in the Martin Creek area, having a displacement of about 30 feet.

Figure 23 is a structure contour map of the northeastern and central parts of the county. The map is drawn on the top of the Tombigbee sand because of the lack of another suitable datum in the predominantly sandy formations. In drilling the test holes, the writer observed a characteristic color change between the Coffee and the Tombigbee deposits (dark-gray to dark greenish-gray) and a change in mud texture. In several test holes, the calcareous concretionary sandstone, which is noted in several surface exposures, was encountered near the top of the Tombigbee.

Figure 24 is a structure contour map of the western part of the county, drawn on the top of the Coffee formation. The top of the Coffee seemed to be a somewhat more reliable datum because of the relatively sharp lithologic change between the chalk of the Demopolis and the sand of the Coffee. It is not a true datum, however, because of the lateral gradation of the two units.

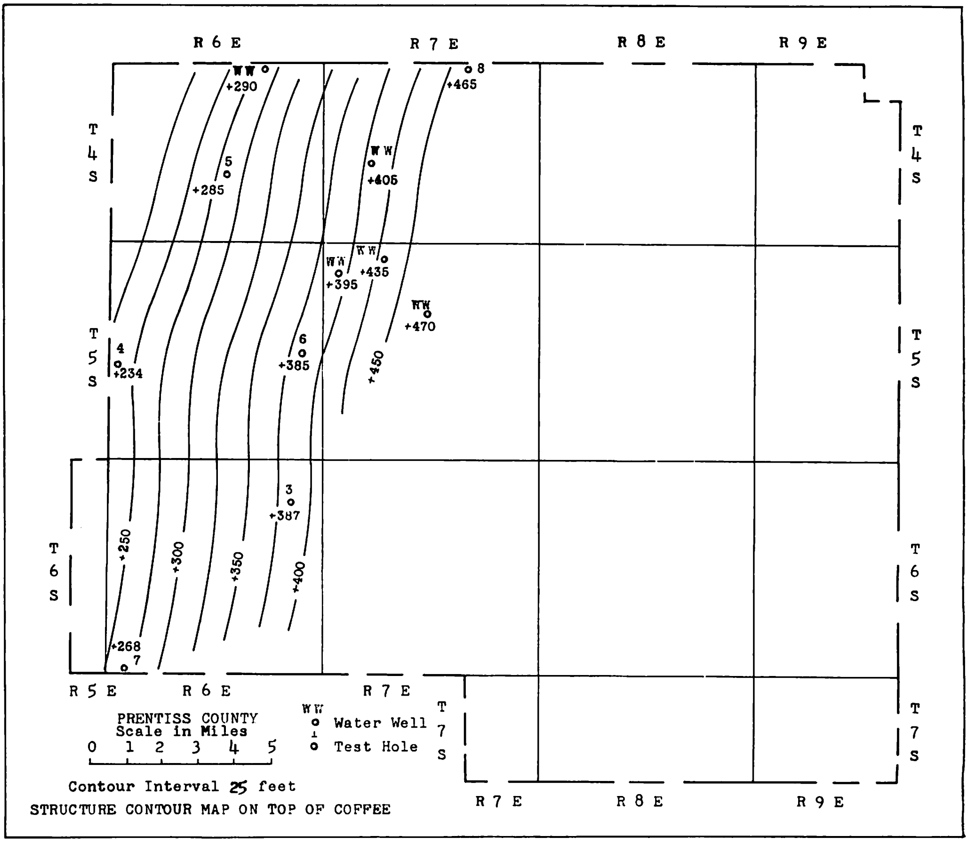


Figure 24.—Structure contour map of top Coffee.

GEOLOGIC HISTORY

In this report the geologic history of the rock formations of Prentiss County applies only to those exposed bedrock deposits of Upper Cretaceous age. The formations involved are, in ascending order, the Gordo, the McShan, the Eutaw, the Coffee, the Demopolis, and the Ripley. Underlying these units are rocks representing the Paleozoic Era which are little known because they are concealed and the only record of their character is revealed by the several oil-test wells drilled into them and scattered outcrops in Tishomingo County. The surface of the Paleozoic rocks seems, however, to be a suitable starting point for a discussion of the geologic history.

Prior to the beginning of Upper Cretaceous time the area now known as Prentiss County is believed to have been a land surface which had been at various altitudes above sea level for a considerable length of geologic time, embracing time essential for the deposition of strata from the Pennsylvanian to Upper Cretaceous age. By the beginning of the Upper Cretaceous, this land surface, which had developed on Paleozoic rocks, had been reduced to a broad low-lying plain of little relief. Early in Upper Cretaceous time crustal deformation caused a tilting of this plain, which resulted in downwarped areas to the south and uplifted areas to the north. This movement caused a rejuvenation of streams flowing from the north and east and an encroachment of the Gordo sea from the south and west. Steepened gradient resulted in the transportation and deposition of large quantities of gravel and sand and subordinate quantities of silt and clay. These sediments were deposited on flood plains, in deltas, and in shallow sea waters, all which were marginal near shore environs subject to reworking as the sea advanced. At the close of the Gordo, the sea withdrew and the Gordo sediments were exposed to a period of erosion.

At the beginning of McShan time, a shallow sea transgressed the eroded land surface of the Gordo deposits. Fine sediments—sands, silts and clays—were dominant depositional components in the relatively quiet shallow sea waters. These fine materials were distributed by gentle waves and currents to form finely laminated and finely cross-bedded strata. Conditions for the preservation of marine fossils were unfavorable; however, the presence of some glauconite substantiates a marine environment. Fossils include some plant fragments derived from nearby lands which are preserved as carbonaceous materials and pieces of lignite. McShan time was followed by another period of emergence and erosion.

At the beginning of Eutaw time the sea transgressed upon the irregular, eroded land surface which had developed on the McShan deposits. As the sea advanced, parts of the McShan were reworked and redeposited as thin layers or stringers of clay blebs or silt blebs in a matrix of reworked and newly deposited sands and some fine chert gravel. Along the shore, logs and wood fragments were left as driftwood and quickly buried in the sands beneath the shallow sea waters—later to be silicified. This phase was followed by the deposition of sands and subordinate amounts of clay and some scattered fine chert gravel. Contemporaneously with sand deposition, greater or lesser amounts of clay were deposited in the form of thin laminae of laminated layers interbedded with thin-bedded sands. The materials were distributed by waves and currents in such a manner as to exhibit irregular bedding and various cross-bedding features. Some vegetal matter which floated into the sea was preserved as small lignitized fragments, larger pieces or even here and there a lignitized log. Conditions seem to have been generally unfavorable in early Eutaw time for the preservation of marine fossils; nevertheless a few sharks' teeth and bone fragments along with an abundance of glauconite, which is disseminated throughout the sediments in greater or lesser amounts, indicate a marine environment. Late in Eutaw time the deposition of the Tombigbee sand accompanied a further sinking of the sea bottom and a consequent deepening of the waters. That the sea bottom was only slightly if at all affected by waves and currents is indicated by the massive to faintly bedded nearly homogeneous sands. Conditions were favorable for a variety of marine animals, and their remains abound in certain layers; however, considerable thicknesses apparently contain no trace of fossil remains. Glauconite was formed and deposited in abundance with the sands. At the close of Eutaw time there was a relatively short (geologically speaking) period of emergence during which great areas were exposed to a little subaerial erosion and to wave action. This break in the depositional record is evidenced by the presence of phosphatic molds of fossils abundant in some basal parts of the Coffee and by a faunal change between the Eutaw and the Coffee, indicated by the abundance in the basal Coffee of certain genera that are not common to the Tombigbee.

At the beginning of Coffee time the low-lying plain which had developed on the Tombigbee was submerged rather quickly. The first Coffee deposition was in a rather muddy sea and is represented, in most part, by silty sands and sandy silts. Some basal sands somewhat resemble the Tombigbee sands, and may be, in part, reworked materials mixed by the advancing sea.

Sand remained the dominant depositional component; silt and clay were subordinate. Minor oscillations of the sea bottom are indicated by the massiveness of some beds as compared to the distinct cross-bedding of others. The fossil remains of a large variety of marine animals are embedded in certain layers. Glauconite was formed in greater or lesser amounts and here and there lignitized plant remains are present. During early upper Coffee deposition vulcanism was active on nearby lands, as is evidenced by some bentonite beds which were formed in pockets on the sea bottom. The deposition of the Coffee ended as a result of a lessening of the supply of sandy materials brought in to the sea by the streams and currents.

Following Coffee deposition the sea cleared somewhat and chalk forming conditions succeeded. The impure chalk of the Demopolis, which contains variable amounts of clay, silt, and sand, was the dominant depositional feature. Marine life thrived under these conditions and numerous fossil shells are present throughout the chalk. Some layers are composed almost entirely of fossil remains. The Demopolis deposition ended with the introduction of large quantities of clastic materials into the sea.

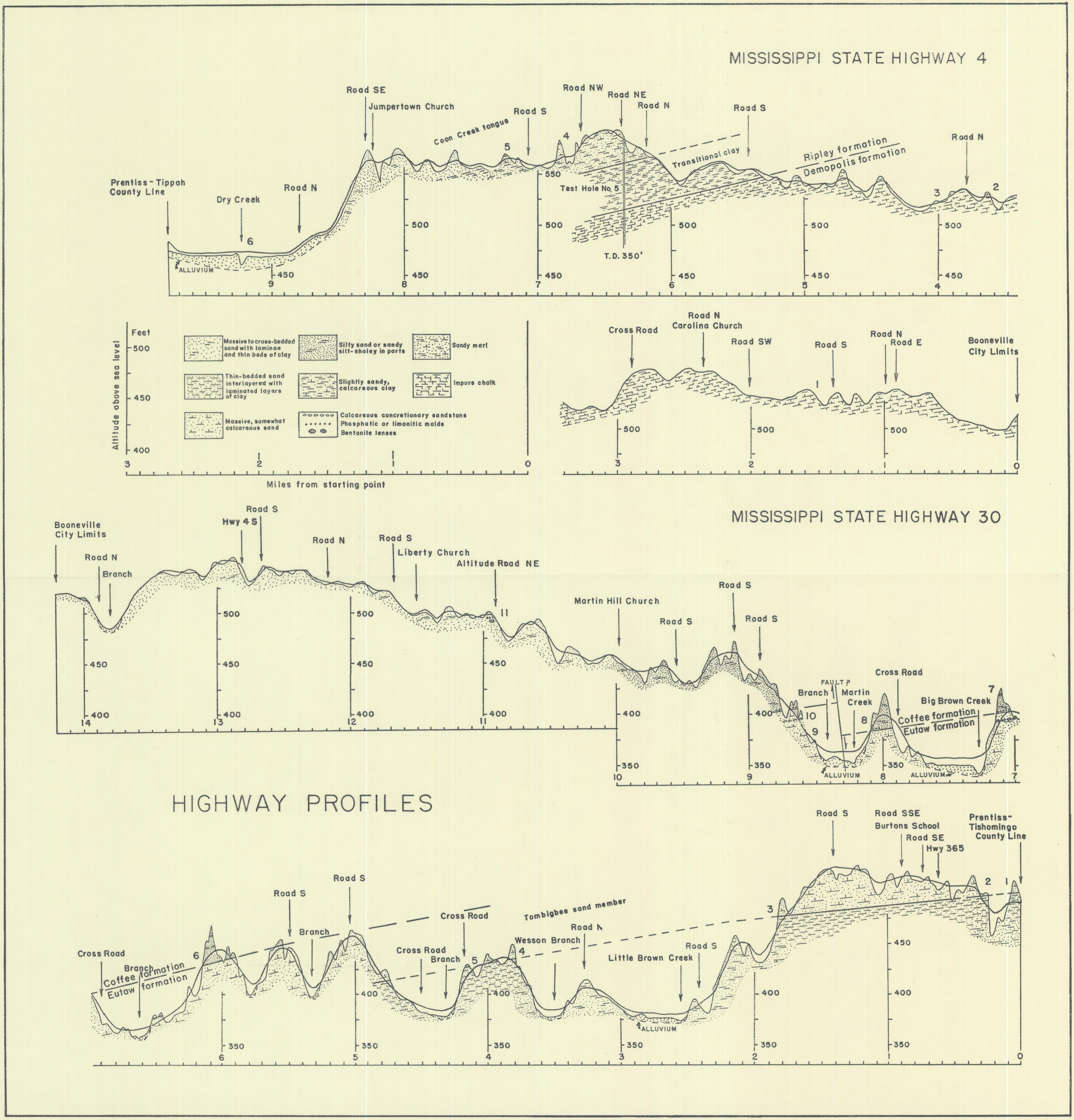
The first Ripley deposition was a calcareous sandy marine clay which marks the transition between the predominantly calcareous deposits of the Demopolis and the sandy materials of the Ripley. This was followed by the deposition of marl beds, large quantities of sand, and subordinate beds of clay.

HIGHWAY PROFILES

Highway profile sections have been found to be both instructive and illustrative as a part of geologic reports. Modern highway surveys provide excellent bases on which geology may be plotted directly and later condensed to the needs of the geologist.

The present profiles were selected because they were the most nearly complete set available through the entire county and because the highways trend nearly down the dip of the rock units exposed.

Road logs of State Highway 30 from the Tishomingo-Prentiss County line to Booneville and State Highway 4 from Booneville to the Prentiss-Tippah County line are given with profile sections as Plate 4.


MISSISSIPPI STATE HIGHWAY 4
Road SE
Jumpertown Church
Coon Creek tongue
Road S
Road NW
Road NE
Road N
Road S
Ripley formation
Demopolis formation
Transitional clay
Test Hole No. 5
T.D. 350'
Prentiss-Tippah County Line
Dry Creek
Road N
ALLUVIUM
Road N
Feet
Altitude above sea level
Massive to cross-bedded sand with laminae and thin beds of clay
Silty sand or sandy silt - shaley in parts
Sandy marl
Thin-bedded sand interlayered with laminated layers of clay
Slightly sandy, calcareous clay
Impure chalk
Massive, somewhat calcareous sand
Calcareous concretionary sandstone
Phosphatic or limonitic molds
Bentonite lenses
Miles from starting point
Cross Road
Road N
Carolina Church
Road SW
Road S
Road N
Road E
Booneville City Limits
MISSISSIPPI STATE HIGHWAY 30
Booneville City Limits
Road N
Branch
Hwy 4 S
Road S
Road N
Road S
Liberty Church
Altitude Road NE
Martin Hill Church
Road S
Road S
Road S
FAULT ?
Branch
Martin Creek
Cross Road
Big Brown Creek
Coffee formation
Eutaw formation
ALLUVIUM
ALLUVIUM
HIGHWAY PROFILES
Road S
Road SSE
Burtons School
Road SE
Hwy 365
Prentiss-Tishomingo County Line
Cross Road
Branch
Coffee formation
Eutaw formation
Road S
Road S
Branch
Cross Road
Tombigbee sand member
Cross Road
Branch
Wesson Branch
Road N
Little Brown Creek
Road S
ALLUVIUM

These sections are complete except for the area within the Booneville City limits, which is not included under the present highway program.

ROAD LOG OF STATE HIGHWAY 30 FROM THE TISHOMINGO-PRENTISS COUNTY LINE TO BOONEVILLE

No. 1	0.0	Tishomingo-Prentiss County line. Contact between lower Eutaw (laminated dark-gray flaky clay interbedded with thin-bedded glauconitic sand) and the Tombigbee sand member (weathered, massive, glauconitic sand containing numerous borings).
No. 2	0.3	Contact between lower Eutaw and Tombigbee sand member obscured by weathering. Next 1.5 miles to No. 3 is weathered Tombigbee.
	0.6	Junction with State Highway 365 to north.
	0.7	Junction with road to southeast.
	0.9	Junction with road to south-southeast at Burtons school.
	1.4	Junction with road to south.
No. 3	1.8	Contact between lower Eutaw and Tombigbee sand member distinctly marked by thin ferruginous layer at or near contact. Next 0.7 mile is well exposed lower Eutaw in several cuts to the eastern edge of Little Brown Creek bottom.
	2.3	Junction with road to south.
	2.5	Little Brown Creek. Crossing Little Brown Creek alluvial plain.
	3.2	Junction with road to north.
	3.4	Wesson Branch.
No. 4	3.8	Contact between lower Eutaw and Tombigbee sand member. Tombigbee sand appears to be somewhat more calcareous at this locality and contains *Exogyra ponderosa* Roemer and fragments of other pelecypoda. A zone several feet above the base contains numerous sharks' teeth and bone fragments.
No. 5	4.2	Junction with cross road. Contact between lower Eutaw and Tombigbee sand member.
	4.3	Branch.
	4.5	Junction with cross road.
	4.7	Contact between lower Eutaw and Tombigbee sand member. Note nodular layer in Tombigbee.
	5.0	Junction with road to south.
	5.3	Branch.
	5.5	Junction with road to south.
No. 6	6.2	About 30 feet of lower Coffee exposed; containing several layers of nodular, concretionary, calcareous sandstone. The centers of several concretions contained *Placenticeras* sp.

and *Mortoniceras* sp. *Inoceramus* sp. and others were noted. Lower part of exposure at or near the Tombigbee sand-Coffee contact.

6.6 Branch.

6.9 Junction with cross road.

No. 7 7.1 Contact between Tombigbee sand member of the Eutaw and the Coffee formation. Thirty-seven feet of Tombigbee sand containing lens-like masses of concretionary calcareous sandstone (up to 1.5 feet in thickness) overlain by 28 feet of Coffee. Basal Coffee is a silty sand containing *Trigonia* and other genera uncommon in the Tombigbee sand. Phosphatic molds of fossils in basal parts.

7.3 Big Brown Creek. Crossing Big Brown Creek alluvial plain.

7.9 Cross road.

No. 8 8.1 Coffee formation. In road ditch are numerous fossils common to the basal Coffee.

8.2 Martin Creek.

8.4 Branch.

No. 9 8.5 Fossiliferous Tombigbee sand.

No. 10 8.6 Tombigbee sand containing lens-like masses of concretionary calcareous sandstone up to 1.5 feet in thickness. The center of one contained an excellent specimen of *Placenticeras* sp. This sandstone appears to be the same sandstone noted at No. 7. About 10 feet above it is a zone locally rich in ferruginous material and containing abundant molds of fossils altering to limonite. This zone is probably basal Coffee. The structural relationships at this place, if their interpretation given herein is correct, indicate a fault in the Martin Creek area with a displacement of about 30 feet. In the next few miles unweathered Coffee is exposed in several highway cuts.

8.9 Junction with road to south.

9.1 Junction with road to south.

9.6 Junction with road to south.

10.0 Junction with road to northeast at Martin Hill Baptist church.

No. 11 10.9 Junction with Altitude road to northeast. Exposure on south side of highway shows two lens-like masses of bentonite or bentonitic clay bedded with sand. Several feet above is a thin ferruginous layer which contains limonitized molds of fossils. The highway cuts from this point to Booneville show, chiefly, weathered sand of the Coffee formation, in which are a few scattered silty or argillaceous facies.

11.5 Liberty Methodist church.

11.7 Junction with road to south.

12.2 Junction with road to north.

12.7 Junction with road to south.
12.9 Junction with State Highway 4 to south.
13.8 Branch.
13.9 Junction with road to north.
14.2 Booneville City limits.

State Highways 30 and 4 continue through Booneville. The contact between the Coffee and Demopolis formations is not visible, but is at the surface in the eastern parts of the town. It was shown to be at about 70 feet on a log of a water well at the old Booneville waterworks.

ROAD LOG OF STATE HIGHWAY 4 FROM BOONEVILLE TO PRENTISS-TIPPAH COUNTY LINE

0.0 Booneville city limits (as defined on Plate 1).
0.9 Junction with road to east.
1.0 Junction with road to north.
1.4 Junction with road to south.

No. 1 1.5 Bald spots of chalk (Demopolis formation) on valley walls south of highway. Fossils from the *Exogyra ponderosa* zone.

