FG - 3

CAROLINA GEOLOGICAL SOCIETY

GUIDEBOOK

BY

L. N. SMITH AND H. S. JOHNSON

DIVISION OF GEOLOGY

SOUTH CAROLINA STATE DEVELOPMENT BOARD

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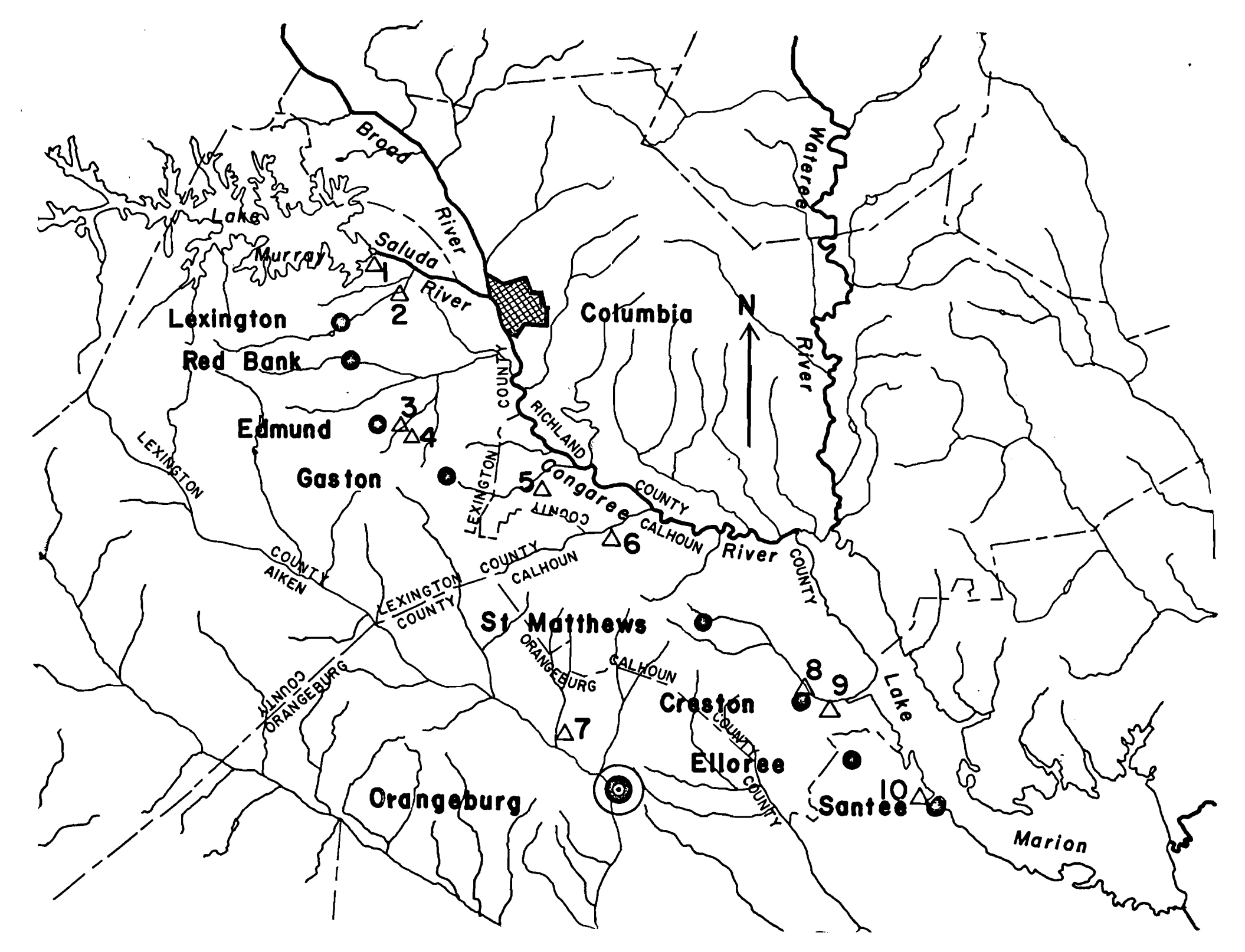
Broad River
Lake Murray
Saluda River
Lexington
Red Bank
Edmund
Gaston
Columbia
Congaree
Wateree River
N
Lexington County
Richland County
Calhoun County
Aiken County
Orangeburg County
St Matthews
