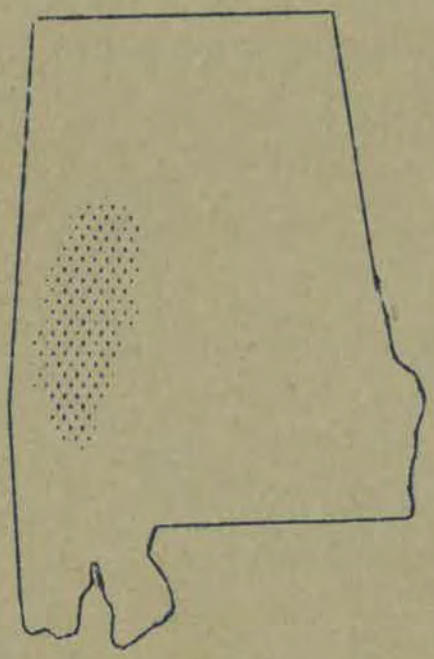
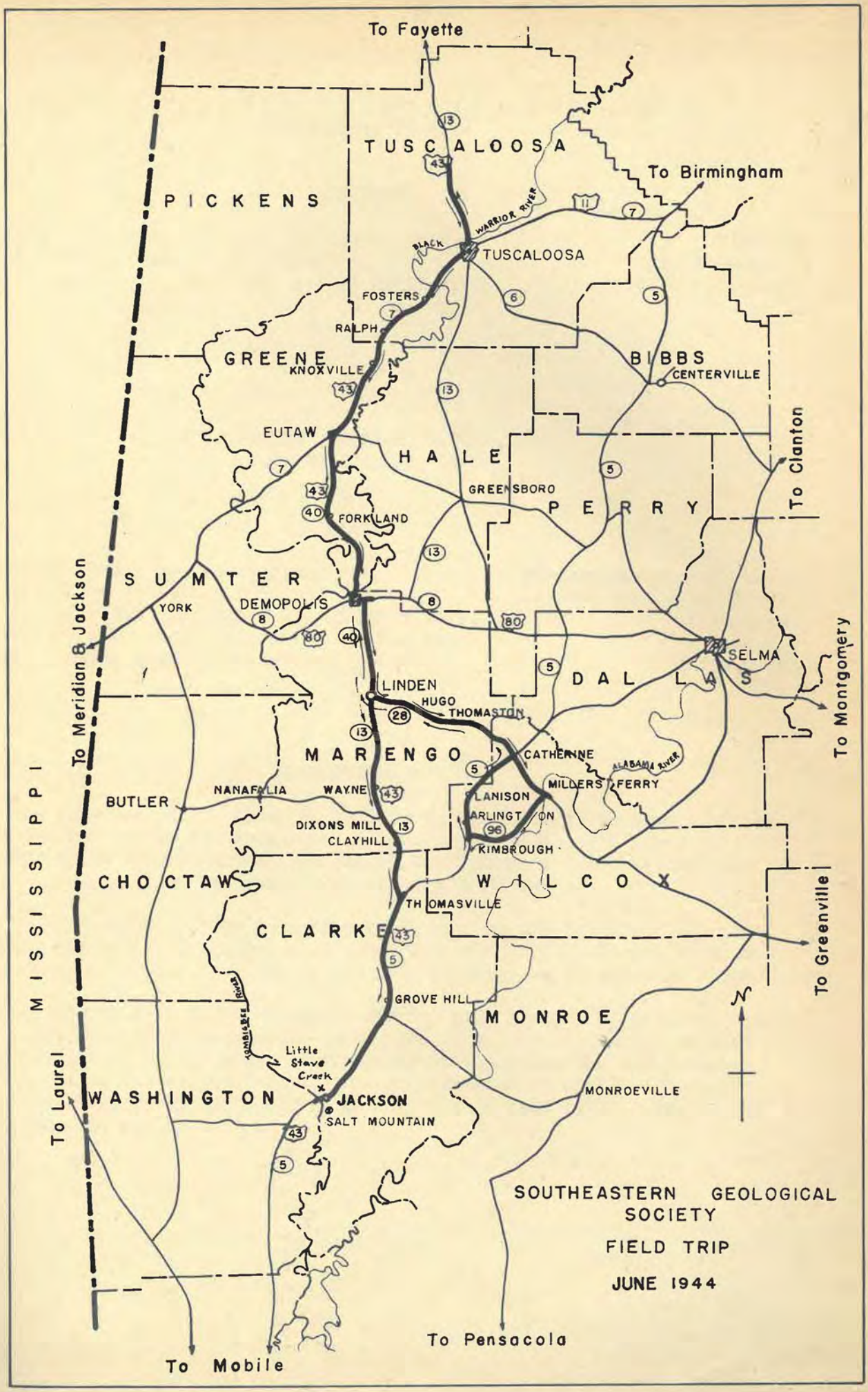
THE FIRST FIELD TRIP
OF THE
SOUTHEASTERN GEOLOGICAL SOCIETY
JUNE 21, 22, 23, 1944



SOUTHWESTERN ALABAMA


To Fayette
TUSCALOOSA
PICKENS
To Birmingham
WARRIOR RIVER
BLACK
TUSCALOOSA
FOSTERS
RALPH
GREENE
KNOXVILLE
BIBBS
CENTERVILLE
EUTAW
HALE
GREENSBORO
PERRY
To Clanton
FORKLAND
SUMTER
YORK
DEMOPOLIS
To Meridian & Jackson
SELMA
To Montgomery
LINDEN
HUGO
THOMASTON
DALLAS
MARENGO
CATHERINE
ALABAMA RIVER
MILLERS FERRY
NANAFALIA
WAYNE
BUTLER
LANISON
ARLINGTON
DIXONS MILL
CLAYHILL
KIMBROUGH
CHOCTAW
WILCOX
THOMASVILLE
CLARKE
To Greenville
MISSISSIPPI
GROVE HILL
MONROE
TOMBIGBEE RIVER
Little Stave Creek
WASHINGTON
JACKSON
SALT MOUNTAIN
MONROEVILLE
To Laurel
N
SOUTHEASTERN GEOLOGICAL SOCIETY
FIELD TRIP
JUNE 1944
To Pensacola
To Mobile

SOUTHEASTERN GEOLOGICAL SOCIETY
Tallahassee, Florida

OFFICERS

HERMAN GUNTER, Director, Florida Geological Survey,	PRESIDENT
ROBERT B. CAMPBELL, Consulting Geologist,	VICE PRESIDENT
E. W. SCOTT, Geologist, Union Oil Co. of California	SECRETARY-TREASURER

SOUTHWESTERN ALABAMA FIELD TRIP
June 21, 22, 23, 1944

LEADERS

Dr. Lyman D. Toulmin, Jr., Geologist,	Alabama Geological Survey
Miss Winnie McGlamary, Paleontologist,	Alabama Geological Survey
E. W. Scott, Geologist, Union Oil Co. of California,	Tallahassee
E. H. Rainwater, Paleontologist, Shell Oil Company,	Tallahassee
R. H. Smith, Louisiana State University,	Baton Rouge

ACKNOWLEDGMENTS

We are indebted to Dr. Lyman D. Toulmin and Miss Winnie McGlamery of the Alabama Geological Survey for their wholehearted cooperation, and especially for preparing the Guide Book material. We regret Dr. Toulmin's inability to lead the party, and appreciate Miss McGlamery's acceptance of this role.

To R. M. Swesnik, former Secretary-Treasurer, we are indebted for his initiation and enthusiastic promotion of plans for this trip, and also to E. W. Scott, Secretary-Treasurer, for his active help in carrying forward the plans.

