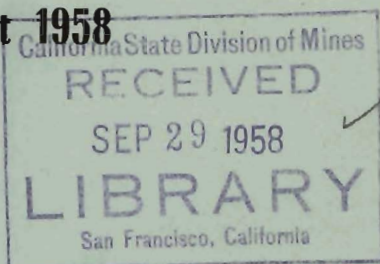


MONTHLY BULLETIN

August 1958



*Mineral
Industries Laboratory*

**1430 Devine Street
Columbia, South Carolina**

**DIVISION OF GEOLOGY
State Development Board**

**DEPARTMENT OF GEOLOGY
University of South Carolina**

THE EOCENE CONGAREE FORMATION

By

Le Brun N. Smith

South Carolina Division of Geology

The area described in this paper is located on the interior edge of the Atlantic Coastal Plain southeast of Columbia, South Carolina. See Fig. 1.

Drainage and Outcrops

The Congaree, Wateree, and Santee Rivers, and smaller streams, drain the area. The bluffs along these rivers and the beds of the smaller streams furnish the only natural outcrops; these are few in number and generally small. The best exposures are the road cuts and borrow pits.

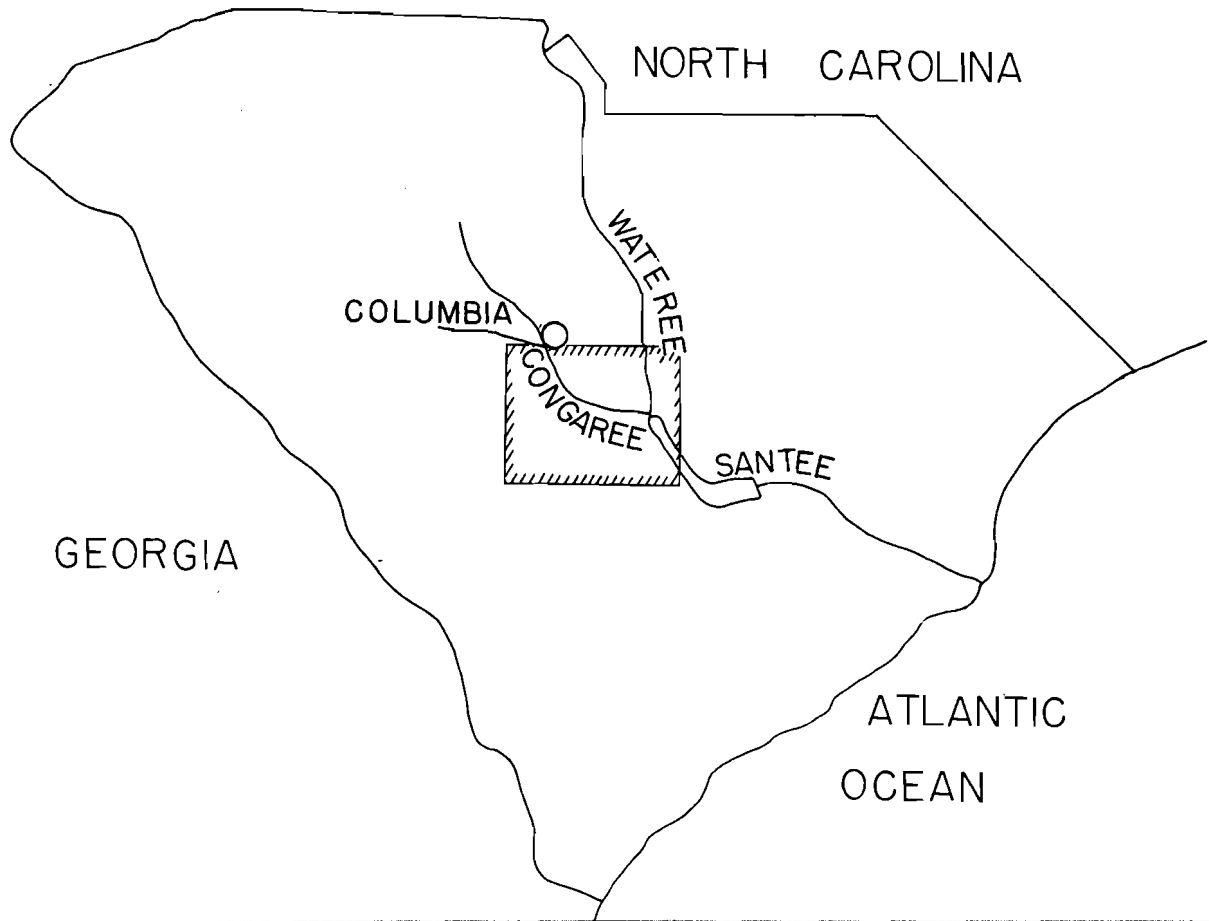
General Stratigraphy

UPPER CRETACEOUS. The two Upper Cretaceous formations present are the Tuscaloosa formation and the Black Creek formation.

Tuscaloosa formation. The Tuscaloosa formation is the oldest and rests on the basement complex along the Fall zone. It consists of lenticular, poorly indurated, interbedded sands and clays. The Tuscaloosa is about 250 feet thick in the central South Carolina area.

Black Creek formation. The Black Creek formation rests on the Tuscaloosa and is present only in the eastern and central part of the area studied. Here it is only a few feet thick and is present as an erosional feather-edge that is overlapped by the Tertiary beds. The Black Creek is thicker to the east and is best exposed in the eastern part of the state. Lithologically the Black Creek is a massive to thin-bedded black shale that has fine sandy partings on the bedding

53



GEORGIA

NORTH CAROLINA

COLUMBIA

WATER REE

CONGAREE

SANTEE

ATLANTIC
OCEAN

planes.

EOCENE

Wilcox group

Black Mingo formation. The Black Mingo sands and shales, the basal unit of the Eocene, rest on the Cretaceous in the eastern part of South Carolina. It is tentatively correlated with the Nanafalia of Alabama. The limits of this formation have not been clearly established, and it may be partly Paleocene. No Black Mingo was found in the area studied by the writer, although in the past, some Wilcox fossils have been reported from this area.