Creston
Elloree
Orangeburg
Santee
Lake Marion
1
2
3
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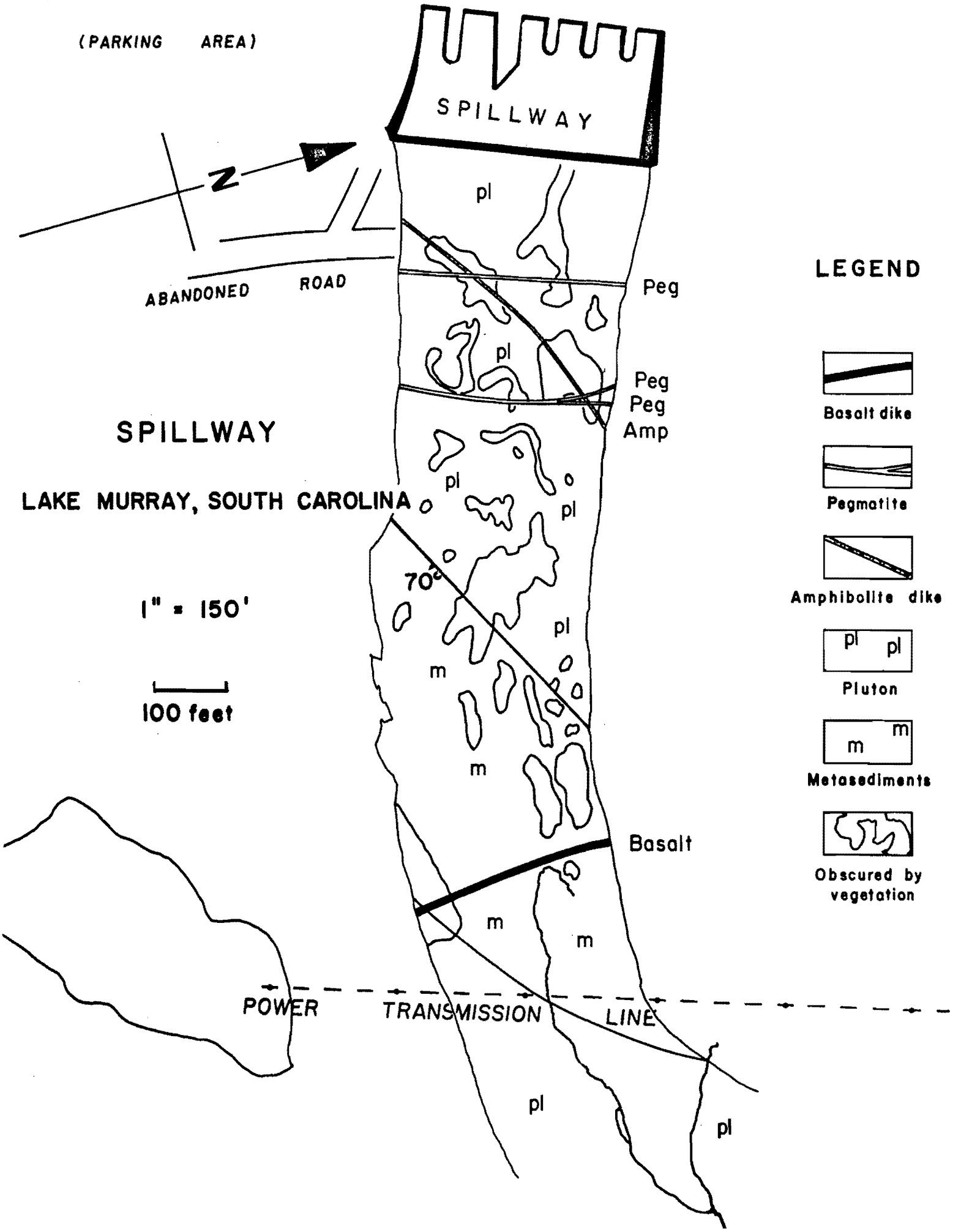
(PARKING AREA)
SPILLWAY
N
ABANDONED ROAD
pl
Peg
pl
Peg
Peg
Amp
SPILLWAY
LAKE MURRAY, SOUTH CAROLINA
pl
pl
70°
1" = 150'
pl
m
100 feet
m
Basalt
m
m
POWER TRANSMISSION LINE
pl
pl
LEGEND
Basalt dike
Pegmatite
Amphibolite dike
pl pl
Pluton
m m
Metasediments
Obscured by vegetation