We are grateful to E. H. Rainwater for his able assistance in conducting the field party, and to Robert Hendee Smith, for outlining for us the exposed geology as we view it in the Little Stave Creek Section, and for the detailed, painstaking work on the columnar section on this area which will long remain a classic. To all others who have contributed to the success of this field trip program, we express our thanks.

UPPER CRETACEOUS OF WEST-CENTRAL ALABAMA

By Winnie McGlamery

The most recently published works on the Upper Cretaceous of Alabama are by Dr. L. W. Stephenson and Mr. Watson H. Monroe.[1,2,3,4/] Detailed study of the Tuscaloosa is now in progress by the U. S. Geological Survey under the direction of Dr. Stephenson and Mr. Monroe.

The Upper Cretaceous of west-central Alabama is composed of the following formations in ascending order: Tuscaloosa, Eutaw, Selma Chalk, Ripley and Prairie Bluff Chalk.

TUSCALOOSA FORMATION

In the vicinity of Tuscaloosa, the Tuscaloosa formation is resting unconformably on beds of Pennsylvanian age. The formation is much thicker in west-central Alabama than in the eastern part of the State, with an estimated thickness of about 1000 feet. The beds are nonmarine in origin, composed of sands, clays and gravel, excepting, however, an exposure in Chilton County, near Maplesville, which carries some glauconite and shell impressions, and a locality 5 miles west of Centerville, on Tuscaloosa highway, Bibb County. Fossil plants have been found in the Tuscaloosa at Cottondale, about ten miles east of Tuscaloosa, and at other localities within the formation. Also there is a fossiliferous shale and sandstone section penetrated in wells.

1/ L. W. Stephenson and W. H. Monroe, Prairie Bluff Chalk and Owl Creek Formation of Eastern Gulf Region, Bull. A. A. P. G., Vol. 21, No. 6, 1937, pp. 808-809.

2/ L. W. Stephenson and W. H. Monroe, Stratigraphy of Upper Cretaceous Series in Mississippi and Alabama, Bull. A. A. P. G., Vol. 22, No. 12, 1938, pp. 1633-1657.

3/ Watson H. Monroe, Guidebook Cretaceous Field Trip, Miss. Geol. Society, May 3-5, 1940.

4/ Watson H. Monroe, Notes on Deposits of Selma and Ripley Age in Alabama, Bull. 48, Geological Survey of Alabama, 1941.

EUTAW FORMATION

An unconformity separates the Tuscaloosa, and the overlying Eutaw. The formation is approximately 400 feet thick at Eutaw, Alabama. The Eutaw deposits were laid down in shallow marine waters, and the beds exhibit cross-bedding. They are more or less glauconitic, and are interstratified with clay. The Tombigbee sand member of the Eutaw, representing the upper 100 feet of the formation, is typically represented at Plymouth Bluff on the Tombigbee River, 4 miles northwest of Columbus, Mississippi. It is composed of medium to fine-grained glauconitic sand with indurated ledges. Among the fossils in this part of the Eutaw are Gryphaea wrathori Stephenson and Exogyra ponderosa Roemer.

SELMA CHALK

The Selma is a massive chalk overlying the Eutaw with an apparent disconformity. The base of the formation is sandy and carries some phosphatic material in the form of molds of shells. The greatest thickness of the chalk is in western Alabama. A water well at Livingston, Sumter County, shows a thickness of almost 900 feet. In the three-fold division of the chalk made by Mr. W. H. Monroe[5] there is a lower marly member, including the section exposed at Selma, the Arcola Limestone Member, and the Demopolis Member.

The lower marly member has an estimated thickness in western Alabama of almost 300 feet. The Arcola limestone lying above it is a hard limestone interstratified with chalk, with a thickness of 5 feet at Arcola Landing on the Warrior River, Hale County, and can be traced from eastern

---

[5] Monroe, Watson H., op. cit., p. 25.

Alabama into Mississippi. In western Alabama its average thickness is about 2 feet.

The Demopolis member contains much purer chalk than the other two members, except for a sandy upper portion, and has an estimated thickness of about 500 feet in western Alabama. The type locality is a bluff on the Tombigbee River at Demopolis at Webb & Sons Cotton Warehouse. This section is about 150 feet above the base and is characterized by a faunal zone about 50 feet thick carrying a small pelecypod, Diploschiza cretacea, and a small brachiopod, Terebratulina filosa.

RIPLEY

In western Alabama the Ripley lies conformably on the Selma, and is composed of micaceous chalky sand and sandstone. The base of the formation has been placed just above the top of the Exogyra cancellata zone in Sumter County, but eastward it occupies a lower stratigraphic position, that is, within the Exogyra cancellata zone. Other fossils characteristic of the Ripley are Ostrea subspatulata and Trigonia thoracica. In eastern Alabama on Barbour Creek south of Eufaula, and the vicinity of the Chattahoochee, there are very fossiliferous beds in the Ripley.

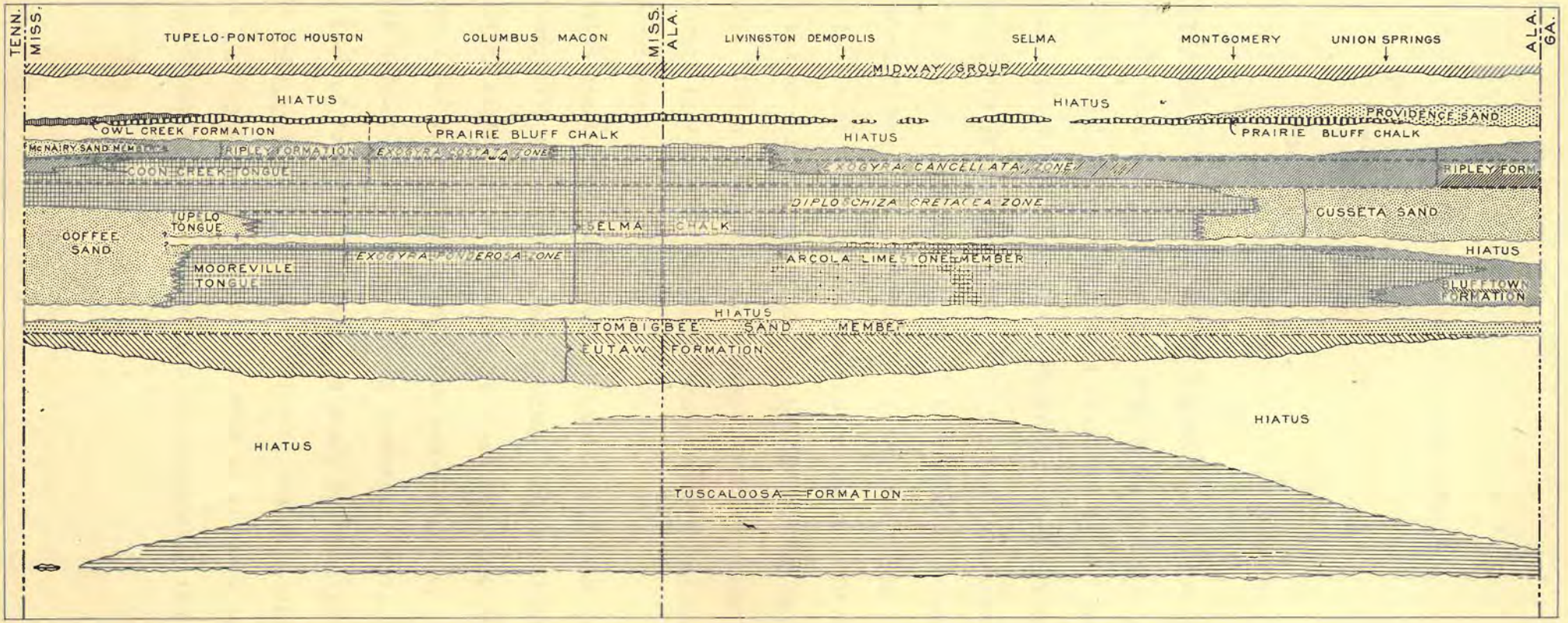
PRAIRIE BLUFF CHALK

The prairie Bluff chalk lies unconformably on the Selma or Ripley. At Prairie Bluff on the Alabama River in Wilcox County, there is an angular unconformity between the Prairie Bluff and the underlying Ripley. The Prairie Bluff is about 50 feet thick and is phosphatic in its lower portion. At Prairie Bluff and other localities it is abundantly fossiliferous. Some of the characteristic fossils are Cliona sp., Hemiaster slocumi Lambert, Linthia variabilis Slocum, Exogyra costata Say (variety with narrow costae), Cranella serica Con., Baculites columna Morton, Scaphites conradi,

Eutrephoceras dekayi (Morton), Diploschiza molleni Stephenson (noted in abundance just north and east of Livingston) a small Gryphaea. Typical Exogyra costata with wider costae are to be found in beds below the Prairie Bluff.

