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THE WAYNESBORO SAND

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Introduction

The Waynesboro Sand is a lentil of the Bucatunna Formation and was deposited at the end of Vicksburg time. This sand body can be traced from its outcrop north of the town of Waynesboro into the subsurface beneath the town and on into southern Wayne County by the use of electrical logs. The thickest section of the Waynesboro Sand, approximately 100 feet, is at the town of Waynesboro where it has been used as a source of water. The Waynesboro Sand was deposited in a fluvial channel environment. The channel of the stream which deposited this sand cut down through the Bucatunna, Byram and Glendon formations and into the Marianna Limestone, all of the Vicksburg Group.

Ground Water

Much of the information about the Waynesboro Sand was obtained from ground-water explorations at the town of Waynesboro. For many years the Waynesboro Sand was the only source of water for the town. The base of the fresh-water section occurs within the Kosciusko Formation approximately 700 feet beneath the town of Waynesboro (Newcome, 1965). The shallower Cockfield Formation does not have sufficient sand development to serve as an aquifer. The limestone formations of the Vicksburg Group will supply water to small domestic wells, but are incapable of supplying enough water to a town the size of Waynesboro. Until recently the town had 5 wells made in the Waynesboro Sand, each yielding between 200 and 300 gallons per minute. A pumping test on the town of Waynesboro well #3 indicated a coefficient of transmissibility of 25,000 gallons per day per foot for this aquifer (Shows et al., 1966). In 1973 one well developed a high iron content and was abandoned. Another well began to break suction and its yield was reduced. In 1979 another well had to be abandoned because of a high iron content and a fourth well had its yield reduced because it began breaking suction. It was soon determined that pumping was exceeding the capacity of the Waynesboro Sand to safely yield water. The town of Waynesboro solved its water-supply problem by drilling a 2400-foot well into the lower Wilcox Formation, 12 miles north of town. The lower Wilcox is capable of yielding large amounts of fresh water at this location.

Previous Investigations

The Bucatunna Formation was first described in the Eleventh Annual Field Trip Guidebook of the Shreveport Geological Society, 1934. This unit was described as "a sequence of bentonitic clays, bentonite, and crossbedded sands which rest upon the rocks of the Vicksburg group with distinct unconformity." The authors of the guidebook placed the Bucatunna in the Miocene section on the basis of this unconformity.

In Stearns MacNeil's 1944 article, Oligocene Stratigraphy of southeastern United States, the Bucatunna and overlying Chickasawhay Formation are placed in the Oligo-

SYSTEM	SERIES	GROUP		STRATIGRAPHIC UNIT	THICK-NESS	LITHOLOGIC CHARACTER
QUATERNARY	RECENT			Alluvium	0-72'	Sand, yellowish gray to yellowish orange, fine- to coarse-grained, sub-angular to rounded quartz; argillaceous in part. Some pea gravel and organic material.
QUATERNARY	PLEISTOCENE			Terrace deposits	0-39'	Sand, multicolored (usually various shades of orange and brown), fine- to coarse-grained, sub-angular to rounded quartz, ferruginous; quartz and chert gravel. Local clay lenses. Contains silicified wood in some areas.
QUATERNARY	PLEISTOCENE			Citronelle Formation	0-100'	Sand, mostly dark yellowish orange, fine- to coarse-grained, ferruginous; clay lenses. Gravel, multicolored, quartz and chert. Banded agate, silicified wood and fossil imprinted chert are common.
TERTIARY	MIOCENE			Hattiesburg Formation	up to 48'	Clay, greenish gray to olive brown, smooth textured. Some silt and sand. Locally weathers to a ferruginous nodular clay with some induration.
TERTIARY	MIOCENE			Catahoula Formation	up to 600'	Sand, brown to various shades of gray, fine- to medium-grained (channels contain pea size black chert and quartz); locally indurated near the surface. Clay, light gray, light green and moderate red (mottled), kaolinitic, micaceous, ferruginous. Silt, light gray to brown, ferruginous, argillaceous; locally indurated. Rare lignite.
TERTIARY	OLIGOCENE			Paynes Hammock Formation	5'-23'	Marl, olive gray to grayish yellow, fossiliferous, arenaceous, glauconitic; with alternating beds of silty to arenaceous limestone and fossiliferous clay. Some claystone ledges.
TERTIARY	OLIGOCENE			Chickasawhay Formation	14'-42'	Limestone, olive gray to grayish yellow, fossiliferous (many fossil molds and rare silicified bone fragments), arenaceous, glauconitic; interbedded fossiliferous marls and clays.
TERTIARY	OLIGOCENE	VICKSBURG		Bucatunna Formation	29'-102'	Clay, light to dark gray, silty to arenaceous, micaceous, carbonaceous, fossiliferous in part. Material in up-dip erosional lows includes fine- to medium-grained sand and bentonitic clays.
TERTIARY	OLIGOCENE	VICKSBURG		Byram Formation	3'-12'	Marl, greenish gray to dark olive gray, argillaceous to arenaceous, glauconitic, fossiliferous. Fossils often have a weathered appearance.
TERTIARY	OLIGOCENE	VICKSBURG		Glendon Formation	15'-36'	Limestone, medium gray to light olive gray, fossiliferous, pyritic, arenaceous. Very hard (limestone) ledges interbedded with gray to greenish gray marls.
TERTIARY	OLIGOCENE	VICKSBURG		Marianna Formation	26'-47'	Limestone, light gray to yellowish gray, fossiliferous, argillaceous. Soft and more homogeneous than Glendon, with hard ledges in lower part.
TERTIARY	OLIGOCENE	VICKSBURG		Mint Spring Formation	3'-17'	Marl, light greenish gray to dark gray, argillaceous to arenaceous, fossiliferous, glauconitic. In some places difficult to distinguish from Marianna.
TERTIARY	OLIGOCENE			Forest Hill Formation	45'-128'	Clay, medium to dark gray, silty, carbonaceous, sparingly fossiliferous. Sandy in some localities.
TERTIARY	OLIGOCENE			Red Bluff Formation	11'-32'	Marl, dark gray to light brown, fossiliferous, argillaceous, ferruginous; partially indurated.
TERTIARY	EOCENE	JACKSON	Yazoo Formation	Shubuta Clay	34'-92'	Clay, light olive gray to yellowish gray, calcareous, fossiliferous.
TERTIARY	EOCENE	JACKSON	Yazoo Formation	Pachuta Marl	10'-30'	Marl, light gray to olive gray, fossiliferous; indurated ledges.
TERTIARY	EOCENE	JACKSON	Yazoo Formation	Cocoa Sand	28'-62'	Sand, light gray, fine- to medium-grained, angular quartz, fossiliferous; partially indurated.
TERTIARY	EOCENE	JACKSON	Yazoo Formation	North Twistwood Creek Clay	41'-58'	Clay, light gray to olive gray, calcareous, montmorillonitic.
TERTIARY	EOCENE	JACKSON		Moodys Branch Formation	7'-18'	Marl, olive gray to yellowish gray, fossiliferous, glauconitic; partially indurated.
TERTIARY	EOCENE	CLAIBORNE		Cockfield Formation	80'-114'	Clay, medium gray to dark gray, silty, lignitic, fossiliferous. Numerous grayish brown, medium-grained sand streaks.

from May (1974)

Figure 1.—Generalized section of exposed strata in Wayne County.

cene Series. The Bucatunna clay was considered a member of the Byram Formation, which also included the Glendon Limestone Member and the Byram Marl Member. MacNeil also noted a disconformity at the base of the Bucatunna which occurs primarily in Wayne County. To the east and west of Wayne County the Bucatunna member was found to be resting conformably upon the Byram Marl Member. MacNeil attributes this disconformity to uplifting and faulting in Wayne County during Byram time.