MILAGE:

0.0 STOP 1 Parking area at spillway on south end of Lake Murray Dam. 12 Miles WNW Columbia, S. C.
The spillway of the Dreher Shoals Dam affords the rare opportunity of observing crystalline rocks of the South Carolina Piedmont in place in an unweathered state. The rocks exposed are particularly interesting in that they range from the normal low rank sericitic phyllite phase of the Carolina slate group (Paleozoic?) to coarse garnetiferous mica schist and kyanite-staurolite gneiss. The genesis of the high rank rocks has given rise to controversy, one school taking the view that they are Carolina slate equivalents and due to contact metamorphism or to local hotspot effects of regional metamorphism, and the other taking the view that they are regionally metamorphosed rocks older than the Carolina slate.

Also of interest and a source of controversy is the quartz-microcline gneiss at the entrance to the spillway. Here there is evidence suggestive of igneous and of metamorphic origin, depending on the interpretation applied.

We hope that anyone who notes something of significance will feel free to ask for the mike to call it to the group's attention.

0.3 Junction Lake Murray Rd. and S. C. 6. Turn left (east) on Lake Murray Rd.

3.9 STOP 2 Guignard Brick Works shale pit. Park at pond on right (south) side of road.

Exposed in the floor of the pit is a sequence of thin-bedded siltstone, argillite, and sericitic phyllite of the felsic phase of the Carolina slate group. The outcrop should be of interest to sedimentationists and to structural geologists alike. We would like to hear the views of the sedimentationists as to the proper nomenclature and classification of these rocks and especially as to the probable environment of deposition. For instance, the thin-bedded siltstone in places contains structures suggestive of ripple cross lamination. Is it possible to tell tops from bottoms of beds?

The structural geologists will be intrigued by the tight drag folding present in places. How does this relate to the postulated large open folds of the Carolina slate group in the Irmo quadrangle? Note the northeasterly plunge of the drag fold axes and that the pencil structure in the weathered rock plunges in this direction at the same angle.

5.4 Junction Lake Murray Rd. and U. S. 378. Turn right (west) on U. S. 378.

6.0 - 7.0 Weathered Carolina slate in cuts and colluvium at creeks.

10.5 Junction U. S. 378 and S. C. 6. Turn left (south) on S. C. 6.

10.7 Lexington, S. C. Town limit.

11.5 Cross U. S. 1 in Lexington. Continue on S. C. 6.

12.6 Contact Tuscaloosa formation rests on crystalline rocks. The contact is obscurred and plotted on the basis of elevation only.

14.8 Red Bank Town limit. Continue on S. C. 6.

15.3 Congaree Creek. Granite is present in erosional windows in the Tuscaloosa along the upper end of Congaree Creek.

15.7 Tuscaloosa in cuts.

17.0 Junction S. C. 6 and S. C. 602. Continue on S. C. 6.

20.6 Cross roads. Turn left (east).

20.7 Junction S. C. 215. Edmund, S. C. continue across S. C. 215 and railroad on sand road.

21.7 Turn right on narrow sand road.

22.0 STOP 3 Park cars and walk down hill to mine.

McCready Clay Pit, Edmund, S. C. Located 1.4 miles east of Edmund. This kaolin pit has not been active for a number of years. It was abandoned because of the badly stained nature of the clay. A 12' bed of purple mottled kaolinitic clay is exposed in the west wall of the pit. It is overlain also on the west wall, by 8' of cross-bedded brown to red sand containing balls of kaolinitic clay. The lower clay bed is the top of the Tuscaloosa formation as exposed in this area. The upper sand bed is thought to be Eocene, part of the Barnwell formation.

