

Additions and revisions to the auger hole records for the
Cainhoy and Charleston quadrangles, South Carolina

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This report is preliminary and has not been reviewed
for conformity with U.S. Geological Survey editorial
standards and stratigraphic nomenclature

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Introduction

After compilation of Open-File Report 85-378 (Weems and Lemon, 1985), a geologic map was compiled based in part on the geologic logs in that report. During compilation, it became apparent that the geologic sections for nine holes in two of the quadrangles (Cainhoy and Charleston) needed correction or revision. Three (CH-5, CH-22, and CH-29) had typographical errors, while six others (CA-2, CA-5, CH-8, CH-10, CH-26, and CH-33) were reinterpreted when compared directly to the sections in nearby holes. Because the reinterpretations will be incorporated into a geologic map (Weems and Lemon, in press), they are shown in this report to provide open-file logs current with the map to which they pertain. Changes from the previous open file report (85-378) are underlined to facilitate comparison.

Additionally, thirteen auger holes from the Cainhoy and Charleston quadrangles, not reported in Open-File Report 85-378, add substantially to our knowledge of the shallow subsurface geology of these quadrangles. These newly reported logs (CA-25 to CA-27, CH-36 to CH-45) also have been used in creating the forthcoming geologic map of these quadrangles and so are included in this open-file report. Background information on these quadrangles remains unchanged from the previous open-file report, to which the interested reader is referred.

References cited

Weems, R. E., and Lemon, E. M., Jr., 1985, Detailed sections from auger holes and outcrops in the Cainhoy, Charleston, and Fort Moultrie quadrangles, South Carolina: U.S. Geological Survey Open-File Report Number 85-378.

Weems, R. E., and Lemon, E. M., Jr., in press, Geologic map of the Cainhoy, Charleston, Fort Moultrie, and North Charleston quadrangles, South Carolina, with text: U.S. Geological Survey Map I-1935, scale 1:24,000.

CAINHOY QUADRANGLE

(depths in feet)

CA-2: 0.65 mile W of east quad. border, 0.1 mile S of north quad. border. Surface elevation 50 feet. (revised)

TEN MILE HILL BEDS

0-23	Sand, fine- grained, well sorted, medium- orange grading through medium-gray to dark- brown and humic by 15 feet
23-35	Sand, fine- grained, silty, medium-gray, micaceous, contains stringers of medium-gray clay
35-43	Sand, fine-grading to medium-grained, oyster shell hash at base
43-51	Clay, medium-gray, micaceous, contains oyster and wood fragments
51-62	Sand, medium-grained, shelly (oyster, snail, coral, etc.), phosphate pebbles at base; (coral yielded alloisoleucine/isoleucine ratio of 0.87, <u>which suggests an early Pleistocene (Penholoway) age for this unit; however, ostracodes from 54' and 62' are post-Penholoway in age and indicate a marginal marine environment, so the coral must be reworked from an older bed</u>)

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DANIEL ISLAND BEDS

62-65	Clay, dark-gray, stiff, shelly
65-66	Sand, medium- grained, well sorted, woody
66-85	Clay, medium-gray, sticky, dense but still slightly greasy, very woody, dark-gray below 77 feet
85-95	Sand, medium- grained, dark-gray, sparsely shelly, contains sand-size phosphate, phosphate lumps in basal foot. Probably near base of unit

Base of Ten Mile Hill beds: -12 feet below sea level
Bottomed in Daniel Island beds

CA-26: 1.75 mi. W of east quad. border, 2.25 mi. N of south quad. border. Surface elevation 8 feet. (new entry)

SILVER BLUFF 0-5 Clay, fine-grained sandy, medium-orange, light-orange, and light-gray mottled, micaceous

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WANDO FM (UPPER MEM) 5-10 Clay, medium-greenish-gray, silty, contains Mulinia

10-26 Silt, clayey, light-bluish-gray, contains oysters and Mulinia, no basal lag bed

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EDISTO FM 26-36 Calcarenite, fine-grained, quartzose, medium-greenish-gray, sparsely shelly, black phosphate lumps (2-6 cm diameter) at base (microfossils from this unit identified in P&S Report ERG-86-17 indicate an early Miocene age)

