GEOLOGICAL SURVEY CIRCULAR 267

STRATIGRAPHY AND STRUCTURE OF OUTCROPPING PRE-SELMA COASTAL PLAIN BEDS OF FAYETTE AND LAMAR COUNTIES, ALABAMA

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ABSTRACT

The Coastal Plain sediments of Fayette and Lamar Counties, Ala., are pre-Selma Late Cretaceous in age and are divided into three mappable units, from oldest to youngest: (1) the Coker formation, (2) the Gordo formation, and (3) a unit composed of the McShan and Eutaw formations undifferentiated. The Coker formation as here defined includes the Cottondale, Eoline, and Coker formations of earlier workers; the name Gordo is used as previously defined. The Coker and Gordo formations constitute the Tuscaloosa group. Structure contours on formational contacts locally show marked irregularities that are partly the result of structural disturbances. Some of these disturbances were probably of post-Morreville (post-Austin) age.

INTRODUCTION

This report presents the general stratigraphic and structural relations of the Coastal Plain sediments that crop out in Fayette and Lamar Counties, Ala., and in adjoining small parts of Marion, Pickens, and Tuscaloosa Counties (fig. 1). Coastal Plain units present in the area are the Tuscaloosa group and a unit composed of the undifferentiated McShan and Eutaw formations, all of pre-Selma Late Cretaceous age.

The geology was mapped on airplane photos and data were transferred to U. S. Department of Agriculture soil maps of Tuscaloosa, Lamar, and Fayette Counties. The Lamar County map, 1908, and the Tuscaloosa County map, 1911, were adjusted to the newer Fayette County map, 1917—a process that introduced some minor inaccuracies in location of control points. Reduction of the geologic map (pl. 1) to publication scale necessitated further generalizing the contact lines. As a result of these generalizations the geologic map does not include all the faults and flexures shown on the structure map (pl. 2).

PREVIOUS INVESTIGATIONS

The name Eutaw was first proposed by Hilgard (1860, p. 62-75) for all the Cretaceous sediments between the Carboniferous and his Tombigbee sand group. Smith and Johnson in 1887 (p. 95-116) first described and named the Tuscaloosa formation to include the variegated clay, sand, and gravel between the Paleozoic rocks and their Eutaw formation. Hilgard had included these beds in his Eutaw group. Smith and Johnson, in separating the Tuscaloosa formation from Hilgard's Eutaw group, restricted the name Eutaw to beds of post-Tuscaloosa age. They added Hilgard's overlying Tombigbee group to their redefined Eutaw formation.

Monroe, Conant, and Eargle in 1946 divided the outcropping Tuscaloosa formation of Smith and Johnson of western Alabama into four units of formational rank