Claiborne group

Congaree formation. The basal Claiborne formation exposed in central South Carolina is the Congaree formation. It consists of light gray to green shale alternating with indurated, thin-bedded, fine-grained sandstone and silicified sandy siltstone. The Congaree formation is correlated with the Tallahatta formation of Alabama.

McBean formation. The up-dip Middle Claiborne is represented by the McBean formation. Lithologically it consists of light colored to rusty unconsolidated and partly indurated sand, clays, and silicified coquina or buhrstone. White blocky fullers earth type clay is a conspicuous feature in this formation. The McBean is correlated with the Lisbon formation of Alabama.

Santee limestone. The Santee is the down-dip equivalent of the upper part of the McBean formation. It is a white to buff, mealy, sparsely phosphatic, fossiliferous limestone. The upper part of the Santee is correlated with the Ostrea sellaeformis zone of the Lisbon in Alabama. The relation of the lower part of the Santee and the McBean is not understood.

Castle Hayne limestone. While not

recognized in the area studied, the Castle Hayne is present southeast of the area. Lithologically it is similar to the Santee; it differs only in fossil content. The Castle Hayne is correlated with the Gosport sand of Alabama.

Jackson group

Barnwell formation. The Barnwell is the residuum of a pre-existing limestone of Jackson age. It is a massive, rusty, sandy clay that exhibits only rudimentary bedding. It overlaps the McBean in the south central part of the state. The Barnwell is correlated with the entire Jackson group of Alabama.

Cooper marl. The Cooper marl was not found in the area studied; it is present, however, to the southeast of the area. This material is a soft, highly fossiliferous, green, phosphatic marl. It is tentatively correlated with the Ocala limestone of southern Alabama. Some workers have evidence that the Cooper marl is Oligocene.