22.0 Reverse course and return to S. C. 215.

23.3 Junction S. C. 215. Turn left (south).

23.5 Junction S. C. 215 and S. C. 6. Continue straight ahead.

25.0 Junction S. C. 215 and S. C. 6. Turn left (southeast) on S. C. 6.

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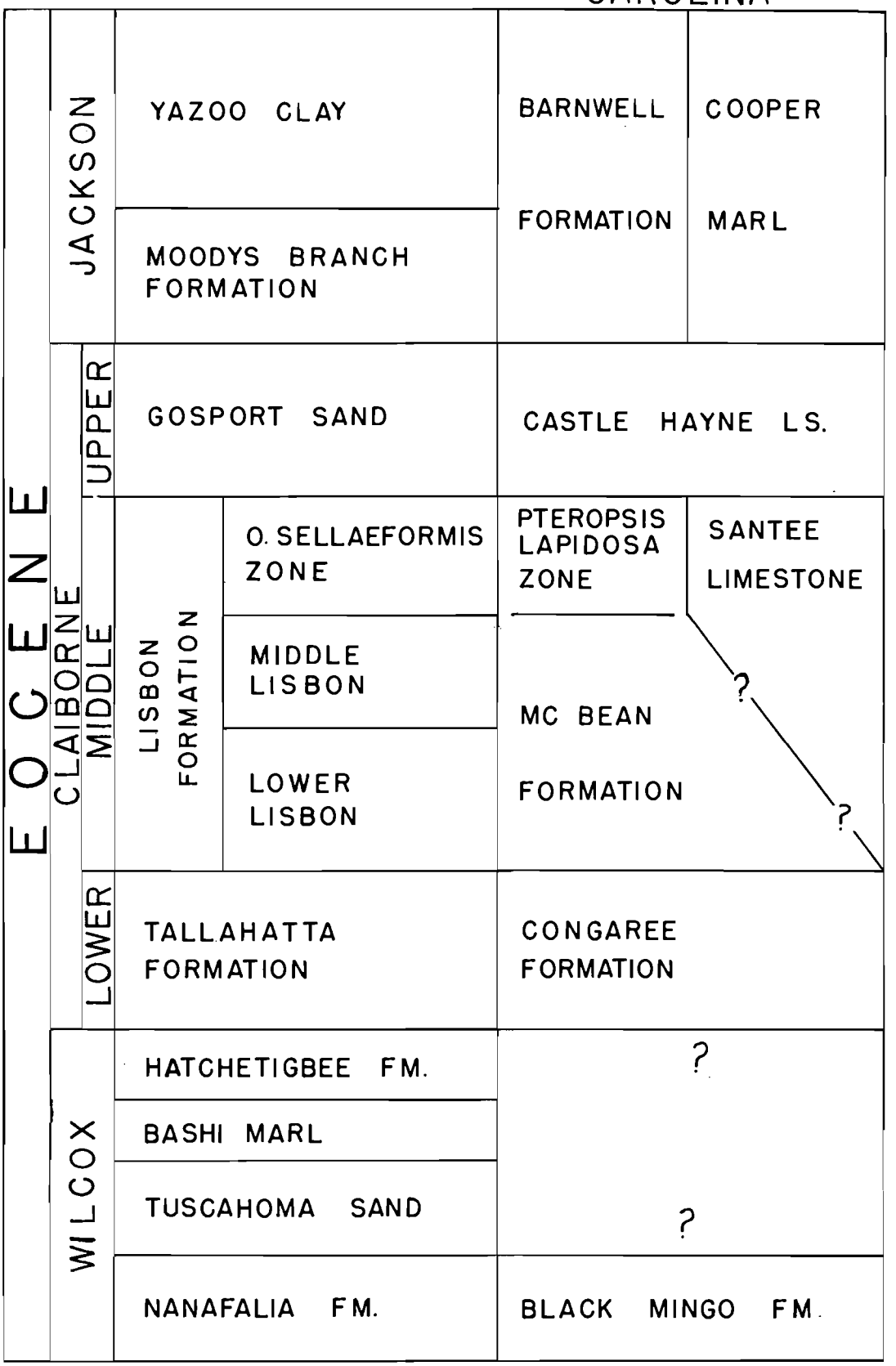