In the Sixth Field Trip Guidebook of the Mississippi Geological Society, 1948, W. J. Hendy gives the Bucatunna formational rank. The Byram Formation consists of the Glendon Limestone and Byram Marl members. Hendy attributes the Waynesboro Sand channel to a large stream in early Bucatunna time. He states that the cross-bedded sands and sandy bentonitic sediments were deposited contemporaneously with the dark-colored silts and clays of the Bucatunna Formation.

In the Wayne County geological bulletin, 1974, by James May, the Bucatunna Clay, Byram Marl and Glendon Limestone are considered as formations of the Vicksburg Group (Figure 1). May generally agreed with Hendy that the Waynesboro Sand was deposited contemporaneously with the Bucatunna clay. From test hole data gathered during his investigation, May decided that the Bucatunna-Byram contact is conformable in Wayne County, except for the updip erosional lows along the outcrop.

Lithology

The lithology of the Bucatunna Formation varies considerably. The Bucatunna Formation is usually referred to as a clay, but considerable amounts of silt and sand are common, especially in Wayne County. The clays are locally fossiliferous and lignitic. They are believed to have been deposited in an estuarine environment. There are some bentonite and bentonitic clay beds in the Bucatunna Formation.

The sands and silts of the Bucatunna Formation in Wayne County are primarily associated with the Waynesboro Sand channels. The sands are subangular and are fine to very fine in grain size. The sands are often crossbedded and fill in the depressions and channels which occur on top of the Bucatunna clay. There are clay balls and clay fragments and lenses associated with the sands. The photographs in figure 2 are of an exposure of the Waynesboro Sand in Section 12, T.9 N., R.7 W., Wayne County. This location is listed as Stop No. 10 in the guidebook of the Sixth Field Trip of the Mississippi Geological Society. Figure 3 is a measured section of this outcrop from the guidebook. There are several localities and measured sections in the guidebook showing both the channel sands and estuarine clays of the Bucatunna Formation.

Figure 4 is a net sand map of the Bucatunna Formation. The thickest sands are found at the town of Waynesboro, where approximately 100 feet of sand is resting on one of the lower limestone ledges in the Glendon Formation. To the north near the outcrop area the channel is cut into the Marianna Formation. The Waynesboro Sand fills erosional lows on the surface of the Bucatunna clay and in the area of the main channel it rests disconformably upon the formations of the Vicksburg Group.

Figure 5 is an isopach map of the interval between the base of the Glendon Formation and the surface of the Bucatunna clay. The surface of the Bucatunna clay was located where the first sand was encountered in the Bucatunna Formation or at the Chickasawhay contact. The Waynesboro Sand is occupying the low areas indicated by this isopach map. There was probably no more than 40 feet of relief during deposition of the Waynesboro Sand.

The maps in figures 4 and 5 were constructed by using 103 electrical logs. Drillers logs were also used where available. Most of the logs were obtained during the Wayne County geological investigation by the Mississippi Geological Survey and from the Survey's water well logging program. A ground-water exploration project by Griner Drilling Service provided many useful logs in the Waynesboro area. Several logs were obtained from Schlumberger on oil test wells in Wayne County. All of these logs as well as some bore hole samples are on file at the Mississippi Bureau of Geology.

The datum for the cross sections in figure 6 is the base of the Chickasawhay Formation. Cross section A follows the major channel as closely as well control allows. Cross section B is drawn across the major channel at the town of Waynesboro. This cross section indicates that the stream may have migrated laterally to the east during its existence. Cross section C is in an area which may have been a depositional basin during an early phase of Waynesboro Sand deposition. The Byram Marl Forma-