DESCRIPTION OF THE CONGAREE FORMATION

Distribution. The Congaree formation crops out along the bluffs of the small tributary streams south of the Congaree River from a point near Creston, S.C. to St. Matthews, S.C., a distance of 15 miles. At St. Matthews, it is overlapped and thereby obscured by the McBean formation and, with the exception of a possible outlier in Lexington County, no exposures are seen west of this point. Data is lacking in the eastern part of the state, and the subsurface extent of the Congaree is not known. Tallahatta age equivalent beds, however, have been found in a well near Savannah, Georgia, just across the S.C. line.

Lithology. In the limited outcrop area the lithology of the Congaree is uniform. It is a series of thin beds of gray to green, sandy, silicified siltstone and sandstone, alternating with light greenish gray shale. The siltstone

		ALABAMA		SOUTH CAROLINA	
E O C E N E	JACKSON	YAZOO CLAY		BARNWELL	COOPER
		MOODYS BRANCH FORMATION		FORMATION	MARL
	UPPER	GOSPORT SAND		CASTLE HAYNE LS.	
	CLAIBORNE MIDDLE	LISBON FORMATION	O. SELLAIFORMIS ZONE	PTEROPSIS LAPIDOSA ZONE	SANTEE LIMESTONE
			MIDDLE LISBON	MC BEAN FORMATION	?
			LOWER LISBON		?
	LOWER	TALLAHATTA FORMATION		CONGAREE FORMATION	
	WILCOX	HATCHETIGBEE FM.		?	
		BASHI MARL			
		TUSCAHOMA SAND		?	
NANAFALIA FM.		BLACK MINGO FM.			

CORRELATION OF THE EOCENE FORMATIONS OF SOUTH CAROLINA AND ALABAMA.

when dry has a low specific gravity and breaks with a conchoidal fracture. The Congaree is from 17 to 22 feet thick in the outcrop area.

Paleontology. The Congaree has one distinctive fossil; the pelecypod, Anadontia augustana Gardner. This fossil is described by Gardener (1951, p. 9) as a dependable guide fossil to the Tallahatta formation of the Middle Eocene. It has been reported from 17 separate localities; 3 in South Carolina, in the Congaree, and 14 in Alabama, in the Tallahatta. It has not, to the writer's knowledge, been reported from Mississippi to Georgia.

Previous use of the name. Sloan (1907, p. 455) first used the name Congaree for his "Phase" of the Eocene that included the sand, clay, and buhrstone in the general region from the Wateree River, South Carolina to McBean Creek near Augusta, Georgia. Sloan considered the Congaree to be in part Lower Eocene and in part Middle Eocene.

Veatch and Stephenson (1911, 'p.268) used the term "Congaree Clay member of the McBean formation" for the fullers' earth type clay at the base of the McBean formation at McBean Creek, Georgia. They regarded it to be equivalent to Sloan's "Congaree Phase" of South Carolina. They extended the use of the name on the basis of lithologic similarity to include the fullers earth in Twiggs County, Georgia.

Shearer (1917, p. 12) stated that the Claiborne was of much smaller areal extent than mapped by Veatch and Stephenson in Georgia, and that the "Congaree clay member of the McBean formation" should be referred to the Jackson. He therefore assigned the bed mapped as Congaree by Veatch and Stephenson to the Jackson and used the name "Twiggs clay member of the Barnwell formation" for the fullers earth in Twiggs Country, Georgia.

Cooke (1936, p. 41), in his study of the Coastal Plain of South Carolina, reduced Sloan's "Congaree Phase" from formational rank and mapped it as an undifferentiated part of the McBean or Middle Claiborne.

Finally, Cooke and McNeil (1952, p. 22) in an effort to resolve some of the confusion that existed, revised the Tertiary stratigraphy of South Carolina. They raised the Congaree to formational rank, redefined its limits and correlated it with the Tallahatta of Alabama.

Present correlation. Sloan in 1907 named no single type locality for his "Congaree Phase," but it is generally accepted to be the Elmore Williams place just west of Gaston, S. C. This locality is a very poor exposure and is very hard to find without a guide. For this reason Cooke and McNeil (1952) in their work chose as the type locality a readily accessible, excellent exposure in a road cut at Halfway Swamp 0.5 mile northwest of Creston, S.C.