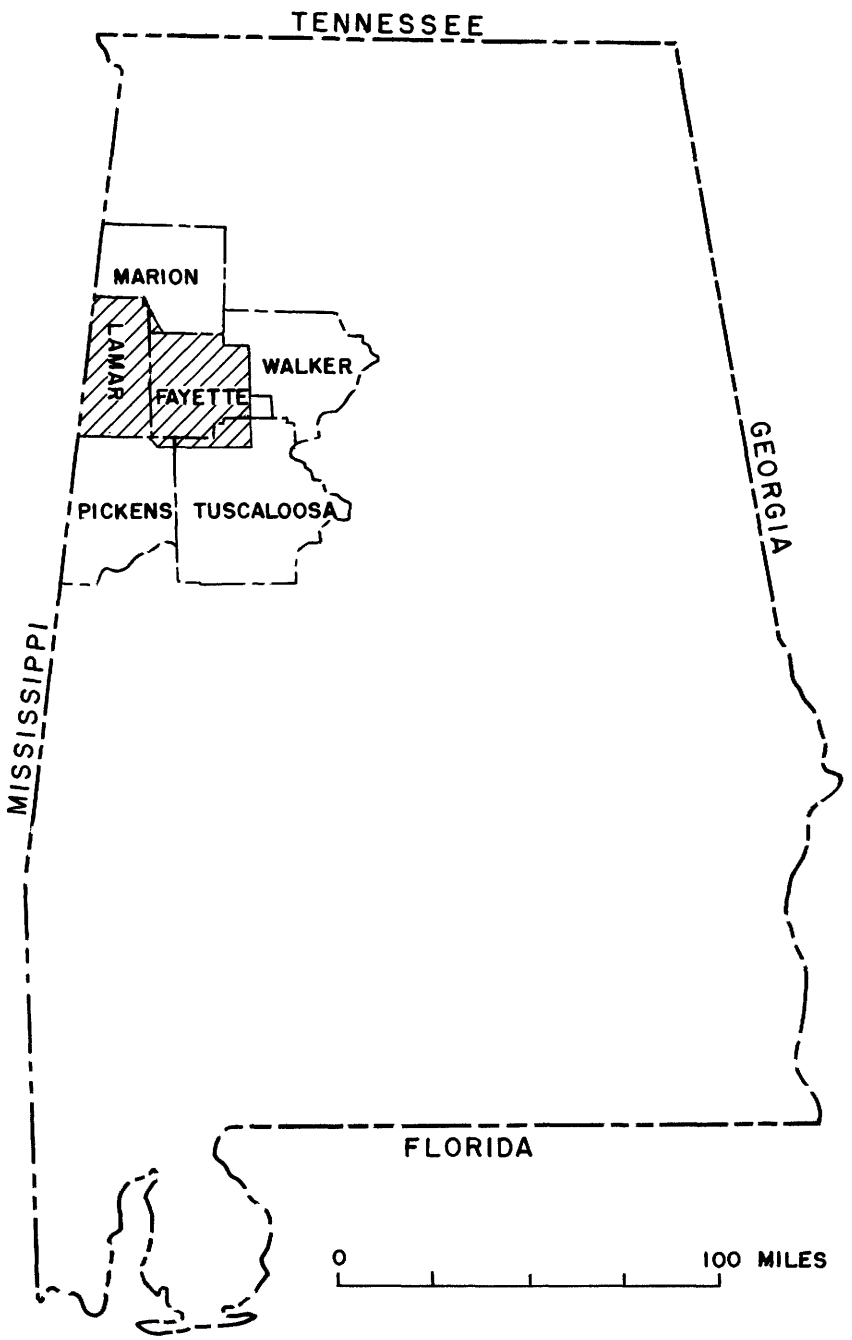

Figure 1. —Index map of Alabama.

and raised the name Tuscaloosa to the rank of group. Their units, from oldest to youngest, are the Cottondale, Eoline, Coker, and Gordo formations. They also divided the Eutaw formation of Smith and Johnson of western Alabama into two units of formational rank, the McShan formation and the Eutaw formation (restricted).

Eargle in 1948 published a preliminary chart that correlated the pre-Selma rocks of Late Cretaceous age in northwestern Alabama with those penetrated by wells in the subsurface of Mississippi and showed a generalized map of the Tuscaloosa group and the undifferentiated McShan and Eutaw formations in parts of northwestern Alabama and northeastern Mississippi.

NOMENCLATURE

Intermittently from 1949 to 1952 the writer made a study of beds of Tuscaloosa age, chiefly in Alabama. The results of the study are summarized in another article (Drennen, 1953). The classification of the Tuscaloosa group used in this report follows the classification proposed in that article and differs from that of Monroe, Conant, and Eargle (1946).

Only two units of formational rank are here recognized within the Tuscaloosa group—lower formation for which the name Coker formation is redefined, and the upper Gordo formation. The Coker formation contains sediments previously called the Cottondale, Eoline, and Coker formations by Monroe, Conant, and Eargle. The Cottondale formation is abandoned, for it cannot be mapped separately from the Eoline and it contains no beds that differentiate it satisfactorily from the latter. Neither are the Eoline and Coker formations of earlier workers recognized to be of formational rank, for in most places they cannot be mapped separately. The Eoline and the Coker formations, as defined by those workers, however, each contains a distinctive clay facies that, where present, serves to distinguish it from the other. The Eoline is considered to be the lower member of the Coker formation and includes beds previously designated Cottondale formation. The Coker formation of Monroe, Conant, and Eargle is considered to be an unnamed upper member of the Coker formation as here defined.

Post-Tuscaloosa sediments are present in the area of this report in the western parts of Lamar and Pickens Counties. Most of these sediments are at the stratigraphic position of the McShan formation, but locally in the extreme western parts are some sediments undoubtedly equivalent to the Eutaw formation as restricted by Monroe, Conant, and Eargle (1946). These sediments are here referred to as the undifferentiated McShan and Eutaw formations.

STRATIGRAPHY

Tuscaloosa group

Coker formation

The Coker formation, the lower unit of the Tuscaloosa group of Late Cretaceous age, is composed of clay, sand, and gravel that rests with great unconformity on sandstone and shale of the Pottsville formation of Pennsylvanian age. The Coker formation consists of two members, a lower Eoline member and an upper unnamed member. The contact between the Coker formation and the underlying Pottsville formation is locally difficult to distinguish with certainty—chiefly because of the intense weathering to which the rocks have been subjected, but also because the predominant rock types of both units are similar. Under conditions of intense weathering, shale and clay of the Pottsville formation resemble clay of the Coker formation, and sandstone of the Pottsville becomes so friable that it resembles sand of the Coker. Conversely, sand of the Coker has locally been sufficiently indurated by weathering to resemble superficially sandstone of the Pottsville. The best means of differentiating highly weathered deposits of Pottsville age from highly weathered deposits of Tuscaloosa age are fossil plant material or gradations from the weathered materials downward into sedimentary rocks that retain primary characteristics.

The two members of the Coker formation are not shown separately on the accompanying geologic map (pl. 1) because at many places it is not possible, on either stratigraphic or lithologic grounds, to ascertain which member is present.

The Eoline member is recognized only by its typical facies which is thinly laminated clay having partings of glauconitic fine sand. All beds of Tuscaloosa age beneath these distinctive but lenticular clay beds are also referred to the Eoline member, which is characterized throughout by great lithologic heterogeneity. At many places, particularly in the most up-dip areas, the basal part of the member is characterized by concentrations of sandy gravel that locally attains a thickness of 30 feet. The basal gravel of the member in northern Tuscaloosa County and the southern two-thirds of Fayette County consists chiefly of quartz pebbles, although minor concentrations of chert are present locally. Northward, in northern Fayette County and southern Marion County, the basal gravel is composed predominantly of pebbles and cobbles of chert. The quartz pebbles, probably derived chiefly from conglomerates of the Pottsville formation, are generally more rounded and of smaller diameter than the pebbles and cobbles of chert, which presumably were derived from limestones of Mississippian age. In some outcrops a few pebbles or cobbles of friable sandstone, undoubtedly derived from the Pottsville formation, are interspersed in the gravel beds of the Coker formation. Most of the sandstone cobbles and some of the quartz pebbles are flattened and resemble beach cobbles, though the flaggy character of many sandstones of the Pottsville may account for the shape of the sandstone cobbles.