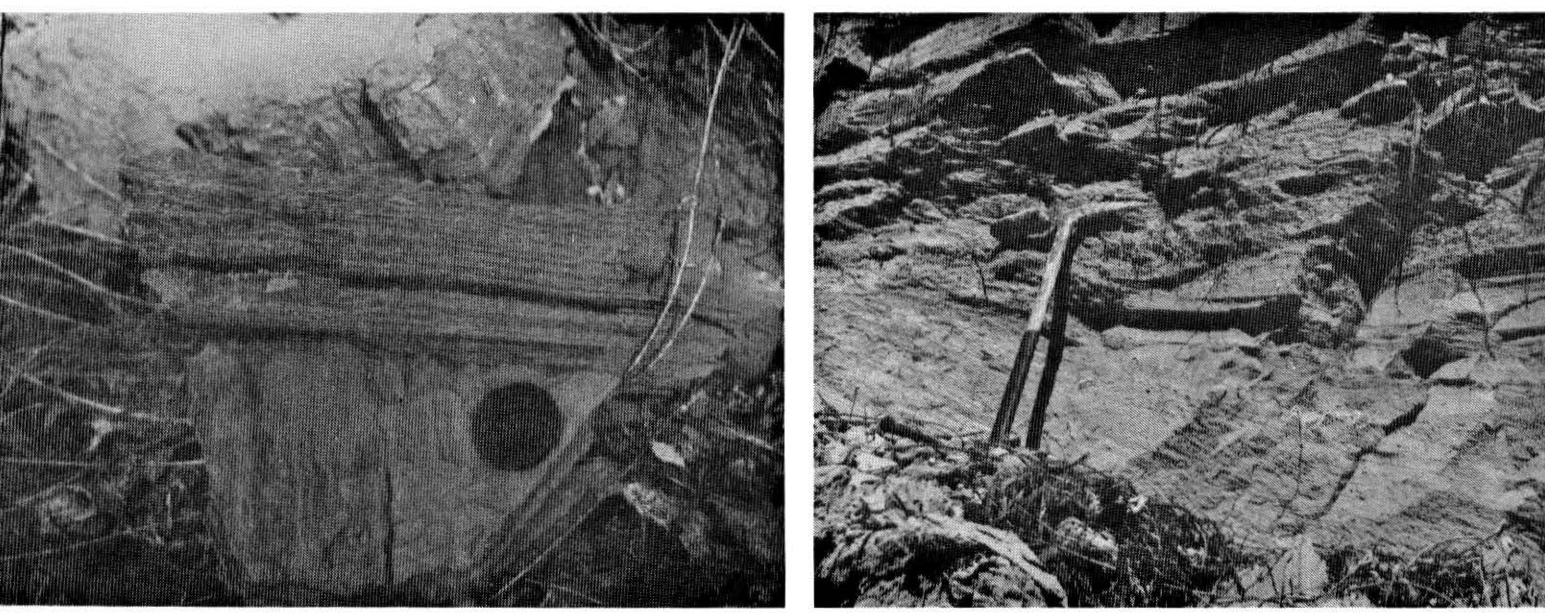
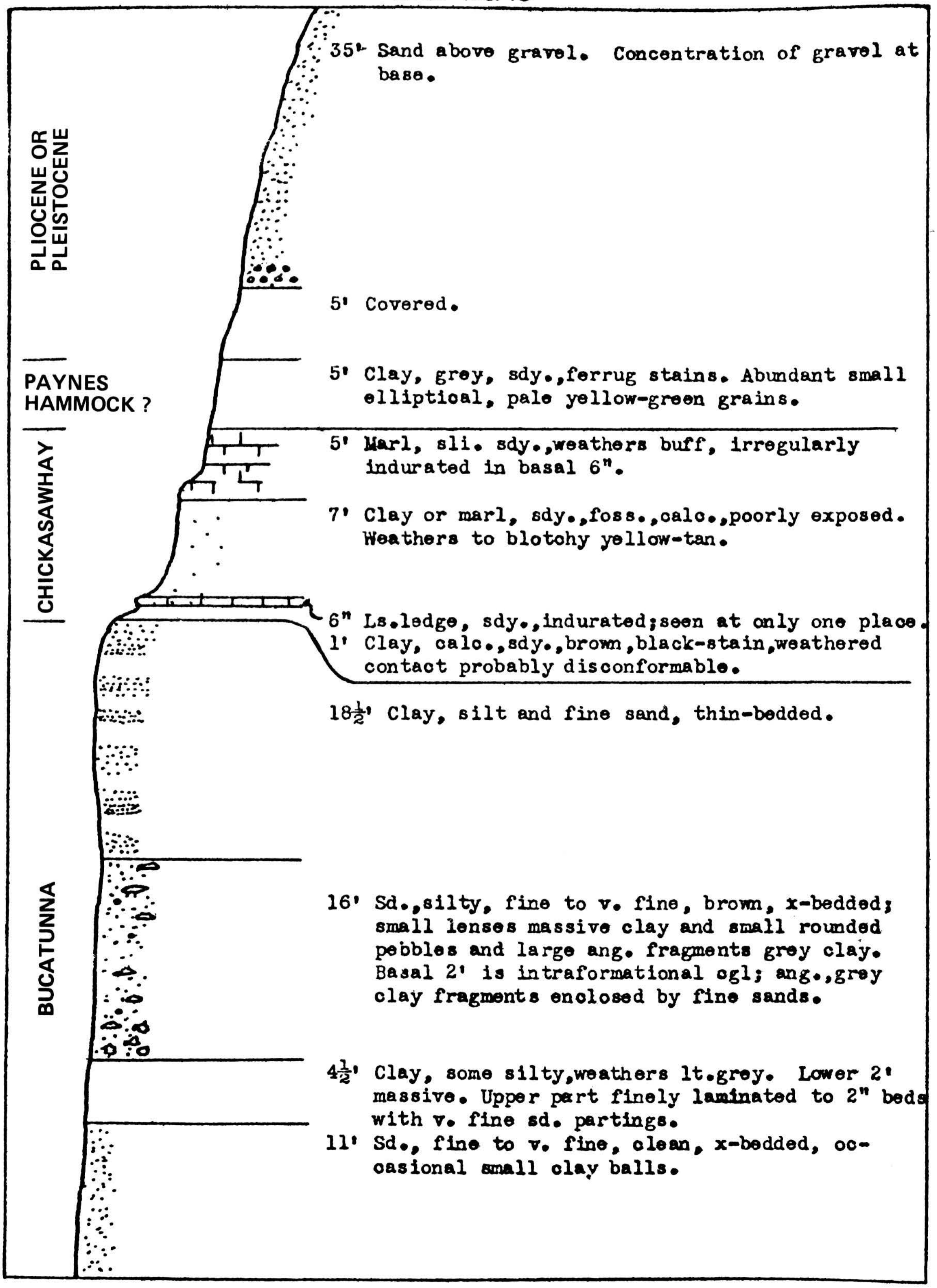