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ASHLEY FM 36-40 Calcarenite, fine-grained, medium-olive-brown, much denser than unit above

Base of Silver Bluff: +3 feet above sea level
Base of Wando Formation (upper member): -18 feet below sea level
Base of Edisto Formation: -28 feet below sea level
Bottomed in Ashley Formation

CHARLESTON QUADRANGLE

(depths in feet)

CH-5: 0.52 mi. W of east quad. border, 2.60 mi. N of south quad. border. Surface elevation 5 feet. (revised)

FILL 0-7 Sand, fine-grained, pale-gray, shelly, root zone at base
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WANDO FM 7-11 Sand, fine-grained, dark-gray and humic at top grading down to medium-orange and then to medium-gray, sand well sorted and micaceous
(MIDDLE MEM)

 11-24 Sand, fine-grained, medium-gray, silty at top, numerous very fine-grained heavies present

 24-25 Sand, fine-grained, medium-blue, silty, micaceous and clay, medium-blue, silty

 25-38 As above but extremely shelly
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MARKS HEAD 38-54 Sand, fine-grained, dark-chocolate-brown, dense, very phosphatic but not calcareous
FM
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ASHLEY FM 54-55 Calcarenite, fine-grained, olive-brown, contains large forams

Base of Wando Formation (middle member): -33 feet below sea level

Base of Marks Head Formation: -49 feet below sea level

Bottomed in Ashley Formation

CH-8: 0.7 mi. E of west quad. border, 0.4 mi. N of south quad. border. Surface elevation 8 feet. (revised)

WANDO FM (UPPER MEM)	0-6	Sand, fine-grained, light-brown, a scattering of very fine-grained heavies present
	6-12	As above but grading to medium-gray
	12-16	Clay, medium-blue, very stiff, oysters and wood fragments present
	
(MIDDLE MEM)	16-20	Sand, fine-grained, medium-blue, clayey, loose, shelly
	20-22	Clay, medium-blue
	
(LOWER MEM)	22-35	Shell hash, medium-blue, clayey fine-grained quartz sand matrix
	
GOOSE CREEK LS	35-37	Calcarenite, medium-grained, pale-yellowish-brown, loose, very phosphatic, phosphate pebble bed at base and burrows filled with this calcarenite extend into upper 6 inches of unit below
	
ASHLEY FM	37-45	Calcarenite, fine-grained, olive-brown, dense, scattered quartz and phosphate sand

Base of Wando Formation (upper member): -8 feet below sea level
 Base of Wando Formation (middle member): -14 feet below sea level
Base of Wando Formation (lower member): -27 feet below sea level
 Base of Goose Creek Limestone: -29 feet below sea level
 Bottomed in Ashley Formation

CH-10: 0.85 mi. W of east quad. border, 2.90 mi. S of north quad. border. Surface elevation 25 feet. (revised)

- WANDO FM 0-5 Sand, mostly fine-grained and well sorted but with a sparse bimodal fraction of scattered coarse grains, well sorted and well rounded, medium-orange
- 5-15 As above but medium-yellow, contains abundant very fine-grained heavies
- 15-17 Sand, very fine-grained, medium-yellow, very micaceous, no coarse fraction
- 17-23 Sand, fine-grained, medium-yellow, well sorted, very fine-grained heavies abundant, Mulinia present
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- (MIDDLE MEM) 23-25 Clay, medium-gray, sandy, shelly
- 25-29 Clay, dark-blue, shelly
- 29-31 Clay, dark-blue, sandy, wood and grass fragments present
- 31-37 Clay, medium-bluish-green, silty, shelly and woody, fine-grained sand lenses with very fine-grained heavies present
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- (LOWER MEM) 37-60 Sand, fine-grained, medium-blue, silty, contains numerous Mulinia and others (oysters, Olivella) with luster
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- DANIEL 60-69.5 Clay, dark-blue, dense, sparsely shelly ISLAND BEDS
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- ASHLEY FM 69.5-70 Calcarenite, fine-grained, olive-brown, dense, quartz and phosphate and foram sand present
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Base of Wando Formation (upper member): +2 feet above sea level
 Base of Wando Formation (middle member): -12 feet below sea level
 Base of Wando Formation (lower member): -35 feet below sea level
 Base of Daniel Island beds: -44.5 feet below sea level
 Bottomed in Ashley Formation