Faunal Zones

The Exogyra ponderosa zone extends from the upper half of the Tombigbee sand member of the Eutaw through the lower two-thirds of the Selma Chalk. The Diploschiza cretacea zone lies within the Exogyra ponderosa zone about 200 feet below the top. The Exogyra costata zone includes the upper third of the Selma, and the Ripley and Prairie Bluff Chalk. The Exogyra cancellata zone lies within the lower 200 feet of the Exogyra costata zone. Anomia tollinoides Morton is an associated form in this zone.



STRATIGRAPHIC AND AGE RELATIONS OF UPPER CRETACEOUS FORMATIONS OF MISSISSIPPI AND ALABAMA

FROM

L.W. STEPHENSON & W.H. MONROE

A.A.P.G. BULL. VOL. 22 NO. 12 DEC. 1938

GENERAL FEATURES OF THE TERTIARY FORMATIONS IN ALABAMA

By Lyman D. Toulmin, Jr.

PALEOCENE SERIES

Midway Group

Clayton formation.-- The oldest Midway deposits rest disconformably on the rocks of the Cretaceous system. This disconformity represents a relatively long lapse of time, as is indicated by the great paleontological hiatus. In eastern Alabama the Clayton formation rests on the eroded surface of the Providence sand. The Clayton formation thins westward and is not mapped as a separate formation in western Alabama. In western Alabama basal Midway beds, included in the Porters Creek (Sucarnoochee) formation, rest on the eroded surface of the Prairie Bluff chalk. Phosphatic casts of mollusks reworked from the underlying chalk are common in the basal Midway calcareous glauconitic sand and sandstone. Ostrea pulaskensis Harris is common in the argillaceous beds a few feet above the Cretaceous contact.

On the Chattahoochee River in eastern Alabama the Clayton formation consists almost entirely of massive limestone about 140 feet thick. In Wilcox County, central Alabama, its thickness is about the same, but the lower portion, about 100 feet thick, consists of red-weathering argillaceous sand with nodular layers of calcareous sandstone. This is overlain by 10 to 20 feet of fossiliferous sand and sandy crystalline limestone filled with Turritella alabamiensis Whitfield, and many other fossils. This is the "Turritella rock" of Smith. This is overlain by 30 to 50 feet of white chalky limestone with casts of nautiloids, the "Nautilus rock" of Smith.

The Clayton formation becomes thinner in western Wilcox County concomitantly with the westward thickening of the Porters Creek formation, and is not distinguished as a separate formation west of Wilcox County.

Section of Clayton formation in road cut west of highway bridge over Alabama River at Millers Ferry

		Feet
4.	"Nautilus rock". White chalky, somewhat argillaceous limestone at top of hill with casts of nautiloids and large Bryozoa	3 - 5
3.	Calcareous sand weathering to loose reddish sand and irregular hard limestone boulders. Contains Ostrea and a few other fossils. This bed, and probably bed 2, make the "Turritella rock" of eastern Wilcox County.	3
2.	Alternating red sand and sandy limestone layers. Carries an echinoid. About	10
1.	Alternating gray shale and hard argillaceous chalky limestone layers, to bottom of road cut.....	10

Porters Creek (Sucarnoochee)formation. -- The Porters Creek (Sucarnoochee) formation has its maximum thickness in western Alabama where it consists mainly of black joint clay that breaks with a conchoidal fracture. The clay contains little lime and forms tough clay soil that is the basis of the "Flatwoods" that are well developed in Mississippi and extend into Alabama as far as the Alabama River at Midway Landing. The lower part of the formation is more calcareous than the upper part and becomes increasingly calcareous east of the Alabama River. It forms a narrow belt of black prairie land bordering, and lying just north of, the "Flatwoods" belt. The formation is marine in origin and contains a thick fossiliferous zone.

The formation thins toward the east and does not extend beyond Butler County in central Alabama. It rests conformably on the Clayton

formation. In western Alabama in places it overlaps the limestone or calcareous sandstone of the basal Midway (Clayton formation equivalent) and rests directly on the Cretaceous. Its maximum thickness in western Alabama is about 200 feet and its thickness in Wilcox County ranges from 35 to 50 feet in the eastern part of the county to 85 feet or more in the western part. It is in part equivalent to the Clayton formation in eastern Alabama.

The Naheola formation. -- The Naheola formation can be conveniently divided into three members, a lower very fossiliferous micaceous silty clay member, 12 to 20 feet thick, typically exposed at Matthews Landing on the Alabama River in Wilcox County, a middle member of unfossiliferous gray cross-bedded sand and laminated gray clay, 100 feet thick, characteristically exposed at Oak Hill in Wilcox County, and an upper fossiliferous greensand member about 25 to 30 feet thick, characteristically exposed at Coal Bluff on the Alabama River where it rests on a four-foot, lignite bed. The Naheola formation has not been recognized in eastern Alabama.

The lower member, the "Matthews Landing marl", containing a greensand bed at the base, lies conformably on the Porters Creek (Sucarnoochee) formation. The middle nonmarine member at several localities contains lignitic clay and lignite. The upper greensand member lies disconformably on the middle member. It is considerably weathered at most places where exposed and consists of loose sand and thin, platy, limonite beds. Fossiliferous unweathered greensand marl belonging in this member, discovered in February, 1942, at Caledonia, Wilcox County, contains a large number of species of Foraminifera and Ostracoda, several of which are diagnostic Midway species. The "Coal Bluff beds", the "Ackerman formation"

in Alabama of Cooke, are therefore of Midway age and are not equivalent to the lower Wilcox Ackerman formation of Mississippi. The upper marine greensand member of the Nahoola, separated by disconformities from the beds below and above, is a distinct lithologic unit that can be mapped from central to western Alabama, and could logically be designated a new formation.

EOCENE SERIES

Wilcox Group

Nanafalia formation. -- The Nanafalia formation extends all the way across the state and lies disconformably on the formations of the Midway group below, on the Clayton formation in eastern Alabama, and on the Nahoola formation in central and western Alabama. It may be divided into three members which are most distinctly developed in Wilcox County; a basal coarse cross-bedded sand up to 30 feet in thickness where present, containing rounded pellets of clay in the lower part; a middle greensand marl member 35 to 80 feet thick, packed with shells of Ostrea thirsae; and an upper glauconitic sandy clay member indurated in central Alabama and called "pseudobuhrstone", 50 feet thick or more, containing molds of Turritella and other marine fossils. The basal sand is absent in some areas and the middle marl member lies directly on the Midway beds. The basal sand was included by Cooke in his "Ackerman formation" in Alabama. The Ackerman formation of Mississippi is probably equivalent, in part at least, to the Nanafalia formation. West of the Tombigbee River the middle marl member thins rapidly, the upper "pseudobuhrstone" member loses its lithologic character, and the formation consists largely of unfossiliferous sandy clay and unconsolidated sand.