CORRELATION OF THE EOCENE FORMATIONS OF SOUTH CAROLINA AND ALABAMA.

25.5 Turn left (east) on sand road.

26.0 STOP 4 Church yard at Bethel Church. Outcrop is located in woods on path leading from church yard. Lunch stop; served before or after visiting outcrop.

This locality was supposed Barnwell by Cooke in 1936 (p. 95), but was later moved into the Congaree by Cooke and McNeil (1952 P. 23). Cooke and McNeil were mistaken in their correlation of the Congaree (Smith 1958) and it now seems that the fossil horizon at this locality is in the McBean. (See correlation chart). Approximately 20 feet of hard unweathered sandstone is exposed with a fossil layer 2 feet thick near the top. The fossils are for the most part silicified, poorly preserved, and unindentifiable. Some species have been identified however; they are as follows:

(1) Endopachys Macclurii Lea (Coral)
(2) Platythrochus. Stokesi Lea (Coral)
(3) Volutocorbis Petrosus Conrad

Other species are present but recognizable only to genus.

26.1 Proceed from church yard and turn left (south) on sand road.

26.4 Junction S. C. 6. Turn left (southeast).

27.0 Junction S. C. 6 and S. C. S. 32.65 (paved). Turn left (east) on S. C. S. 32.65.

32.5 Gaston, S. C. Turn left.

32.7 Turn right and cross railroad.

32.9 Junction 321 and S. C. S. 32.65. Continue across U. S. 321.
Note: Tertiary contact is crosssed in the valley on this road; the contact is not visible due to sand cover. The contact elevation is 300'.

35.6 Junction. Continue straight ahead.

36.3 Tuscaloosa formation exposed in road cut.

36.6 Junction (Calhoun Co. line) turn left on S. 9-31.

36.8 Colluvial sand resting on Tuscaloosa on right.

38.0 McBean formation on left.

38.3 Claystone member of McBean on left.

38.8 Approximate Tertiary-Cretaceous contact.

41.0 Junction U. S. 21. Turn right (south).

43.2 STOP 5 Tertiary escarpment and Tertiary-Cretaceous contact.

On U. S. 21, at Stop 5, siliceous clay-shale is exposed in the ditch on the east side of the road. This exposure marks the boundary between the Sand Hills Physiographic District and the Dissected Tertiary Upland Physiographic District. This is not the best exposure of the contact in this area. On a county sand road just east of Stop 5 the following section was measured:

		Feet
	(6) Soil and residual clay derived from the underlying siliceous clay-shale to top of cut.....	4
McBean formation (Eocene)		
	(5) Buff to gray siliceous clay shale..	9
	(4) Medium-grained glauconitic sand with clay lenses to 1.5 feet thick.....	9
	(3) Buhrstone containing poorly preserved unidentifiable fossils.....	5
Black Creek formation (Upper Cretaceous)		
	(2) Clay-shale and sand.....	3
Tuscaloosa formation (Upper Cretaceous)		
	(1) White to gray kaolinitic sandy clay to ditch on road.....	5

43.5 Junction. Turn left on S. 9. 118.

45.1 Junction U. S. 176 turn right.
Note: A view of the Congaree river basin to the left. Tertiary-Cretaceous contact is 0.3 miles down the hill to the left.

47.4 Approximate Tertiary-Cretaceous contact.

48.4 Tuscaloosa exposed in road cuts.

48.7 Junction turn right on S 9. 25.

49.7 Junction turn left on sand road.

50.5 STOP 6 Little Beaver Creek.

Exposure in road cut on county road overlooking Little Beaver Creek 1.2 miles S. 30° W. of Rucker's Pond on U. S. Highway 176, Calhoun County.