The fullers earth type clay at the Elmore Williams place, Sloan's type locality, is actually McBean; this is demonstrated by the fact that Lisbon corals have been found here by the writer in the glauconitic sand below the fullers earth. It is evident that Sloan intended these beds to be his "Congaree Phase," for in other localities in this general area sections measured by Sloan fit the nomenclature of sand, clay, and buhrstone as he described them in his "Congaree Phase." The new type locality of Cooke and McNeil, however, is a different type lithology and bears little similarity to the "Congaree Phase" described by Sloan.

These two type localities are different units of different age. The fullers earth type clays near Gaston are part of the McBean formation and

equivalent to the Lisbon of Alabama. The siltstone and shale near Creston is a new unit, not used by Sloan, but named the Congaree formation by Cooke and McNeil and is equivalent to the Tallahatta of Alabama.

This leaves the situation with added confusion. It is suggested however, that the present status of the Congaree formation remain as described by Cooke and McNeil, bearing in mind that Sloan's "Congaree Phase" is part of the McBean formation.

References

- Cooke, C. Wythe, 1936, Geology of the Coastal Plain of South Carolina: U. S. Geological Survey Bull. 867.
- _____, 1943, Geology of the Coastal Plain of Georgia: U. S. Geol. Survey Bull. 941. (1944)
- Cooke, C. Wythe, and MacNeil, F. S., 1952, Tertiary stratigraphy of South Carolina: U. S. Geol. Survey Prof. Paper 243-B.
- Cooke, C. W., and Shearer, H. K., 1918, Deposits of Claiborne and Jackson age in Georgia: U. S. Geol. Survey Prof. Paper 120.
- Gardner, Julia, 1951, Two new guide fossils from the Tallahatta formation of the Southeastern States: Washington Acad. Sci. Jour., Vol 41, No. 1, pp. 8-12.
- Sloan, E., 1908, Catalogue of the mineral localities of South Carolina: S. Carolina Geol. Survey, Series 4, Bull. 2.
- Shearer, H. K., 1917, A report on the bauxite and fullers earth of the coastal plain of Georgia: Georgia Geol. Survey Bull. 31.

THE WORTH OF SOUTH CAROLINA
MINERAL INDUSTRY

By

M. James Green

The value of mineral production can be expressed in many ways. In Table 1 the South Carolina mineral production is classified according to Raw, Upgraded, and Fabricated. These data were compiled by the S. C. Department of Labor.

	1954	1955
Raw	\$ 12 644 000	\$ 13 403 000
Upgraded	17 744 000	20 197 000
Fabricated	38 668 000	41 180 000
	1956	1957
Raw	\$ 16 557 000	\$ 18 090 000
Upgraded	21 342 000	-
Fabricated	49 752 000	54 000 000

Table 1.

Table 2 lists the production for 1956 and 1957 according to product. These data were compiled by the U. S. Bureau of Mines.

The South Carolina mineral industry is small but healthy. It's equipment is modern and its management progressive. There are many areas where new production is contemplated in the near future; these new operations should increase considerably the value of the total production of the state.

Table 2. - Mineral production in South Carolina, 1956-57 1/

Mineral	1956		1957 <u>2/</u>	
	Short tons (unless otherwise stated)	Value	Short tons (unless otherwise stated)	Value
Clays	1,087,408	\$ 5,450,685	1,087,000	\$ 6,543,000
Mica, sheet	5,400	13,784	(3)	(3)
Sand and gravel	3,228,740	2,925,902	2,807,000	2,555,000
Stone	3,994,077	5,321,970	4,506,800	6,141,000
Titanium	2,592	326,283	3,450	305,200
Value of items that cannot be disclosed: Barite, cement, kyanite, mica (scrap), monazite, vermiculite, zircon, and values indicated by footnote 3.		7,913,593		8,480,300
Total South Carolina		<u>4/</u> 21,342,000		<u>4/</u> 23,367,000

1/ Production as measured by mine shipments, sales, or marketable production

2/ Estimated from producers' reports and other sources

3/ Figure withheld to avoid disclosure of individual company confidential data.

4/ The total has been adjusted to eliminate duplication in the value of clays and stone.