Tuscahoma formation. -- The Tuscahoma formation extends all the way across the state and consists of about 200 feet of unfossiliferous cross-bedded sand and stratified sandy clay. In central and western Alabama it contains two fossiliferous marl beds. The lower part of the formation includes a clay-boulder conglomerate bed consisting of sand containing boulders of laminated gray clay up to 2 feet in length. The Bells Landing marl, 6 to 10 feet thick on the Alabama River, lies 25 feet above the Greggs Landing marl (4 to 5 feet thick) and is 120 feet below the marl of the overlying Bashi formation. The Tuscahoma formation is here considered to include all the strata up to the base of the Bashi marl. It is thus extended to include the 3-foot lignite bed and the overlying cross-bedded sand and sandy clay strata, about 70 feet thick, that have been included heretofore in the Bashi formation. In western Alabama the Tuscahoma formation contains considerable unconsolidated sand.

Bashi formation. -- The Bashi formation is here considered to be restricted to the fossiliferous marine greensand marl 6 to 20 feet thick in central and western Alabama, and to equivalent sand, clay, and fossiliferous marl beds, 40 feet thick or more, in eastern Alabama. The formation extends all the way across the state.

Hatchetigbee formation.-- The Hatchetigbee formation consists of 175 to 200 feet, or more, of unfossiliferous sandy clays and clayey sands of gray, brown, and purple color lying conformably on the Bashi formation. Like the Wilcox group as a whole, the Hatchetigbee formation is thicker in western Alabama and down the dip from its outcrop. Its thickness in the area of the Hatchetigbee anticline was estimated by

Hopkins to be 300 feet.[1] The upper 90 feet of the formation is exposed at the type locality in the Hatchetigbee anticline where it is disconformably overlain by the Tallahatta formation. Several beds in the formation at the type locality contain marine fossils. On the Chattahoochee River in eastern Alabama the formation has a thickness of only 22 feet.

Claiborne Group

Tallahatta formation. -- The Tallahatta formation consists of 140 to 200 feet of siliceous claystone and aluminous sandstone, glauconitic in part, extending across the state and resting disconformably on the Hatchetigbee formation. In central and western Alabama the hard beds of the Tallahatta, called "buhrstone", form a prominent northward-facing escarpment or cuesta, and an inward-facing escarpment surrounding the crest of the Hatchetigbee anticline. The formation is marine in origin and sparingly fossiliferous. The upper part of the formation where exposed in Little Stave Creek is very fossiliferous and contains Ostrea lisbonensis, Ostrea johnsoni, and Discocyclina advena.

Lisbon formation. -- The very fossiliferous Lisbon formation consists predominantly of calcareous and glauconitic sandy clays and sands of marine origin. It is separated by a minor disconformity from the Tallahatta formation below and extends all the way across the State. The entire formation is exposed on the Alabama River at Lisbon Bluff and Claiborne Bluff, where it is 117 feet thick, and in Little Stave Creek in Clarke County where it is almost 150 feet thick. The formation contains several beds of large Ostrea sellaeformis, and in the lower portion it contains Ostrea lisbonensis.

1/ Hopkins, O. B., 1918, Oil and gas possibilities of the Hatchetigbee anticline, Alabama; U. S. Geol. Survey, Bull. 661h, p. 287

Gosport formation. -- The Gosport formation is separated from the Lisbon formation below by a minor disconformity. It consists of very fossiliferous marine greensands, dark green to reddish brown in color depending on the amount of weathering, and interfingering wedges of nonmarine sand and carbonaceous clay which extend as far east within the formation as the Alabama River. The nonmarine beds have been correlated with the Cockfield formation in Mississippi. The Gosport formation is here considered to include the overlying lithologically and faunally similar Periarchus bed or "Scutella" bed which was formerly considered to be the basal bed of the Jackson group. The Periarchus bed carries Nonionella cockfieldensis. The entire Gosport formation is exposed at Claiborne Bluff where it is 24 to 26 feet thick including the "Periarchus" bed, and in Little Stave Creek where it is 25 feet thick. The nonmarine beds are absent at Little Stave Creek, but are present in exposures a few miles to the north. The formation is 35 feet thick at Willow Branch in Choctaw County. The formation is known only in Choctaw, Washington, Clarke, Monroe, and Conecuh counties.

Jackson Group

Jackson formation in western Alabama.-- The Moodys Branch marl, lying conformably on the Periarchus bed or Nonionella cockfieldensis zone of the Gosport formation, is the basal formation of the Jackson group in western Alabama. It consists of marine fossiliferous calcareous silt and sand and blue glauconitic marl, between 20 and 25 feet thick in the Little Stave Creek section.

The Yazoo clay, lying conformably on the Moodys Branch marl, consists of marine fossiliferous blue and blue-gray plastic clay that

breaks up into blocks having conchoidal fracture surfaces. These beds of clay are about 42 feet thick in the Little Stave Creek section.

Marine beds aggregating 30 feet in thickness in the Little Stave Creek section conformably overlie the blue plastic clay. These beds consist of a basal bed of blue to buff marl or glauconitic limestone, about 6 feet thick, containing Poriarchus pileus-sinensis, overlain by fossiliferous buff marl, fossiliferous blue glauconitic marl, and blue plastic clay.

In western Alabama the total thickness of the Jackson group of formations ranges from about 80 to about 125 feet. In the Little Stave Creek section the total thickness is about 95 feet. The formations become more calcareous eastward and grade into the Ocala limestone.

Ocala limestone. -- East of the Tombigbee River the Ocala limestone is equivalent to the Jackson group of formations in western Alabama. It extends eastward into Georgia and Florida and lies conformably on the Poriarchus bed of the Gosport formation. It is a soft cream-colored to white chalky limestone 40 to 60 feet thick in Alabama. It carries a few fossils, several of which occur also in the Jackson group in western Alabama, notably Macropneustes mortoni (Conrad), Schizaster armiger Clark, and Pecten perplanus Morton.

OLIGOCENE SERIES

Vicksburg Group

Red Bluff clay. -- The Red Bluff clay extends from Mississippi into western Alabama. East of the Tombigbee River it thins rapidly and merges into the Marianna limestone, and any Red Bluff strata that are present are included in that formation. The Red Bluff clay has a maximum

thickness of 40 feet near the Mississippi line, but is only 9 feet thick at St. Stephens Bluff on the Tombigbee River in Washington County. The formation consists of marine fossiliferous gray to blue-green glauconitic marl containing Ostrea vicksburgensis and other fossils.

Marianna limestone. -- The Marianna limestone extends from Mississippi across Alabama into northwestern Florida. It retains the same lithologic character throughout this distance. It is a soft cream-colored to white porous marine limestone known as "chimney rock", owing to its local use in building chimneys, and as "orbitoidal limestone", owing to the abundance of Lepidocyclina mantelli (Morton). The formation rests conformably on the Red Bluff clay in western Alabama and on the Ocala limestone in eastern Alabama. It is characteristically exposed at St. Stephens Bluff on the Tombigbee River where it has a total thickness of 74 feet.

Glendon limestone. -- The Glendon limestone is a fossiliferous, marine, yellow to white, irregularly indurated and in places crystalline limestone. It is distinguishable both lithologically and faunally from the Marianna limestone on which it lies conformably. Where both formations are exposed the Glendon limestone is harder and in most places forms an overhanging ledge filled with irregular tubular cavities resulting from weathering. It is called "horsebone rock" owing to its habit of weathering into irregularly shaped masses with smooth surfaces. The Glendon limestone carries Lepidocyclina supera (Conrad) whereas the Marianna limestone carries L. mantelli (Morton). The Glendon limestone is about 20 feet thick at the type locality and has a maximum thickness of about 40 feet and an average thickness of about 15 feet. It is probably absent in eastern Alabama.