2.0 Junction with road to southwest.
2.3 Junction with road to north at Carolina Methodist church.
2.9 Junction with cross road.

No. 2 3.7 Bald spots of chalk (Demopolis formation) on both sides of highway. Fossils from the *Exogyra cancellata* and *Anomia tellinoides* subzone.

3.9 Junction with road to north.

No. 3 4.1 Bald spots of chalk (Demopolis formation) on valley walls south of highway. Fossils from the *Exogyra cancellata* and *Anomia tellinoides* subzone.

5.3 Approximate contact of Demopolis formation and transitional clay of Ripley formation (not seen). Highway cuts shallow and deeply weathered.

5.6 Junction with road to south.

6.2 Junction with road to north. Approximate contact of the transitional clay and the Coon Creek (not seen). Highway cuts shallow and deeply weathered.

6.4 Junction with road to northeast. Test Hole 5 drilled north of highway on property of Jumpertown Fire Tower. Observe relationships among Coon Creek, transitional clay and Demopolis. Hole bottomed in Coffee sand at 350 feet.

6.7 Junction with road to northwest.

No. 4 6.9 Excellent exposure of Coon Creek marl in highway cut. Contains fossils which disintegrate rapidly on weathering.

7.1 Junction with road to south.

No. 5	7.3	Coon Creek marl in highway cut.
	8.2	Jumpertown Methodist church.
	8.3	Junction with road to southwest.
	8.8	Junction with road to north. Crossing Dry Creek alluvial plain.
No. 6	9.2	Dry Creek. Calcareous marl exposed in bottom of creek (probably transitional clay).
	9.8	Prentiss-Tippah County line.

MINERAL RESOURCES

BENTONITE

Bentonite is exposed at several localities in the Coffee formation in Prentiss County. Only two deposits, however, approach workable dimensions; the other deposits are extremely localized and consist of small lens-like masses, pockets or nodules.

The larger of the two workable bodies, which originally covered about 65 acres, crops out on the property of S. M. Wroten and on adjoining properties (E.½, Sec.36, T.5 S., R.7 E. and W.½, Sec.31, T.5 S., R.8 E.) about 4.5 miles southeast of Booneville along State Highway 4. Pits on both sides of the highway made during several mining operations, disclose a maximum thickness of about 3 feet of bentonite having an average thickness of about 1.5 to 2.0 feet. Overburden is as much as 35 feet at places, but the average is 15 to 20 feet.

The smaller deposit, which originally covered about 60 acres, is on the W. D. Ward property (formerly John Duncan) about 7.0 to 7.5 miles southeast of Booneville (E.½, Sec.11, T.6 S., R.7 E.). At this locality the bentonite also has a maximum thickness of about 3 feet and an average of about 1.5 to 2.0 feet. Overburden in this area averages 20 to 30 feet, ranging up to 40 feet.

No reserve tonnage estimates are available; however, the greater part of the easily workable bentonite has been removed.

The bentonite of the two deposits is somewhat similar in physical character. It is greenish-gray when wet and cream-colored when dry, and is commonly coated along joints and fractures with iron oxide stains. The luster is dull along fresh fractures and shiny on cut surfaces. The dry clay is smooth and has a somewhat soapy feel. It is hard, compact, brittle, jointed and exhibits a conchoidal fracture. The texture is extremely fine and relatively free of grit. Some small pockets, however, contain inferior silty bentonite and limy bentonitic clay. On drying the bentonite disintegrates by a continuous cracking and crumbling until it is reduced to a fine powder.

Chemical analyses shown by Vestal[95] in 1938 for bentonite from the Wroten pits are given below.

	"(1)	(2)
SiO_2	55.40 percent	55.92 percent
Al_2O_3	29.07 percent	23.74 percent
Fe_2O_3	6.75 percent	7.45 percent
CaO		1.04 percent
MgO		2.17 percent
Moisture		0.00 percent
Loss on Ignition		8.67 percent
Totals	91.20 percent	98.99 percent

"(Analysis No. 1 was made by the Nichols laboratories, Knoxville, Tennessee, and confined to determination of silica, alumina, and ferric oxide; No. 2 was made by Dr. W. F. Hand, State Chemist of Mississippi State College, Mississippi.)"

In 1935 Bay[96] published bleaching tests of samples from the middle of the bentonite bed and from the silty and limy phases of the Wroten deposit and from the bentonite bed of the Ward deposit (formerly John Duncan). They are included as Table 3.

TABLE 3

BLEACHING TESTS OF BENTONITE

	Raw				Acid-Treated			
	Gr.	Yel.	Red	Bl.	Gr.	Yel.	Red	Bl.
Wroten deposit								
Bentonite	0.3	0.4	0.4	0.4	1.4	2.2	2.7	2.9
Silty phase	0.2	0.3	0.3	0.3	1.2	1.4	1.4	1.4
Limy phase	0.4	0.5	0.6	0.6	1.0	1.4	1.5	1.6
Ward deposit								
Bentonite	0.4	0.5	0.5	0.5	1.1	1.7	2.2	2.9

Bay states that these tests show that the impure phases of the bentonite are distinctly inferior as bleaching agents and must be separated from the marketable clay.

The two deposits seem to have comparable stratigraphic and structural relations and appear to be remnants of one original deposit. They dip generally to the west and seem to thin to the north and west.

The bentonite bodies occupy a topographically high position which allows for good drainage and reduces overburden. Strip-mining, however, has resulted in the removal of most of the bentonite from areas of least overburden, leaving only areas which will require more expensive mining operations. Both deposits are easily accessible to all weather roads and are close to rail lines at Booneville.

Prentiss County has been thoroughly but fruitlessly explored by the writer, by earlier workers, and by prospectors for private interests for additional deposits of bentonite worth economic exploitation. Bentonite, however, is so commonly concealed by plant cover, by various erosional features, or by disintegration on weathering that further prospecting along freshly washed slopes or in new excavations may possibly reveal an additional large deposit, but the future discovery of large bodies of bentonite in Prentiss County is doubtful.

CLAY

Some clay is present in each of the formations and, for the most part, is associated closely with sand, silt, and other impurities. Several deposits, however, may be suitable for limited ceramic uses.

Gray clay of the Gordo formation crops out in the bed of a small creek branch just east of the road descending the hills into Mackys Creek bottom (SW.¼, NW.¼, Sec.10, T.7 S., R.9 E.). This clay is relatively free of impurities and has a thickness of 17 feet (Test Hole 2). It is at a position, however, rather low on relatively high relief hills and overburden is great over most of the area. Lower parts of the clay are below natural drainage.

The chalk of the Demopolis formation contains varying amounts of clay, silt and sand throughout; and where weathering has been severe, a layer of residual materials blankets the solid chalk. As would be expected, this residuum consists dominantly of clayey materials from which most of the lime has been leached. These deposits range in thickness up to 20 feet, but average less than 10 feet. Some parts of the clay contain undesirable impurities such as concretions or coatings of lime, aggregates of limonite, and some crystallized gypsum, all which lessen the value of the clay. The light overburden, normally low water-table and favorable transportation facilities are desirable features. The residual clay is easily accesible at Booneville and in areas northwest of Booneville north of State Highway 4. Other areas include those west of Wheeler and northwest of Baldwyn.

No doubt other deposits of clay of greater or less purity exist in the alluvium under the flood plains and in the stream terraces, especially in those associated with the chalk belt.

These residual, alluvial, and terrace deposits may be suitable for the manufacture of low-grade or medium-grade brick.

Logan,[97] in 1907, briefly discussed the clay industry of Prentiss County. The Booneville Brick and Tile Company (shut down several years ago) used a mixture of bluish clay from a 4-foot bed lying on the "Selma chalk", a reddish clay from a 3- to 5-foot bed which overlies the bluish clay, and a sandy loam from a 2- to 3-foot bed at the surface, for the manufacture of brick and drain tile. A log of a water well located at a higher altitude than that of the pit indicated a thickness of 20 feet for the clays. At places the clay contained lime and ironstone concretions, which caused fusion during the burning of the brick, and in some parts of the kiln the brick ran together into a slaggy mass before the brick in other parts had been properly burned. The lime acted as a flux to melt the iron and so produced fusion. The individual brick shrank on the average ½-inch in length and ¼-inch in width.

Table 4 shows physical properties in the unburned state, and Table 5 shows pyro-physical properties, of two samples of clay from Booneville. Screen analysis and chemical analysis are not available. These tests are from the files of the Mississippi State Geological Survey, and the analyst is unknown. However, the tests are dated January 1, 1941, and it is believed that they were made by Thomas Edwin McCutcheon, then employed by the Survey.

TABLE 4

PHYSICAL PROPERTIES IN THE UNBURNED STATE
SAMPLES B-1 AND B-2 FROM BOONEVILLE

Sample No.	Water of plasticity in percent	Drying shrinkage		Modulus of rupture in pounds per square inch	Color
		Volume in percent	Linear in percent		
B-1	18.27	9.94	3.45	304	------------
B-2	18.47	9.75	3.38	368	------------

TABLE 5

PYRO-PHYSICAL PROPERTIES

SAMPLES B-1 AND B-2 FROM BOONEVILLE

Sample No.	At cone	Porosity in percent	Absorption in percent	Bulk specific gravity	Apparent specific gravity	Volume shrinkage in percent	Linear shrinkage in percent	Modulus of rupture in lbs./sq. in.	Color
	03	30.20	16.62	1.82	2.61	2.54	.87	203	Salmon
	1	30.70	16.75	1.83	2.64	1.66	.57	306	Salmon
B-1	3	29.31	15.93	1.84	2.61	1.70	.57	359	Salmon
	5	28.84	15.65	1.84	2.60	1.48	.50	369	Salmon
	7	28.78	15.61	1.84	2.59	1.47	.50	380	Salmon
	03	29.73	16.68	1.79	2.55	3.99	1.35	204	Salmon
	1	30.28	16.68	1.83	2.61	1.80	.60	307	Salmon
B-2	3	28.74	15.69	1.83	2.57	1.10	.37	353	Salmon
	5	28.77	15.69	1.83	2.57	.97	.33	447	Salmon
	7	28.38	15.37	1.85	2.58	.37	.13	505	Salmon

The Thrashers Brick Manufacturing Company began operations in 1906, using a yellow surface clay—probably alluvium, but shut down many years ago.

Logan[08] briefly discusses the Baldwyn Brick and Tile Company in a part on Lee County, Clay Industry. This plant, actually located in Prentiss County, at the time of his report used a red and blue clay from a 6- to 8-foot bed overlying 7 feet of sand and overlain by 2 feet of sandy loam or sand and soil. The plant now uses a sandy and silty clay from stream terrace material.

CHALK

A large part of the western half of Prentiss County is underlain by beds of impure chalk containing variable amounts of clay, silt, and sand. Generally the chalk is sandy in its basal parts and more argillaceous in upper intervals. Considerable areas of the normal outcrop of the chalk are covered by surficial deposits; however, numerous exposures appear as bald spots, in gullies and on the steep valley walls of some of the streams.

Sampling localities were chosen on the basis of the excellent exposures afforded, accessibility and nearness to urban areas, and stratigraphic position. Two general regions were selected:

The Booneville area (five localities sampled, P-1, P-2, P-3, P-4, P-5) and the Baldwyn area (two localities sampled, P-6, P-7). Forty-eight individual samples were collected and combined into seven composite samples, each representing a locality. In addition to these, analysis of one sample (C-1) is given by Logan[99] and analysis of one sample (M-27) by Mellen[100] from the Booneville area, and analyses of two samples (M-25 and M-26) from the Baldwyn area are given by Mellen. Of the eleven localities represented, seven samples (P-4, P-5, P-6, P-7, C-1, M-25, and M-27) are from the lower part of the chalk (*Exogyra ponderosa* zone) and four samples (P-1, P-2, P-3, and M-26) are from the upper part of the chalk (*Exogyra cancellata* zone).

List of Sample Localities

P-1 Composite sample of 55 feet of chalk from 87-foot exposure in the road cut and ditch on the north facing slope of Pollys Creek Valley (SE.cor., NE.¼, SW.¼, Sec.24, T.4 S., R.6 E.). Ten samples at 5-foot intervals, from the base upward, 1-A, 1-B, 1-C, etc., through 1-J.

P-2 Composite sample of 50 feet of chalk in the road cut and adjoining pasture on the northeastward facing slope of Osborne Creek (SE.¼, NE.¼, Sec.2, T.5 S., R.6 E.). Ten samples at 5-foot intervals, from the base upward, 2-A, 2-B, 2-C, etc., through 2-J.

P-3 Composite sample of 40 feet of chalk in gullies several hundred feet south of State Highway 4 on the southeast facing valley slope of a branch of Osborne Creek (NE.¼, SE.¼, Sec.36, T.4 S., R.6 E.). Seven samples at 5-foot intervals, from the base upward, 3-A, 3-B, 3-C, etc., through 3-G.

P-4 Composite sample of 15 feet of chalk in bald spot of the west facing hillside above cattle pond (NW.¼, NW.¼, Sec.8, T.5 S., R.7 E.). Three samples at 4-foot intervals, from the base upward, 4-A, 4-B, and 4-C.

P-5 Composite sample of 35 feet of chalk in road cut on the east facing valley wall of Osborne Creek (SE.¼, NW.¼, Sec.12, T.5 S., R.6 E.). Six samples at 5-foot intervals, from the base upward, 5-A, 5-B, 5-C, etc., through 5-F.

P-6 Composite sample of 40 feet of chalk in the highway cut of State Highway 370 on the northeast facing valley slope of Okolalah Creek (SW.¼, SE.¼, Sec.33, T.6 S., R.6 E.). Eight samples at 5-foot intervals, from the base upward, 6-A, 6-B, 6-C, etc., through 6-H.

P-7 Composite sample of 20 feet of chalk in the highway cut of State Highway 370 on the east facing slope of Cambelltown Creek

(SE.¼, SW.¼, Sec.32, T.6 S., R.6 E.). Four samples at 5-foot intervals, from the base upward, 7-A, 7-B, 7-C, and 7-D.

C-1 Chalk sample from an exposure in a cut of the Gulf, Mobile, and Ohio Railroad several hundred yards south of the station at Booneville (SW.¼, NE.¼, Sec.16, T.5 S., R.7 E.).

M-25 Composite sample of 8 feet of chalk from an exposure on the Jim Gamble property on the northeast facing slope of Okolalah Creek Valley (NE.¼, NE.¼, Sec.32, T.6 S., R.6 E.).

M-26 Composite sample of 20 feet of chalk from an exposure on the Howard Wallace property on the northeast facing slope of Okolalah Creek (SE.¼, NE.¼, Sec.19, T.6 S., R.6 E.).

M-27 Composite sample of 12 feet of chalk from an exposure on the Tom Carter property on the north side of the Osborne road about 1 mile southwest of Booneville (SE.¼, NW.¼, Sec.17, T.5 S., R.7 E.).

TABLE 6

CALCIUM CARBONATE CONTENT OF CHALK SAMPLES*

Sample No.	$CaCO_3$
P-1	49.44
P-2	53.54
P-3	49.04
P-4	66.55
P-5	56.80
P-6	65.06
P-7	60.80
C-1	73.90
M-25	73.81
M-26	63.05
M-27	67.80

*Calcium carbonate analyses on dry basis in percent. Analyses P-1 through P-7 by Mississippi Chemical Laboratory, Dr. M. P. Etheredge, State Chemist, September 12, 1959: Analysis C-1 from M. G. S. Bull. 13, p. 64, 1916: Analyses M-25, M-26, M-27 from M. G. S. Bull. 46, Table 1, p. 10.

TABLE 7

COMPLETE CHEMICAL ANALYSES*

Sample No.	P-1	P-3	P-4
Ign. loss	27.00	26.80	33.14
Silica, SiO_2	29.10	29.80	20.50
Alumina, Al_2O_3	11.05	11.33	5.41
Iron oxide, Fe_2O_3	3.32	3.32	2.40
Titania, TiO_2	0.43	0.35	0.39
Lime, CaO	28.80	27.07	37.50
Magnesia, MgO	0.50	0.58	0.50
	100.20	99.25	99.84

*Analyses by Mississippi Chemical Laboratory, Dr. M. P. Etheredge, State Chemist, October 9, 1959.

Because of the relatively low calcium carbonate content of the chalk samples as indicated by the analyses, their uses are rather limited. Calcium carbonate analyses of samples C-1 and M-25 meet the minimum specifications set by Mellen[101] in which he states that 70 percent calcium carbonate is the required minimum percentage for commercial uses for agriculture limestone.

Complete analyses of samples P-1 and P-3 indicate materials which may be acceptable for the manufacture of rock wool; however, the true value of the rock for that purpose can only be determined experimentally.

SAND AND GRAVEL

Sand is very abundant in Prentiss County, and is the main constituent of almost all the exposed rock units with the exception of the Demopolis formation and the transitional clay of the Ripley formation. Sand from the lower part of the Eutaw, the middle and upper parts of the Coffee, and the Coon Creek tongue of the Ripley formation is used extensively as road topping with or without admixture, for highways and county roads. These sands contain small amounts of silt and clay which bind and make firm, relatively dust-free surfaces. Other impurities in the sands include aggregates or lumps of ironstone, iron oxide stains or coatings, glauconite, and muscovite mica. The sands range from fine- to coarse-grain.

Some sands, particularly those in the upper part of the Coffee and in the Coon Creek, if washed, may be suitable for local use as a fine aggregate in concrete or mortar.

No sand was found that approached a glass sand because of the relatively high percentage of iron compounds present.

Several small gravel deposits in Mackys Creek bottom in the southeastern corner of the county have been worked in the past. These deposits are apparently local, as they appear to underlie terraces. No large body of gravel was found in the county.

OIL AND GAS

To date only three wells have been drilled for oil and gas in Prentiss County, all which were dry holes. Two of the wells, however, had reported shows of oil.

In 1941, the first well, Home Development Company Mrs. Annie Allen No. 1, was drilled in the southeastern corner of the county (NW.¼, SE.¼, Sec.8, T.7 S., R.9 E.). Located on the outcrop of the Eutaw at an elevation of 440 feet, it was drilled to a total depth of 2145 feet and bottomed in the Cambro-Ordovician. Reported shows of oil were at 1530 feet and 1760 feet.

Later, (1954) the second well, Huntington Minerals Incorporated J. M. Taylor et ux. No. 1, was also drilled in the southeastern part of the county (NE.¼, SW.¼, NE.¼, Sec.28, T.6 S., R.9 E.). It began in the Eutaw at an elevation of 498 feet and was drilled to a total depth of 2850 feet.

The latest well, in 1955, J. F. Michael and Van Dresser Drilling Company Bonnie Knight No. 1, was drilled in the western part of the county (Center NE.¼, NW.¼, Sec.7, T.5 S., R.6 E.). It started in the Ripley at an elevation of 547 feet and was completed at a total depth of 2613 feet in the Cambro-Ordovician. There was no reported show of oil in this well; however, a slight odor was noted at 1453 feet. The sample tops as reported by the Dixie Geological Service, May 19, 1955, are as follows: Devonian at 750-65 feet, Silurian at 1150-53 feet, Wayne at 1350-60 feet, and Ordovician at 1360-70 feet. Schlumberger tops as reported are as follows: Ordovician at 1340 feet, and Dolomitic limestone at 1840 feet.

Prior to the drilling of the third well, geophysical exploration was conducted in a large part of western Prentiss County by a major oil company. This information was reported to the writer by local citizens, and its relation to the drilling is not known.

The present investigation revealed only minor evidences of structural movement in the Cretaceous sediments, which may or may not be the result of movement in the Paleozoic rocks which underlie the county. This movement could be only superficial movement in the surface rocks. The possibility of a trap suitable for the accumulation of oil and gas is not proven or disproven, and such a trap may well be found in the older and regionally more structurally affected Paleozoic rocks. Further geophysical exploration followed by drilling may in the future prove the county's potentialities for oil and gas production.