Figure 2

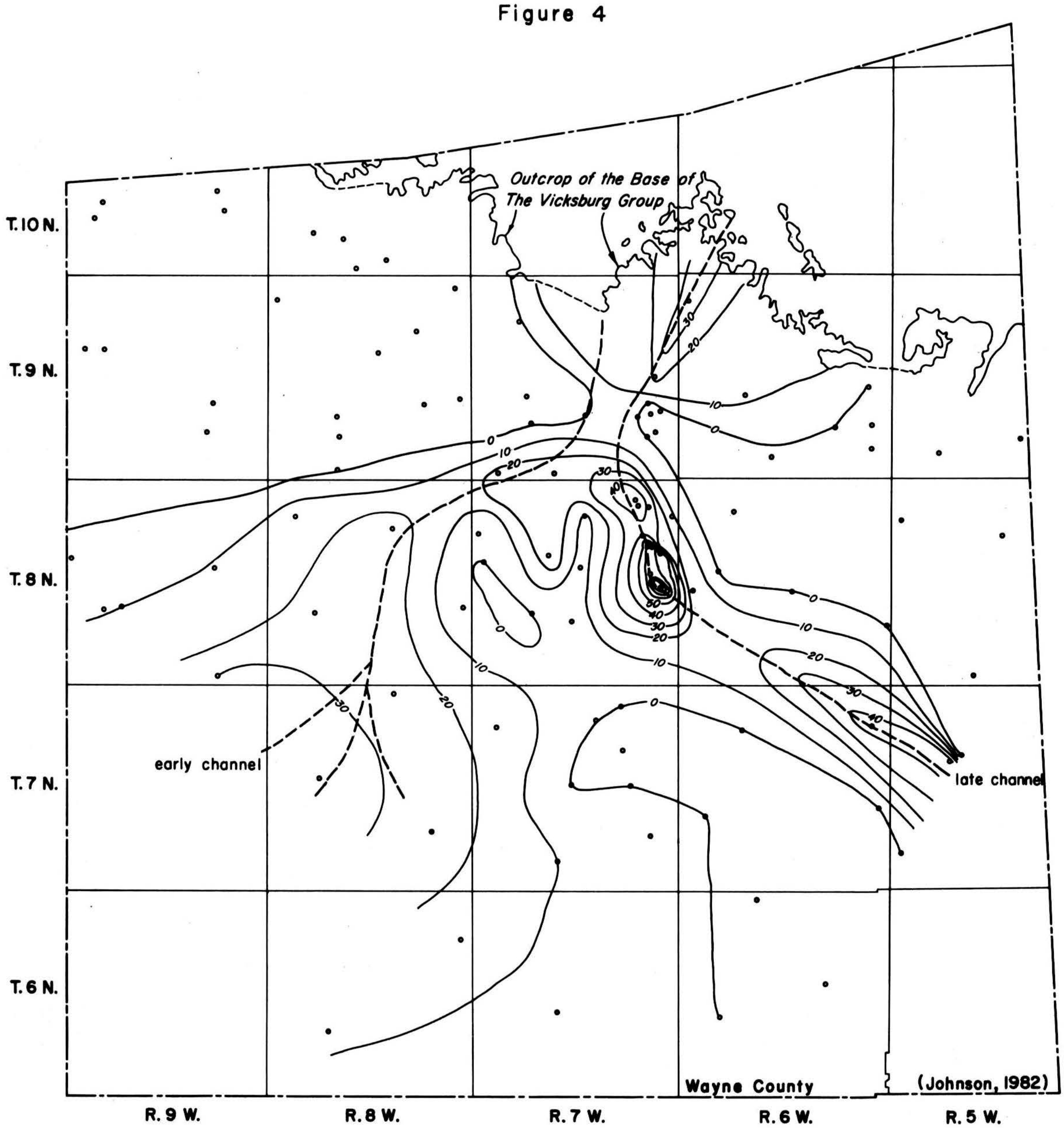
STOP NO. 10



NW¼ Sec. 12, T. 9 N., R. 7 W., Wayne County, Mississippi

Figure 3

Figure 4



Net Sand Isopach map of the Bucatunna Formation (Waynesboro Sand)

----- Proposed channel routes

Contour Interval 10 feet

SCALE IN MILES

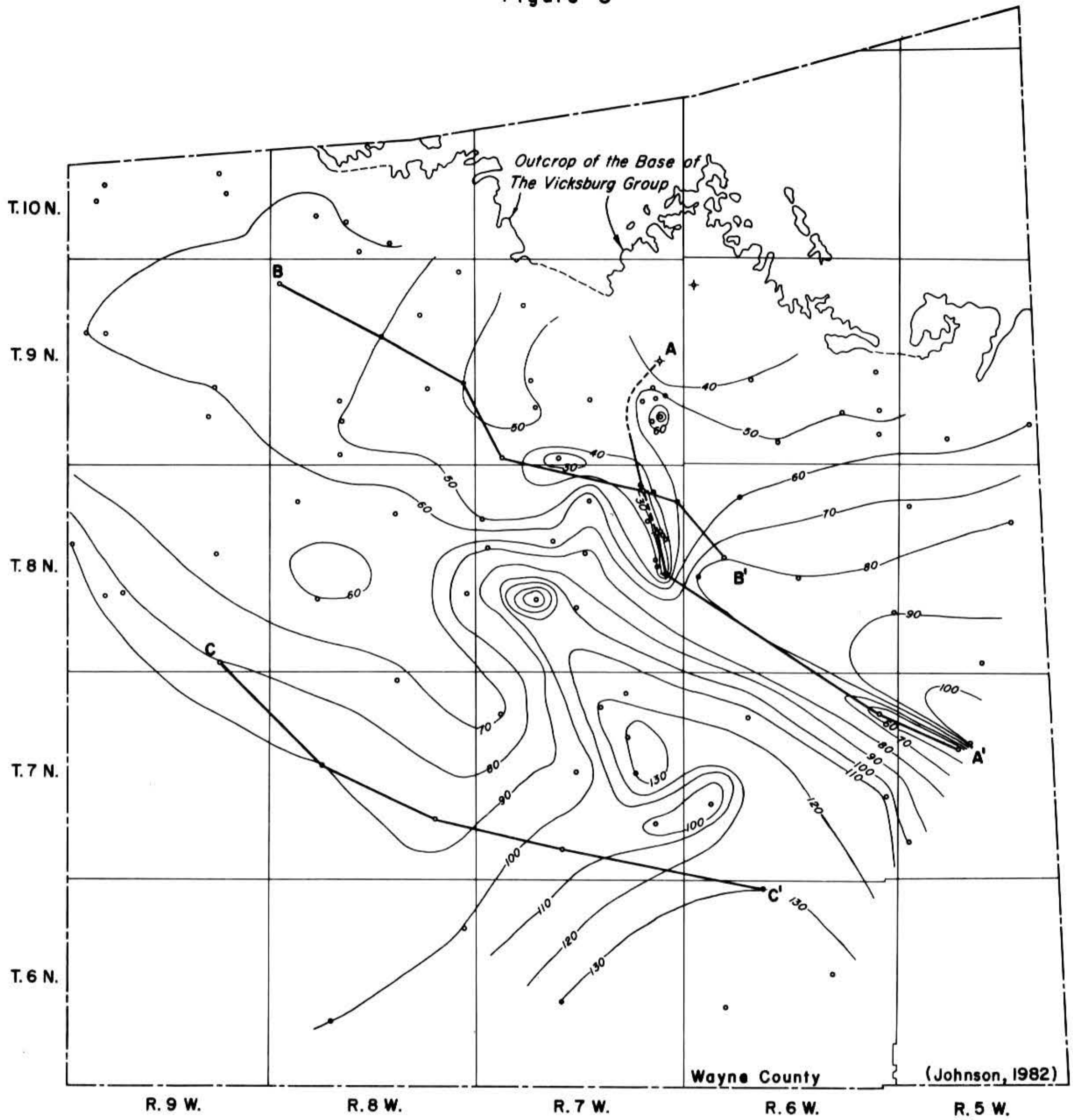
SCALE IN KILOMETERS

tion is not delineated on these cross sections because of its extreme thinness in Wayne County.

Depositional History

In early to middle Oligocene times there was a worldwide sea-level highstand (Vail et al., 1977). The shoreline during this highstand was about 30 miles north of Wayne County (May, 1974). It was during this time that the marine limestone formations of the Vicksburg Group were being deposited in the Gulf Coastal Plain. The Byram Marl Formation is a shallow marine sediment which was deposited at the end of this transgression, or possibly when the sea began to recede at the end of Vicksburg time.