CH-22: 1.30 mi. S of north quad. border, 1.65 W of east quad. border. Surface elevation 6 feet. (revised)

SILVER BLUFF 0-14 Sand, fine-grained, medium-orange and medium-gray mottled, clayey

 14-30 Clay, medium-bluish-gray, sandy, dense, some sand lenses (? burrows), oysters appear abundantly at 23 feet

ASHLEY FM 30-40 Calcarenite, fine-grained, olive-brown, dense, quartz sand, large forams, and abundant phosphate sand present

Base of Silver Bluff: -24 feet below sea level
Bottomed in Ashley Formation

CH-26: 0.4 mi. E of west quad. border, 0.75 mi. N of south quad. border. Surface elevation 19 feet. (revised)

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- WANDO FM 0-26 Sand, fine-grained, pale-brownish-orange (0-2) grading through pale-yellow (3-5), pale-brown (5-9), and pale-yellowish-brown (9-22) to medium-orangish-brown (22-26), well sorted, numerous fine-grained heavies, muscovitic from 5 to 9 feet, some medium-grained sand below 9 feet
- 26-27 Clay, medium-blue, sandy and woody
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- (MIDDLE MEM) 27-33? Sand, medium-grained, medium-gray, shelly (Anadara transversa, Mulinia, Dinocardium, Astarte, oyster, Dosinia, Olivella, etc.); Mulinia yielded alloisoleucine/isoleucine ratios of 0.36 to 0.40; no obvious contact with bed below
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- (LOWER MEM) 33?-38 Sand, medium-grained, medium-gray, shelly with fauna similar to bed above, sparse phosphate pebbles at base; Mulinia yielded allo/ile ratios of 0.42-0.51
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- DANIEL 38-43 Clay, medium-gray, stiff, dense, sandy, much tougher than above, numerous phosphate lumps up to 5 cm in diameter in basal 3 feet
- ISLAND BEDS
- ASHLEY FM 43-55 Calcarenite, fine-grained, olive-brown, calcite-cemented lumps and large forams present

Base of Wando Formation (upper member):	-8 feet below sea level
Base of Wando Formation (middle member):	<u>-14? feet below sea level</u>
<u>Base of Wando Formation (lower member):</u>	<u>-19 feet below sea level</u>
Base of Daniel Island beds:	-24 feet below sea level
Bottomed in Ashley Formation	

CH-33: 1.0 mi. E of west quad. border, 0.55 mi. N of south quad. border. Surface elevation 11 feet. (revised)

WANDO FM 0-15 Sand, fine-grained, medium-gray (0-1) grading through pale-orange (1-3) to pale-gray, well sorted, micaceous, abundant very fine-grained heavies, shelly below 7 feet

 15-22 Clay, medium-gray, stiff, caliche-like nodules in upper foot

(MIDDLE MEM) 22-31 Sand, fine-grained, pale-gray, silty, shelly (mostly Mulinia)

 31-35 Sand, fine-grained, medium-gray, very clayey, stiff sticky

(LOWER MEM) 35-44 Sand, fine-grained, medium-gray, silty, shelly, phosphate lumps at base

ASHLEY FM 44-45 Calcarenite, fine-grained, olive-brown

Base of Wando Formation (upper member): -11 feet below sea level
Base of Wando Formation (middle member): -24 feet below sea level
Base of Wando Formation (lower member): -33 feet below sea level
Bottomed in Ashley Formation

CH-36: 0.9 mi. S of north quad. border, 1.9 mi. E of west quad. border. Surface elevation 13 feet. Excavation site (new entry, section measured by H. S. Johnson, Jr. of the South Carolina Geological Survey as locality "10-1, informal name Drydock No. 5").