Chickasawhay marl. -- The Chickasawhay marl is correlated with the Flint River formation of southeastern Alabama and Georgia and with the Suwannee limestone of Florida. It lies disconformably on the Glendon limestone in western Alabama and the Marianna limestone in southeastern Alabama. This hiatus represents a stratigraphic interval at least equal to the Byram marl and Bucatunna clay of Mississippi which are absent in Alabama. Some Bucatunna clay strata may be present locally in Alabama. The Chickasawhay has been divided into two members.2/ The lower member, Oligocene in age, is the typical part of the formation. The upper member contains species of mollusks closely related to species in the Miocene Tampa limestone of Florida.

The Chickasawhay marl consists of fossiliferous marine strata which in Alabama are chiefly marlstone or argillaceous limestone with fossil molds, blue-green plastic clay, soft blue-green to buff marl with Teredo circula Aldrich, and blue-green unfossiliferous sand. The formation has a maximum thickness in western Alabama of 35 feet and possibly a somewhat greater thickness in southeastern Alabama. It extends east to Covington County, Alabama, and into northwestern Florida.

Flint River formation.-- The Flint River formation, correlated with the Chickasawhay marl and Suwannee limestone, consists of sand and masses of silicified limestone or chert in southeastern Alabama northwestern Florida, and southwestern Georgia. It overlaps older formations. The cherty limestone beds contain reef corals and a large molluscan fauna.

2/ Cooke, C. W., 1940. Prefatory note, in Mansfield, W. C., Mollusks of the Chickasawhay marl; Jour. Paleontology, vol. 14, pp. 171-173.

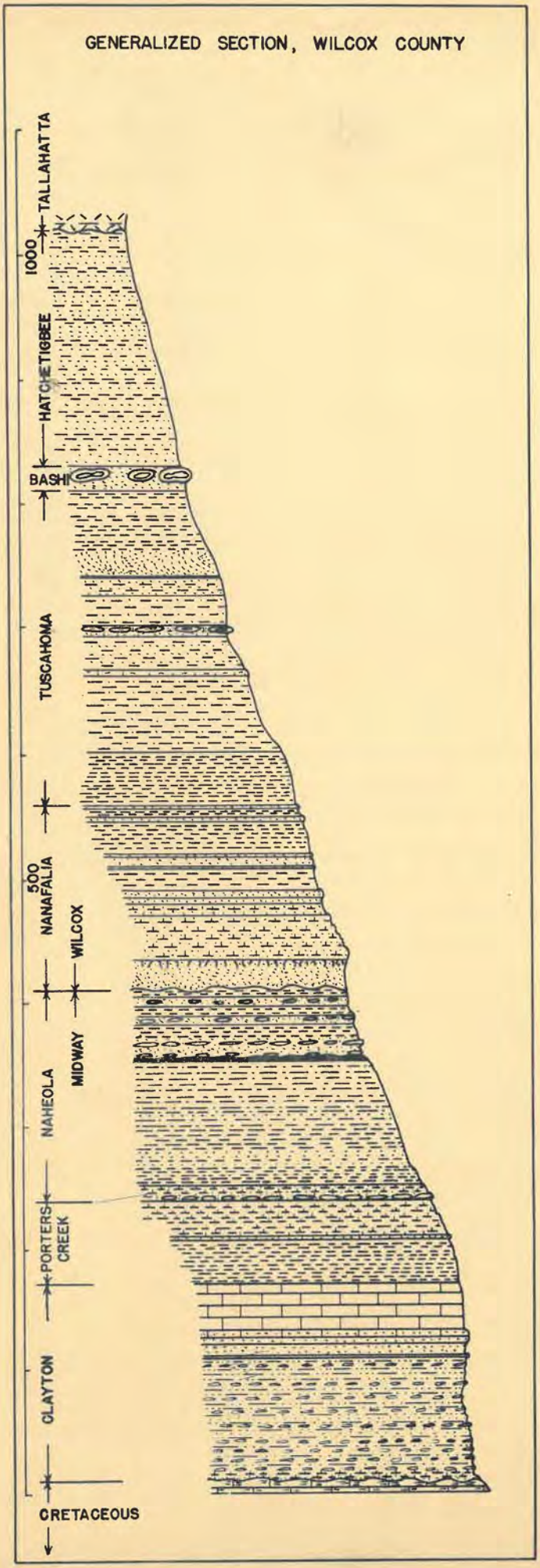
MIOCENE AND PLIOCENE SERIES

Strata of Miocene and Pliocene age in Alabama are nonmarine and unfossiliferous in the region of their outcrop. The Miocene series consists predominantly of sand and clay, and the Pliocene series of sand, clay, and gravel. These two series are discussed more fully in publications of the Alabama Survey and in other publications. 3/

3/ See:

Cooke, C. W., 1926, The Cenozoic formations, in Adams and others, Geology of Alabama; Alabama Geol. Survey, Spec. Rept. 14.

Toulmin, L. D., 1940, The Salt Mountain limestone of Alabama, Alabama Geol. Survey, Bull. 46, pp. 51-54.


GENERALIZED SECTION, WILCOX COUNTY
1000
500
TALLAHATTA
HATCHETIGBEE
BASHI
TUSCAHOMA
NANAFALIA
WILCOX
MIDWAY
NAHEOLA
PORTERS CREEK
CLAYTON
CRETACEOUS

SOUTHEASTERN GEOLOGICAL SOCIETY

FIELD TRIP ROAD LOG

FIRST DAY

0 Start at flagpole in Tuscaloosa.

.4 Black Warrior River.

.55 Turn left. Follow U. S. Highway #43.

1.0 Stop light- continue north.

4.2 Fresh exposures of Tuscaloosa laminated sand and clay.

10.4 STOP- Park on gravel road on left. Cretaceous-Pennsylvanian contact. Tuscaloosa sand and gravel overlying Pottsville sand. Typical lithified Pottsville sand exposed 100 yards north of contact. Pottsville shale exposed in stream bed and cut along highway about 300 yards north of stop.

10.6 On highway- return to Tuscaloosa.

21.0 Flagpole.

21.3 Turn right on U. S. Hwy. #43- Shell service station on right. Alluvium and terrace gravels between here and Black Warrior River.

22.6 Stillman Institute on left.

30.2 Black Warrior River.

33.3 STOP- Tuscaloosa section exposed in road-cut.
2' sandy soil.
10' buff sand and gravel.
5' red and gray clay.
8' brown pebbly sand. Red surface staining from overlying clay.

34.2 Tuscaloosa sand and gravel.

39.2 Ralph Post Office.

40.5 First exposure of Tuscaloosa - Eutaw contact.

41.0 Enter Green Co. - leave Tuscaloosa Co.

42.6 STOP - Good exposure of Eutaw sand and clay.
Intraformational disconformity between sand and underlying laminated sand and lignitic clay.

42.9 Knoxville Post Office.

43.5 Tuscaloosa - Eutaw contact (covered by soil).

44.8 Tuscaloosa - Eutaw unconformity.

46.0 Tuscaloosa - Eutaw contact.

48.1 Well-bedded Eutaw sand exposed in road-cut.

48.5 Eutaw clay exposed in road-cut. Outlier of Eutaw (upper part).

54.85 Small fault in Eutaw on right.

56.0 Town of Eutaw. Continue south on U. S. Hwy. #43.

56.5 Turn right on Hwy. #43.

57.8 Selma chalk knoll on left.

57.9 Road junction -turn left.

61.1 Turn right on road across field.

61.4 STOP- Choctaw Bluff with Selma-Eutaw contact
The following section is exposed:

	Feet
River terrace deposit and weathered Selma chalk	
Red and gray clay containing a few quartz pebbles.	13
Selma Chalk:	
Thin-bedded gray marl	25
Hard calcareous sandstone containing phosphatic molds and a few quartz pebbles; highly irregular base	4.5
Unconformity	
Eutaw formation (Tombigbee sand member):	
Fine grained sparingly glauconitic sand; *Gryphaea wratheri* Stephenson and *Exogyra ponderosa* Roemer.	11
	53.5

Correlation: Texas- Austin chalk above middle and Bonham marl.