Figure 5

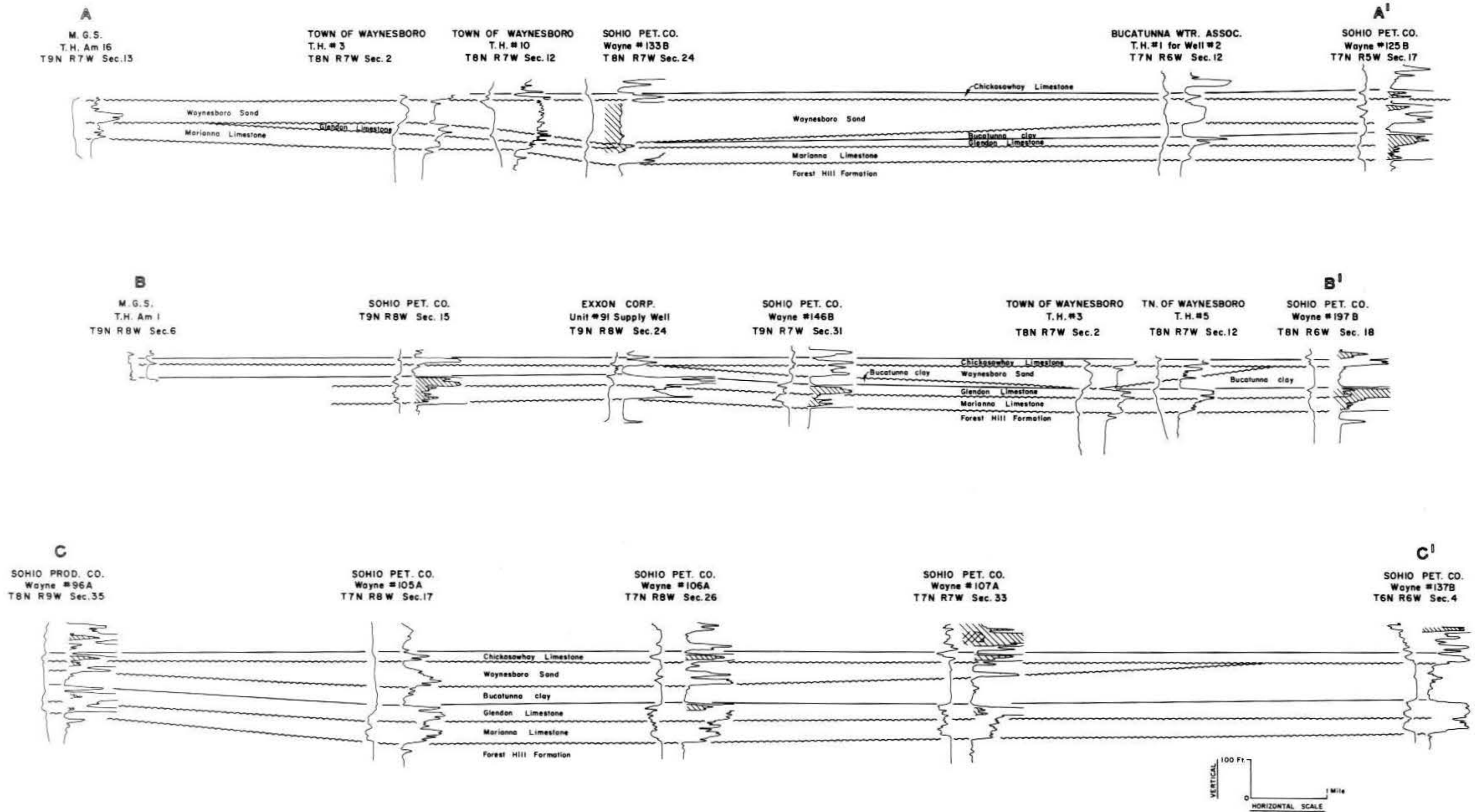


Isopach map of the interval between the base of the Glendon Formation and the top of the Bucatunna clay
+ Marks locations where Bucatunna clay has been removed
A——A' Line of cross section
Contour interval 10 feet

The Byram-Bucatunna contact is conformable and gradational. The Byram Formation is thinner in Wayne County than it is in the rest of the state; it is approximately 13 feet thick on the western edge of the county, becoming much thinner to the east. The Byram has been completely removed in the areas where the Waynesboro Sand channels have cut through the Bucatunna clay. The thinning of the Byram Formation and the disconformable contact at the base of the Waynesboro Sand have probably led many writers to believe that there was an unconformity between the Byram and Bucatunna formations in Wayne County.

The Bucatunna Formation was deposited in a nearshore, estuarine environment during the regression of the sea at the end of Vicksburg time. As the sea receded a stream de-

Figure 6



A
M. G. S.
T. H. Am 16
T9N R7W Sec.13
TOWN OF WAYNESBORO
T. H. # 3
T8N R7W Sec. 2
TOWN OF WAYNESBORO
T. H. # 10
T8N R7W Sec. 12
SOHIO PET. CO.
Wayne # 133 B
T8N R7W Sec. 24
BUCATUNNA WTR. ASSOC.
T. H. #1 for Well #2
T7N R6W Sec. 12
A'
SOHIO PET. CO.
Wayne #125 B
T7N R5W Sec. 17
Chickasawhay Limestone
Waynesboro Sand
Marianna Limestone
Glendon Limestone
Bucatunna clay
Forest Hill Formation
B
M. G. S.
T. H. Am 1
T9N R8W Sec. 6
SOHIO PET. CO.
T9N R8W Sec. 15
EXXON CORP.
Unit #91 Supply Well
T9N R8W Sec. 24
SOHIO PET. CO.
Wayne #146B
T9N R7W Sec. 31
TOWN OF WAYNESBORO
T. H. #3
T8N R7W Sec. 2
TN. OF WAYNESBORO
T. H. #5
T8N R7W Sec. 12
B'
SOHIO PET. CO.
Wayne #197 B
T8N R6W Sec. 18
C
SOHIO PROD. CO.
Wayne #96A
T8N R9W Sec. 35
SOHIO PET. CO.
Wayne #105A
T7N R8W Sec. 17
SOHIO PET. CO.
Wayne #106A
T7N R8W Sec. 26
SOHIO PET. CO.
Wayne #107A
T7N R7W Sec. 33
C'
SOHIO PET. CO.
Wayne #137B
T6N R6W Sec. 4
VERTICAL
100 Ft.
0
1 Mile
HORIZONTAL SCALE

veloped on the emerging land surface in the area of the present-day Chickasawhay River. This stream cut its channel into the Bucatunna and underlying formations. Silt and sand were transported along and deposited within the channel and nearshore embayments.

During the early phase of this stream's history, it deposited fine sand and silt in an embayment in southwestern Wayne County. Bucatunna clay type sediments were still being deposited at this time. As the sea continued to recede the stream migrated laterally to the east. The channel became entrenched and cut into the Byram, Glendon and Marianna formations. The stream's channel was lengthened and its lower course was diverted to the southeast.

At the end of Vicksburg time sea level began to rise and the shallow marine limestones and marls of the Chickasawhay Formation were deposited. The destructional processes associated with this marine transgression probably modified and smoothed the topography of this area. The Chickasawhay Formation rests unconformably upon the Bucatunna Formation. It is thickest down dip to the south and thins considerably toward the outcrop area; however, the thickest recorded section, 42 feet, was reported by May in the area of the main channel at the town of Waynesboro. The Chickasawhay and overlying Paynes Hammock formations are placed in the Oligocene Series on the basis of paleontological evidence (Poag, 1972).

Structure and Sea-level Changes

The regional strike of the Vicksburg Group in Wayne County is north 70° west and the dip is approximately 38 feet per mile to the southwest. Several faults were proposed by May (1974) in northern Wayne County. These faults were based on anomalous features indicated by Moodys Branch and Glendon structure maps, fracturing and warping of the Glendon in portions of its outcrop area, and topographic features. The worldwide sea-level changes outlined by Vail et al. (1977) may have been intensified in Wayne County due to uplifting and faulting.

A releveling survey of the Gulf Coastal Plain by the National Geodetic Survey indicated that the area around Wayne County is an anomalous positive area that is rising by approximately 4 millimeters per year (Holdahl and Morrison, 1974). This uplifting and subsequent faulting could be due to movement in the Louann Salt beds which underlie much of southern Mississippi. If this uplifting were active during Oligocene times the thinning of the Byram Marl Formation and the deposition of the Waynesboro Sand Lentil may be explained.