MISCELLANEOUS MINERALS AND ROCKS

Small quantities of several common minerals and rocks are scattered through the formations of Prentiss County, but for various reasons none is of any economic importance. Because of the interest taken in them by some people as unique findings, which is evidenced by the numerous letters regarding rock and mineral identifications that are received by the Survey from time to time, they are briefly discussed herein.

For the most part, the bedrock in Prentiss County is of sedimentary marine origin and a large fraction of it contains glauconite disseminated in greater or lesser amounts. Glauconite, a hydrous silicate of ferric iron and potassium, is characteristically a green to dark-greenish mineral, but may be lighter in color. In unweathered exposures of "green sand" and some marls, glauconite may be the chief mineral contributing the green color, and to some sands it commonly gives a "salt and pepper" appearance. In sufficient concentrations, it has been utilized as a source of potassium and used in ion-exchange processes as a water softener. Glauconite in high concentrations and high in potassium content may be suitable for use as a natural fertilizer.

On many of the hills, tabular or concretionary limonite or limonitic sandstone is present. This material is formed due to the solution of iron from the iron containing minerals in the formations, such as glauconite, iron sulfide, etc., and the deposition of iron concentrations along levels of more stable groundwater or surface water conditions and less permeability. It is of no value economically.

Disseminated throughout the formations in variable amounts, is a shiny, flaky, mineral—muscovite mica, which is usually in fine aggregate and glitters in direct sunlight. This mineral is common in rocks of all ages and is of little importance, except in relatively pure concentrated deposits.

Heavy mineral accumulations were noted in gullies and highway ditches and in the rain washed floors of sand pits, associated with the predominantly sandy formations in the county. The best concentrations were associated with the Coon Creek sands. Future depletion of present reserves of minerals of this type may result in an economic interest in sands which contain relatively low heavy mineral concentrations.

Iron sulfide (FeS_2), a compound of iron and sulfur, is commonly present as nodules or concretions of varying shapes scattered through the formations. It may be in the form of the yellowish metallic mineral pyrite, or, more commonly, the silvery gray metallic mineral marcasite, both of which form crystals. Because many uninformed people have mistaken these minerals for gold and silver, they have been commonly called "fool's gold". In large deposits, these minerals have limited uses in the manufacture of sulfuric acid.

At several places manganese minerals are present as a black coating on sand grains which form galls or larger concretions.

Calcium phosphate nodules or molds of fossils are scattered in the basal Coffee formation in association with the Eutaw-Coffee contact. Calcium phosphate in low percentages in of no importance commercially. Calcite ($CaCo_3$) and gypsum ($CaSO_4 \cdot 2 H_2O$) are present in insignificant quantities in the chalk and the residuum from the chalk in the form of crystals or small viens. The gypsum is commonly the mineral selenite.

Fragments, lumps, or thin streaks of a dark-brown to black, coal-like substance, lignite, are common at places in the Eutaw and the Coffee formations. Lignite is a product of the partial decomposition of vegetal matter, and in this instance is of no value.

Silicified logs and fragments of silicified wood are present in the Eutaw and Coffee formations and are numerous along the McShan-Eutaw contact.

TEST HOLE RECORDS

TEST HOLE 1

Location: In the southeast corner of a pasture on the property of A. J. Sample, adjacent to Marietta Fire Tower (Cen. NW.¼, Sec.30, T.6 S., R.8 E.)

Elevation: 460 feet Date: Feb., 1959

Thickness	Depth	Description
		Coffee formation
3.0	3.0	Soil and subsoil
4.5	7.5	Sand, light-gray mottled with iron oxide, fine-grained, silty, finely glauconitic, micaceous
2.5	10.0	Sand, light-gray mottled with iron oxide, fine-grained, silty, finely glauconitic, micaceous; contains some thin layers of ferruginous materials
8.0	18.0	Sand, light-gray splotched red, fine-grained, silty, finely glauconitic, micaceous

92.5	110.5	Silt, dark-gray, sandy, compact, finely glauconitic, finely micaceous, fossiliferous
0.5	111.0	Shell conglomerate in sand matrix
29.0	140.0	Silt, dark-gray, sandy, compact, finely glauconitic, finely micaceous, fossiliferous
		Eutaw formation (Tombigbee member)
8.0	148.0	Sand, dark greenish-gray, silty, compact, finely glauconitic, finely micaceous, fossiliferous
2.5	150.5	Sandstone, dark-gray, fine-grained, well indurated, glauconitic, fossiliferous
54.5	205.0	Sand, dark greenish-gray, fine-grained, glauconitic; some thin streaks of dark-gray silt
10.0	215.0	Sand, green to dark greenish-gray, fine- to medium-grained, silty, glauconitic, finely micaceous
		Eutaw formation (lower part)
8.0	223.0	Clay, dark-gray, waxy, shaly, and thin streaks of sand
2.0	225.0	Sandstone, dark greenish-gray, fine-grained, well indurated, glauconitic, fossiliferous
10.0	235.0	Sand, dark greenish-gray, fine- to medium-grained, glauconitic. Water bearing
35.0	270.0	Clay and sand. Dark-gray, waxy, shaly, micaceous clay and subordinate streaks of dark greenish-gray, fine- to medium-grained, glauconitic sand; contains some lignite
33.0	303.0	Sand and clay. Dark greenish-gray, fine- to medium-grained, glauconitic sand and subordinate streaks of dark-gray, waxy, shaly, micaceous clay; contains some lignite and thin stringers of small chert gravel. Water bearing
41.0	344.0	Sand, green to dark greenish-gray, fine- to medium-grained, lignitic; contains thin stringers of small chert gravel. Water bearing
4.0	348.0	Clay, dark-gray, waxy, shaly
35.0	383.0	Sand and clay. Dark greenish-gray, fine- to medium-grained, glauconitic sand and streaks of dark-gray, waxy, shaly clay; contains stringers of small chert gravel. White silty material and some gravel at base
		McShan formation
27.0	410.0	Sand, silt and clay. Fine silty sand and dark-gray, soft, lignitic clay with a thin bed of small chert gravel at base
		Gordo formation
4.0	414.0	Clay, gray, plastic
37.0	451.0	Gravel, small chert; contains some thin streaks of dark-gray fine sand and clay. Water bearing

TEST HOLE 2

Location: At top of hill southeast of junction of gravel road with unimproved road to northeast (SW.¼, NW.¼, Sec.10, T.7 S., R.9 E.) a mile west of the Tishomingo County line

Elevation: 447 feet Date: Feb., 1959

Thickness	Depth	Description
		Eutaw formation (lower part)
10.0	10.0	Sand, red-brown, fine-grained, silty, stained with iron oxide; contains scattered chert pebbles
8.0	18.0	Sand, brown to red-brown, fine-grained, silty, glauconitic, sparingly micaceous, stained with iron oxide; contains scattered chert pebbles and clay blebs
6.0	24.0	Sand, brown to red-brown, fine- to medium-grained, glauconitic, sparingly micaceous; stained with iron oxide; contains thin layers of ferruginous material, varicolored clay blebs and some scattered chert gravel
40.0	64.0	Sand, tan to brown, fine- to medium-grained, glauconitic, sparingly micaceous; contains varicolored clay blebs and some scattered chert gravel
10.0	74.0	Sand, yellowish to tan, fine- to medium-grained, glauconitic, micaceous; contains some chert gravel and ferruginous material at base
		McShan formation
28.0	102.0	Fine sand and silt, tan, glauconitic, very micaceous, clayey in parts; contains much ferruginous material and small chert and quartz gravel at base
		Gordo formation
18.0	120.0	Sand, gray, fine-grained, very clayey, finely micaceous, lignitic
17.0	137.0	Clay, gray, plastic, lignitic
26.0	163.0	Sand and gravel. Light-gray to dark-gray, fine- to coarse-grained, cherty sand and thin beds of small chert gravel; contains lignitic material
10.0	173.0	Sand and gravel. Tan to brown, medium- to coarse-grained, cherty sand, and beds of small chert gravel. Stained with iron oxide. Water bearing
15.0	188.0	Sand, clay and gravel. Tan to brown, medium-grained, cherty sand and interbeds of dark-gray plastic clay and small, iron-stained, chert gravel. White kaolinitic material at base
		Paleozoic rocks
7.0	195.0	Sandstone, whitish to buff, fine-grained, well indurated

Test Hole 3

Location: On the right-of-way for U. S. Highway 45 just north of the intersection of old U. S. Highway 45 and U. S. Highway 45 at Frankstown (NW.¼, Sec.12, T.6 S., R.6 E.)

Elevation: 407 feet — Date: Feb., 1959

Thickness	Depth	Description
		Demopolis formation
2.5	2.5	Soil and subsoil
8.5	11.0	Chalk, light-gray to buff, argillaceous, sandy, fossiliferous
5.0	16.0	Chalk, gray to bluish-gray, sandy, fossiliferous
1.0	17.0	Shell conglomerate, sand matrix
		Coffee formation
9.0	26.0	Sand, tan to buff, fine- to medium-grained, glauconitic; contains ferruginous material at base
31.0	57.0	Silt, dark-gray, compact, micaceous, finely glauconitic, fossiliferous
19.0	76.0	Sand, dark-gray, fine- to medium-grained, finely glauconitic. Water bearing
18.0	94.0	Fine sand and silt, dark-gray, compact, finely glauconitic, micaceous
0.5	94.5	Sandstone, dark-gray, well indurated, calcareous, finely glauconitic
25.5	120.0	Silt, dark-gray, compact, sandy, finely glauconitic. micaceous
32.0	152.0	Sand, dark-gray, fine-grained, silty, finely glauconitic, fossiliferous
11.0	163.0	Silt, dark-gray, compact, sandy, finely glauconitic, micaceous
13.0	176.0	Sand, dark-gray, fine-grained, finely glauconitic
58.0	234.0	Fine sand and silt, dark-gray, finely glauconitic, fossiliferous
38.5	272.5	Sand, greenish to dark-gray, fine-grained, glauconitic, fossiliferous
0.5	273.0	Sandstone, dark-gray, fine-grained, finely glauconitic, fossiliferous
32.0	305.0	Fine sand and silt, dark-gray, finely glauconitic, micaceous
		Eutaw formation (Tombigbee member)
0.5	305.5	Sandstone, dark-gray, fine-grained, well indurated
19.5	325.0	Fine sand and silt, dark-gray, finely glauconitic
1.0	326.0	Shell conglomerate, sand matrix
14.0	340.0	Sand, greenish to dark-gray, fine-grained, silty, glauconitic, fossiliferous

7.0	347.0	Clay, dark-gray, waxy, shaly
31.0	378.0	Sand, green to dark greenish-gray, fine- to medium-grained, glauconitic, micaceous, lignitic. Water bearing
		Eutaw formation (lower part)
8.0	386.0	Clay, dark-gray, waxy, shaly
18.0	404.0	Sand and clay. Green to dark greenish-gray, glauconitic, silty, fine sand and dark-gray, waxy, shaly clay
6.0	410.0	Clay, dark-gray, waxy, shaly

TEST HOLE 4

Location: Southwest of intersection of gravel road from Blackland south and west to Tippah County and log road, about one mile east of Tippah County line (SW.¼, NW.¼, Sec.19, T.5 S., R.6 E.)

Elevation: 596 feet Date: Feb., 1959

Thickness	Depth	Description
		Ripley formation (Coon Creek member)
6.0	6.0	Soil and subsoil
3.0	9.0	Clay, light-gray to tan splotched reddish with iron oxide, silty, sandy, micaceous, glauconitic
16.0	25.0	Clay, light-gray to tan, plastic, finely micaceous
2.0	27.0	Sand, light-gray to tan, medium- to coarse-grained, very glauconitic, fossiliferous
1.5	28.5	Sandstone, light-gray to tan, fine- to medium-grained, well indurated, glauconitic, fossiliferous
9.5	38.0	Sand, tan to brown, medium- to coarse-grained, glauconitic
20.0	58.0	Sand, tan to brown, medium- to coarse-grained, glauconitic; contains thin streaks of clay
20.0	78.0	Marl, blue-gray to dark-gray, micaceous, finely glauconitic, fossiliferous
		Ripley formation (transitional clay)
48.0	126.0	Clay, dark bluish-gray, slightly sandy, plastic, calcareous
		Demopolis formation
234.0	360.0	Chalk, gray to dark bluish-gray, argillaceous, compact, fossiliferous (basal parts contain thin shell beds); becoming more sandy toward base
		Coffee formation
50.0	410.0	Sand, light-gray to gray, medium-grained, very glauconitic; contains some thin streaks of dark-gray, waxy, shaly clay. Water bearing

TEST HOLE 5

Location: In the southeast corner of property of Jumpertown Fire Tower (NW.¼, NW.¼, Sec.27, T.4 S., R.6 E.)

Elevation: 585 feet Date: March, 1959

Thickness	Depth	Description
		Ripley formation (Coon Creek member)
5.0	5.0	Soil and subsoil
13.0	18.0	Clay, light-gray to tan, silty, sandy, finely glauconitic, very micaceous
6.0	24.0	Marl, bluish-gray to dark-gray, finely glauconitic, micaceous, fossiliferous
		Ripley formation (transitional clay)
46.0	70.0	Clay, dark bluish-gray, slightly sandy, plastic, calcareous
		Demopolis formation
231.0	301.0	Chalk, bluish-gray to dark-gray, argillaceous, compact, fossiliferous (basal parts contain thin shell beds); becoming more sandy toward base
		Coffee formation
35.0	336.0	Sand, light-gray to gray, fine- to medium-grained, glauconitic; contains some thin streaks of dark-gray, waxy, shaly clay. Water bearing
14.0	350.0	Sand, dark-gray, fine- to medium-grained, silty, glauconitic, micaceous

TEST HOLE 6

Location: In the right-of-way of the Blackland road at the intersection with gravel road to the north some 3.5 miles southwest of Booneville (NE.¼, NW.¼, Sec.24, T.5 S., R.6 E.)

Elevation: 430 feet Date: March, 1959

Thickness	Depth	Description
		Demopolis formation
1.0	1.0	Soil and subsoil
7.0	8.0	Chalk, light-gray to buff, argillaceous, fossiliferous
36.0	44.0	Chalk, gray to bluish-gray, argillaceous, sandy, fossiliferous (abundance of shells at base)
		Coffee formation
3.0	47.0	Sand, light-gray to gray, fine- to medium-grained, glauconitic, lignitic
7.0	54.0	Clay, dark-gray, waxy, shaly, micaceous, lignitic
18.5	72.5	Sand, light-gray to gray, fine- to medium-grained, very glauconitic, lignitic. Water bearing
3.5	76.0	Clay, dark-gray, waxy, shaly, micaceous
24.0	100.0	Sand, light-gray to dark-gray, fine- to medium-grained, silty, finely glauconitic, micaceous; contains streaks of dark-gray compact silt

TEST HOLE 7

Location: On the right-of-way of State Highway 370 northeast of the intersection of a gravel road to the north, about 4 miles west of Baldwyn (SE.¼, SW.¼, Sec.31, T.6 S., R.6 E.)

Elevation: 416 feet Date: March, 1959

Thickness	Depth	Description
		Demopolis formation
1.5	1.5	Soil and subsoil
6.5	8.0	Clay, light-gray to tan, plastic (residuum from chalk)
5.0	13.0	Chalk, light-gray to buff, argillaceous
135.0	148.0	Chalk, bluish-gray to dark-gray, argillaceous, compact, fossiliferous (basal parts contain thin shell beds); becoming more sandy toward base
2.0	150.0	Shell conglomerate, sand matrix
		Coffee formation
16.0	166.0	Sand, light-gray to gray, fine- to medium-grained, very glauconitic, lignitic; contains thin streaks of dark-gray, waxy, shaly clay
4.0	170.0	Silt, dark-gray, sandy, compact, finely glauconitic, micaceous

TEST HOLE 8

Location: Behind a brick house at the intersection of a gravel road with old U. S. Highway 45 on the Alcorn County line a mile east of new Highway 45. (NE.¼, NE.¼, Sec.10, T.4 S., R.7 E.)

Elevation: 490 feet Date: March, 1959

Thickness	Depth	Description
		Terrace (?)
5.0	5.0	Soil and subsoil
2.5	7.5	Sand, gray mottled with iron oxide, fine-grained, silty; contains pebble size ferruginous concretions
		Demopolis formation
7.5	15.0	Clay, gray mottled with iron oxide, silty, plastic (residuum from chalk)
11.0	26.0	Chalk, dark bluish-gray, argillaceous, fossiliferous; becoming very sandy at base and contains shells
		Coffee formation
6.0	32.0	Sand, tan, medium-grained, silty, glauconitic
21.0	53.0	Sand, tan, medium-grained, glauconitic; contains thin streaks of light-gray clay. Water bearing
29.0	82.0	Sand and silt. Sand, light-gray to gray, fine- to medium-grained, glauconitic, lignitic; interbedded with dark-gray, finely micaceous, compact silt
26.0	108.0	Sand, gray, fine- to medium-grained, glauconitic, lignitic, contains streaks of dark-gray compact silt. Water bearing

17.0	125.0	Silt, dark-gray, compact, finely glauconitic, micaceous, carbonaceous
1.0	126.0	Sandstone, dark-gray, fine-grained, well indurated, calcareous
138.0	264.0	Sand, gray, fine- to medium-grained, glauconitic, lignitic; contains streaks or dark-gray compact silt. Water bearing
		Eutaw formation (Tombigbee member)
7.0	271.0	Sand, dark-gray, fine- to medium-grained, glauconitic
0.5	271.5	Sandstone, dark-gray, fine-grained, well indurated, calcareous
78.5	350.0	Sand, green to dark-gray, fine-grained, very glauconitic, carbonaceous. Water bearing
		Eutaw formation (lower part)
4.0	354.0	Clay, dark-gray, waxy, shaly
33.0	387.0	Sand, greenish to dark greenish-gray, fine-grained, very glauconitic, lignitic; contains streaks of dark-gray, waxy, shaly clay. Water bearing
3.0	390.0	Clay, dark-gray, waxy, shaly
10.0	400.0	Sand, green to dark-gray, fine-grained, glauconitic, lignitic, silty; contains streaks of dark-gray waxy, shaly clay

TEST HOLE 9

Location: In the road right-of-way south of the intersection of a gravel road north to Blue Hill and a gravel road west which intersects the Altitude road about 4 miles east-northeast of Altitude (SE. ¼, NE. ¼, Sec.6, T.5 S., R.9 E.)

Elevation: 508 feet Date: March, 1959

Thickness	Depth	Description
		Coffee formation
1.5	1.5	Soil and subsoil
8.5	10.0	Sand, light-gray to tan, fine-grained, silty, iron stained; contains some fine highly oxidized glauconite
1.0	11.0	Silt, olive to tan, sandy, very glauconitic, finely micaceous
15.0	26.0	Silt, dark-gray, sandy, compact, finely glauconitic, micaceous, fossiliferous
		Eutaw formation (Tombigbee member)
9.0	35.0	Sand, gray, fine-grained, silty, glauconitic, fossiliferous
2.0	37.0	Sandstone, light-gray, fine-grained, calcareous, well indurated, glauconitic
35.0	72.0	Sand, gray to dark greenish-gray, fine-grained, silty, glauconitic, micaceous
2.0	74.0	Sandstone, light-gray, fine-grained, well indurated, calcareous, finely glauconitic

20.0	94.0	Sand, gray to dark greenish-gray, fine-grained, silty, glauconitic
11.0	105.0	Sand, greenish to dark greenish-gray, fine-grained, glauconitic. Water bearing
		Eutaw formation (lower part)
1.0	106.0	Clay, dark-gray, waxy, shaly
11.0	117.0	Sand, greenish to dark greenish-gray, fine-grained, glauconitic. Water bearing
13.0	130.0	Sand and clay. Sand, green to dark greenish-gray, fine-grained, silty, glauconitic; interbedded with dark-gray, waxy, shaly clay
16.0	146.0	Sand, dark greenish-gray, fine-grained, glauconitic; contains streaks of dark-gray, waxy clay. Water bearing
16.0	162.0	Sand, dark greenish-gray, fine-grained, glauconitic; contains bone fragments, sharks' teeth, lignite, and some small gravel and thin streak of hard white silty material at top. Water bearing
72.0	234.0	Sand, greenish to gray, fine- to medium-grained, glauconitic; contains streaks of dark-gray, waxy clay, some streaks of hard white silty material, and scattered small chert gravel. Water bearing
2.0	236.0	Gravel, "green sand," hard white silty material, lignite, and streaks of highly micaceous silty clay
		McShan formation
14.0	250.0	Fine sand and silt. Dark-gray to greenish-black, highly micaceous, glauconitic, lignitic
		Gordo formation
17.0	267.0	Clay, gray, plastic, finely micaceous
23.0	290.0	Gravel, small, chert, sand matrix, with streaks of gray clay

TEST HOLE 10

Location: In the northwest corner of the property of Lebanon Church at the Tishomingo County line. (SE.¼, NE.¼, Sec.22, T.4 S., R.9 E.)