Where gravel is absent in the basal part of the Eoline member, the Pottsville formation is generally overlain by massive to crossbedded medium to coarse sand, but at some places beds of laminated fine sand and fissile clay lie only a few feet above the Pottsville formation. In some areas lenticular beds of massive to subfissile gray clay, which is commonly carbonaceous or ferruginous and mottled, form the basal part of the member. Locally, compact laminated clay contains concretions of earthy or massive siderite as much as 1 foot in diameter. The massive clay of the Eoline locally attains a thickness of about 90 feet. Good exposures of such clay are in Fayette County about 4 airline miles east of Fayette along an east-west gravel

road just south of the Southern Railway; also, about 7 airline miles northeast of Fayette and about 2½ miles east of U. S. Highway 43 in cuts of an east-west hard-surfaced farm road that leads east and northeast to New Prospect Church; and immediately east of Glen Allen, near the Marion County line in northern Fayette County, in cuts of the St. Louis-San Francisco Railway (not shown on map).

Most of the Eoline member consists of fine- to medium-grained red to yellow and gray sands that are commonly glauconitic, but at many places these sands are coarse grained and angular; glauconite is by no means present in all parts of the member. The typical lenticular and thinly laminated clays having partings of glauconitic fine sand are chiefly in the middle and upper parts of the member, although their stratigraphic position is variable. Locally they are at least 70 feet thick; in some areas they are absent.

Typical beds of the Eoline member are well exposed just east of Sipsey River in southern Fayette County in cuts of a road that trends southeast from the town of Fayette, and in northwestern Fayette County in cuts of State Route 167 about 2 miles northeast of Bluff.

The unnamed upper member of the Coker formation is recognized by its typical variegated and mottled massive ferruginous clay that locally is sandy and at many places contains spherules of siderite and large concretions of massive to earthy siderite. These beds of massive clay commonly range in thickness from a few feet to 40 feet, but at one place west of Sipsey River, in southern Fayette County, is an 80-foot bed of the typical mottled massive clay—as shown by the following section exposed for half a mile south of Martins Creek along a north-south gravel road that generally parallels and lies just west of the Fayette-Newtonville road, in the SW¼ sec. 25, and the NW¼ sec. 36, T. 16 S., R. 13 W.

Section south of Martins Creek, Fayette County

	Feet (approximately)
Gordo formation:	
Sand, reddish brown, contains much gravel of fine to medium chert pebbles; iron-cemented chert-pebble conglomerate layer 4 to 12 inches thick at base; to top of exposure	6
Coker formation:	
Upper member:	
Clay, greenish-gray; purple- and yellow-mottled, massive; and clayey fine sand having similar colors; irregular ironstone layer at base	18
Sand, yellow to light-gray; locally stained red, brown, or purple; chiefly medium, massively cross-bedded, micaceous; upper 15 feet contains many layers and films of gray clay; ironstone layer at base	65
Coker formation--Continued	
Upper member--Continued	
Clay, greenish-gray; purple- and yellow-mottled; massive; exposed	6
Covered	8
Clay, highly weathered; purple mottled in upper 25 to 30 feet, lower parts are weathered to dark gray-green and purple red, massive; locally contains decomposed concretions of siderite	80
Sand, reddish-brown to yellow, medium, highly crossbedded; contains many films of clay and stringers of gray and yellow clay chips; exposed	2

Some fissile clay is also found in the upper member of the Coker formation. Sand of this member resembles sand of the Eoline member and at some places is sparsely glauconitic. As previously mentioned, massive variegated clay is also present locally in the lower part of the Eoline member, but only those beds stratigraphically higher than the typical laminated clay facies of the Eoline are referred to the upper member of the Coker formation. At most places the uppermost part of the upper member is massive variegated clay, but at some places it is thickly to thinly laminated and crossbedded varicolored clay and sand, and at a few places it is chiefly sand.

Both members of the Coker formation are variably ferruginous and commonly have crusts and layers of limonite or limonite-cemented sand. The Coker formation is overlain unconformably by gravel of the Gordo formation, the upper unit of the Tuscaloosa group.

Other than leaf prints, the only fossils found in the Coker formation are borings of organisms. Some of the borings resemble those of Halymenites major Lesquereux, but many do not have the rugosities that are considered typical of Halymenites. Borings are found chiefly at the stratigraphic position of the Eoline member.

Variations in thickness of the Coker formation as determined by surface and subsurface data are shown in figure 2. On the surface in central Fayette County, about 4¼ miles northeast of the town of Fayette, the Coker formation is about 240 feet thick. It thins northwestward to about 175 feet in the vicinity of the Briggs and Knapp No. 1 Wefel well (NE¼SE¼ sec. 25, T. 12 S., R. 14 W.), northeastern Lamar County, roughly 21 miles northwest of the town of Fayette, Fayette County. About 3 miles northwest of the Wefel well, surface measurements indicate a thickness of about 90 feet for the Coker. In the Stanolind No. 1-A Woods well (NE¼SE¼ sec. 23, T. 14 S., R. 15 W.), Lamar County, about 10 miles northeast of Vernon, the Coker is interpreted to be 295 feet thick and thickens west-southwestward to 335 feet in the Wilmut No. 1 Rye well (NE¼NE¼ sec. 22, T. 15 S., R. 17 W.), Monroe County, Miss., about 3¼ miles west of the Alabama State line. The top of the Pottsville formation in these wells (fig. 2) is shown at the depths determined by Eargle (1948), but the top of the Coker