Conclusions

The Waynesboro Sand is a lentil of the Bucatunna Formation. It occurs primarily in Wayne County, Mississippi, but similar sand bodies may occur elsewhere within the Bucatunna Formation. The Waynesboro Sand locally cuts through the Bucatunna clay and rests disconformably on other formations of the Vicksburg Group. It is unconformably overlain by the Chickasawhay Formation. This sand body is a good source of water for small-capacity wells. Future ground-water exploration should help further define the channels.

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FOSSIL HOP-HORNBEAM WOOD FROM RANKIN

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ABSTRACT

Fossil wood collected by the authors near Brandon, Mississippi, was determined by thin-section technique to be comparable in essential details to extant hop-hornbeam (*Ostrya virginiana*) wood. The silicified material is probably Pleistocene in age and associated with a former drainage system of the combined ancestral Ohio and Mississippi Rivers. Such finds are considered to be of key importance in understanding floristic change through geologic time.

INTRODUCTION

The sparseness of knowledge about fossil wood in Mississippi (and the southeastern United States in general) belies its commonness. Silicified wood is not only abundant in certain areas, but is typically sought after as a "precious stone" by rockhounds and gem collectors. It is often featured in rock shops and lapidaries. Jewelry is frequently made from it. Rarely, if ever, though can the buyer or collector (not to mention the scientist) be given the answer to the seemingly simple question, "what wood is this?" Also, the exact source (original location) of a given piece of fossil wood is all too often less than entirely clear. The commonness of and popular interest in petrified wood have thus been essentially inversely correlated (for whatever reason) with reliable information on its structure, identity, age and geologic source.

Since the early work of Berry (1916, 1922, 1924), save for one published abstract by Dukes (1961), little scientific attention (resulting in publication) has been accorded this interesting geological phenomenon in the Southeast. This is indeed unfortunate since fossil wood, like much other fossil plant material, contains significant clues to what past floras and vegetation were like, how they changed, and, correspondingly, something of what the paleoenvironment must have been.

The potential scientific value of petrified wood has thus led us to reopen investigations into its anatomy, taxonomy, and geologic origin (e.g., Blackwell and Dukes, 1981; Blackwell et al., 1981). This present paper, and others under review or now in manuscript, represent a continuation of these efforts. It is hoped that, as a result, in a few more years a much better overall picture of fossil wood in the Southeast will emerge, not only in terms of determining its true identity and age, but also with regard to its geobotanical (including phytogeographic and paleoclimatological) implications.

Although the identity of silicified wood is now known at localities in several counties in Mississippi, this report constitutes, to our knowledge, the first account of botanically identified fossil wood from a pinpointed site in Rankin County, central Mississippi. Specimens were collected by the authors in 1979 and 1980 from the farm property of Mr. Clyde Hatten (of the State Department of Education), approximately four miles northeast of the town of Brandon. The exact coordinates are: Rankin County: South half of the 45 56/100 acres on the North side of the Northwest Quarter (NW¼) of Section 7, Township 5 North, Range 4 East. The actual site was a garden on the Hatten property. A large amount of rain had occurred just prior to one of our visits, and pieces of fossil wood (Plate 1, Figure 1) could be seen which had "worked their way up through" the soil from what was most likely a shallow Pleistocene terrace deposit immediately beneath the soil line (Baughman et al., 1971). Mr. Hatten had previously collected other specimens from the site, including a trunk-like segment of considerable size (Figure 2). A sampling of specimens was taken back to geological laboratories at Miami University (Ohio) for later sectioning work, as outlined below.

MATERIALS AND METHODS

Specimens showing adequate preservation were sliced with a large trim saw in a proper size to fit on petrographic glass slides. Three types of cuts, cross-section, radial-longitudinal section and tangential-longitudinal section, were made on each specimen. Each specimen was thus divided into a minimum of three slugs. Each slug was polished on the appropriate face through a graded silicon carbide grit series on a lapidary wheel, finally being

COUNTY, CENTRAL MISSISSIPPI

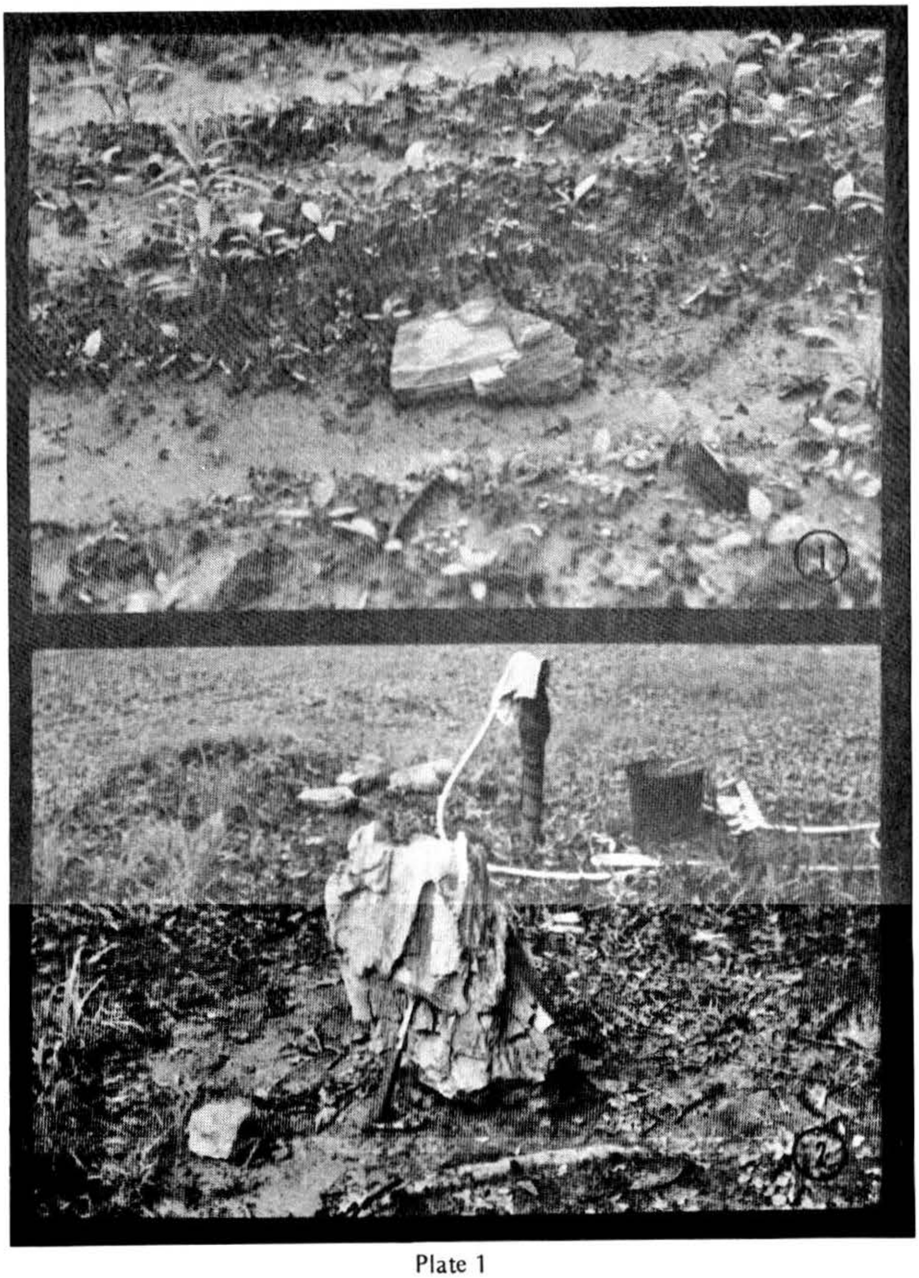

Plate 1

Figure 1. Specimen of petrified wood (hop-hornbeam, *Ostrya virginiana*) which had surfaced in garden from probable Pleistocene terrace deposit immediately beneath the soil.