Arkansas- Tokio formation

Return by same route to highway.

61.7 Gravel road.

64.9 Hwy. #43 - turn sharply to left. Route from this point to Forkland crosses "Black Belt" soil derived from Selma Chalk.

73.9 Ascend Arcola limestone cuesta.

77.3 Forkland P. O. Forkland to Demopolis over terrace and flood-plain material of Black Warrior and Tombigbee rivers. (Black Warrior to east- Tombigbee to west).

86.3 Black Warrior River. Leave Greene Co. - enter Marengo Co.

88.0 Demopolis member of Selma Chalk exposed in road cut along right side of highway.

88.3 Demopolis Square.

88.35 Blvd. stop- turn right.

88.6 STOP - River bank at Webb and Sons warehouse. Type locality of Demopolis member of Selma Chalk- Diploschiza cretacea Return to Demopolis Inn for lunch.

88.8 Demopolis Square.

88.95 Turn right on Hwy. #43.

89.2 Continue straight on dirt road past school.

89.5 Turn left.

89.6 Turn right and into gateway through Gaineswood (built 1832). Historical plantation home. Return by same route to school and turn right in front of school.

89.95 Pavement-US Hwy. #43. Spocari cement plant in distance to left making cement from Selma Chalk.

91.0 Hwy. junction, turn south on #43 (Linden road) Cross Selma Chalk "Black Belt" area.

95.3 STOP - Exogyra cancellata zone

Exogyra cancellata

Anomia tellonoides

Paranomia scabra

Ostrea falcata

96.3 Exogyra cancellata zone. Possibly beginning of Ripley.

97.0 Ripley (?)

97.8 Ripley (?)

104.2 Steel bridge. Ripley (?) cuesta ahead.

104.6 STOP - Ripley locality. Brown sand overlying white sand. Many borings at contact. Lenticular fossiliferous sandy clay at base of brown sand.

Exogyra costata

Sharks tooth

105.9 Linden courthouse. Turn left on Alabama Hwy. #28.

108.25 Possible Midway-Prairie Bluff contact.

111.5 Fossiliferous lower Midway locality. Ostrea pulaskensis very abundant.

111.6 Basal Midway conglomerate on Prairie Bluff.

113.3 Hugo siding.

117.1 Thomaston.

118.2 Midway - Cretaceous contact.

118.4 STOP - Prairie Bluff-Ripley contact in road cut. Ostrea subspatulata abundant in Ripley sand.

120.35 Ripley. Ostrea subspatulata.

123.55 Leave Marengo Co. - enter Wilcox Co.

125.55 Midway-Prairie Bluff contact. Good exposure of pebbly, basal sand of the Midway.

129.0 Junction with Alabama Hwy. #5- continue east.

129.4 Midway exposed in road cut.

132.85 Prairie plantation. Turn left on dirt road.

133.1 Turn left at road fork.

133.55 STOP - Midway - Prairie Bluff contact exposed in bed of Shell Creek. Fossiliferous, very foraminiferal Midway exposed on hill about 400 yards to north.

Return to highway.

134.2 Highway - turn left.

136.1 Road fork at beacon. Continue ahead to Alabama River bridge.

136.7 STOP - Clayton (lower Midway) formation exposed in bluff.
This section described on page 6.
Return to beacon.

137.1 Turn left on Alabama Hwy. #96.

137.9 STOP - Clayton "Nautilus rock". Type locality of Adhaerentia midwayensis Plummer.

138.0 Porters Creek formation (Sucarnoochee).

140.6 STOP - Highly fossiliferous Matthews Landing marl of Naheola formation (upper Midway).

141.7 Naheola sands and sandy clays.

150.75 Kimbrough.

150.8 Road intersection, turn sharply to left and cross railroad.

151.7 Turkey Creek.

151.9 STOP - Ostrea thirsae beds of Nanafailia formation.

152.6 Pavement. State Highway #5. Turn right and return to Demopolis for night. Dinner at Demopolis Inn.

Second Day

Breakfast at 6:30 at Demopolis Inn. Lunches for today will be obtained at breakfast time.

0 Demopolis Square. Proceed to Linden via Hwy. #43.

16.5 Linden Court House. Continue straight ahead on Hwy. #43.

18.2 Porters Creek (Sucarnoochee) clay in ditch on left.

18.5 Porters Creek clay.

19.1 Porters Creek clay.

20.4 Porters Creek clay.

21.7 STOP? Porters Creek clay.

23.8 Beginning of Naheola formation. Matthews Landing marl. Hard greensand bed lying on Porters Creek clay.

24.8 Naheola formation. Middle (Oak Hill)member.

25.0 Naheola formation. Middle (Oak Hill) member.

25.8 Naheola formation. Middle (Oak Hill) member.

26.4 Six-inch lignite bed on left in Oak Hill member of Naheola formation.

26.6 Weathered glauconitic sand of upper Naheola (Coal Bluff) member, 20-25 feet above lignite.

27.8 Naheola formation. Upper (Coal Bluff) member.

28.4 Approximate position of Midway-Wilcox contact.

29.1 Nanafalia formation.

29.3 Nanafalia formation. Ostrea thirsae bed on right.

34.6 End of pavement at Dixons Mill. Continue straight ahead on Hwy. #43.

37.4 Tuscahoma formation. Cross-bedded sand.

37.7 Tuscahoma formation. Laminated sandy clay.

38.1 Tuscahoma formation. Laminated sandy clay.

39.4 Tuscahoma formation. Clay-boulder conglomerate.

39.7 Tuscahoma formation.

40.2 Leave Marengo - enter Clarke County.

40.6 Tuscahoma beds with steep south dip on right.

41.5 Lignite bed about 3 feet thick in upper part of Tuscahoma. Formerly marked base of Bashi formation.

42.4 Weathered Bashi marl on left, about 60 feet above lignite.

42.8 Bashi marl boulders.

43.0 Hatchetigbee formation begins.

45.6 Highway intersection, Thomasville. Turn right on pavement to Grove Hill and Jackson.

51.3 Tallahatta escarpment ahead.

51.9 Hatchetigbee exposure. Tallahatta in hill on right.

52.0 Approximate location of Hatchetigbee-Tallahatta contact.

52.1 STOP. Tallahatta exposure.

53.0 Lisbon formation overlying Tallahatta.

55.3 Exposure of Gosport (Periarchus bed) overlain by Jackson clay.

57.5 Jackson clay on left.

61.1 Grove Hill. Continue ahead. Route from here to Jackson is over surficial sand deposits.

73.8 Road to Little Stave Creek.

74.0 STOP. Little Stave Creek.

Note: If time permits, an optional stop is planned at Salt Mountain. In this case continue ahead from this reading to Jackson.

76.2 Ocher pit on left.

77.8 Jackson Post Office.

78.1 Turn left on gravel road at Sinclair Station

78.2 Terrace gravels in deep gulley on right.

78.6 Railroad crossing

79.3 Bassett Creek.

80.0 Turn right.

83.5 Oligocene limestone on left - Marianna, Glendon, Chickasawhay.

83.7 Salt Creek.

83.8 STOP. Oligocene limestone bluff on right, concealed by trees. Jackson fault between here and Salt Mountain. Throw of fault approximately 1300 feet.