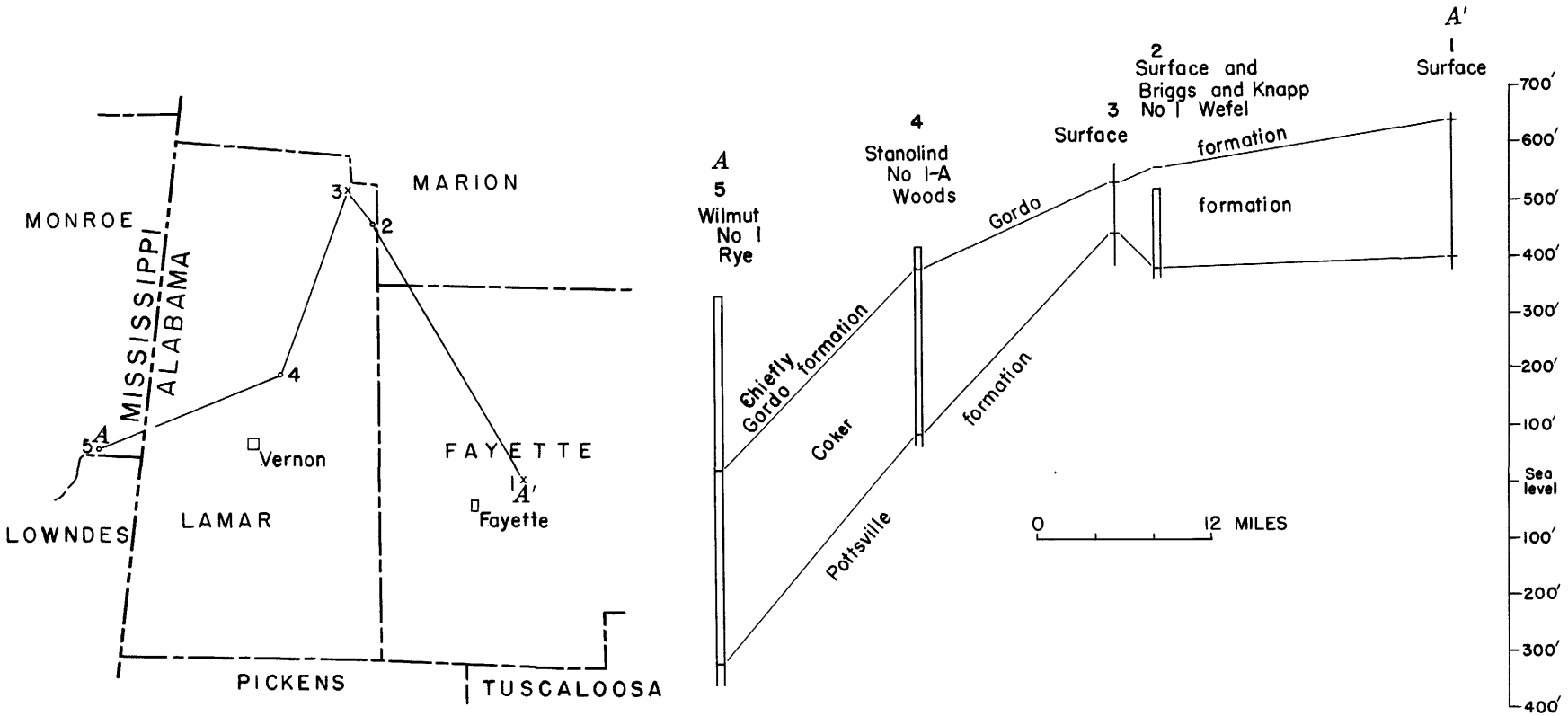

Figure 2. —Map and section showing variations in thickness of Coker formation.

formation as shown in the Stanolind No. 1-A Woods well and the Wilmut No. 1 Rye well is interpreted to be higher than determined by Eargle.

Gordo formation

The Gordo formation, the upper unit of the Tuscaloosa group, is composed of clay, sand, and gravel that rests unconformably on sand and clay of the Coker formation. On the outcrop the Gordo formation is about 200 feet thick. The formation is not divided into members but consists locally of at least three units, each of which is composed of heterogeneously bedded clay, sand, and gravelly sand. Each unit has persistent sandy gravel at the base and persistent clay at the top. These units within the formation are in fact extensive lenses that are traceable with certainty for only a few miles.

In general the Gordo formation in the northern parts of Fayette and Lamar Counties contains more gravel than it does farther south. This gravel is composed of subangular to subrounded pebbles and cobbles of chert. The base of the formation is nearly everywhere marked by an irregular layer of limonite-cemented chert-pebble conglomerate. The basal sandy gravel of the formation, as distinguished from the more common gravelly sand, attains a thickness of 40 feet.

Sands of the Gordo formation are characteristically medium to coarse, angular to subangular, and massively crossbedded, but fine-grained laminated sands are not uncommon. Coloration of the sands ranges from red through brown, yellow, and gray to white.

The clay of the Gordo formation resembles the massive clay typical of the upper member of the Coker formation and is commonly gray, mottled by shades of red, purple, brown, and yellow. This mottling is attributed to the decomposition of contained ferruginous compounds. At many places, clay of the Gordo, like that of the Coker, contains spherules of siderite (commonly weathered to limonite), crusts of limonite, and zones of ocherous silt. These clay beds locally attain a thickness of 50 feet, but where the Gordo has been observed in contact with the undifferentiated McShan and Eutaw formations, the uppermost clay bed of the Gordo formation does not exceed 25 feet in thickness.