Elevation: 580 feet Date: March, 1959

Thickness	Depth	Description
		Coffee formation
2.5	2.5	Soil and subsoil
2.5	5.0	Sand, red-brown, fine-grained, silty, finely glauconitic
7.0	12.0	Sand, tan to brown, fine-grained, silty, finely glauconitic
31.0	43.0	Sand, dark-gray, fine-grained, silty, glauconitic
		Eutaw formation (Tombigbee member)
36.0	79.0	Sand, dark greenish to dark greenish-gray, fine-grained, silty, glauconitic, carbonaceous, micaceous, fossiliferous

1.0	80.0	Sandstone, gray, fine-grained, well indurated, calcareous, finely glauconitic
38.0	118.0	Sand, greenish-gray, fine-grained, silty, glauconitic
		Eutaw formation (lower part)
36.0	154.0	Sand, green to dark greenish-gray, fine-grained, silty, glauconitic, carbonaceous; contains thin streaks of dark-gray, waxy, shaly clay; and some scattered gravel at base
22.0	176.0	Sand and clay. Greenish-gray, fine-grained, glauconitic sand and dark-gray, waxy, shaly clay; becomes silty in parts and contains some thin streaks of hard whitish silty material
4.0	180.0	Gravel, sand, clay, and hard whitish silty material
48.0	228.0	Sand, greenish-gray, fine-grained, glauconitic; contains some dark-gray clay and scattered small chert gravel
		McShan formation
14.5	242.5	Fine sand and silt. Greenish to dark-gray, highly micaceous, carbonaceous, finely glauconitic; contains some lignite and a thin bed of small, chert gravel at base
		Gordo formation
9.5	252.0	Dark-gray, plastic clay, sandy in part
68.0	320.0	Gravel and silt. Small chert gravel interbedded with white compact, silty, kaolinitic material

Test Hole 11

Location: On the northwest side of the road at the junction of two gravel roads at a distance of about 6 miles northeast of Booneville. (NW.¼, NE.¼, Sec.29, T.4 S., R.8 E.)

Elevation: 585 feet — Date: March, 1959

Thickness	Depth	Description
		Coffee formation
15.0	15.0	Sand, red-brown, fine- to medium-grained, silty, micaceous, stained with iron oxide; contains some highly oxidized glauconite
13.0	28.0	Sand, tan to buff, fine- to medium-grained, micaceous, glauconitic; contains blebs of light-gray, plastic clay and ferruginous material in lower part
6.0	34.0	Clay, light-gray to tan, silty, micaceous, finely glauconitic
10.0	44.0	Clay and sand. Light-gray to tan sandy clay with streaks of fine- to medium-grained, glauconitic sand. Stained with iron oxide
44.0	88.0	Silt, dark-gray, sandy, compact, micaceous, finely glauconitic
5.0	93.0	Sand, dark-gray, silty, micaceous, glauconitic

5.0	98.0	Sand, clay and lignite. Greenish to greenish-gray, fine- to medium-grained glauconitic sand, brownish, yellowish to dark-gray, carbonaceous, micaceous clay, and lignite
40.0	138.0	Sand, gray, fine- to medium-grained, glauconitic, micaceous, lignitic with streaks of dark-gray, silty sand. Water bearing
7.0	145.0	Silt, dark-gray, compact
7.0	152.0	Sand, gray, fine- to medium-grained, glauconitic
74.0	226.0	Silt and fine sand, dark-gray, compact, micaceous, finely glauconitic
		Eutaw formation (Tombigbee member)
0.5	226.5	Sandstone, fairly well indurated, fossiliferous
43.5	270.0	Sand, greenish to dark greenish-gray, fine-grained, silty, very glauconitic, fossiliferous
0.5	270.5	Sandstone, gray, fine-grained, well indurated, calcareous, glauconitic
35.5	306.0	Sand, dark-gray to dark greenish-gray, silty, glauconitic, micaceous, fossiliferous
6.0	312.0	Sand, greenish, fine-grained, silty, glauconitic, lignitic, finely micaceous
		Eutaw formation (lower part)
3.0	315.0	Clay, dark-gray, waxy, shaly
35.0	350.0	Sand and clay. Greenish to gray, fine-grained, glauconitic sand and thin bedded dark-gray, waxy, shaly clay

Test Hole 12

Location: On the sawmill property to the right of entrance road near gravel road about 2.5 miles southeast of Hills Chapel (SW.¼, SE.¼, Sec.26, T.5 S., R.8 E.)

Elevation: 458 feet　　　Date: March, 1959

Thickness	Depth	Description
		Coffee formation
3.0	3.0	Soil and subsoil
9.0	12.0	Silt, light-gray to tan, mottled with iron oxide stain, sandy, micaceous; contains highly oxidized glauconite
8.0	20.0	Sand, olive drab, fine-grained, silty, glauconitic, fossiliferous
13.0	33.0	Sand, dark-gray, fine-grained, compact, silty, finely glauconitic, fossiliferous
		Eutaw formation (Tombigbee member)
83.0	116.0	Sand, greenish to dark greenish-gray, fine-grained, silty, glauconitic, fossiliferous
		Eutaw formation (lower part)

23.0	139.0	Sand, greenish to gray, fine-grained, very glauconitic; contains streaks of dark-gray, waxy, shaly clay. Water bearing
15.0	154.0	Clay and sand. Thin-bedded, dark-gray, waxy, shaly clay and greenish-gray, fine-grained sand
65.0	219.0	Sand, greenish to gray, fine-grained, glauconitic; contains some streaks of dark-gray, waxy, shaly clay and some scattered, small, dark gravel; and a streak of small gravel and whitish to tan silty material at base
4.0	223.0	Clay, dark-gray, waxy, shaly; carbonaceous material and marcasite noted
42.0	265.0	Sand and clay. Greenish to dark-gray, fine-grained sand, becoming silty in part and containing thin-bedded, dark-gray, waxy, shaly clay. Some gravel, lignite and streaks of hard buff silty material
		McShan formation
29.0	294.0	Fine sand and silt, greenish, highly micaceous; contains some small dark chert gravel at base
		Gordo formation
16.0	310.0	Gravel, small, chert and sand matrix

TEST HOLE 13

Location: In the edge of a field on the northeast side of a northwest-southeast trending gravel road about 4.5 miles due east of Wheeler (SW.¼, SE.¼, Sec.2, T.6 S., R.7 E.)

Elevation: 485 feet Date: March, 1959

Thickness	Depth	Description
		Coffee formation
8.0	8.0	Sand, red-brown, fine-grained, silty
10.0	18.0	Sand, light-gray to tan, silty, fine-grained, finely micaceous, finely glauconitic
16.0	34.0	Sand, dark-gray, fine-grained, silty, finely micaceous and glauconitic
1.0	35.0	Sandstone, gray, calcareous, fine-grained, well indurated, glauconitic
7.0	42.0	Sand, dark-gray, fine-grained, silty, finely micaceous and glauconitic
0.5	42.5	Sandstone, gray, calcareous, well indurated, glauconitic
11.5	54.0	Sand, dark-gray, fine-grained, silty, finely micaceous and glauconitic
11.0	65.0	Sand, gray, fine-grained, glauconitic. Water bearing
2.0	67.0	Clay, dark-gray, plastic, slightly silty, carbonaceous, micaceous

17.0	84.0	Sand, gray, fine-grained, glauconitic; contains some streaks of dark-gray silty material. Water bearing
48.0	132.0	Sand and silt. Dark-gray to dark greenish-gray, fine-grained, glauconitic sand and dark-gray, compact silt
17.0	149.0	Sand, gray, fine-grained, very glauconitic and fossiliferous. Water bearing
17.0	166.0	Silt and sand. Dark-gray, compact silt and streaks of gray, fine-grained glauconitic sand
44.0	210.0	Sand, gray to greenish-gray, fine-grained, glauconitic, fossiliferous

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Ground-Water Resources of Prentiss County

B. E. ELLISON

and

E. H. BOSWELL

Prepared by the United States Geological Survey

in cooperation with the

Mississippi Board of Water Commissioners and the

Mississippi Geological Survey

1960

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GROUND-WATER RESOURCES OF PRENTISS COUNTY

B. E. ELLISON AND E. H. BOSWELL

U. S. GEOLOGICAL SURVEY

ABSTRACT

Prentiss County, in northeastern Mississippi between Corinth and Tupelo, is underlain by formations of calcareous clay, shale, sand, and gravel ranging in age from Late Cretaceous to Recent. Except for the Quaternary deposits which are found beneath the terraces and flood plains of the streams and which supply water to many of the shallow dug wells, all the water-bearing units are in the Upper Cretaceous series. The formations dip to the west toward the axis of the Mississippi embayment; the movement of ground water is generally to the southwest.

The Coffee sand and sands of the Eutaw formation are the principal sources of ground water in the county. The Gordo formation is the source for two flowing wells used for irrigation in the lowlands of Big Brown Creek, and it is a potential source of water in an area of about three townships in southeastern Prentiss County. The water from the Gordo contains undesirable quantities of iron for certain uses. The Gordo is overlapped by the Eutaw formation and is very thin or absent in most of the county.

Ground water has not been extensively developed in this county. The withdrawals at Booneville and Baldwyn combined average less than 1 million gallons a day. Only a small decline in water level has been recorded. In chemical quality all the waters are generally good for many uses, although iron removal may be necessary for certain uses.

This report includes among other things a tabulation of data for 370 wells, chemical analyses of water samples from 24 selected wells throughout the county, and a map showing the location of the wells.

INTRODUCTION

PURPOSE AND SCOPE OF INVESTIGATION

The investigation of the ground-water resources of Prentiss County is part of a statewide program of ground-water study which was begun in September 1953 in cooperation between the Mississippi Geological Survey and the U. S. Geological Survey.

More specifically it is a part of the investigation of the water-bearing properties of the Cretaceous system in northeastern Mississippi. The cooperative program with the State Survey continued until July 1, 1956, at which time the Mississippi Board of Water Commissioners by legislative act became the State cooperator with the Geological Survey in continuing the study. The purpose of the program is to determine the quantity and quality of ground water available for use from the various geologic formations of the State.

The objectives of the investigation in Prentiss County were as follows:

1. Inventory all drilled wells and representative dug wells and tabulate data on their location, depth, diameter, water level, and yield.
2. Determine the quantity of ground water used by municipalities and industries.
3. Collect data on water levels, delineate areas of artesian flow, and establish observation wells for future water-level data.
4. Determine the chemical character of the water from each of the principal water-bearing formations.

The investigation in Prentiss County was begun in March 1959 and was made under the immediate supervision of J. W. Lang, District Geologist in charge of ground-water investigations, and the administrative direction of P. E. LaMoreaux, Chief, Ground Water Branch, U. S. Geological Survey.

PREVIOUS INVESTIGATIONS

Some of the data included in this report were collected during broadscale areal investigations of the Cretaceous aquifers in northeastern Mississippi. A report on the municipal and industrial water supplies of northern Mississippi, including Prentiss County, is in preparation. Earlier reconnaissance studies of the ground-water resources of Mississippi, including some data for Prentiss County, were published in 1928 in a report by L. W. Stephenson, William N. Logan, and Gerald A. Waring, as Water-Supply Paper 576 of the U. S. Geological Survey, "The Ground-Water Resources of Mississippi."

A selected bibliography of reports containing information on the geology and ground-water resources and on drinking-water standards is appended to this report.

ACKNOWLEDGMENTS

Acknowledgment is made to waterworks personnel and other officials of Baldwyn and Booneville for cooperation in furnishing production records and other assistance; to the citizens of Prentiss County for their cooperation in obtaining data on wells given in this report; to the Mississippi State Highway Department for furnishing special county base maps; and to Mr. Tracy W. Lusk, State Geologist, for technical assistance and coordination of this study with investigations of the State Geological Survey.

GEOLOGIC FORMATIONS AND THEIR WATER-BEARING CHARACTERISTICS

Except for Quaternary alluvium and terrace deposits, the rocks cropping out at the surface in Prentiss County belong to the Upper Cretaceous series. They consist chiefly of clay, chalk, shale, sand, and some gravel. All drilled wells in the county tap water-bearing sand and gravel beds of the Cretaceous; several shallow dug and bored wells are in the valley alluvium or terrace deposits. A summary of the geologic units and their hydrologic properties is given in table 1.

All ground water is originally derived from precipitation, though ground water alone represents only a part of the total rainfall. Water from rainfall may be carried away by surface streams; it may be partly consumed by plant transpiration or by evaporation; or, under favorable conditions, it may seep into the soil, percolate downward, and eventually reach the zone of saturation and become ground water. The upper surface of the zone of saturation is known as the water table. Supply wells have their source in the saturated zone.

The direction of movement of ground water is controlled by the topography, geologic structure, and the size and arrangement of the rock particles. These controls permit the water to move in the sand and gravel from the water-table areas down the dip into artesian reservoirs where it becomes available to supply deep drilled wells in certain parts of Prentiss County. For ex-

TABLE 1.—GENERALIZED SECTION OF THE GEOLOGIC FORMATIONS IN PRENTISS COUNTY, MISS., AND THEIR WATER-BEARING PROPERTIES.

System	Series	Stratigraphic unit	Symbol	Lithologic character	Water-bearing properties
QUATERNARY	Recent and Pleistocene	Valley alluvium	Qal	Clay, silt, sand, and gravel.	Supplies water to a few shallow dug and bored wells in valleys. Quality is variable.
		Terrace deposits	Qt	Clay, silt, sand, and gravel.	Sand and gravel beds yield small supplies in shallow dug and bored wells. Quality is variable.
CRETACEOUS	Upper Cretaceous	Selma group: Ripley formation, undifferentiated	Kr	Sand, sandstone, clay, and shale.	The source for shallow dug wells in the extreme western part of the county. No drilled wells were found.
		Selma group: Demopolis chalk	Kd	Chalk, sandy, white; interbedded sand and clay near the top.	Relatively impermeable and not an aquifer.
		Selma group: Coffee sand	Kc	Sand, fine to medium, glauconitic, fossiliferous; clay and shale.	Sand beds in parts of the formation are good aquifers and yield water to domestic wells in all the county west of Big Brown Creek. The water is low in dissolved solids; it usually has a high iron content and ranges from moderately hard to very hard. Flowing wells are found in the valley of the tributaries of Twenty Mile Creek.
		Eutaw formation: Tombigbee sand member	Ket	Sand, massive, fine to medium, calcareous, very glauconitic; indurated sandstone layers.	A good aquifer in all parts of Prentiss County west of the outcrop. The water is similar in quality to that from the Coffee sand. Because most wells are not cased through the Coffee sand a water sample could not be obtained from the Tombigbee sand member.
		Eutaw formation	Ke	Sand, normally crossbedded, medium to coarse, glauconitic; interbedded shale and clay; scattered gravel in lower part of formation.	The thick sand beds of the Eutaw formation supply most wells east of Highway 45 and are the source for some deeper wells in the western part of the county. All municipal and industrial wells are developed in the Eutaw formation. The water is of good quality but ranges from moderately hard to hard.
		Tuscaloosa group: McShan formation	Kmc	Typically laminated fine sand and clay.	Not known to be an aquifer in Prentiss County.
		Tuscaloosa group: Gordo formation	Ktg	Sand, gravel, and clay.	Yields large supplies to two flowing irrigation wells in the southeastern part of the county. Is thin, absent, or not known to have been reached by wells in other parts of the county.

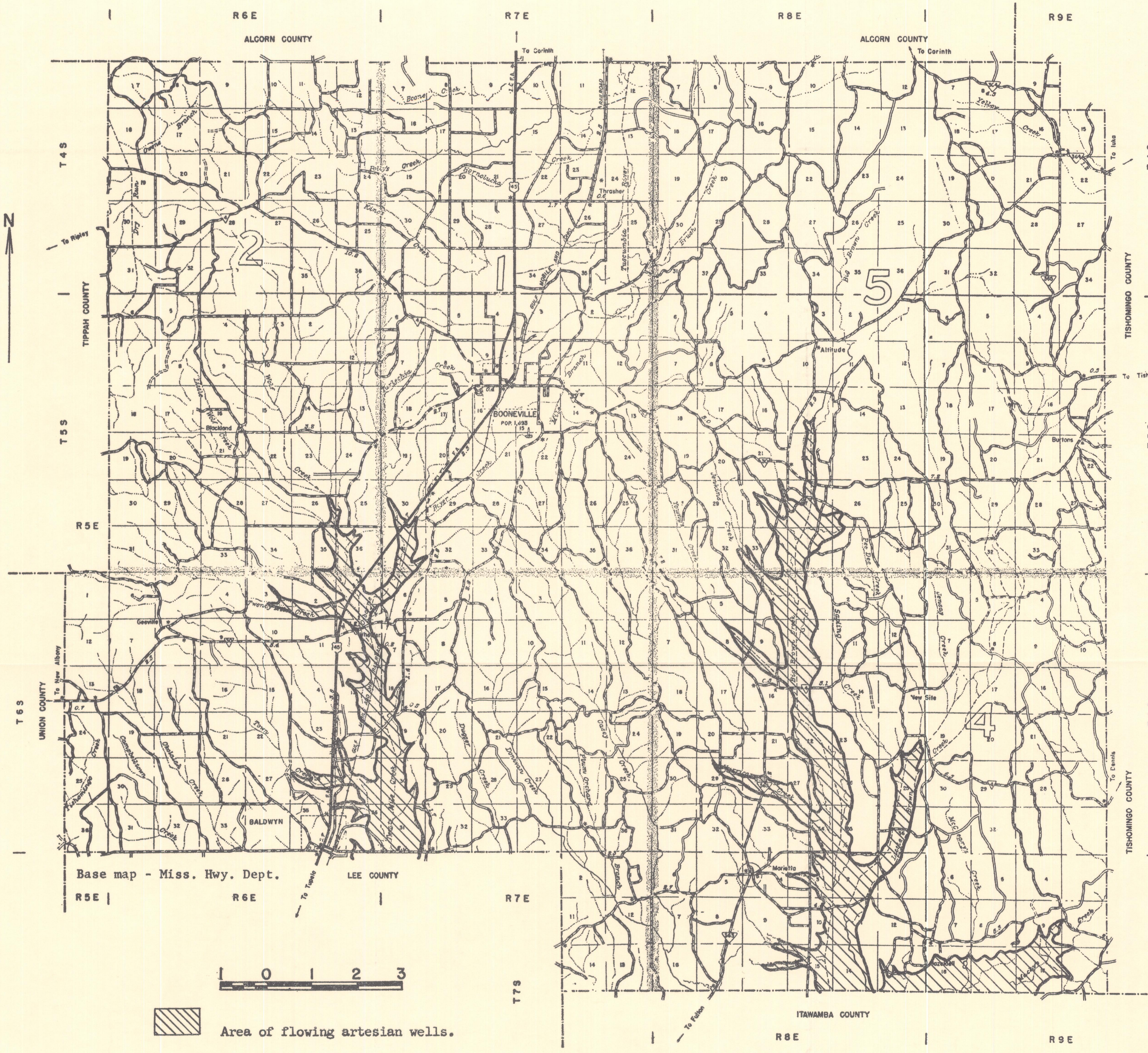

FIGURE 1.- MAP OF PRENTISS COUNTY, MISS., SHOWING GENERALIZED AREA OF ARTESIAN FLOW.

ample, precipitation in eastern Prentiss County falls on the outcrop of the Eutaw formation, where a water table is formed. This is the recharge or replenishment area.