84.0 Salt Mountain.

84.2 Turn around and return to Jackson and proceed to Little Stave Creek.

90.6 Jackson Post Office.

94.4 STOP. Little Stave Creek.

COLUMNAR SECTION
SOUTHWEST ALABAMA

SCALE-FEET

SOUTHEASTERN GEOLOGICAL SOCIETY
FIELD TRIP JUNE 21-23, '44

AGE	GROUP	FORMATION AND MEMBER	THICKNESS IN WELLS	WELL DEPTH	SAMPLE DESCRIPTION
OLIGO-MIOCENE					
		CHICKASAWHAY		530	Fine-grained sand with traces of white fossiliferous marl
		VICKSBURG 173+ Red Bluff clay at base.	173+	573	Very fossiliferous white marl
EOCENE		JACKSON 162+ MOODYS BRANCH MEMBER AT BASE	102 60	648	Fossiliferous white marl.
	CLAIBORNE	GOSPORT	30	710	Glauconitic sandy marl and marly sand
		UP. LISBON	95	805	Sandy glauconitic marl.
		LOW. LISBON			Glauconitic clay and sand. Some question as to correct labelling of samples through part of this interval. Somewhat more sandy and glauconitic in lower part.
		TALLAHATTA Lithologically similar to outcrop.	N.S.	1165 1294	Pale-greenish, indurated, siliceous, slightly calcareous claystone.
	WILCOX	UPPER WILCOX — HATCHETIGBEE Upper contact may be as much as 100 to 130 feet higher.	310	1475	Greenish brown, silty shale, lignite and fine grained sand. Very rare micro-fossils.
		UPPER WILCOX — BASHI	140	1760	Glauconitic fossiliferous sandstone and gray silty clay. Lignite at base.
		UPPER WILCOX — TUSCAHOMA (HOLLY SPRINGS FORMATION OF MISSISSIPPI) Shell beds are present near the middle of this formation at the outcrop.	620	1900	Gray, silty, shaly clay and fine grained sand.
		LOWER WILCOX — NANAFALIA — UPPER NANAFALIA	540	2440	Gray, silty, shaly clay and fine grained sand.
		LOWER WILCOX — NANAFALIA — SALT MOUNTAIN MEMBER	200	2640	White chalky limestone and glauconitic marl.
		LOWER WILCOX — ACKERMAN (As restricted by Cooke and Toulmin)	150	2989	Oyster-bearing, glauconitic sand and silty shale. Gray silty shale.
		? ?	?	3269 3280	? ? ? ?
	MIDWAY	"NAHEOLA"			Greenish-gray silty shale, darker than above, with fossiliferous sand at the top. Dark sandy limestone.
		SUCARNOOCHEE (PORTER'S CREEK)	980	4260	Silty limestone. Sideritic limestone.
		"CALCAREOUS MIDWAY" (CLAYTON of Miss. Geol. Soc.)	170	4430 4540	Dense, greenish-gray shale. Fossiliferous marl.
UPPER CRETACEOUS	SELMA		1078		Very fossiliferous, white marly chalk. More marly in lower part.
	EUTAW			5576	Slightly calcareous and glauconitic, fine grained sand.
		TOMBIGBEE SAND MEMBER	344 300	5920	Greenish-gray shaly clay and sand.
	TUSCALOOSA	"UPPER TUSCALOOSA" This unit is assigned to the Tuscaloosa by the Mississippi Geol. Soc.	630	6550	Red, green, and tan varicolored clays and fine grained sands. Abundant fine sideritic spherules in lower part.
		"MARINE TUSCALOOSA"	540	7090	Green, silty, and carbonaceous shale.
		"LOWER TUSCALOOSA"	540	7630	Predominantly fine sand, slightly calcareous. Lignite Loose to calcareous coarse sand. Pale red to orange clays. Coarse to fine loose sands.
LOWER CRETACEOUS	"TRINITY" (UNDIFFERENTIATED)	The Miss. Geol. Soc. suggested the presence of Glen Rose in this area.			Dark-red and tan silty clays. Dark-red, mottled with tannish-green silty to sandy micaceous clay, fine to coarse sands calcareous in part. Red and reddish-brown, dense, thin bedded, silty, shaly clays and fine sands. Light red silty clays and fine sands. Bright red, silty to sandy clays and fine sands. Red silty to sandy clays with streaks of greenish-gray micaceous shale and fine sands. Red, greenish and orange silty clays with coarse sands. Red and green, silty sandy clays, coarse sands, calcareous in part.
UPPER JURASSIC - LOWER CRETACEOUS	"COTTON VALLEY (RED BED FACIES)"			8560 9440 9900 10,800 11,160	Red, silty clays, with green, fine to coarse sands. Bright red silty clay with purplish, green and tan clay. Numerous beds of coarse sand with some pebble gravel. Light colored clay, coarse sands with some pebble gravel. Dominantly coarse sands and pebble gravel. Coarse, loose sand to hard limy sandstone.
		POSS. EQUIV. OF LOWER PART OF COTTON VALLEY OR UPPER PART OF BUCKNER FORMATION.	504	11,664	Red and green clay, and red fine-grained sandstone.
		"BUCKNER"	116	11,780	Like above with thin beds of anhydrite and limestone.
		"SMACKOVER LIME"	460	12,240	Fossiliferous gray limestone interbedded with anhydrite.
		"EAGLE MILLS"	159	12,399	Fine-grained sandstone, dense limestone, anhydrite. Rock salt.

12,399' Total depth.

SCHLUMBERGER LOG, DEPTHS AND THICKNESSES FROM ERION PRODUCING CO. - WAITE NO. 1

DEPTHS AND THICKNESSES FROM ARKANSAS FUEL OIL CO. - McCLURE PINE NO. 1

Base Exposed Section El. 224.5

Discocyclina advena

Lucina Clays

Falls El. 244.3

O. johnsoni El. 225.3

Falls El. 251

Green Sand

Top of Buhrstone El. 251.8

Corals Abundant

Chickasawhay Bluff El. 216.9 at base

Approximate Position Jackson Fault

Little Stave Creek

Base of Gosport El. 323.2

Falls above 3rd O. sellaeformis El. 303.7

6th O. sellaeformis El. 270.3

El. 275.9

Falls above 3rd O. sellaeformis El. 309.0

1st O. sellaeformis

Falls above 3rd O. sellaeformis El. 298.9

Base of Gosport El. 318.1

Top of "Scutella" bed

Base of Gosport El. 308.8

"Scutella" bed El. 328.2

Creek El. 318.3

Top of Falls El. 331.4

Path from cars

High Bluff in Yazoo Clays

Periarchus pileus-sinensis

Echinoids El. 358.9

Base Oligocene El. 363.8

Top of Falls El. 366.8

Top Glauconitic "Mint Spring Equivalent" El. 384.6

Top exposed section Marianna. El. 400

Top of Bluff El. 441.3

B

A

Indicates direction of dip

N

MISSISSIPPI

CLARKE

Area

JACKSON

MOBILE

FLA

GULF OF MEXICO

LOCALITY MAP

PLAN

SCALE

0 100 500 1000 FT.

1

OLIGOCENE	EOCENE				OLIGOCENE	
CHICKASAWHAY	TALAHATTA	LISBON	GOSPORT	JACKSON		VICKSBURG
				MOODY'S BRANCH EQUIVALENT / YAZOO / PECTEN-BRYOZOA BED / SHUBUTA CLAY	RED BLUFF	MINT SPRING / MARIANNA

ELEVATION IN FEET

400 375 350 325 300 275 250 225 200 175

B

Approximate Position Jackson Fault

Base Exposed Section

Chickasawhay Outcrop

O. johnsoni

6th O. sellaeformis

5th O. sellaeformis

4th O. sellaeformis

3rd O. sellaeformis

2nd O. sellaeformis

1st O. sellaeformis

"Scutella" Bed

Hard Ledge

Diastem

A

7000 6500 6000 5500 5000 4500 4000 3500 3000 2500 2000 1500 1000 500 0

DISTANCE IN FEET

Note: Dips calculated where shown as solid line; assumed where shown as broken line.