The uppermost part of the Gordo formation ranges in composition from variegated and mottled massive gray sandy clay to mottled clayey sand. At a few places the uppermost bed consists of thin-bedded sand and clay. Thin beds of fissile clay are also present locally. In the west-central and northwestern parts of Lamar County the uppermost part of the formation is, in general, composed of massive clay that is gray to black and variably carbonaceous. This black clay of the formation has not been noted south of the latitude of Vernon.

Other than comminuted plant matter, the fossils observed in the Gordo formation are borings that resemble Halymenites and other borings that lack the rugose surfaces considered characteristic of Halymenites.

The farthest up-dip observed exposure of the Gordo formation is in a gravel pit on the top of a high hill about 4¼ airline miles northeast of Fayette, Fayette County. This locality can be reached by a generally north-south gravel road that intersects U. S. Highway 43 at a point about 3-3/4 miles east of Fayette. The following section is exposed in the gravel pit and southward for about 1,000 feet along this road.

Section about 4¼ miles northeast of Fayette

	Feet (approximately)
Gordo formation:	
Gravel; chiefly of chert pebbles, subrounded to subangular, fine to large, some cobbles; in coarse reddish-brown friable sand; iron-sandstone layer at base ..... irregularly overlies	35
Coker formation:	
Upper member:	
Sand, brown, massive, firm silty, micaceous; iron-sandstone layer at base ..... irregularly overlies	5
Silt, gray, finely sandy, micaceous; grades downward into thinly laminated firm yellow sand that grades downward into gray- and yellow-mottled massive to subfissile silty to finely sandy clay; total exposed	10
Covered	8
Clay as above, having streaks of micaceous black sand; exposed...	½
Covered	4
Sand and clay interbedded; mammillary ironstone layer at base; exposed	2
Sand, brown, silty, micaceous, thickly interbedded with silty subfissile gray clay (clay lenses as much as half a foot thick); clay balls in lower part of sand; iron-sandstone layer at base.....	11
Sand, yellow, highly weathered, firm, clayey; exposed	1
Covered	15
Sand, light-brown, massive, firm, micaceous; exposed	3

Undifferentiated McShan and Eutaw formations

In Alabama and Mississippi early workers were not consistent in mapping the base of the old Eutaw formation. In Lamar County, Ala., and in Mississippi, sediments of McShan age were commonly included in the Tuscaloosa formation, but in much of Alabama they

were included in the Eutaw formation. Eargle (1948) was the first to show the true geographic position of the top of the Tuscaloosa group in Lamar County.

The post-Tuscaloosa sediments in the area of this report are chiefly the stratigraphic equivalent of the McShan formation as defined by Monroe, Conant, and Eargle (1946). Locally in the west-central and southwestern parts of Lamar County are some sediments probably equivalent to their restricted Eutaw formation. The writer has not attempted to map them separately, but work to the west and north in Mississippi may show that they can be differentiated.

Although the contact between the Gordo formation and the undifferentiated McShan and Eutaw formations is easily traceable in most areas of the outcrop, the writer has not found it possible in the up-dip areas to separate sediments of the undifferentiated Eutaw and McShan formations from the Gordo formation. All the sediments in those areas are shown as Gordo formation on the geologic map (pl. 1). The areas are (1) west-central and southwestern parts of T. 12 S., R. 15 W., (2) south-central part of T. 15 S., R. 15 W., and (3) north-central and northeastern parts of T. 16 S., R. 15 W.

The undifferentiated McShan and Eutaw formations are composed of clay, sand, and gravelly sand that rest, generally conformably, on sand and clay of the Gordo formation of the Tuscaloosa group. The basal few feet of the McShan and Eutaw formations consists generally of fine to medium, massive to crossbedded, red to brown sand. At some places, however, the basal sand is coarse and contains some fine pebbles of subangular to subrounded chert and rarely a fragment of silicified wood. At many places the basal sand of the unit is laminated, crossbedded, and contains glauconite. Locally the basal beds consist of evenly bedded and thinly interlaminated silt and rippled fine to very fine glauconitic sand.

Clays of the unit are commonly thinly laminated like those typical of the Eolinè member of the Coker formation but are generally more silty. The undifferentiated McShan and Eutaw formations also contain clays that are massive to subfissile, gray to black, and carbonaceous-resembling clays of the upper part of the Gordo formation in the central and northern parts of Lamar County. The unit also contains lenses of massive waxy gray-green clay that may be bentonitic. Massive clay showing the high degree of variegated coloration and mottling typical of clay of the Gordo formation has not been noted at the stratigraphic position of the McShan and Eutaw.

An excellent exposure of the contact between the Gordo formation and the McShan and Eutaw formations is on State Route 19 about 5 miles south of Sulligent, Lamar County.