	Feet
(6) Soil and residual clay derived from siliceous clay-shale.....	7
McBean formation (Eocene)	
(5) White blocky lightweight siliceous clay-shale with conchoidal fracture.....	20
(4) Medium-grained glauconitic sand with lenses of fossiliferous buhrstone 0.1 to 0.2 foot thick containing corals. Thin-bedded olive-drab clay layers 0.2 to 0.5 foot thick occur 10 feet above base of unit.....	13.5
Black Creek formation (Upper Cretaceous)	
(3) Black thin-bedded shale (dark gray when dry) at base grading into more massive shale at top. Contains Upper Cretaceous microfauna.....	5.5
Tuscaloosa formation (Upper Cretaceous)	
(2) Light-colored sand containing black carbonaceous material.....	1
(1) Gray to varigated kaolinitic sandy clay containing partially decomposed crystals and cleavage fragments of feldspar 1 to 10 mm in size.....	15 to cover

Two species of corals were found in bed 4 at this and other McBean localities. They are Paracyathus alternatus Vaughn and Balanophyllis sp. Other fossils occur in the same bed but they are not identifiable.

50.6 Turn left on sand road.

51.2 Tertiary-Cretaceous contact.

52.3 Junction turn right on U. S. 176.

61.8 Junction U. S. 176 and U. S. 601. Turn right on U. S. 601.

72.5 Orangeburg city limits. End trip.

Banquet at Berry's on the Hill next to the Holiday Inn Motel at 7:45 P. M.

SUNDAY

0.0 Assemble with cars headed north on U. S. 301 & 601 in front of Berry's on the Hill Resturant.

0.2 Junction U. S. 21. Turn left on U. S. 21.

1.4 Junction turn left on U. S. 21.

2.4 Junction turn right on U. S. 21.

6.0 STOP 7 Caw Caw Swamp

The section at Caw Caw Swamp is described by Cooke (1936 p. 63-4) as 16 feet of very fine gray to white porous, friable sandstone of very light weight, at the base of the section. This porous sandstone contains impressions of many species of fossils shells. The species are listed by Cooke (1936 p. 64) and also by Stenzel et al (1957). The sandstone is overlain by pale green clay and sand which weathers a brick red (Cooke 1936 p. 64). This bed contains, in pockets, many species of fossils, some of which were identified by G. E. Siple and are listed below:

(1) Sycostoma enteroqramma (Gabb)
(2) Atrina cawcawensis (Harris)
(3) Pteropsis lapidosa (Conrad)
(4) Glycymeus cf. G. iodonea (Conrad)
(5) Laevibuccinum prorsune (Conrad)
(6) Buccitriton texanum (Gabb)
(7) Turritella cf. T. dutexta (Harris)
(8) Athleta lisbonensis (Aldrich) vai.
(9) Eosurcula pulcherrima (Heilprin)
(10) Natica semilunata Lea
(11) Crepidula lirata (Conrad)
(12) Glycymeris cf. G. lisbonensis Harris
(13) Turritella sp. aff. T. Carinata Lea

These beds are the Pteropsis lapidosa zone of the McBean formation and are the near shore equivalent of the Santee limestone.

10.6 Junction turn right on S. 9. 22.

10.8 Junction turn left on S. 9. 22.

16.1 Junction U. S. 176. Continue straight ahead.

17.1 St. Matthews City limits.

17.3 Bear right on blacktop road.

17.8 Junction turn left on S. 9. 46.

18.0 Junction turn right on S. C. 6 and cross U. S. 601. Continue on S. C. 6.

19.3 Junction keep right.

22.2 Congaree formation on right at road level.

27.0 Junction. Turn left on S. C. 33.

28.1 STOP 8 Congaree formation at Halfway swamp.

Halfway Swamp, 0.8 miles north of Creston, Calhoun County, in a steep road cut on S. C. Highway 33 at the Halfway Swamp crossing.