SECTION A-B

LITTLE STAVE CREEK
CLARKE COUNTY, ALA.

PLAN AND GEOLOGICAL CROSS SECTION

FROM PLANE TABLE SURVEY BY R. H. SMITH, W. J. HENDY, ALEC OSANIK, LOUIS WILBERT, AND RICHARD WASEM. GEOLOGY BY R. H. SMITH

DATUM ASSUMED

LITTLE STAVE CREEK

CLARKE CO., ALABAMA[10]

GEOLOGY BY R.H. SMITH, ALEC OSANIK, W. HENDY, L. WILBERT, R. WASEM, E. MONSOUR, P. THOMAS, AND G. MURRAY.

400

PLEISTOCENE

VICKSBURG

MARIANNA

SOFT WHITE LIME
"CHIMNEY ROCK" FACIES
ABUNDANT BRYOZOA

CLYPEASTER ROGERSI
LEPIDOCYCLINA MANTELLI
PECTEN POULSONI (SENSU STRICTU)

SLIGHTLY GLAUCONITIC, GRAYISH-WHITE, ARGILLACEOUS LIME (1)

MINT SPRINGS EQUIVALENT

CONCRETIONS
FOSSILIFEROUS ZONE
GREEN-GRAY, GLAUCONITIC MARL

SPONDYLUS DUMOSUS, PECTEN CF. POULSONI,
OSTREA VICKSBURGENSIS

RED BLUFF

CONCRETIONS

HANTKENINA ALABAMAENSIS

AGE?

PLASTIC, BLUE-GRAY CLAY

DISCONFORMITY

PHOSPHATIC NODULES

TOP-CHLAMYS PERPLANUS, PLANULINA COCOAENSIS, MARGINULINA COCOAENSIS, ANOMALINA COCOAENSIS, GLOBOROTALIA COCOAENSIS, VULVULINA ADVENA, GAUDRYINA JACKSONENSIS, SARACENARIA ORNATULA

"SHUBUTA HILL CLAY" (2)

GLAUCONITIC MARL

MACROPNEUSTES MORTONI, SCHIZASTER ARMIGER, ATURIA ALABAMAENSIS, OSTREA SP.

BUFF TO WHITE, INDURATED MARL

AKTINOCYCLINA BAINBRIDGENSIS
LEPIDOCYCLINA OCALANA
PERIARCHUS PILEUS-SINENSIS

PECTEN-BRYOZOA BED

BUFF, LIMY SAND

300

JACKSON (9)

BLOCKY, BLUE-GRAY CLAY

(3)

FOSSILIFEROUS LEDGE

BLOCKY, BLUE-GRAY CLAY

AMMOBACULITES, HAPLOPHRAGMOIDES FAUNA

FOSSILIFEROUS MARL

YAZOO CLAY

BLOCKY CLAYS

WELL INDURATED, LIMY LEDGE
SL. ARGILLACEOUS SILT
BLOCKY, GRAY, SILTY CLAYS

PHOSPHATIC NODULES

TEXTULARIA DIBOLLENSIS VAR. HUMBLEI

BLOCKY, BLUE CLAYS

BLUE, GLAUCONITIC, SILTY, CLAY-MARL

HARD, SANDY LEDGE

BUFF SAND

THIN, FOSSILIFEROUS LEDGE

MOODYS BRANCH EQUIVALENT

FAIRLY HARD, BUFF TO YELLOW SILT AND SAND

LEPIDOCYCLINA SP.
OPERCULINOIDES VAUGHANI, SCHIZASTER SP.
CAMERINA JACKSONENSIS

SOFT MARL

HARD, LIMY SILT

COARSE, GLAUCONITIC SAND, LIME CEMENT

PERIARCHUS LYELLI ("SCUTELLA BED") (4)
NONIONELLA COCKFIELDENSIS

DARK GREEN, GLAUC., MARLY, SHELL CONCENTRATE

GOSPORT

CONCRETIONARY LEDGE

VERY FOSSILIFEROUS, DARK GREEN, GLAUC. SD., MORE FOSS. DOWNWARD

CONCRETIONARY LEDGE

VERY FOSSILIFEROUS, BROWN, FERRUGINOUS SAND

GRAY SAND

VENERICARDIA ALTICOSTATA BED
SHARK TOOTH BED
DISCONFORMITY
TOP CERATOBULIMINA EXEMIA

BLOCKY, GRAY, LIGNITIC, MICACEOUS CLAY

200

CALCAREOUS, GLAUCONITIC, FOSSILIFEROUS, SANDY CLAY

HARD LEDGE

POLYLEPIDINA GARDNERI (5)
OSTREA SELLAEFORMIS BED
CORALS, CHLAMYS

BLUE-GREEN, FOSSILIFEROUS, SANDY MARL

BLUE TO GRAY-GREEN, GLAUCONITIC, FOSSILIFEROUS SDY. MARL

OSTREA SELLAEFORMIS BED

SANDY LIME

OSTREA SELLAEFORMIS BED

GREEN TO GRAY, GLAUCONITIC, SANDY MARL

DIASTEM

LIGHT BROWN, CALCAREOUS SAND

CONCRETIONS

OSTREA SELLAEFORMIS BED

BLUE-GRAY, GLAUCONITIC, FOSSILIFEROUS SAND

LISBON

CLAIBORNE

BLOCKY, BLUE-GRAY, SILTY CLAY

TRANSITIONAL, ARGILLACEOUS SILT AND SAND

CONCRETIONS

OSTREA SELLAEFORMIS BED

GREENISH, GLAUCONITIC SAND WITH IRREGULAR CONCRETIONS

OYSTER REEF

OSTREA SELLAEFORMIS BED

FOSSILIFEROUS ZONE
UNFOSSILIFEROUS, BLUE-GRAY SAND

DISCONFORMITY

100

FOSSILIFEROUS, GRAY, MICACEOUS CLAY
GLAUCONITIC ZONE

GLAUCONITIC, FOSSILIFEROUS, GRAY SILTS

GLAUCONITIC, FOSSILIFEROUS, GRAY SAND

GLAUCONITIC, FOSSILIFEROUS SILTY CLAY

DIASTEM

FOSSILIFEROUS, CALCAREOUS SAND (6)

OSTREA LISBONENSIS
DIASTEM
"FLABELLUM" BED

INDURATED, LIMY SAND

CALCAREOUS GREENSAND (7)

DIASTEM
PROSCUTELLA MISSISSIPPIENSIS

SILICEOUS CLAYSTONE

OSTREA LISBONENSIS
DIASTEM

CHOCOLATE-BROWN CLAYS

INDURATED LEDGES

LUCINA CLAYS

DISCOCYCLINA ADVENA

GLAUCONITIC, GRAY CLAY (8)

OSTREA LISBONENSIS

BLUE-GRAY, SANDY SILT

OSTREA JOHNSONI

TALLAHATTA

GLAUCONITIC, BLUE-GRAY SAND

CALCAREOUS CONCRETIONS
GRAY CLAY

GLAUCONITIC, BLUE-GRAY SAND

GRAY, SILTY CLAY AND SAND WITH CONCRETIONS

HARD, CALCAREOUS LEDGE

BLUE-GRAY CLAY WITH CONCRETIONS

HARD LEDGE

GRAY, SILTY SAND

GRAY CLAYS

HARD LEDGE AND CALC. CONCRETIONS

GRAY, SILTY CLAY

BASE OF EXPOSED SECTION

0

DRAFTED BY GROVER MURRAY, JR.