The artesian water is under hydrostatic pressure because the outcrop is at a higher altitude than the water-bearing sand

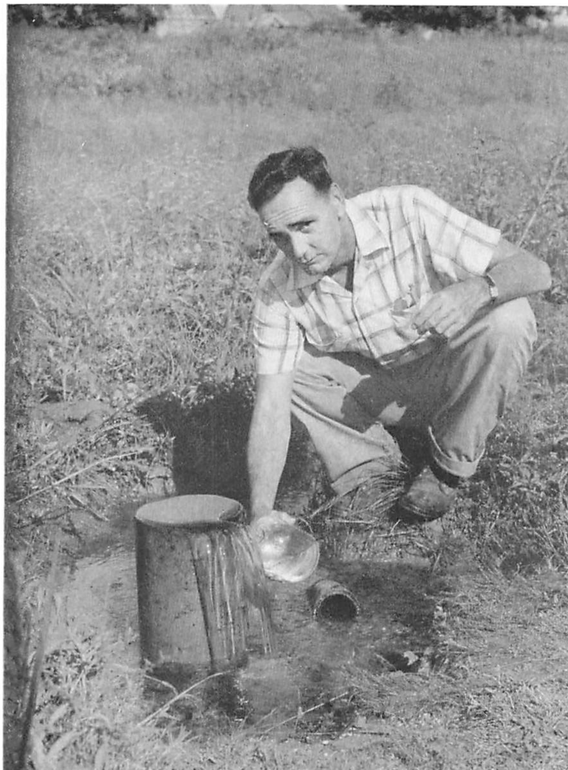

Figure 2.—Artesian well (L26) flowing continuously in lowland of Big Brown Creek, Prentiss County. Depth, 280 feet; aquifer, Gordo formation; rate of flow, about 25 gallons per minute; temperature of water, 63° F. Well is used for irrigation of row crops during dry seasons.

in the well; therefore, it rises a certain distance up the bore of the well. A well in which the water rises in this way is considered artesian whether or not it flows. Most of the domestic wells and all municipal and industrial wells in Prentiss County are artesian wells. An artesian well will flow if there is sufficient pressure head and the land surface is comparatively low. The altitude of the valley floor of Big Brown Creek is low enough that the water rises above the land surface in wells, resulting in flowing artesian wells. In certain areas flowing wells may be obtained from one or more aquifers. There are two significant areas of artesian flow in the county. They lie along the main stems and tributaries of Big Brown Creek and Twenty Mile Creek (fig. 1). A flowing irrigation well in the Gordo formation is shown in figure 2.

The water in the outcrop belts of the Eutaw formation, the Coffee sand, and the Ripley formation in Prentiss County occurs

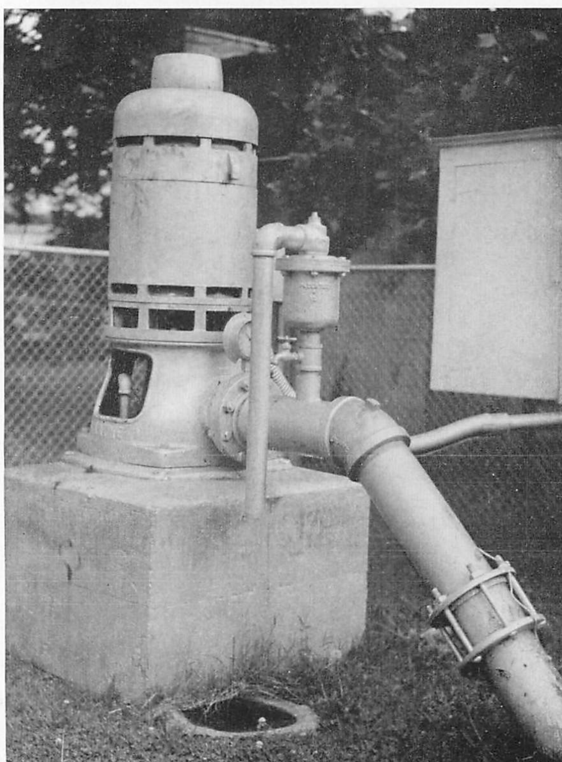

Figure 3.—Municipal well at Booneville in the Eutaw formation. Depth, 425 feet; yield, about 300 gallons per minute; temperature of water, 65° F. Three such wells ranging in depth from 419 to 486 feet furnish the water supply for the city of Booneville.

under water-table conditions. As the water moves in the sandy layers along the bedding planes of the formations, which dip in a westerly direction, it passes beneath impervious beds such as

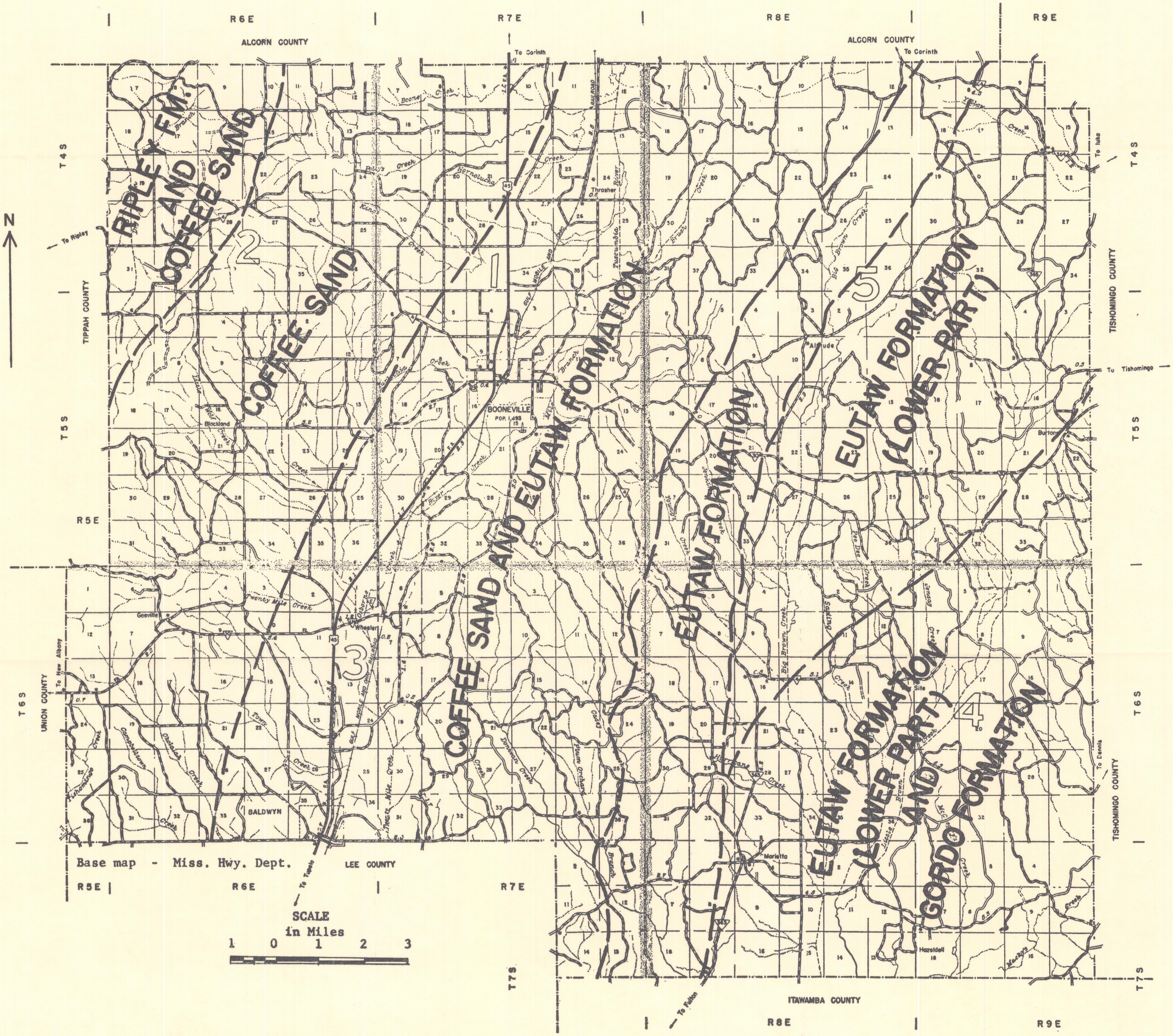

FIGURE 4.- GEOLOGIC SOURCES OF MAJOR GROUND-WATER SUPPLIES IN PRENTISS COUNTY, MISS.

clay and marl and becomes artesian, forming a part of the large artesian reservoirs west of the water-table areas. The municipal wells at Booneville and Baldwyn, which are developed in the Eutaw formation, yield artesian water which originated as precipitation on the outcrop of the formation in eastern Prentiss County and western Tishomingo County. Figure 3 shows a typical large-capacity supply well at Booneville.

The areas of different geologic sources of the major ground-water supplies are indicated by figure 4. These show in general where water supplies have been developed from the indicated units; they do not necessarily correspond to the areas of outcrop. Water supplies in any one part of the county may be derived from one or more geologic units, according to the depth of the wells. For example, at Booneville water supplies can be developed from the Coffee sand of the Selma group or the Tombigbee sand member or other parts of the Eutaw formation. In the southeastern part of Prentiss County most of the supply wells are in sands of the Eutaw formation, but a few deep wells obtain water from the Gordo formation. The Gordo is potentially an important aquifer throughout an area of three townships or more. In the northwestern part of the county the Ripley formation (fig. 4) forms the land surface; it is the source of water supply for many shallow dug wells. Beneath the Ripley is the Coffee sand, which is the source of supply for drilled wells 350 to 400 feet deep.

WATER-LEVEL FLUCTUATIONS AND THEIR SIGNIFICANCE

Changes in water levels in wells can be correlated with changes in ground-water storage, barometric changes, and several minor influences. They reflect natural recharge by infiltration of rainfall on outcrop areas and by movement of ground water from places of higher altitude. Water-level fluctuations correlate with losses and gains to streams and lakes and indicate the effects of flowing or pumping wells on the ground-water reservoirs.

Shallow water-table wells and springs may respond with rising water levels or increased flows within a few hours or days after precipitation, and with declining water levels or decreased flows in drought periods. In Prentiss County seasonal fluctuations of water levels are related directly to the rainfall. During late winter the levels are usually at their highest because of the prolonged and large amount of recharge from heavy winter rains and the low rate of evapotranspiration. Water levels are generally lowest during October, after the summer period of high evapotranspiration and low recharge. Measurements are being made periodically by the U. S. Geological Survey on a few selected observation wells. Figure 5 shows a water-level measurement being made with a steel tape.

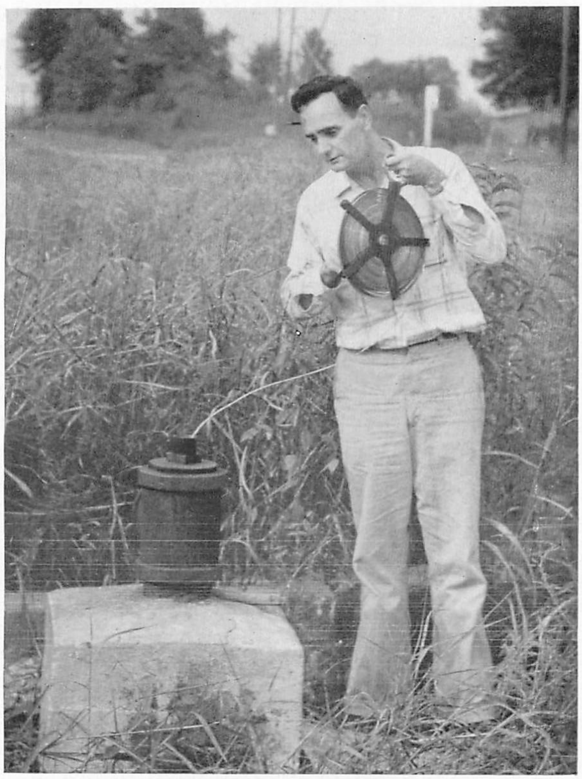

Figure 5.—Water-level measurement being made in an unused railroad well (K16) at Wheeler. Depth, 385 feet in the Eutaw formation; water level, 18.7 feet on September 11, 1959.

Water levels in Prentiss County, according to available records, show a small, gradual decline over the years as a result of the growing number of supply wells and the increasing withdrawals, particularly from the deep artesian aquifers. No large declines are indicated. For example, the water level in a well (K16) 385 feet deep at Wheeler, where there is little pumping, stood at 15 feet below the land surface in 1919 and had declined to only 18 feet in 1959. No comparative water levels are available for the Booneville or Baldwyn localities, where there is a considerable amount of ground-water pumping.

The Booneville water supply is obtained from 3 wells (419, 425, and 486 feet deep) in the Eutaw formation. Pumpage has been plotted by months for the period of record (fig. 6), and shows that in 1957, 1958, and the first part of 1959 the average monthly pumpage was about 11.5 million gallons; the maximum was 15.5 million gallons in August 1959 and the minimum 9.0 million gallons in February 1959. The water supply at Baldwyn also is from 3 wells in the Eutaw formation, but at Baldwyn there are several privately owned wells in addition to the municipal wells. The pumpage by the town of Baldwyn is less than a third the amount for Booneville. (See fig. 7.)

QUALITY OF WATER

The nature of the chemical constituents found in ground water depends on the amount and kinds of gases dissolved in the water falling as rain, the nature of the surface upon which it falls, and the chemical nature and solubility of the material making up the water-bearing formation. Most of the objectionably hard waters contain large amounts of calcium and magnesium, these elements being easily dissolved from the rocks in the area.

The chemical quality of water may limit its use for domestic or municipal supply, or for industry. Various industrial users require water of a certain degree of softness—for example, a water having a hardness of more than 80 parts per million (ppm) may cause troublesome scale in low-pressure steam boilers. For high-pressure boilers the requirement is even more stringent. Textile mills, laundries, bleaching, dyeing, soap, and tanning industries require soft water for efficient production. Iron is an undesirable constituent, and in municipal and industrial water supplies the content should be as low as possible—not more than 0.3 ppm in domestic water. Most of the iron in water can be removed by aeration and settling or filtration. Ground water is valuable for air conditioning and several other uses because of its relatively uniform temperature, which in the summer is lower than that of surface water.

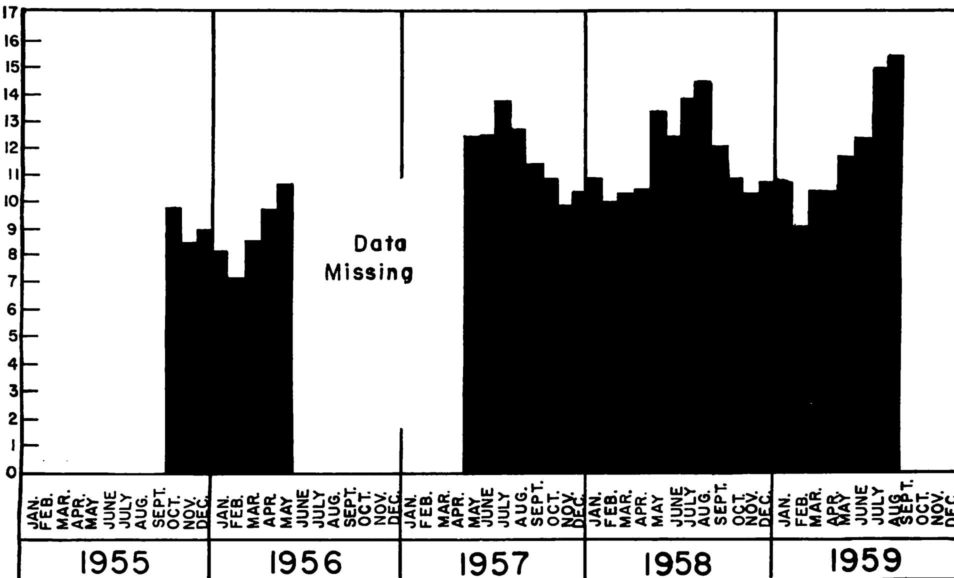

Fig. 6—Municipal pumpage for the city of Booneville, Miss., shown in millions of gallons per month, 1955-59.

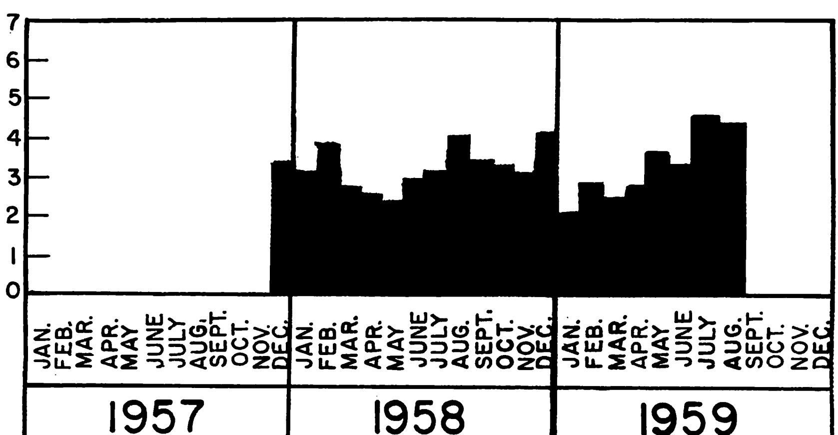

Fig. 7—Municipal pumpage for the town of Baldwyn, Miss., shown in millions of gallons per month, 1957-59.

Data on the chemical quality of 24 samples of well waters in Prentiss County are presented in table 2. For comparison, the limits recommended by the U. S. Public Health Service for several constituents in drinking water are included in the table. The pH and temperature of the well waters are given where available.

The hardness of water from the Coffee sand ranged from 56 to 230 parts per million (ppm) in samples collected from widely spaced wells. Water from the Eutaw formation ranged in hardness from 32 to 126 ppm and averaged about 101 ppm in the 14 samples analyzed. The chloride content of water from both the Coffee sand and the Eutaw formation is low, ranging from 1.2 to 21 ppm.

The iron content differs considerably from place to place, even within the same formation. In water from the Coffee sand it ranged from a high of 15 to a low of 0.06 ppm; in most samples the iron content was several parts per million. The iron content of water from the Eutaw formation ranged from 0.03 to 3.0 ppm and averaged 0.97 ppm. No treatment for iron removal is given at Booneville although two of the three water samples show excessive iron content (see F1, F2 and F11, table 2) or Baldwyn (see J1, J2 and J22).

Fluoride is present in small amounts in most of the waters, although in three samples (E3, E29 and K2) none was found. The range in fluoride in 12 other samples was from 0.1 to 0.4 ppm; water from the Eutaw formation had the greatest amount of fluoride.

The ground waters in Prentiss County are of generally good quality for many uses, although treatment for iron and or hardness reduction may be desirable for some of them if they are to be used for certain specific purposes. With the exception of some undesirably high quantities of iron, the recommended maximum limits for chemical constituents were not exceeded (and in most samples not nearly approached) in the waters analyzed.

TABLE 2.—DESCRIPTIONS AND ANALYSES OF WATER FROM WELLS IN PRENTISS COUNTY, MISSISSIPPI
(ANALYSES, CHEMICAL CONSTITUENTS IN PARTS PER MILLION BY U. S. GEOLOGICAL SURVEY)

Well No.: Numbers correspond with those in table 3. Water-bearing unit: Kr, Ripley formation; Kc, Coffee sand; Ke, Eutaw formation; Ktg, Gordo formation.