	Feet
McBean formation (Eocene)	
(3) Coarse weathered sand, glauconitic at base.....	7
Congaree formation (Eocene)	
(2) Alternating fine rusty brown sand and shale.....	5
(1) Light green shale alternating with hard silicified sandy siltstone layers about 3 inches thick. Contains Anadontia? Augustana Gardner. Concealed base at creek.....	16

This outcrop is the type locality of the Congaree formation, with a distinctive lithology and fossil content. The guide fossil Anadontia? Augustana Gardner is easily identified and, according to Miss Gardner (1951) it is restricted to the Tallahatta at the Lisbon contact. The fossil is scarce at this outcrop and the chance of finding a specimen is small.

29.0 Turn around at junction and reverse course.

30.9 Junction turn left on S. C. 6.

32.1 STOP 9 Turn left through fence. Stay on road and follow leader to Stop 9. Quarry in Santee limestone. Return to Highway.

The Santee limestone may be divided into upper and lower zones. The lower zone is buff to white hard limestone with abundant macrofauna. The upper zone is a somewhat darker buff color and contains macrofauna sparsely distributed through it. The line of division between these zones is not sharp. The two zones may be seen best in this abandoned limestone quarry on the Robert Edwards farm near Creston, Calhoun County. The lower zone is exposed from the base of the quarry walls to a height of 2 to 4 feet, and the upper zone extends from this level to the top of the quarry walls at a maximum height of about 20 feet.

A partial list of the ostracodes found in the Santee limestone was prepared by P. M. Brown as follows:

(1) Trachyleberis rukasi (Gooch)
(2) T. Hilgardi (Howe and Garrett)
(3) T. Pellucinoda (Swain)
(4) Cytheromorpha cf. C. Cocenica (Stephenson)
(5) Haplocytherida cf. H. Goochi (Stephenson)
(6) Loxoconcha Creolensis (Howe and Chambers)
(7) L. Claibornensis (Murray)
(8) Pterygocytheiesis sp. aff. P. Washingtonensis (Swain)

A list of the foraminifera identified by S. M. Herrick is as follows:

(1) Bullminella robertsi Cushmann
(2) Cibicides westi
(3) C. danvillensis Howe and Wallace
(4) Nonian micrum
(5) Textularia cuyluri

32.1 S..C. 6 turn left from pasture gate.

37.7 Traffic light main street, Elloree, S. C.

39.8 Junction S. C. 267. Continue on S. C. 6

44.2 Turn left on woods road.

44.5 STOP 10 sinks in Santee limestone.

A number of large sink holes, some of which are open to running streams at the bottom, are present in the Santee limestone at this stop. The sinks are at the base of the Santee and the stream courses are probably flowing on the underlying formation.

End trip.

Return to highway and turn left for U. S. 301. Turn right for Columbia and points north or west.

REFERENCES

Cooke, C. Wythe, 1936, Geology of the Coastal Plain of South Carolina: U. S. Geological Survey Bull. 867.

Cooke, C. Wythe, 1943, Geology of the Coastal Plain of Georgia: U. S. Geol. Survey Bull. 941. (1944)

Cooke, C. Wythe, and MacNeil, F. Stearns, 1952, Tertiary stratigraphy of South Carolina: U. S. Geol. Survey Prof. Paper 243-B.

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.

Herrick, S. M., 1956, Guidebook to the 1956 U. S. Geological Survey Ground Water Branch field trip to the Coastal Plain of Georgia: (Unpublished).

Siple, G. E., 1957, Carolina Geological Society guidebook for the South Carolina Coastal Plain field trip: (Unpublished)

Sloan, Earle, 1908, Catalogue of the mineral localities of South Carolina: South Carolina Geol. Survey, Series 4, Bull.2.

Stenzel, H. B., 1956, Pelecypoda of the Stone City beds (Eocene) of Texas: Univ. of Texas Bureau of Economic Geology Bull. 5704.

Vaughan, T. Wayland, 1900, The Eocene and lower Oligocene coral faunas of the United States: U. S. Geol. Survey Mon. 39.