WANDO FM 0-15 Clay, fine-grained sandy, light-yellowish-brown to medium-bluish-green with brown, green, and white mottling, plastic, grading down to sand, very fine-grained, very clayey, light-greenish-white to light-yellowish-brown; phosphate pebbles up to 13 cm in diameter present along basal contact

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GOOSE 15-20 Calcarenite, fine-grained, light-greenish-white to light-yellowish-brown, lower two feet contain abundant shell hash; black to brown rounded phosphate pebbles up to 5 cm in diameter and sparse rounded to subrounded quartz pebbles up to 3 cm in diameter at base

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MARKS 20-30 Sand, fine-grained to very fine-grained, calcareous and phosphatic, dark-olive-green; at 29 feet is a layer of oyster and chalky, articulated pelecypod shells; basal foot contains brown to black rounded phosphate pebbles up to 3 cm in diameter, many of which are phosphatized molds or casts of pelecypods and other shells

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ASHLEY FM 30-44 Calcarenite, fine-grained to very fine-grained, medium olive green, dries to a chalky color, contains very sparse small pelecypods apparently distributed at random

Base of Wando Formation (upper member): -2 feet below sea level
 Base of Goose Creek Limestone: -7 feet below sea level
 Base of Marks Head Formation: -17 feet below sea level
 Bottomed in Ashley Formation

CH-38: 3.6 mi. W of east quad border, 3.45 mi. S of north quad.
border. Surface elevation 6 feet. (new entry)

FILL	0-4	Debris and Ashley sediment
LATE HOLOCENE	4-10	Clay, dark-gray, greasy, contains oyster fragments, has oily smell in upper foot
	at 10	Peat and soft wood fragments
DANIEL ISLAND BEDS	10-15	Clay, sandy, dark-bluish-gray, micaceous
	15-17	Sand, fine- grading down to medium-grained, clayey, light-bluish-gray, no basal phosphate bed
MARKS HEAD FM	17-18	Sand, fine-grained, light-brown, silty, slightly calcareous, grades to
	18-26	Sand, fine-grained, dark-brown, contains oyster fragments and abundant mica-like flakes, phosphatized clam mold on basal contact
ASHLEY FM	26-35	Calcarenite, fine-grained, medium-olive-brown,

Base of Holocene: -4 feet below sea level
Base of Daniel Island beds: -11 feet below sea level
Base of Marks Head: -20 feet below sea level
Bottomed in Ashley Formation

CH-39: 2.1 mi. E of west quad. border, 3.1 mi. S of north quad. border. Surface elevation 11 feet (new entry)

WANDO FM 0-16 Sand, fine-grained, light-orangish-brown (0-3) grading through medium-orangish-brown (3-5) and light-brown (5-10) to light-orangish-brown, (10-16) well sorted, clean; sparse very fine grained heavies present near base

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(MIDDLE MEM) 16-18 Clay, medium-brown in upper two inches and light gray below that, sticky, moderately dense, grades rapidly to

18-35.5 Clay, dark-gray, and sand, fine-grained, micaceous, dark-gray, interlayered on centimeter scale, sparsely shelly below 30 feet

35.5-36 Peat and fragments of wood, dark-brown

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(LOWER MEM) 36-53 Sand, fine-grained, light-gray, silty, very sparse shell fragments present, sparse phosphate pebbles and sharks' teeth, grades down to medium-grained at base

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ASHLEY FM 53-60 Calcarenite, medium-yellowish-olive-brown, phosphatic

Base of Wando Formation (upper member): -5 feet below sea level
Base of Wando Formation (middle member): -25 feet below sea level
Base of Wando Formation (lower member): -42 feet below sea level
Bottomed in Ashley Formation

CH-40: 2.5 mi. E of west quad. border, 4.15 mi. S of north quad. border. Surface elevation 11 feet. (new entry)