Figure 2. Large trunk-like segment of same collected by Mr. Clyde Hatten.

hand-polished (1000 grit) on a glass plate. After drying, the slugs were mounted (polished face down) on the glass slides with epoxy cement. After the epoxy hardened (typically overnight under heat and pressure), the mounted slugs were thin-sectioned with a cut-off saw and furthered thinned down with a grinding wheel. When almost transparent, each specimen was hand-polished (again, on a glass plate), dried, and then coverslips were mounted with the same epoxy. Slides so made were suitable for microscopic examination.

All slides and specimens relating to this study are deposited in the paleobotanical collections associated with the Herbarium of Miami University (MU).

Slide specimens of comparative extant material were examined at the U. S. Forest Products wood anatomy laboratory in Madison, Wisconsin, an undertaking which proved invaluable to the outcome of this and other studies on fossil wood.

RESULTS AND DISCUSSION

It should be borne in mind that the vast majority of petrified woods in Mississippi (including the Rankin County material) are silicious replacements. In most cases they are chalcedony or mixtures of chalcedony and opal (Blackwell et al., 1981). Little if any of the original plant material remains, and yet a more or less exact silicon dioxide replica of the original cell structure is present. This, of course, is what allows identification and comparison to extant woods. Unfortunately, it is usually the case that some decay preceded silicification. Thus, the quality of fossilization differs even from one specimen to another at a given site.

The cell preservation in the Rankin County material (this study) was quite variable, ranging from rather poor to "good enough." These specimens do not constitute the best and most aesthetic replacements seen; yet, the cellular skeleton is well enough duplicated in some of them (Plate 2, Figures 3, 5 and 6) to permit botanical determination. The combination of anatomical features preserved, including the angular (oblique) pattern of vessel distribution (Figure 3) and the uniseriate tangential lines of apotracheal parenchyma (also Figure 3), was sufficient to permit a determination (see for example keys in Panshin and de Zeeuw, 1980) as hop-hornbeam (*Ostrya virginiana,* Betulaceae), also known as "ironwood." The rather uniform bi- and triseriate rays (as viewed in tangential section, Figure 6) were also helpful in this identification. Based on microscopic structure visible, this silicified wood matched so well with extant hop-hornbeam wood (Figure 4) that we do not feel that a new fossil taxon should be described. Thus, the specimens in this case are simply recognized as fossil wood of *Ostrya virginiana.*

The find of silicified, and probably Pleistocene, hop-hornbeam wood at the Rankin County site is not without meaning. In a previous study (Blackwell and Dukes, 1981) of fossil wood in Pleistocene terrace gravels (pre-loess terrace doposits) at Thompson Creek, Yazoo County, western Mississippi, five different types of fossil wood were found, all comparable to extant taxa. However, and somewhat surprisingly we thought at the time, hop-hornbeam was the most common fossil wood we encountered in that study. Thus, finding hop-hornbeam at the Rankin County site as well may indicate a prominence for this tree in the Pleistocene flora which does not exist today. *Ostrya virginiana* is not necessarily common today, and occurs primarily as a small understory tree associated with a variety of other hardwoods of the deciduous forest (see for example Harrar and Harrar, 1962). Not only do our finds indicate that hop-hornbeam may have been more common in the Pleistocene, but the large diameter segments uncovered (e.g., Plate 1, Figure 2) would seem to indicate that Pleistocene *Ostrya* may have been somewhat larger than its extant progeny.

Although the Rankin County fossil woods are near the eastern edge of Pleistocene terrace sands and gravels deposited by former Mississippi and Ohio River drainages (see Fisk, 1944), they are presumed to have a similar origin to the Pleistocene petrified woods (apparently, and expectedly, present in greater variety) in western Mississippi (i.e., closer to the present Mississippi River channel). It is quite feasible that, in the case of both localities, fossil woods came to occupy their present position by any or a combination of all of the following three mechanisms: 1) they could have been growing locally (in early or mid-Pleistocene times) and been buried, and subsequently silicified, "in situ" by flooding; 2) they could have been drifted down from farther north prior to permineralization, and then buried and silicified; or 3) they could have been fossilized farther north, and later washed down with the gravels. It may never be entirely clear which of these alternatives is most appropriate. All would seem plausible. Regardless, the Rankin County material stands as an example of identifiable fossil wood, from a definitely known collecting site, with an approximately known geologic age and source of origin.

ACKNOWLEDGMENTS

We wish to thank Mr. Clyde Hatten of Brandon, Mississippi, for permission to collect on his property. We also wish to express gratitude to Dr. B. Francis Kukachka of the U. S. Forest Products Laboratory, Madison, Wisconsin, for his help in identification of various fossil woods from Mississippi.