Section about 5 miles south of Sulligent

	Feet (approximately)
McShan and Eutaw formations undifferentiated:	
Sand, red, fine to medium cross-bedded; contains films, balls, and thin layers of yellow clay, and many irregular layers and tubes of ironstone and iron-sandstone	5
grades downward into	
Sand, red, chiefly fine to medium; has partings and thin layers of purplish clay; at base this sand is coarse grained and contains granules and very fine pebbles of chert	6 to 10
Gordo formation:	
Clay, gray- and yellow-mottled, massive; ferruginous layer locally at base	2 to 3
locally overlies abruptly, but elsewhere grades downward into	
Clay, blue-gray, massive; contains irregular but persistent layer (about 1 foot thick) of black carbonaceous clay	10

At several places in west-central and northwestern Lamar County a possibly persistent bed of massive carbonaceous clay is present about 80 feet above the base of the formation; but, because of the high topographic position, it has not been possible to obtain enough exposures of this clay to determine its continuity. Good exposures, probably of this clay, are in Monroe County, Miss., in cuts of a gravel road that trends south and west from Gattman, Miss.

One of the best observed sections of the undifferentiated McShan and Eutaw formations is in Lamar County in sec. 9, T. 16 S., R. 16 W., between Wilson and Yellow Creeks about 8 airline miles southwest of Vernon along a northwest-facing slope of a gravel road that leads down to the flood plain of Wilson Creek. At this locality about 100 feet of sand, silt, and clay of the undifferentiated McShan and Eutaw formations overlies about 35 feet of clay and sand of the Gordo formation.

Section about 8 miles southwest of Vernon, Lamar County

	Feet (approximately)
McShan and Eutaw formations undifferentiated:	
Sand, dark-gray, fine, massive, carbonaceous; contains much very fine mica; upper 2 feet is fissile; total exposed	4

	Feet (approximately)
McShan and Eutaw formations undifferentiated--Continued	
Silt, gray to yellowish-brown, ocherous; interlaminated with very fine ferruginous sand	2
Sand, gray, very fine, massive, lenticular; contains pale glauconite and much very fine mica; locally contains weathered iron-sulphide concretions	1 to 4
Clay, gray, laminated; having partings of fine-grained glauconitic white sand	2
grades downward into	
Sand, red to yellow and white, medium, crossbedded, loose; contains many lenses (as much as 1 foot thick) and films of gray clay; ferruginous layer marks sharp base	15
Sand, light-brown, very fine, micaceous, thickly to thinly interlaminated with gray clay; highly crossbedded; upper part is chiefly clay; exposed	10
Covered	2
Clay, dark-gray, slightly red-stained, massive, exposed	2
grades downward into	
Sand, light-red, fine, indurated	½ to 1
grades downward into	
Sand, gray, very fine, laminated, silty, highly and very finely micaceous; contains thin layers of ferruginous sand; upper part is weathered and sublaminated to massive	9
Sand, brownish-red to light-brown, fine to medium, finely crossbedded; contains many films of gray clay; sharp base	6
Gordo formation:	
Clay, greenish-gray, yellow-mottled, massive, waxy; lower 15 to 20 feet is chiefly fine to very fine, light-red to gray and yellow clayey sand; irregular ferruginous layer at base	25
Sand, gray, very fine, massive, silty and clayey, very firm; contains much very fine mica; upper foot is clayey; irregular ferruginous layer at base	5
Sand, gray and light-brown, fine to very fine, crossbedded; much very fine mica; contains irregular thin lenses of finely sandy gray clay; to base of exposure	3

STRUCTURE

Rocks of the Pottsville formation of Pennsylvanian age, which underlie the Tuscaloosa group, were extensively folded and faulted, chiefly by disturbances before deposition of the Tuscaloosa. Recent work shows, however, that the Coastal Plain beds in the area of this report are also flexed and faulted. Small high-angle faults involving these beds are present on the outcrop, and structure contours drawn on formation contacts locally show sharp displacements that are likely a result of faulting or close folding. Both normal and reverse faults have been observed. The maximum measured throw on faults involving pre-Selma Coastal Plain beds in western Alabama is 35 feet.

The character of the faults in the pre-Selma sediments of Cretaceous age suggests that they are tensional and compressional breaks of slight extent that resulted from adjustment of the blanket of Coastal Plain strata to minor disturbance at depth. Such faults, although more numerous than heretofore recognized, do not seem to be persistent either along their strike or in depth.

Monroe (1938; Stephenson and Monroe, 1940, p. 34) called attention to secondary structure involving the Eutaw formation and the Selma chalk (now the Mooreville chalk of the Selma group) in east-central Lowndes County, Miss.—just west of the areas in Alabama known to be structurally disturbed. It seems probable, therefore, that at least some structural irregularities in the pre-Selma sediments of western Alabama are post-Mooreville (post-Austin) in age. This relatively late disturbance may have affected possible oil and gas reservoirs in the Paleozoic rocks.

On the outcrop in the area three contacts are persistent enough to serve as horizons for structural mapping: (1) the contact at the base of the Tuscaloosa group, (2) the contact between the Coker and Gordo formations, and (3) the contact at the top of the Tuscaloosa group (pl. 2).

The formations strike generally northward and dip toward the west. The amount of dip of traceable contacts are as follows: Contact between the Pottsville and Coker formations, 5 to 75 feet per mile; contact between the Coker and Gordo formations, 10 to 100 feet per mile; contact at the top of the Tuscaloosa group, 5 to 45 feet per mile. A few reverse dips and many irregular dips have been noted.

Because the Pottsville and Tuscaloosa contact is characterized at least locally by notable pre-Tuscaloosa topographic relief, contours drawn on that contact are probably not indicative of structure at depth. The contact between the Coker and Gordo formations shows marked irregularities that are partly the expressions of structural disturbance. Most irregularities of the contact at the top of the Tuscaloosa are attributed to structural disturbance although some undoubtedly are a result of differential compaction. At many places it is not known to what extent the irregularities of the contacts result from structural disturbances and to what extent from depositional and compactional phenomena.