Well No.	Owner	Date of collection	Water-bearing unit	Silica (SiO_2)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Carbonate (CO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Dissolved solids	Hardness as $CaCO_3$: Total	Hardness as $CaCO_3$: Noncarbonate	Specific conductance (micromhos at 25°C)	pH	Color	Temperature (°F)
	U. S. Public Health Service drinking water standards				[a]0.3		125					250	250	1.5		500						
A4	D. T. Brooks	5-19-59	Kc	4.8	0.92	53	14	6.2	2.4	179	0	52	6.0	0.2	0.2	240	190	43	368	7.0	6	64
A6	Jumpertown School	11-27-58	Kc	8.2	3.7	60	13	6.4	3.3	196	0	47	6.5	.2	.4	271	203	42	405	8.0	4	....
B7	Thrasher School	11-27-58	Kc	9.1	15	18	3.4	4.1	1.8	80	0	2.2	2.5	.2	.3	102	59	0	140	6.8	2	....
B28	Elmer McCoy	5-19-59	Kc	4.3	3.2	29	1.6	5.0	1.4	52	0	43	4.5	.2	.1	136	79	36	195	6.2	6	63
E3	G. A. Blassingame	11- 1-56	Kc	......	.55	64	17	10	3.8	244	0	40	6.2	.0	.9	290	230	30	458	7.9	5	....
E29	J. C. Vandevander	5-19-59	Qt[e]	1.5	.07	21	5.1	22	1.2	15	0	11	42	.0	48	221	74	61	278	5.6	5	61
F1	City of Booneville	6-23-54	Ke	8.9	1.3	33	6.9	5.2	3.5	137	0	12	2.5	.1	.0	155	111	0	249	7.5	5	64
F2	do	4- 7-59	Ke	4.2	.04	39	6.8	6.5	4.0	148	0	11	7.0	.2	.6	166	126	4	268	7.9	0	65
F9	John K. Kaye	9- ?-19	Kc	45	9.1	14	5.0	[b]26	......	92	8	13	2.4	......	Tr.	166	[c]56	....	......	....	....	....
F10	do	9- ?-19	Kc	36	7.0	35	4.7	[b]20	......	152	0	22	1.4	......	Tr.	200	[c]107	....	......	....	....	....
F11	City of Booneville	4- 7-59	Ke	1.1	1.4	35	7.4	8.7	4.2	148	0	.2	13	.1	.3	146	118	0	266	8.1	0	64
J1	Town of Baldwyn	12- 2-54	Ke	8.6	.17	29	5.5	22	3.7	136	0	7.4	19	.3	.3	172	95	0	291	7.9	5	63
J2	do	12- 2-54	Ke	8.6	.17	29	5.5	22	3.7	136	0	7.4	19	.3	.3	172	95	0	291	7.9	5	63
J22	do	4-28-59	Ke	4.3	.04	30	7.4	17	4.0	140	0	7.0	19	.2	.8	168	106	0	276	7.8	5	64
J65	Davis Lumber Co.	9- ?-19	Ke	23	.64	24	6.6	[b]28	......	130	2	10	20	......	.5	181	[c]87	....	......	....	....	....
J66	R. E. L. Sutherland	9- ?-19	Kc	18	.06	52	12	[b]12	......	200	0	37	1.2	......	1.1	232	[c]179	....	......	....	....	....
J67[d]	Davis Lumber Co.	4- ?-14	Ke	15	2.7	29	3.4	[b]26	......	137	0	7.9	21	......	.5	170	[c]86	....	......	....	....	....
K2	R. V. Ryan	11- 1-56	Ke	......	.03	33	6.9	9.3	3.8	138	2	13	5.5	.0	1.0	160	111	0	255	8.3	7	....
K11	Wheeler School	11-26-58	Ke	6.4	.64	32	6.1	14	3.6	148	0	8.6	4.8	.2	1.1	167	105	0	249	8.1	0	63
K16	Mobile & Ohio R. R. Co.	9- ?-19	Ke	25	.50	36	6.8	[b]19	......	145	0	18	15	......	.4	188	[c]118	....	......	....	....	....
L8	Marietta School	11-25-58	Ke	3.8	.79	36	7.1	17	3.9	144	0	10	20	.2	.3	183	119	1	296	7.6	1	63
L26	E. W. Caviness	6-25-59	Ktg	1.8	.40	32	9.1	21	4.1	124	0	12	38	.2	.1	216	118	16	341	7.4	7	63
L29	New Site School	4-15-59	Ke	17	2.2	7.9	3.1	3.7	3.0	44	0	4.8	2.2	.4	.1	94	32	0	89	6.5	1	63
L46	R. R. Smith	5- 1-59	Ke	8.5	3.0	31	6.8	4.5	3.6	116	0	19	3.0	.1	.3	151	106	10	220	7.2	3	62

[a] Limit for iron and manganese together.
[b] Sodium and potassium calculated as sodium.
[c] Calculated.
[d] Analysis by Mississippi State Chemical laboratory.
[e] Terrace sands.

CONCLUSIONS

The principal results of the ground-water investigation in Prentiss County as of August 1959 are as follows:

1. Ground water in considerable quantities for municipal, industrial, and farm uses is available from sand and gravel beds of the Gordo formation, the sandy beds of the Eutaw formation, and the Coffee sand. Most of the large-capacity wells are developed in the sands of the Eutaw formation. The Gordo formation offers a potential source of water for comparatively large wells in the southeastern part of the county, but the formation is overlapped by the Eutaw formation and is thin or absent throughout the remainder of the county.

2. The formations dip to the west into the Mississippi embayment, and the depth of wells in each formation increases in that direction. Water occurs under water-table conditions in the outcrops and moves downdip into the confined beds to the west of the outcrops, where it is under artesian pressure. The direction of movement of the ground water is generally from the northeastern part of the county, where the water levels are at the highest altitude, toward the southwestern part where they are the lowest.

3. In chemical quality, the ground waters in Prentiss County are generally acceptable for many uses, although treatment for iron or hardness reduction may be recommended for some of them if they are to be used for certain specific purposes. Except for some undesirably high quantities of iron, the recommended maximum limits for chemical constituents in drinking water were not exceeded in the waters analyzed. The hardness of the water in the Coffee sand is somewhat greater than the hardness of the water from the Eutaw formation, which averaged about 101 ppm in the samples analyzed.

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Stephenson, L. W., Logan, William N., and Waring, Gerald A., 1928, The ground-water resources of Mississippi: U. S. Geol. Survey Water-Supply Paper 576, 515 p., 3 figs., 12 pls.

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RECORDS OF WELLS

Records of wells in Prentiss County, including for each well the depth, diameter, water-bearing formation, water level, method of lift, use of the water, and pertinent remarks, are given in table 3. A map, figure 8, shows the location of wells for which data are given in table 3. A grid system is used for well numbering, the grids being designated alphabetically beginning with A in the upper left corner of the map. The grid lines follow township lines except for areas smaller than half a township, which are included in an adjoining township. Consecutive numbers are used for wells in each grid area.

TABLE 3.—RECORDS OF WELLS IN PRENTISS COUNTY, MISSISSIPPI

Well No.: Numbers correspond to those in figure 8 and table 2. See p. 18 for description of well-numbering system. Asterisk indicates chemical analysis given in table 2.

Type of well: Most wells are rotary drilled. Exceptions are noted under "Remarks." Most depths are as reported by the owner or driller.

Water level: Levels shown in feet are reported; those in feet and tenths were measured on the dates shown.

Altitude: Altitudes determined from contour maps or aneroid barometer.

Method of lift: C, cylinder; F, natural flow; J, jet; M, manual; P, pitcher; T, turbine; S, submersible.

Use of water: D, domestic; I, industrial; Ir, irrigation; N, none; P, public supply; S, stock.

Water-bearing units: Qal, alluvium; Qt, terrace deposits; Kr, Ripley formation; Kc, Coffee sand; Ke, Eutaw formation; Ket, Tombigbee sand member, Eutaw formation; Ktg, Gordo formation.

Well No.	Owner	Driller	Date completed	Depth of well (ft.)	Diameter of well (in.)	Water-bearing unit	Altitude of land-surface datum (ft.)	Water level: Above (+) or below land-surface datum (ft.)	Water level: Date of measurement	Method of lift	Use of water	Remarks
A1	W. C. Wallis	R. C. Bonds	1955	284	4	Kc	540	160	1955	J	D,S	
A2	M. B. Padgett	Padgett	-------	204	----	Kc	520	-------	-------	J	D,S	
A3	J. O. Smith	J. W. Webb & Sons	1946	325	4	Kc	560	250	1956	M	D,S	
*A4	D. T. Brooks	R. C. Bonds	1956	348	4	Kc	560	186	1956	C	D,S	
A5	Oliver Eaton		-------	34	----	Kr	580	29.9	5-19-59	M	D,S	Dug well.

TABLE 3.—(CONTINUED)

Well No.	Owner	Driller	Date completed	Depth of well (ft.)	Diameter of well (in.)	Water-bearing unit	Altitude of land-surface datum (ft.)	Water level: Above (+) or below land-surface datum (ft.)	Water level: Date of measurement	Method of lift	Use of water	Remarks
*A6	Jumpertown School	J. W. Webb & Sons	1957	600	10	Kc	570	154	1957	T	P	Well reaches Tombigbee sand; Coffee sand is chief aquifer.
A7	R. T. Chase	R. C. Bonds	1955	315	4	Kc	528	90	1955	J	D	
A8	U. E. Orff	Norwell Drilling Co.	1954	280	4	Kc	520	--------	--------	C	D	
A9	J. C. Young	R. C. Bonds	1958	216	6	Kc	530	--------	--------	C	D	
A10	L. L. Inman	J. W. Webb & Sons	1948	230	4	Kc	540	--------	--------	C	D	
A11	G. W. Michael	do	1944	350	4	Kc	540	--------	--------	C	D,S	
A12	H. C. Smart	R. C. Bonds	1957	325	5	Kc	550	174	1957	J	D,S	
A13	L. L. Green	J. W. Webb & Sons	1953	369	4	Kc	580	--------	--------	C	D	
A14	Orville James	R. C. Bonds	1957	350	4	Kc	570	--------	--------	C	D	
A15	M. F. Geno	do	1952	400	4	Kc	580	177.0	6-24-59	----	N	
A16	W. C. Bridges	Felkins	1954	385	5	Kc	580	--------	--------	C	D	
A17	L. R. Brumley	J. W. Webb & Sons	1947	390	4	Kc	550	84.2	6-24-59	----	N	
A18	C. E. Green	Norwell Drilling Co.	1954	315	4	Kc	490	--------	--------	J	D	
A19	L. P. Windham	do	1955	320	4	Kc	460	--------	--------	J	D	
A20	E. C. Surratt	Norwell Drilling Co.	1955	320	4	Kc	460	90	1955	J	D	

TABLE 3.—(CONTINUED)

Well No.	Owner	Driller	Date completed	Depth of well (ft.)	Diameter of well (in.)	Water-bearing unit	Altitude of land-surface datum (ft.)	Water level: Above (+) or below land-surface datum (ft.)	Water level: Date of measurement	Method of lift	Use of water	Remarks
A21	English Estate	J. W. Webb & Sons	1956	390	4	Kc	545	....	....	C	D	Supplies five families.
A22	G. C. Storey	do	1952	211	4	Kc	480	....	....	C	D	
A23	J. C. Stanley		1930	300	4	Kc	550	....	....	C	D	
A24	D. A. Walthers	J. W. Webb & Sons	1955	342	4	Kc	565	110	1955	C	D,S	
A25	F. W. Miller	J. W. Webb & Sons	1958	368	4	Kc	560	....	....	C	D,S	
A26	J. V. Windham	do	1957	300	4	Kc	580	....	....	M	D,S	
B1	L. C. Thompson	Norwell Drilling Co.	1946	169	4	Kc	465	30	1955	J	D,S	
B2	O. B. Weatherbee	do	1950	150	4	Kc	500	....	....	J	D,S	
B3	Mrs. Cora Davis	J. W. Webb & Sons	1946	120	4	Kc	500	66	1956	J	D,S	
B4	D. M. Calvary	Norwell Drilling Co.	1952	165	4	Kc	520	....	....	J	D,S	
B5	T. Q. Stutts	Norwell Drilling Co.	1953	125	4	Kc	490	66	1955	J	D,S	
B6	E. B. McCoy	do	1954	144	4	Kc	520	....	....	J	D,S	
*B7	Thrasher School		1943	125	4	Kc	480	....	....	J	P	
B8	Cecil Grimes	R. C. Bonds	1954	154	4	Kc	460	....	....	J	D	
B9	W. H. Davis	do	1957	185	4	Kc	510	85	1959	J	D	
B10	do	do	1951	207	4	Kc	520	90	1959	J	D	
B11	Jack McGee	Norwell Drilling Co.	1948	120	4	Kc	485	50	1948	J	D	

TABLE 3.—(CONTINUED)

Well No.	Owner	Driller	Date completed	Depth of well (ft.)	Diameter of well (in.)	Water-bearing unit	Altitude of land-surface datum (ft.)	Water level: Above (+) or below land-surface datum (ft.)	Water level: Date of measurement	Method of lift	Use of water	Remarks
B12	W. T. Sorrell	J. W. Webb & Sons	1953	135	4	Kc	460	55	1959	J	D	
B13	T. D. Cox	Norwell Drilling Co.	1954	240	4	Kc	485	....	....	C	D,S	
B14	J. C. McCutchen	J. W. Webb & Sons	1954	168	5	Kc	485	60	1954	J	D,S	
B15	do	Norwell Drilling Co.	1957	188	5	Kc	490	....	....	J	D	
B16	W. G. Wood	Norwell Drilling Co.	1956	124	4	Kc	485	....	....	C	D	
B17	C. R. Nunley	do	1953	140	4	Kc	500	....	....	J	D	Water is filtered before use.
B18	Roger Stanley	J. W. Webb & Sons	1945	175	4	Kc	475	....	....	J	D,S	
B19	J. H. Lewis	Norwell Drilling Co.	1954	82	4	Kc	470	29	1954	J	D,S	
B20	J. C. Hopkins	do	1957	120	4	Kc	480	....	....	J	D	
B21	F. E. Parker	do	1949	100	4	Kc	450	....	....	J	D,S	
B22	C. E. Phillips	do	1945	100	4	Kc	450	....	....	J	D	
B23	H. M. Shikle	do	1956	105	4	Kc	510	75	1956	J	D	
B24	M. R. Gardner	Norwell Drilling Co.	1950	115	4	Kc	465	46	1950	J	D	
B25	L. C. Moore		1951	175	4	Kc	500	....	....	J	D,S	
B26	R. L. Crabb	Norwell Drilling Co.	1954	160	4	Kc	460	....	....	J	D	Supplies residence, motel and service station.

TABLE 3.—(CONTINUED)

Well No.	Owner	Driller	Date completed	Depth of well (ft.)	Diameter of well (in.)	Water-bearing unit	Altitude of land-surface datum (ft.)	Water level: Above (+) or below land-surface datum (ft.)	Water level: Date of measurement	Method of lift	Use of water	Remarks
B27	Mrs. Eliza Honeycutt	Norwell Drilling Co.	1955	144	4	Kc	480	......	......	J	D	
*B28	Elmer McCoy	do	1955	165	4	Kc	505	40	1955	J	D,S	
B29	F. B. Worley	do	1950	102	4	Kc	480	......	......	J	D,S	
B30	do	do	1948	120	4	Kc	495	......	......	J	D,S	
B31	S. E. Doss	do	1951	130	4	Kc	455	15	1951	J	D,S	
B32	do	do	1945	156	4	Kc	465	......	......	C	D,S	
C1	J. D. Jones		......	35	...	Kc	540	33	1956	M	D,S	Dug well.
C2	M. L. Runions	R. C. Bonds	1955	280	4	Ket	545	......	......	J	D,S	
C3	H. G. Huddleston	Norwell Drilling Co.	1956	80	4	Kc	470	15	1956	J	D,S	
C4	L. E. Morgan	R. C. Bonds	1959	195	4	Ket	430	47	1959	J	D	
C5	A. W. Stevens	Norwell Drilling Co.	1958	104	4	Kc	480	50	1958	J	D	
C6	R. A. Smith		1957	190	4	Ket	500	......	......	J	D	Water is filtered before use.
C7	Mrs. Valcour Smith		1941	168	4	Kc	520	......	......	J	D	
C8	Mrs. F. J. Cole	Burns	1923	224	4	Ke	405	3.3	4-29-59	J	S	
C9	J. W. Phillips	R. C. Bonds	1943	187	4	Ket	515	......	......	P	D,S	
C10	C. L. Lambert	do	1955	252	4	Ket	500	......	......	S	D,S	

TABLE 3.—(CONTINUED)

Well No.	Owner	Driller	Date completed	Depth of well (ft.)	Diameter of well (in.)	Water-bearing unit	Altitude of land-surface datum (ft.)	Water level: Above (+) or below land-surface datum (ft.)	Water level: Date of measurement	Method of lift	Use of water	Remarks
D1	Oscar DePoyster	Norwell Drilling Co.	1953	125	4	Ke	510	35	1953	J	D,S	
D2	Highway Dept.	R. C. Bonds	1953	210	4	Ke	540			J	D,S	
D3	Marshall Trimble	Norwell Drilling Co.	1955	184	4	Ke	530			J	D	
D4	J. G. Timbs	do	1955	102	2	Ke	515			J	D	
D5	J. D. Elliot	do		102		Ke	520			J	D	
D6	Mrs. Ethel Tennison		1949	16		Ket	520	6.8	4-29-59	M	D	Dug well.
D7	R. P. Wilson	Massey	1939	140	4	Ket	515			C	D,S	
D8	L. L. Woodruff	do	1928	145	6	Ket	550	40	1928		N	Well formerly supplied steam mill.
D9	J. T. Wheeler			55			595	48.9	4-29-59	M	D,S	Dug well.
D10	W. B. Umfrees		1936	22			600	15.5	4-29-59	M	D,S	Do.
D11	J. C. Cole	R. C. Bonds	1958	190	4	Ke	520	39	1958	J	D,S	
D12	J. M. Phifer	do	1956	180	4	Ke	520	35	1956	J	D,S	
D13	M. P. Phifer	do	1956	155	4	Ke	520	55	1956	J	D,S	
D14	Mrs. Bertha Moss	do	1959	173	4	Ke	525	60	1959		D	
D15	Mrs. Annie McGaughy		1953	140	4	Ke	560			J	D,S	
D16	A. B. Parker	Norwell Drilling Co.	1959	180	4	Ke	540			J	D,S	

TABLE 3.—(CONTINUED)

Well No.	Owner	Driller	Date completed	Depth of well (ft.)	Diameter of well (in.)	Water-bearing unit	Altitude of land-surface datum (ft.)	Water level: Above (+) or below land-surface datum (ft.)	Water level: Date of measurement	Method of lift	Use of water	Remarks
D17	E. H. Maness	R. C. Bonds	1954	240	4	Ke	540	....	....	J	D,S	
E1	F. A. Owens	R. C. Bonds	1953	231	4	Kc	476	65	1956	J	D,S	
E2	J. M. Geno	J. W. Webb & Sons	1942	380	4	Kc	500	80	1956	C	D,S	
*E3	G. A. Blassingame	Norwell Drilling Co.	1956	188	4	Kc	420	40	1956	J	D,S	
E4	Harry Morris	J. W. Webb & Sons	1948	190	4	Kc	450	55	1955	J	D,S	
E5	Mrs. Sally Smith	do	1946	250	4	Kc	420	35	1956	J	D,S	
E6	H. L. Gullett	do	1947	325	4	Kc	450	65	1947	J	D,S	
E7	S. F. Jumper	do	1951	290	4	Kc	508	....	....	C	D,S	
E8	Mrs. Annie Yates	Norwell Drilling Co.	....	210	4	Kc	470	....	....	M	D	
E9	W. E. Hill	Warren McGee	1900	160	6	Kc	425	....	....	M	D	
E10	S. G. Garner	do	1900	135	4	Kc	430	38	1959	P	D	
E11	do		1865	210	4	Kc	450	45	1959	S	D	Supplies five families.
E12	Blackland School	S. G. Garner	1928	140	4	Kc	440	40	1959	J	N	School discontinued.
E13	R. W. Kelly	J. W. Webb & Sons	1954	303	4	Kc	480	....	....	J	D	
E14	R. S. Jones	J. H. Morgan	1919	195	4	Kc	465	97.4	6-24-59	M	D	
E15	Mrs. R. G. Garrett	R. C. Bonds	1959	220	4	Kc	460	....	....	J	D	
E16	J. D. Milling		1919	300	4	Kc	430	64	1959	J	D,S	

TABLE 3.—(CONTINUED)

Well No.	Owner	Driller	Date completed	Depth of well (ft.)	Diameter of well (in.)	Water-bearing unit	Altitude of land-surface datum (ft.)	Water level: Above (+) or below land-surface datum (ft.)	Water level: Date of measurement	Method of lift	Use of water	Remarks
E17	Atkins Childers	Norwell Drilling Co.	1954	125	4	Kc	420	----	----	C	D,S	
E18	H. E. Rowland	J. W. Webb & Sons	1958	240	5	Kc	465	96	1958	J	D,S	
E19	J. H. McCombs	R. C. Bonds	1951	250	4	Kc	445	----	----	J	D,S	
E20	R. C. Smith	Norwell Drilling Co.	1956	150	4	Kc	420	40	1959	J	D	
E21	E. E. Richardson	do	1952	160	4	Kc	405	36	1959	J	D	
E22	do	J. W. Webb & Sons	1953	160	4	Kc	405	----	----	P	D	
E23	A. J. Smith	Livingston	1938	150	4	Kc	375	16	1959	C	D	
E24	do	do	1921	120	4	Kc	365	+	1959	F	S	Measured flow 2 gpm on 3-13-59. Temp. 64°F.
E25	R. G. Pressley		----	130	2	Kc	365	+	1959	F	S	Measured flow 1.3 gpm on 3-13-59. Temp. 64°F.
E26	J. E. Rowland	R. C. Bonds	1957	180	4	Kc	405	----	----	J	D	
E27	Miss Belma Strange	J. W. Webb & Sons	1949	150	4	Kc	380	25	1955	J	D	
E28	W. T. Coats		----	185	4	Kc	460	----	----	C	D,S	Supplies three families, large chicken house and barn.