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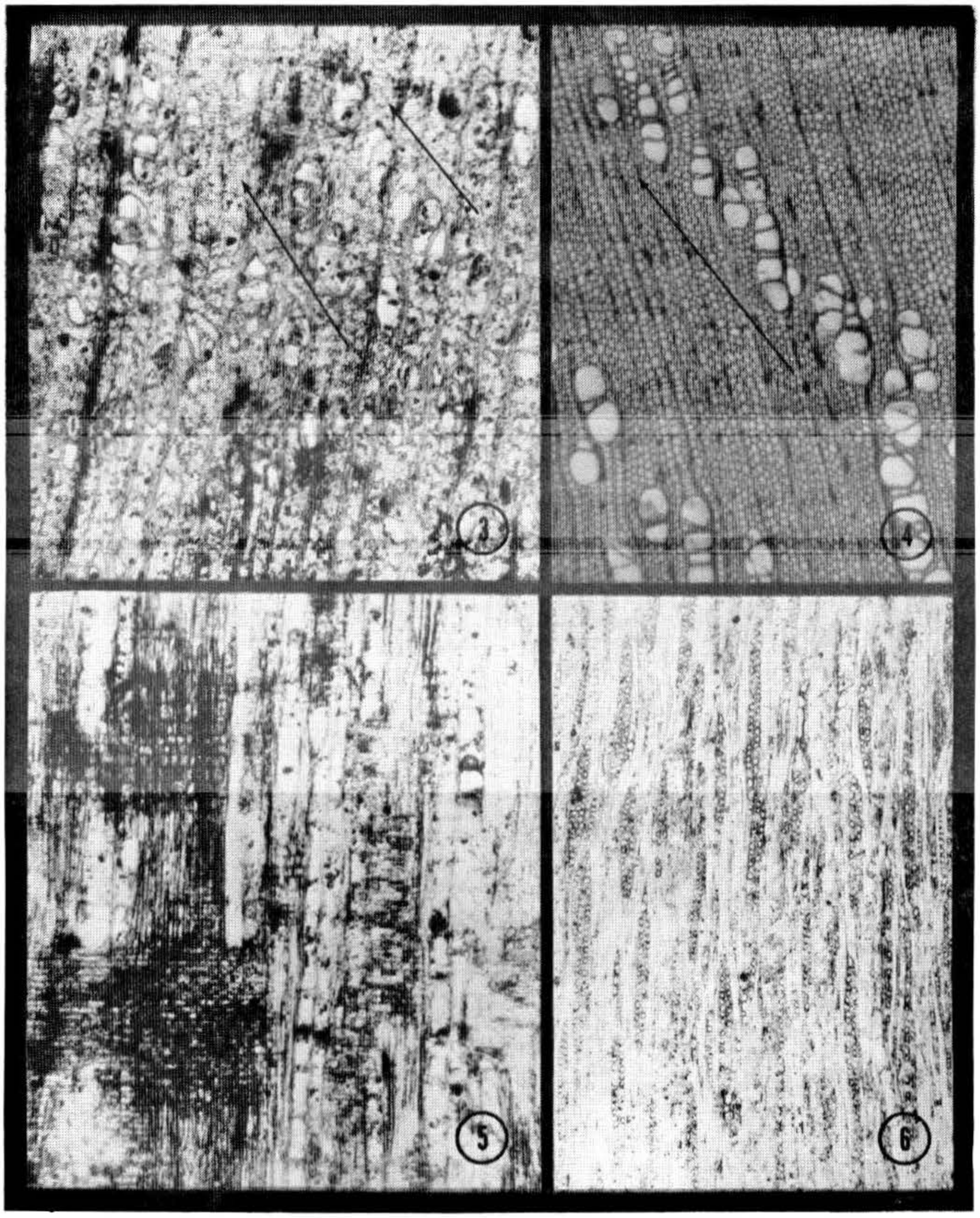

Plate 2

Figure 3. Photomicrograph (X 33) of cross-section of fossil hop-hornbeam (*Ostrya virginiana*) wood; note oblique vessel distribution pattern (arrows showing direction of orientation); apotracheal parenchyma is visible as numerous narrow faint bands between (more or less at right angles to) the wood rays.

Figure 4. Photomicrograph (X 68) of extant hop-hornbeam wood in cross-section; note similar diagonal vessel pattern (parallel to arrow); thin lines of parenchyma are visible between the rays.

Figure 5. Radial-longitudinal section of fossil hop-hornbeam wood (photomicrograph, X 33); sheet-like rays are readily seen running horizontally.

Figure 6. Photomicrograph (X 33) of tangential-longitudinal section of silicified hop-hornbeam wood; rays are viewed transected.

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PETROLEUM NEWS

MISSISSIPPI OIL AND GAS STATISTICS, FOURTH QUARTER 1981

Oil

	Bbls. Produced	Severance Tax	Average Price Per Bbl.
October	2,601,915	$ 4,708,997.76	$ 30.16
November	3,506,993	6,638,464.16	31.55
December	3,011,304	5,686,175.25	31.47
Totals	9,120,212	$ 17,033,637.17	$ 31.13

Gas

	MCF Produced	Severance Tax	Average Price Per MCF
October	10,354,914	$ 2,112,606.70	$ 3.40
November	27,976,840	5,923,536.30	3.53
December	17,908,523	3,814,577.81	3.55
Totals	56,240,277	$ 11,850,720.81	$ 3.51

source: State Tax Commission

CALENDAR OF EVENTS

1982 June - September

June 16-17 - Low-level waste disposal, symposium, Arlington, Va. (M.Güven Yalcintas, Oak Ridge National Laboratory, Box X, Oak Ridge, Tenn. 37830, phone: 615/576-2078)

June 26-July1 - American Association of Petroleum Geologists and Society of Economic Paleontologists & Mineralogists, ann. mtg., Calgary, Alberta. (For AAPG, N. Gale Koch, Petro-Canada, Box 2844, Calgary, T2P 3E3. For SEPM, R. G. Young, Home Oil Co., 324 8th Ave. SW, Calgary, T2P 2Z5)

July 21-23 - Ground-water monitoring, seminar, Denver. (David Nielsen, National Water Well Association, 500 W. Wilson Bridge Road, Worthington, Ohio 43085. Phone: 614/846-9355) Fee: $400

July 29-30 - Ground-water monitoring, seminar, Columbus, Ohio. (David Nielsen, National Water Well Association, 500 W. Wilson Bridge Road, Worthington, Ohio 43085. Phone: 614/846-9355) Fee: $300

August 8-11 - Soil Conservation Society of America, ann. mtg., New Orleans. (Max Schnepf, 7515 NE Ankeny Road, Ankeny, Iowa 50021. Phone: 515/289-2331)

September 8-10 - Unconventional methods in exploring for oil and gas, symposium, Dallas. (James E. Brooks, Institute for the Study of Earth & Man, Southern Methodist University, Box 274, Dallas, Texas 75275. Phone: 214/692-3488)

September 15-17 - Highway geology, symposium, Vail, Colorado. (Jeffrey L. Hynes, Colorado Geological Survey, 1313 Sherman St., Room 715, Denver, Colorado 80203. Phone 303/866-2611)

September 22-24 - Ground-water quality, symposium, Atlanta. (Kathy Butcher, National Water Well Association, 500 W. Wilson Bridge Road, Worthington, Ohio 43085. Phone: 614/846-9355)

"The great tragedy of Science —
the slaying of a beautiful hypothesis
by an ugly fact."

Thomas Henry Huxley

"What vain creatures we are,
to impose our puny order
on that chaotic continuum we call geology."

J. P. N. Badham

Letter

The following is an excerpt from a letter sent by Frederic F. Mellen in regard to Victor A. Zullo's article in the March issue of *Mississippi Geology*, "A new species of the turtle barnacle *Chelonibia* Leach, 1817, (Cirripedia, Thoracica) from the Oligocene Mint Spring and Byram Formations of Mississippi." Mr. Mellen is a past director of the Mississippi Bureau of Geology (then the Mississippi Geological Survey) and the author of many Survey bulletins as well as numerous other publications on a diversity of topics. For many years he has worked as an independent geologist in Mississippi. His comments given below share the feelings of many researchers in the geological community concerning the detail, diligence, and diversified interest with which the profession should be pursued.

"Thanks so very much for the work contained in the current issue of *Mississippi Geology*. I am greatly honored by Zullo's naming of *Chelonibia Melleni*, and you are also to be congratulated in finding many additional valves of this somewhat new species.

"It makes one humble to think how carelessly we search, overlooking much more than we ever find. Of course the things we leave unfound will later be found by others, for the most part. But there is always a haunting fear that a one-only rarity will be crushed underfoot, discarded through non-recognition, or not even seen and left to return to oblivion by natural processes."

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