Faulting in beds of the Coker formation can be seen about half a mile south of Sipsey, Fayette County, in cuts of a northwest-facing slope of a northwest-southeast gravel road. At least two faults are present, and all beds involved probably belong to the Eoline member. The amount of displacement is unknown.

In Lamar County, Ala., about 3 airline miles south-southeast of Gattman, Miss., faults displacing the contact

between the Gordo formation and the undifferentiated McShan and Eutaw formations can be observed in cuts of the gravel road that leads southward from Gattman. Much of this road generally parallels and lies just east of Cut Bank Creek.

Faulted beds of the McShan and Eutaw formations are exposed on State Route 18 about half a mile east of Cut Bank Creek, Lamar County, where the highway cut shows two high-angle normal faults, having throws of about 15 and 20 feet.

Southwest of Fayette, in the southern part of T. 16 S., R. 13 W., Fayette County, structure contours on the contact between the Coker and Gordo formations suggest a west-trending zone of faulting. No definite faults have been observed in that area, but stratal irregularities attributed to structural disturbance and possible faults have been noted.

HISTORICAL SUMMARY

The deposits of the Coker formation represent essentially continuous deposition in a shallow expanding sea. During early Coker time the most northeastern part of Lamar County and parts of south-central Marion County apparently were not submerged. In those areas, only a thin section of the Coker formation, chiefly equivalent to the upper member, is present between the Pottsville and Gordo formations.

The contact between the Coker and Gordo formations represents an unconformity. The Gordo overlaps the Coker regionally, and the basal beds of the Gordo mark the first appearance of abundant and persistent chert gravel above the basal gravel of the Coker—which probably indicates an uplift in the source areas (Mississippian outcrop) to the north, possibly in Tennessee. It is likely that most of the gravel was derived from rocks of Mississippian age on the southern flank of the uplift in Alabama, but the major disturbance probably occurred farther north. The Gordo formation consists locally of at least three units composed of basal beds of chert gravel overlain by sand and clay, which indicates possibly that pulsating uplifts in the source areas occurred throughout Gordo time.

Although locally in some surface areas the contact between the Gordo and McShan formations may represent an unconformity, for the greater part of its extent in Lamar County, as in other parts of western Alabama, it seems to be conformable. Apparently no widespread withdrawal of the sea occurred at or near the end of Gordo time, and no incontrovertible evidence for an unconformity has been seen at this horizon by the present writer. The undifferentiated McShan and Eutaw formations in general seem to be a product of a deeper water environment than the Gordo formation.

CONCLUSION

The stratigraphy of the pre-Selma Coastal Plain units in the area of this report, particularly in Lamar County, will not be fully understood until several wells are drilled to determine the subsurface position of horizons of stratigraphic reference. It is not now known what ratio structural disturbance bears to depositional factors as a cause of stratigraphic anomalies.