TABLE 3.—(CONTINUED)

Well No.	Owner	Driller	Date completed	Depth of well (ft.)	Diameter of well (in.)	Water-bearing unit	Altitude of land-surface datum (ft.)	Water level: Above (+) or below land-surface datum (ft.)	Water level: Date of measurement	Method of lift	Use of water	Remarks
*E29	J. C. Vandevander		----	17	----	Qt	420	12.8	5-19-59	C	D,S	Dug well.
E30	Coy Rinehart	J. W. Webb & Sons	1948	247	4	Kc	425	----	----	J	D,S	
*F1	City of Booneville	Layne-Central Co.	1931	419	12	Ke	500	157	1932	T	P	
*F2	do	do	1950	425	16	Ke	525	183	1950	T	P	Test hole drilled to 491 feet.
F3	J. N. Melton		1955	35	----	Kc	530	32.8	4-30-59	M	D	Dug well.
F4	Mrs. George Fraser	R. C. Bonds	1958	132	4	Kc	525	84.3	5-19-59	M	D	
F5	Mrs. Lula Fraiser	Norwell Drilling Co.	1955	200	4	Kc	400	----	----	----	N	
F6	A. W. Hicks	R. C. Bonds	1954	270	4	Ket	510	----	----	J	D,S	
F7	Hurshal Gargus	Norwell Drilling Co.	1944	340	4	Ke	490	112	1956	C	D,S	
F8	C. C. Collins	do	1955	320	4	Ke	500	80	1955	J	D,S	
*F9	John K. Kaye		1919	200	1½	Kc	505	55	1919	----	N	Well 8 WSP 576; destroyed. Three other wells now in use.
*F10	do		1919	110	6	Kc	505	55	1919	----	N	Well 10 WSP 576; destroyed. Drilled to depth of 379 feet.

TABLE 3.—(CONTINUED)

Well No.	Owner	Driller	Date completed	Depth of well (ft.)	Diameter of well (in.)	Water-bearing unit	Altitude of land-surface datum (ft.)	Water level: Above (+) or below land-surface datum (ft.)	Water level: Date of measurement	Method of lift	Use of water	Remarks
*F11	City of Booneville	Carloss Drilling Co.	1956	486	12	Ke	495	160	1956	T	P	Drawdown reported 11 ft. after pumping 500 gpm for 24 hours in 1956. Test hole 506 ft. deep.
F12	Joe Cain	Ewing Gas Co.	1957	306	4	Ke	510	----	----	J	D	Well supplies three families.
F13	A. C. James	Norwell Drilling Co.	1955	110	4	Kc	520	----	----	J	D	
F14	A. C. James	J. W. Webb & Sons	1945	100	4	Kc	520	----	----	----	N	
F15	J. E. Jennings	H. P. Herndon & Son	1949	230	6	Kc	530	----	----	C	D,S	
F16	do		1909	140	6	Kc	530	----	----	----	N	
F17	H. K. Inman	R. C. Bonds	1958	265	4	Kc	500	----	----	J	D,S	
F18	L. H. Stutts		1939	225	4	Kc	550	----	----	C	D,S	
F19	Mrs. D. H. Golf	R. C. Bonds	1955	200	4	Kc	450	----	----	J	D	
F20	W. E. Cox, Jr.	Norwell Drilling Co.	1939	160	4	Kc	415	12	1942	J	D,S	
F21	H. W. Green		----	250	4	Kc	405	40	1959	J	D	
F22	J. E. Cox		1918	54	----	Kc	510	45.4	4- 8-59	J	D	Dug well.

TABLE 3.—(CONTINUED)

Well No.	Owner	Driller	Date completed	Depth of well (ft.)	Diameter of well (in.)	Water-bearing unit	Altitude of land-surface datum (ft.)	Water level: Above (+) or below land-surface datum (ft.)	Water level: Date of measurement	Method of lift	Use of water	Remarks
F23	M. T. McKinney	Norwell Drilling Co.	1948	135	4	Kc	485	30	1948	C	D,S	
F24	do	R. C. Bonds	1953	250	4	Kc	485	22	1953	J	D,S	
F25	W. L. Caver			200		Ket	475			S	D,S	
F26	M. L. Strange		1952	193	4	Ket	470	81.1	4- 9-59	M	D	
F27	J. M. Edge	R. C. Bonds	1955	335	4	Ket	450	110	1955	J	D	
F28	Bobby Tidwell	J. W. Webb & Sons	1956	190	4	Ket	430	40	1956	J	D,S	
F29	Pauline Botts	H. P. Herndon & Son	1952	210	4	Ket	440	70	1952	J	D	
F30	O. L. Waddle	Norwell Drilling Co.	1956	149	4	Kc	500	75	1956	J	D	
F31	H. R. Waddell	do	1954	82	4	Kc	475			J	D	
F32	S. W. Duncan	R. C. Bonds	1956	350	4	Ket	520			J	D	Water is filtered before use.
F33	R. P. Robbins	Norwell Drilling Co.		100	4	Kc	500			C	D	
F34	C. S. Walden		1937	100	4	Kc	400	28	1940	J	D,S	
F35	W. A. Stennett		1947	150	4	Kc	400			J	D,S	
F36	W. E. Cox, Sr.	Livingston	1947	180	4	Kc	380	+	1959	J	D,S	Flows when pump not running.
F37	do	H. P. Herndon & Son	1959	180	4	Kc	400			J	D,S	

TABLE 3.—(CONTINUED)

Well No.	Owner	Driller	Date completed	Depth of well (ft.)	Diameter of well (in.)	Water-bearing unit	Altitude of land-surface datum (ft.)	Water level: Above (+) or below land-surface datum (ft.)	Water level: Date of measurement	Method of lift	Use of water	Remarks
F38	E. G. Caldwell	Norwell Drilling Co.	1951	247	4	Ket	450	60	1951	J	D	
F39	J. R. Counce	R. C. Bonds	1952	240	4	Ket	450	-------	-------	J	D,S	Supplies two families, dairy barn and large chicken house.
F40	H. F. Billingsley	H. P. Herndon & Son	1952	190	4	Kc	465	60	1952	J	D	
F41	E. G. Caldwell	Norwell Drilling Co.	1955	180	4	Kc	420	40	1955	J	D	
G1	Luther Taylor	R. C. Bonds	1955	210	4	Ke	------	40	1955	J	D,S	
G2	do		-------	207	4	Ke	350	+ 3	1956	F	S	Reported flow 10gpm 1956.
G3	H. A. Gann	R. C. Bonds	1952	212	4	Ke	400	40	1956	J	D,S	
G4	Allen Hare	Norwell Drilling Co.	1953	122	4	Ke	380	23	1953	J	D,S	
G5	D. C. Pippin	do	1947	103	4	Ket	390	18	1947	C	D	
G6	I. L. McCreary	Norwell Drilling Co.	1954	130	4	Ke	375	-------	-------	C	D,S	
G7	M. E. Breedlove	do	1954	160	4	Ke	360	8	1954	J	D,S	
G8	Hills Chapel School	do	1949	146	6	Ke	390	-------	-------	J	P	
G9	C. D. Smith	do	1947	146	6	Ke	380	-------	-------	J	D	Water is filtered before use.

TABLE 3.—(CONTINUED)

Well No.	Owner	Driller	Date completed	Depth of well (ft.)	Diameter of well (in.)	Water-bearing unit	Altitude of land-surface datum (ft.)	Water level: Above (+) or below land-surface datum (ft.)	Water level: Date of measurement	Method of lift	Use of water	Remarks
G10	J. D. Pounds	R. C. Bonds	1957	200	----	Ke	470	--------	--------	J	D	
G11	R. C. McCalmon	do	1956	235	----	Ke	470	--------	--------	J	D	
G12	R. B. Carpenter	do	1951	210	4	Ket	500	--------	--------	J	D	
G13	V. M. Nicholson	Norwell Drilling Co.	1951	150	4	Ke	350	+	1959	F	S	Measured flow 3.5 gpm on 3-10-59. Temp. 64°F.
G14	V. M. Nicholson	R. C. Bonds	1956	151	4	Ke	------	--------	--------	J	D	
G15	E. L. Smith	Norwell Drilling Co.	1947	165	4	Ke	385	33	1947	J	D	
G16	do	do	1947	130	4	Ke	370	18.8	3-26-59	P	D	
G17	I. B. Rutherford	Norwell Drilling Co.	1953	165	4	Ket	450	--------	--------	----	N	
G18	C. R. Hodge	R. C. Bonds	1954	197	4	Ke	------	--------	--------	J	D,S	
G19	J. E. Shackelford		1936	60	4	Ke	350	+	1959	F	S	Measured flow 2.5 gpm on 4-7-59. Temp. 62°F.
G20	C. H. Sharp	Norwell Drilling Co.	1954	165	4	Ket	450	34.7	4-15-59	M	D	
G21	H. G. Lester	R. C. Bonds	1954	300	4	Ke	460	--------	--------	J	D	
G22	M. L. White		1946	250	4	Ke	400	--------	--------	C	D	
G23	L. W. Simmons	R. C. Bonds	1953	150	4	Ke	410	97	1958	S	D	

TABLE 3.—(CONTINUED)

Well No.	Owner	Driller	Date completed	Depth of well (ft.)	Diameter of well (in.)	Water-bearing unit	Altitude of land-surface datum (ft.)	Water level: Above (+) or below land-surface datum (ft.)	Water level: Date of measurement	Method of lift	Use of water	Remarks
G24	J. W. Simmons	Norwell Drilling Co.	1957	120	4	Ke	370	------	------	J	D	
G25	T. J. Brown		------	80	6	Ket	485	58.1	4-16-59	M	D	
G26	Amos Melton	Norwell Drilling Co.	1957	178	4	Ke	465	110	1958	J	D	
G27	L. C. Bonds	do	1958	240	4	Ke	465	78.8	4-16-59	M	D	
G28	Ellis Kizer	R. C. Bonds	1954	189	4	Ke	480	70	1954	J	D,S	
G29	Mrs. Lucille Phillips		1957	37	----	Ket	420	30.6	4-16-59	M	D	Dug well.
G30	Obie Robertson		------	26	----	Kc	390	15.2	4-29-59	M	D,S	Do.
G31	A. E. Cole	Norwell Drilling Co.	1955	252	4	Ke	475	62	1955	C	D,S	
G32	H. W. Chase		------	32	----	Kc	460	17.9	4-29-59	M	D	Dug well.
G33	Rastus Gann	Massey	1938	212	4	Ke	405	2.5	4-29-59	P	S	
G34	Omer Lambert		------	20	----	------	385	15.4	4-30-59	M	D	Dug well.
G35	J. B. King	Norwell Drilling Co.	1956	80	4	Kc	500	------	------	J	D,S	
G36	H. C. Simmons	R. C. Bonds	1951	290	4	Ke	510	------	------	P	D,S	
G37	L. V. Wheeler	Norwell Drilling Co.	1958	270	4	Ke	------	113	1958	J	D,S	
G38	R. T. Wheeler	do	1958	270	4	Ke	------	------	------	J	D,S	
H1	G. W. Engle	R. C. Bonds	------	155	4	Ke	490	------	------	J	D,S	
H2	Lee Shamblin	do	1953	178	4	Ke	480	50	1956	J	D,S	

TABLE 3.—(CONTINUED)

Well No.	Owner	Driller	Date completed	Depth of well (ft.)	Diameter of well (in.)	Water-bearing unit	Altitude of land-surface datum (ft.)	Water level: Above (+) or below land-surface datum (ft.)	Water level: Date of measurement	Method of lift	Use of water	Remarks
H3	D. W. Cunningham	do	1953	210	4	Ke	520	103	1953	J	D,S	
H4	B. R. Smith	Massey	1927	114	6	Ke	380	6.2	3-26-59	M	D	
H5	J. T. Smith		1945	16	----	Ke	380	11.2	4-15-59	M	D,S	Dug well
H6	New Hope School		1952	170	4	Ke	460	--------	--------	J	P	Well now used by church.
H7	A. C. Barnes		1953	21	----	Ket	520	12.6	4-30-59	M	D	Dug well.
H8	A. M. Bullard		1945	44	----	Ke	450	38.4	4-30-59	M	D	Do.
H9	W. V. Moore		1955	22	----	Ke	420	16.8	4-30-59	M	D	Do.
H10	J. O. Chase		1951	52	----	Ket	480	48.0	4-30-59	M	D	Do.
H11	Curtis Holley		--------	28	----	Ke	430	23.0	4-30-59	M	D,S	Do.
H12	A. M. Harper		--------	39	----	Ke	460	32.0	4-30-59	M	D	Dug well.
H13	A. L. Riddle		1921	44	----	Ke	------	39.8	4-15-59	M	D	Do.
*J1	Town of Baldwyn		1912	496	8	Ke	390	65	12-2-54	T	P	
*J2	do		1912	496	8	Ke	390	--------	--------	T	P	
J3	J. M. Franks	J. W. Webb & Sons	1948	200	4	Kc	400	50	1956	C	D	Supplies three businesses in Frankstown.
J4	Bonner Arnold		1948	375	4	Ket	320	--------	--------	C	D,S	

TABLE 3.—(CONTINUED)

Well No.	Owner	Driller	Date completed	Depth of well (ft.)	Diameter of well (in.)	Water-bearing unit	Altitude of land-surface datum (ft.)	Water level: Above (+) or below land-surface datum (ft.)	Water level: Date of measurement	Method of lift	Use of water	Remarks
J5	H. M. Wallis		1876	275	4	Kc	440	125	1956	----	D,S	
J6	B. C. Waters		1910	135	4	Kc	430	65	1956	C	D,S	
J7	O. C. Arnold		--------	126	4	Kc	410	63	1956	M	D,S	
J8	T. J. Chisholm	J. W. Webb & Sons	1942	490	4	Ke	400	35	1942	C	D,S	
J9	J. S. Gamble	do	1942	487	4	Ke	400	80	1947	C	D,S	
J10	G. T. Stiles		1956	300	4	Kc	420	90	1956	C	D,S	
J11	Baldwyn Brick & Tile Co.		1905	350	4	Ke	350	--------	--------	----	N	Well 4 WSP 576; unused.
J12	Carnation Co.	J. W. Webb & Sons	1945	400	6	Ke	365	30	1945	T	I	
J13	C. A. Morris	do	1945	204	4	Kc	410	--------	--------	J	D	
J14	Mack Ford	H. P. Herndon & Son	1956	200	4	Kc	400	--------	--------	J	D	
J15	Gene Cruse	do	1952	210	4	Kc	400	--------	--------	J	D	
J16	Joe Davis	do	1953	280	----	Kc	400	--------	--------	C	D	
J17	Leonard Brown	do	1953	360	----	Kc	470	--------	--------	C	D	
J18	J. D. Franks	J. W. Webb & Sons	1946	225	4	Kc	407	50	1946	J	D	
J19	N. C. Pressley	do	1948	225	4	Kc	407	--------	--------	J	D	

TABLE 3.—(CONTINUED)

Well No.	Owner	Driller	Date completed	Depth of well (ft.)	Diameter of well (in.)	Water-bearing unit	Altitude of land-surface datum (ft.)	Water level: Above (+) or below land-surface datum (ft.)	Water level: Date of measurement	Method of lift	Use of water	Remarks
J20	J. M. LeCroy	do	1954	200	6	Kc	400	60	1959	J	I	Supplies cotton gin in Frankstown.
J21	T. A. Parker		1951	120	4	Kc	410	....	....	C	D,S	Supplies three families and dairy barn.
*J22	Town of Baldwyn	Layne-Central Co.	1956	426	10	Ke	395	....	....	T	P	Test hole drilled to 524 feet.
J23	J. P. Davis	Norwell Drilling Co.	1944	225	4	Kc	390	57.1	3-23-59	J	D	
J24	T. V. Strange	J. W. Webb & Sons	1938	200	3	Kc	370	15	1959	J	D,S	
J25	J. M. LeCroy	do	1954	200	6	Kc	400	60	1959	J	D	
J26	M. A. Wallis	Morgan	1920	215	....	Kc	410	....	....	J	D	
J27	T. V. Strange		....	200	3	Kc	365	15	1959	P	D,S	
J28	W. M. Arnold		1927	310	....	Kc	420	....	....	C	D,S	Supplies three families and large barn.
J29	Mrs. W. F. Morrow	J. W. Webb & Sons	1954	300	4	Kc	465	....	....	C	D	
J30	L. Q. Starling	H. P. Herndon & Son	1958	240	4	Kc	460	....	....	J	D	
J31	Geeville School		1915	340	4	Kc	460	....	....	C	D	Well now used by J. H. McElroy.