- FILL 0-4 Soil, bricks, and other cultural items
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- WANDO FM 4-30 Sand, fine-grained, light-brown (4-9) grading
(UPPER MEM) to medium- to dark-gray (9-19); shelly below 7 feet (mostly Mulinia down to 19 feet, but fauna begins to include Anomia, Olivella, and Anadara brasiliiana below that)
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- (MIDDLE MEM) 30-41 Clay, dark-gray, sticky, greasy
41-41.5 Clay, medium-brown, stiff, sticky, contains wood fragments
41.5-43 Clay, fine-grained sandy, light-gray, roots from above bed penetrate this unit, grades to
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- (LOWER MEM) 43-48 Sand, fine-grained, light-gray, silty and clayey but grades down in basal 6 inches to coarse sand with black, 0.5 cm diameter phosphate pebbles
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- ASHLEY FM at 48 8 cm layer of dark brown silt containing burrows filled with coarse sand and wood fragments; probably a paleosol
48-55 Calcarenite, fine-grained, medium-yellowish-olive-brown
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Base of Wando Formation (upper member): -19 feet below sea level
Base of Wando Formation (middle member): -32 feet below sea level
Base of Wando Formation (lower member): -37 feet below sea level
Bottomed in Ashley Formation

CH-41: 0.35 mi. E of west quad. border, 0.2 mi. N of south quad. border. Surface elevation 12 feet. (new entry)

WANDO FM (UPPER MEM)	0-1	Sand, fine-grained, dark-gray, grades to
	1-3	Sand, fine-grained, light-yellowish-brown with medium-orange mottles, well sorted, grades to
	3-12	Sand, fine-grained, light-brownish-gray (3-5) grading through light gray (5-7) and medium-gray (7-9) to medium-orange (9-12), well sorted, contains abundant very fine-grained heavies, micaceous below 9 feet
	12-13	Clay, dark-brownish-gray
	13-14	Peat, dark-brown
	
(MIDDLE MEM)	14-16	Clay, dark-brownish-gray grading down to dark-gray, sticky, grades down to
	16-18	Clay, medium-bluish-gray, sandy
	18-28	Sand, fine-grained, medium-gray, silty, micaceous, shelly, includes 5-8 cm thick interbeds of medium-gray, greasy clay
	at 28	Sand, coarse-grained, full of shell hash, 3 cm thick
	28-31	Clay, dark-gray, sticky
	
(LOWER MEM)	31-34	Sand, fine-grained, silty, shelly (including <u>Mulinia</u> , <u>Anadara brasiliana</u> , <u>Olivella</u> , <u>Polinices</u> , and others); phosphate pebbles and indurated lumps of Goose Creek Limestone at base
	
GOOSE CREEK LS	34-35	Calcarenite, medium-grained, light-gray, phosphate sand abundant

Base of Wando Formation (upper member): -2 feet below sea level
 Base of Wando Formation (middle member): -19 feet below sea level
 Base of Wando Formation (lower member): -22 feet below sea level
 Bottomed in Goose Creek Limestone

CH-42: 0.6 mi. E of west quad. border, 3.15 mi. S of north quad. border. Surface elevation 11 feet. (new entry, = CHA-2-H of Houser)

WANDO FM 0-5 Clay, medium-gray and medium-orange, stiff
(UPPER MEM)

 5-20 Sand, medium-grained, medium-orangish-brown
 with laminae of light-gray clay interlayered

 20-26 Sand, fine- to medium-grained, medium-gray,
 clayey, soft, shelly in basal foot, phosphate
 pebbles along basal contact

ASHLEY FM 26-115 Calcarenite, fine-grained, dark-olive-brown

Base of Wando Formation (upper member): -15 feet below sea level
Bottomed in Ashley Formation

CH-43: 0.75 mi. E of west quad. border, 2.85 mi. S of north quad. border. Surface elevation 3 feet. (new entry, = CHA-1-H of Houser)

FILL	0-25	Clay, wood, and Ashley sediment intermingled
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WANDO FM (MIDDLE MEM)	25-30	Sand, fine- to coarse-grained, and clay, interbedded, dark-gray, sparsely shelly
	30-40	Clay, dark-gray, sticky, sparsely shelly
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ASHLEY FM	40-95	Calcarenite, fine-grained, medium-olive-brown, shelly from 53-87, phosphate pebbles abundant in basal two feet
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HARLEYVILLE FM	95-125	Calcarenite, very fine-grained, light olive-brown, contains indurated layers

Base of Wando Formation (middle member): -37 feet below sea level
Base of Ashley Formation: -92 feet below sea level
Bottomed in Harleyville Formation