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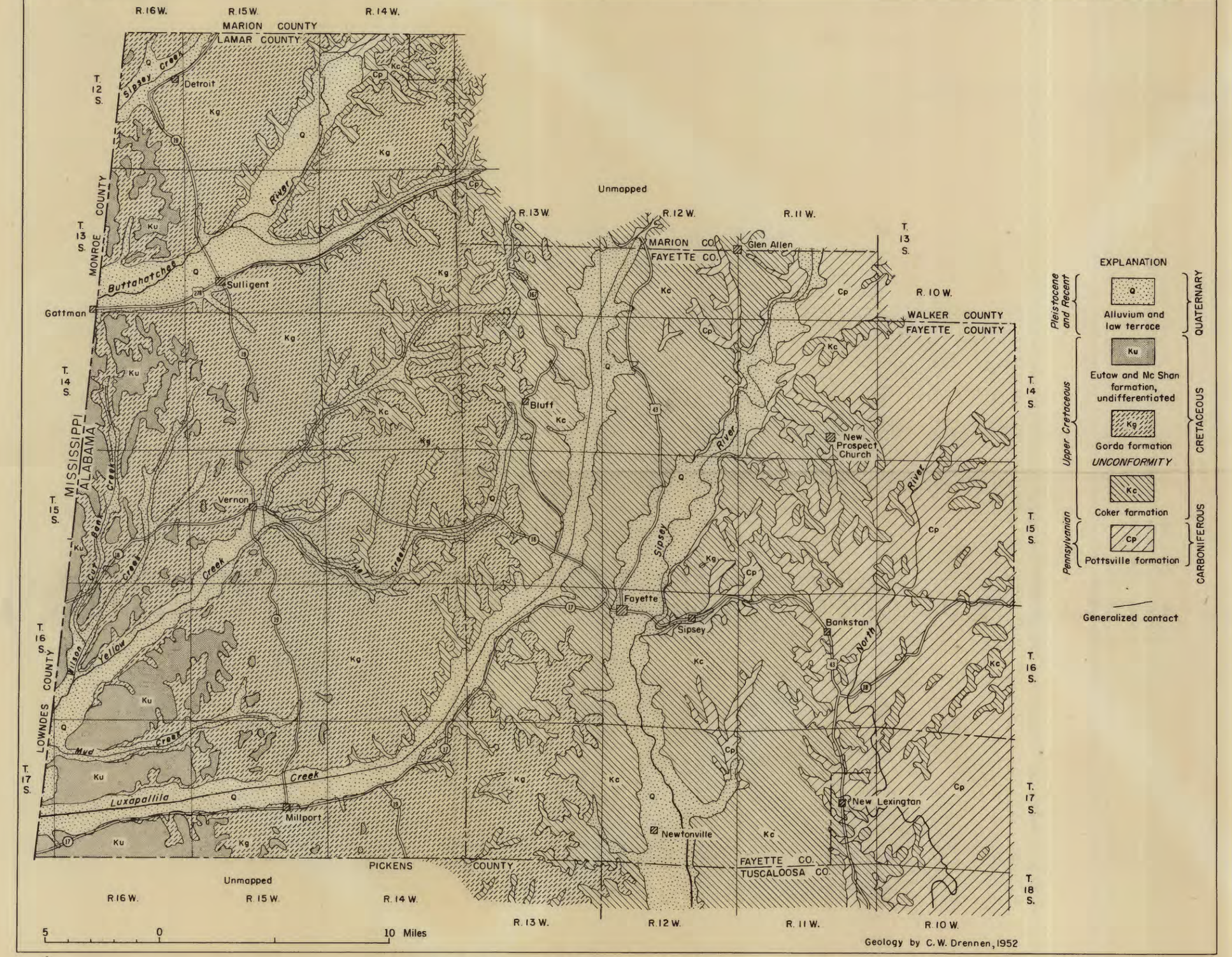
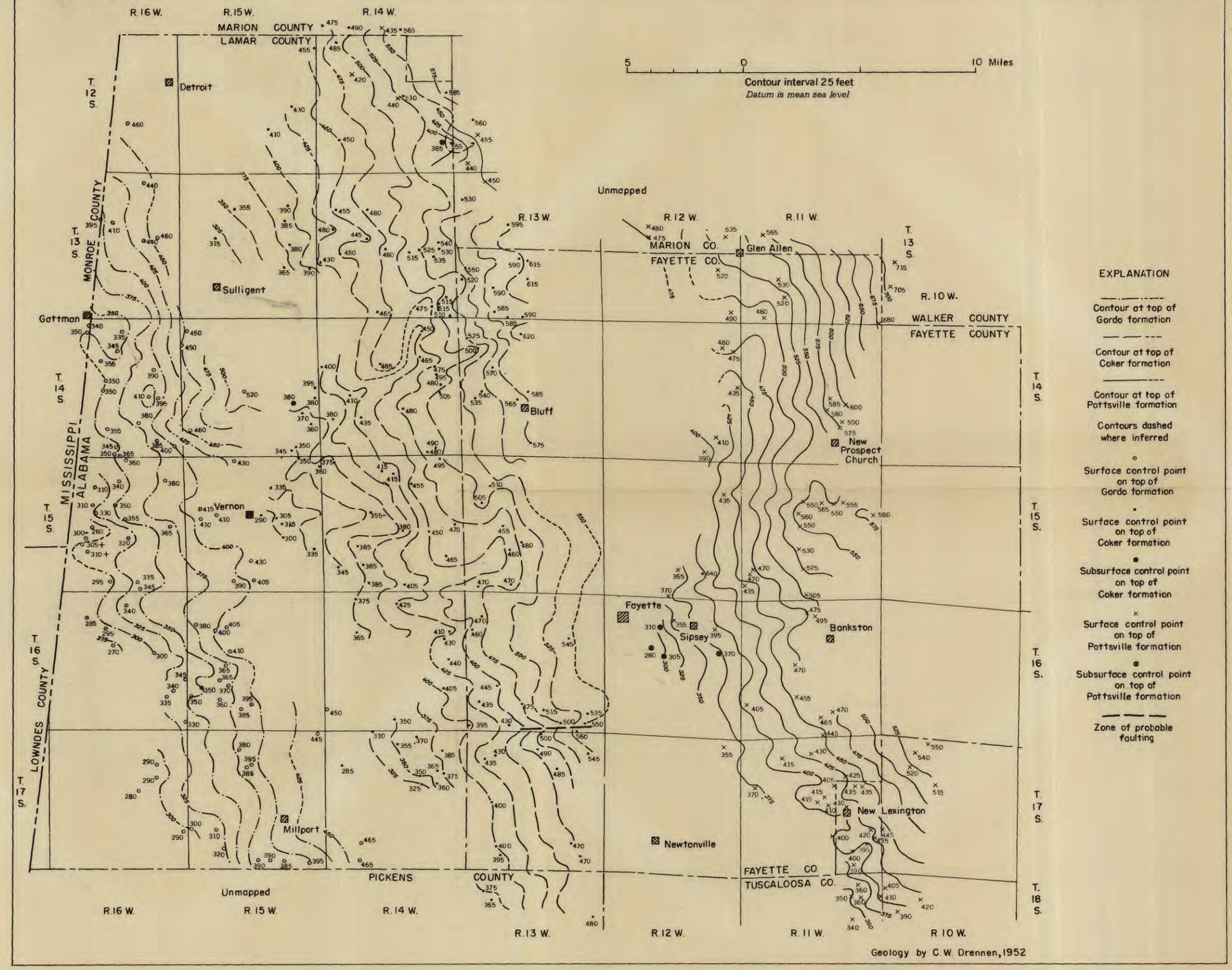


GEOLOGIC MAP OF FAYETTE AND LAMAR COUNTIES, ALABAMA



STRUCTURE CONTOUR MAP OF PARTS OF FAYETTE AND LAMAR COUNTIES, ALABAMA