TABLE 3.—(CONTINUED)

Well No.	Owner	Driller	Date completed	Depth of well (ft.)	Diameter of well (in.)	Water-bearing unit	Altitude of land-surface datum (ft.)	Water level: Above (+) or below land-surface datum (ft.)	Water level: Date of measurement	Method of lift	Use of water	Remarks
J32	R. A. Anderson		1944	400	4	Ke	400			C	D,S	
J33	V. S. Kelley	J. W. Webb & Sons	1946	220	4	Kc	440			C	D	
J34	Clyde Gardner	do	1939	478	4	Ke	400			C	D,S	Supplies two families and large dairy barn.
J35	D. T. Palmer	Felkins	1950	385	4	Kc	460			C	D	
J36	W. B. Grishom		1934	185	4	Kc	400	20	1958	C	D,S	
J37	F. M. Palmer	Ewing Gas Co.	1957	410	4	Kc	510	82	1957	J	D	
J38	J. V. Hill		1929	475	4	Kc	470			C	D	
J39	Paul Ashmore	H. P. Herndon & Son	1957	312	4	Kc	460			J	D	
J40	do	J. W. Webb & Sons	1944	276	4	Kc	465			C	D	
J41	Leslie Cox			200	4	Kc	455	85	1957	C	D,S	
J42	Mrs. Troy Waters	J. W. Webb & Sons	1937	135	4	Kc	420			C	D	
J43	E. C. McCary	do	1947	450	4	Kc	480			C	D	
J44	do			265	6	Kc	480			C	N	
J45	N. M. Carpenter	J. W. Webb & Sons	1945	425	4	Kc	470			C	D	
J46	C. E. Carpenter	do	1945	300	4	Kc	460			C	D	
J47	W. G. Goodson	J. K. Goodson	1924	200	4	Kc	445			C	D	

TABLE 3.—(CONTINUED)

Well No.	Owner	Driller	Date completed	Depth of well (ft.)	Diameter of well (in.)	Water-bearing unit	Altitude of land-surface datum (ft.)	Water level: Above (+) or below land-surface datum (ft.)	Water level: Date of measurement	Method of lift	Use of water	Remarks
J48	J. L. Chisholm	J. W. Webb & Sons	1943	400	4	Kc	425	....	....	P	D	
J49	Jack Holley	H. P. Herndon & Son	1952	252	4	Kc	380	30	1952	C	D,S	
J50	H. R. Tapp		1870	160	6	Kc	445	....	....	M	D	
J51	T. W. Smith		....	200	4	Kc	455	50	1959	C	D	
J52	E. V. Gamble	J. W. Webb & Sons	1957	534	4	Ke	430	90	1957	C	D	
J53	E. L. Marshall	do	1946	512	4	Ke	430	....	....	C	D	Well supplies three families.
J54	Hurlen Hill	Ewing Gas Co.	1958	510	4	Ke	425	....	....	J	D	
J55	W. T. Ingram		1925	300	4	Kc	420	....	....	C	D	
J56	J. W. Ingram		....	150	4	Kc	430	65	1958	C	D	
J57	J. J. Bishop		....	420	4	Ke	410	....	....	C	D	
J58	L. A. Crawford		....	350	4	Kc	440	....	....	C	D	
J59	Robert Miller	J. W. Webb & Sons	1957	300	6	Ke	370	....	....	J	D	
J60	J. E. Copeland	do	....	436	4	Ke	410	....	....	C	D	
J61	J. H. Arnold	do	1942	400	4	Ke	360	17	1942	J	D	
J62	L. C. Prather		1935	380	4	Ke	327	+	1959	F	D	Measured flow 1.1 gpm 4-6-59. Temp. 63°F.

TABLE 3.—(CONTINUED)

Well No.	Owner	Driller	Date completed	Depth of well (ft.)	Diameter of well (in.)	Water-bearing unit	Altitude of land-surface datum (ft.)	Water level: Above (+) or below land-surface datum (ft.)	Water level: Date of measurement	Method of lift	Use of water	Remarks
J63	D. B. Stubbs	J. W. Webb & Sons	1945	400	4	Ke	345	15	1945	J	D,S	Supplies residence and three large chicken houses.
J64	W. W. Copeland	do	1952	360	4	Ke	345	20	1952	C	D,S	
*J65	Davis Lumber Co.		1908	410	5	Ke	375	50	1908	N	N	Well 3 WSP 576; destroyed.
*J66	R. E. L. Sutherland		1907	110	4	Kc	380	3	1907	----	N	Well 15 WSP 576; destroyed.
*J67	Davis Lumber Co.		1898	410	4	Ke	375	--------	--------	----	N	Well 2 WSP 576; destroyed. Formerly owned by the town of Baldwyn.
K1	Dan Woodruff		1953	290	4	Kc	500	--------	--------	C	D,S	
*K2	R. V. Ryan	H. P. Herndon & Son	1951	375	4	Ke	460	60	1956	J	D,S	
K3	F. L. Chittom	do	1953	400	----	Ke	430	--------	--------	J	D,S	
K4	Mrs. R. L. Miller	H. P. Herndon & Son	1951	315	4	Ke	400	90	1951	C	D,S	
K5	Lester Howell		1954	300	4	Ke	400	--------	--------	J	D,S	

TABLE 3.—(CONTINUED)

Well No.	Owner	Driller	Date completed	Depth of well (ft.)	Diameter of well (in.)	Water-bearing unit	Altitude of land-surface datum (ft.)	Water level: Above (+) or below land-surface datum (ft.)	Water level: Date of measurement	Method of lift	Use of water	Remarks
K6	J. D. Smith	H. P. Herndon & Son	1951	222	4	Ket	......	30	1951	J	D,S	
K7	W. B. Wallace	do	1954	260	4	Ke	410	66	1954	C	D	
K8	Odell Roberts	J. W. Webb & Sons	1956	260	4	Ke	410	......	......	J	D	
K9	John Roberts	do	1955	145	4	Ket	410	......	......	J	D	
K10	Vaughn Michael	H. P. Herndon & Son	1955	187	4	Ke	......	......	......	J	D	
*K11	Wheeler School	J. W. Webb & Sons	1955	365	6	Ke	370	......	......	J	P	
K12	A. C. Pace	H. P. Herndon & Son	1954	240	4	Ke	......	......	......	J	D	
K13	J. J. Glenn	do	1947	220	4	Ke	......	......	......	J	D	
K14	do	do	1949	190	4	Ke	......	......	......	P	D	
K15	Ellis Glover	R. C. Bonds	1956	190	4	Kc	345	14	1956	J	D	
*K16	Mobile & Ohio R.R. Co.	Wilson	1917	385	10	Ke	370	15	1919	......	N	Well 16 WSP 576; Unused.
K17	Ebe Glover	R. C. Bonds	1956	190	4	Kc	350	14	1956	J	D	
K18	W. L. Wilson	Livingston	1937	290	4	Ke	350	12	1937	J	D	
K19	W. D. Owens	J. T. Medlin	1957	300	4	Ke	430	96	1958	J	D	
K20	H. P. Elder		1944	155	......	Kc	385	......	......	J	D	Supples three families.

TABLE 3.—(CONTINUED)

Well No.	Owner	Driller	Date completed	Depth of well (ft.)	Diameter of well (in.)	Water-bearing unit	Altitude of land-surface datum (ft.)	Water level: Above (+) or below land-surface datum (ft.)	Water level: Date of measurement	Method of lift	Use of water	Remarks
K21	Mrs. Marjorie Pruitt	J. W. Webb & Sons	1950	160	4	Kc	360	----	----	J	D	
K22	C. H. Moore	R. C. Bonds	1956	180	4	Kc	375	20	1956	J	D	
K23	O. M. Moore	do	1955	280	4	Kc	485	----	----	J	D	
K24	Alfred Rampley	H. P. Herndon & Son	1958	280	5	Kc	500	40	1958	J	S	
K25	M. L. Hill	J. W. Webb & Sons	1958	175	4	Kc	500	----	----	J	D,S	Supplies two families and large chicken house.
K26	L. C. Cagle	R. C. Bonds	1957	336	4	Ke	465	----	----	J	D	
K27	W. B. Cagle	H. P. Herndon & Son	1953	350	4	Ke	455	110	1958	J	D,S	
K28	O. O. Ricks	do	1953	353	6	Ke	475	----	----	C	D	
K29	L. C. Ricks	do	1953	345	4	Ke	390	60	1953	J	D	
K30	G. C. Curry	Ewing Gas Co.	1959	368	4	Ke	380	----	----	J	D	
K31	R. C. Fleming	R. C. Bonds	1957	260	4	Ke	430	----	----	J	D	
K32	M. D. Ward		----	50	----	Kc	480	41.8	4- 9-59	M	D	Dug well.
K33	J. E. Floyd	Norwell Drilling Co.	1943	195	4	Ke	385	----	----	J	D,S	Supplies two families and dairy barn.
K34	do	do	1943	190	----	Ke	385	----	----	J	D	Supplies three families.

TABLE 3.—(CONTINUED)

Well No.	Owner	Driller	Date completed	Depth of well (ft.)	Diameter of well (in.)	Water-bearing unit	Altitude of land-surface datum (ft.)	Water level: Above (+) or below land-surface datum (ft.)	Water level: Date of measurement	Method of lift	Use of water	Remarks
K35	H. E. Sumners	do	1952	226	4	Ke	415			J	D	
K36	Mrs. H. H. Harrell		1951	410		Ke	365			J	D	
K37	L. C. Prather		1900	380	4	Ke	335			P	D	
L1	Grover Livingston	J. W. Webb & Sons	1945	240	4	Ke		60	1945	J	D,S	
L2	R. K. Tennison	H. P. Herndon & Son	1951	189	4	Ke				J	D	
L3	T. J. Johnson	R. C. Bonds	1955	180	4	Ke		80	1956	J	D,S	
L4	G. C. Shamlin	do	1954	196	4	Ke		66	1956	J	D,S	
L5	W. D. Harris		1906	76	4	Ket		61	1956	M	D,S	
L6	O. X. Franks	Norwell Drilling Co.	1952	102	4	Ke				J	D,S	
L7	Bruce Cornelious	H. P. Herndon & Son	1951	200		Ke				J	D	
*L8	Marietta School	do	1955	160	4	Ke		55	1955	J	P	
L9	J. W. Green			8		Ke		4.6	5- 1-59	M	D	Dug well.
L10	M. C. Swinney	H. P. Herndon & Son	1951	120	4	Ke				J	D	
L11	M. F. Rogers	do	1954	220	4	Ke				J	D	
L12	do	do	1954	180	8	Ke				M	D	
L13	Hershal Huddleston	do	1953	200	4	Ke				C	D	
L14	G. T. Pharr	do	1948	148	4	Ke				C	D	

TABLE 3.—(CONTINUED)

Well No.	Owner	Driller	Date completed	Depth of well (ft.)	Diameter of well (in.)	Water-bearing unit	Altitude of land-surface datum (ft.)	Water level: Above (+) or below land-surface datum (ft.)	Water level: Date of measurement	Method of lift	Use of water	Remarks
L15	Roy Boggs	do	1953	180	2	Ke	----	----	----	----	D	
L16	Leon Slack	do	1952	200	6	Ke	----	----	----	----	D	
L17	J. F. Womack	do	1948	148	4	Ke	----	----	----	J	D	
L18	C. L. Bolton	do	1954	180	10	Ke	----	----	----	M	D	
L19	S. G. Googe	H. P. Herndon & Son	1954	265	8	Ke	----	----	----	----	D	
L20	H. H. Lauderdale	do	1949	150	4	Ke	----	----	----	C	D	
L21	John Williams	do	1951	189	----	Ke	----	----	----	----	D	
L22	Hoyt Hunkapillen	do	1949	231	4	Ke	----	----	----	----	D	
L23	D. O. Fowler	do	1948	198	4	Ke	----	----	----	P	D	
L24	Horace Green	do	1954	202	----	Ke	----	----	----	J	D	
L25	E. W. Caviness	J. W. Webb & Sons	1954	210	8	Ktg	310	+	1959	J	Ir	Estimated flow 20 gpm 6-25-59. Temp. 62°F.
*L26	do	H. P. Herndon & Son	1955	280	6	Ktg	320	+	1959	J	Ir	Estimated flow 25 gpm 6-25-59. Temp. 63°F.
L27	Holley Sparks	R. C. Bonds	1955	185	6	Ke	400	71.8	3-27-59	J	D	
L28	J. Q. Weaver	do	1956	152	4	Ke	----	50.4	3-27-59	J	D	
*L29	New Site School	do	1955	267	5	Ke	430	60	1959	J	P	

TABLE 3.—(CONTINUED)

Well No.	Owner	Driller	Date completed	Depth of well (ft.)	Diameter of well (in.)	Water-bearing unit	Altitude of land-surface datum (ft.)	Water level: Above (+) or below land-surface datum (ft.)	Water level: Date of measurement	Method of lift	Use of water	Remarks
L30	Cayce DePoyster	J. W. Webb & Sons	1952	150	4	Ke	......	....	....	J	D	
L31	Mrs. W. L. Caver, Sr.	H. P. Herndon & Son	1948	132	4	Ke	......	20	1959	J	D	
L32	Mrs. W. L. Caver, Sr.	H. P. Herndon & Son	1951	112	4	Ke	......	6	1959	P	D	
L33	Mrs. W. W. White	W. W. White	1940	57	....	Ket	......	32.9	4- 7-59	M	D	
L34	J. V. Moreland	Norwell Drilling Co.	1955	124	4	Ke	......	63.8	4- 7-59	M	D	
L35	Mrs. Evelyn McCreary		1928	25	....	Ket	......	18.7	4- 7-59	M	D	Dug well.
L36	R. W. Sanders	J. W. Webb & Sons	1948	150	4	Ke	......	55	1948	J	D	
L37	L. O. Livingston	H. P. Herndon & Son	1956	190	4	Ke	......	....	....	J	D	
L38	P. R. Garvin	R. C. Bonds	1956	238	4	Ke	......	....	....	J	D	
L39	W. W. Breedlove	do	1955	160	4	Ke	......	....	....	J	D	
L40	W. T. Jones	J. W. Webb & Sons	1947	253	4	Ke	490	50.2	4- 9-59	M	D	
L41	S. S. Sanders		....	200	....	Ket	465	36.3	4- 9-59	M	D	
L42	W. C. Key	H. P. Herndon & Son	1942	260	4	Ke	405	60	1942	J	D	
L43	E. L. Caviness	Norwell Drilling Co.	1951	180	4	Ke	......	15	1959	J	D	
L44	R. R. Smith	J. W. Webb & Sons	1948	127	4	Ke	......	8	1948	J	D	
L45	R. R. Smith	J. W. Webb & Sons	1948	126	4	Ke	......	+	1959	F	S	Measured flow 2 gpm 4-14-59. Temp. 62°F.

TABLE 3.—(CONTINUED)

Well No.	Owner	Driller	Date completed	Depth of well (ft.)	Diameter of well (in.)	Water-bearing unit	Altitude of land-surface datum (ft.)	Water level: Above (+) or below land-surface datum (ft.)	Water level: Date of measurement	Method of lift	Use of water	Remarks
*L46	do	H. P. Herndon & Son	1950	187	4	Ke	----	+	1959	F	S	Measured flow 25 gpm 4-15-59. Temp. 62°F.
L47	Mrs. C. W. Brown		----	54	----	Ke	----	49.2	5- 1-59	M	D	
L48	J. M. Goodwin	H. P. Herndon & Son	1944	140	4	Ke	----	----	----	C	D	
L49	J. S. Holley		1913	119	6	Ke	----	61.0	4-16-59	M	D	
L50	E. W. Horn		1957	11	----	Ke	----	5.2	4-16-59	M	D	Dug well.
L51	P. V. Jones		1934	17	----	Ke	----	9.0	4-16-59	J	D	Do.
M1	E. N. Whitehead	R. C. Bonds	1954	140	4	Ke	----	----	----	----	D,S	
M2	Milton Rhoads	do	----	215	4	Ktg	----	----	----	----	N	Unused.
M3	Bill Bennett		----	60	----	Ke	----	51	1956	----	D,S	Dug well.
M4	R. D. McKinney	R. C. Bonds	1954	165	4	Ke	----	25	1954	----	N	Unused
M5	Clay Wright		----	65	----	Ke	----	59.9	4-14-59	M	D	Dug well.
M6	D. C. Crabb		----	70	----	Ke	----	66.4	4-15-59	M	D	Do.
M7	H. J. Wright		----	36	----	Ke	----	30.0	5- 1-59	M	D,S	Dug well.
M8	O. J. Thornton		1954	85	----	Ke	----	81.2	5- 1-59	M	D,S	Do.

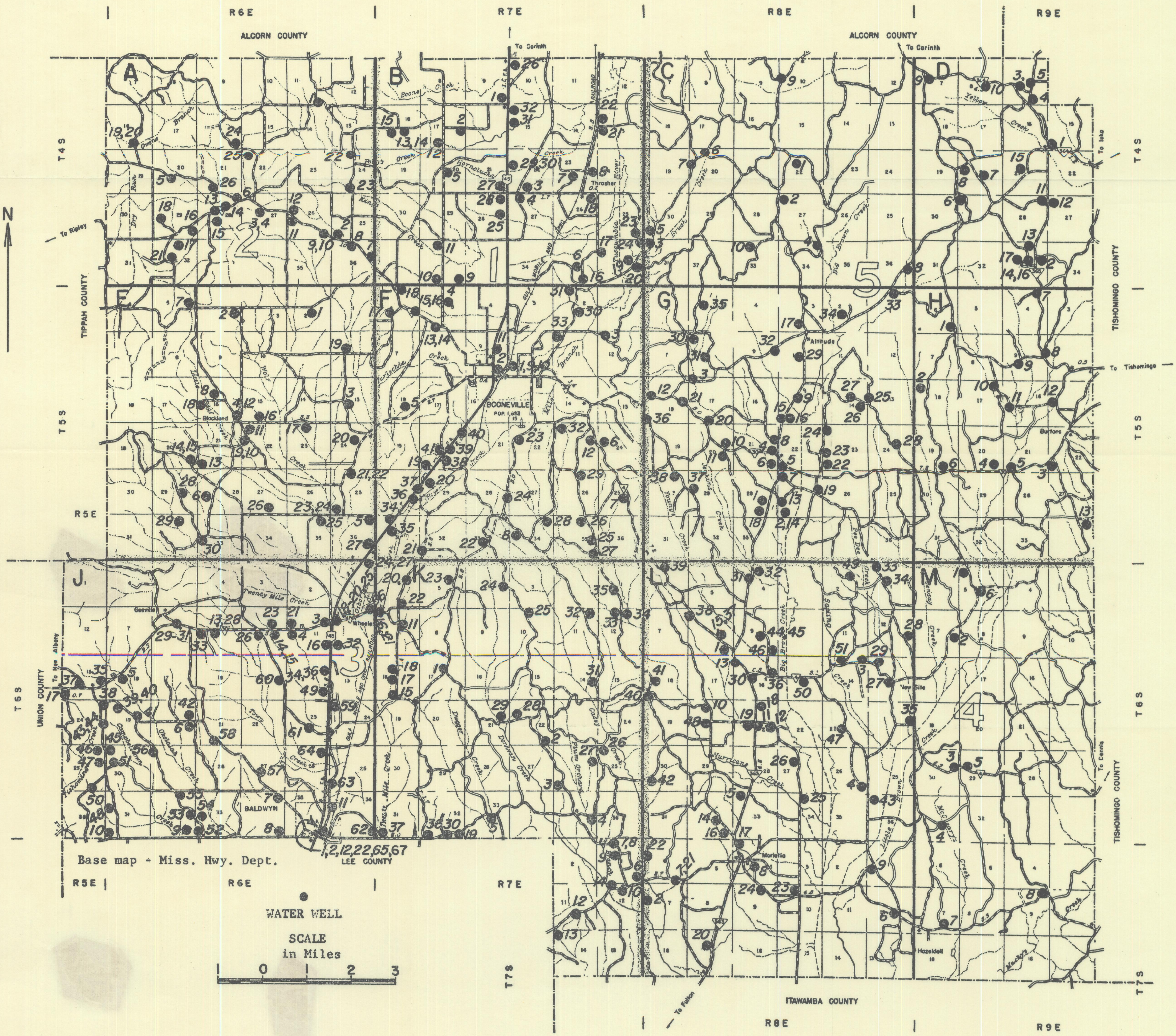

FIGURE 8.- MAP OF PRENTISS COUNTY, MISS., SHOWING LOCATION OF WELLS FOR WHICH RECORDS ARE TABULATED