STATE OF TENNESSEE
DEPARTMENT OF CONSERVATION
DIVISION OF GEOLOGY

REPORT OF INVESTIGATIONS No. 5

GUIDEBOOK TO GEOLOGY ALONG TENNESSEE HIGHWAYS

By

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STATE OF TENNESSEE

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GUIDEBOOK TO GEOLOGY ALONG TENNESSEE HIGHWAYS

By

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INTRODUCTION

While the reader's trip is still in the planning stage, it is suggested that he check Tennessee Division of Geology Bulletin 59, *Annotated Bibliography of the Geology of Tennessee Through December 1950,* to see what publications apply to the fields of his special interests. Occasional references are cited in the logs to enable one to read descriptions in advance of what geological "spots" he may choose to visit. Complete citations for these references are listed in the bibliography at the end of this report.

Roads in Tennessee are continually changing because of an active road building program, and some new highways may not exactly fit the logs. Also, the variation in odometer readings of different vehicles will likely cause slight deviation in corresponding mileages cited in the logs. Geographical tie-points, scattered throughout the logs, allow the reader to relocate his position when necessary.

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Pleistocene erosional features.
Optional side trip to fossil-leaf collecting locality in clay pit.

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Marble exposure.

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Zinc mining.

Marble exposures.

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Mississippian stratigraphy of the Eastern Highland Rim.
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Log No. 34.—Wells Creek Basin, Stewart and Houston Counties.

Excellent example of a cryptovolcanic structure, including Knox, Ordovician, Silurian, and Devonian strata.

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Robert J. Floyd, Senior Geologist, Tennessee Division of Geology, did the editing and proofreading. Richard G. Stearns, Assistant State Geologist, supervised the preparation of illustrations.

Log No. 1

U. S. Highway 51, Kentucky State Line at Fulton to Mississippi State Line South of Memphis [1]

0.0	Tennessee-Kentucky State Line in Fulton. (See Wascher, Humbert, and Cady, 1948, and Leighton and Willman, 1950, for information on the Quaternary geology and physiography of extreme western Tennessee.)
0.3	Peorian loess in railroad cut.
10.3	Enter Union City.
11.9	Junction U. S. 45W and U. S. 51 on south edge of Union City.
19.4	Jackson (?) silt and clay in ditch on left.
23.9	Havana surface on right; valley terrace on left.
28.2	Obion River. Late Wisconsin valley terraces flank both sides of river.
31.4	Enter Dyer County.
38.2	Newbern City Limits. Newbern is located on the Havana surface.
41.6	Peorian loess underlying the Havana surface.
42.8	Late Wisconsin valley terrace.

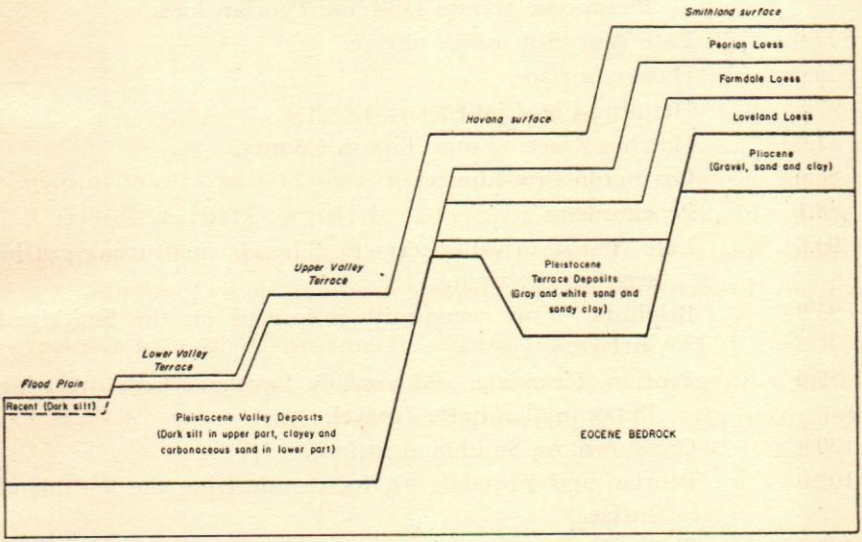

FIGURE 2.—*Relationships of Quaternary deposits to physiographic levels in West Tennessee.*

[1] *By Melvin V. Marcher, Geologist, Ground Water Branch, U. S. Geological Survey.*

43.8	Havana surface.
44.7	Late Wisconsin valley terrace.
45.1	Dyersburg City Limits.
49.3	Late Wisconsin valley terrace.
51.8	Havana surface.
55.6	South Fork Forked Deer River. Enter Lauderdale County.
56.5	Late Wisconsin valley terrace.
57.6	Early Wisconsin (?) valley terrace.
58.9	Halls.
64.0	Late Wisconsin valley terrace. The Havana surface can be seen on the right.
65.8	Smithland surface.
66.6	Silt, clay, and carbonaceous material of the Jackson (?) formation is exposed in the railroad cut .1 mile east.
67.1	Pliocene "Lafayette" gravel overlain by Peorian, Farmdale, and possibly Loveland loess.
70.3	Late Wisconsin valley terrace. The Havana surface can be seen on the right.
71.7	Ripley City Limits.
71.9	Silty, sandy clay of the Jackson (?) formation overlain by Pleistocene terrace sand and Peorian loess.
74.0	Late Wisconsin valley terrace.
75.0	Havana surface.
77.8	Henning City Limits.
81.0	Hatchie River. Enter Tipton County.
86.0	Covington City Limits.
88.1	Peorian loess.
94.6	Late Wisconsin valley terrace. The Havana surface can be seen on the right.
95.9	Brighton. This community is located on the Smithland surface.
99.0	Peorian, Farmdale, and possibly Loveland loess overlying Pliocene "Lafayette" gravel.
100.8	Crosstown, on Smithland surface.
102.0	Peorian and Farmdale (?) loess underlying the Smithland surface.
105.9	Shelby County Line.
106.4	Havana surface.
107.7	Late Wisconsin valley terrace.
110.5	Millington.

113.5	Peorian, Farmdale, Loveland, and possibly pre-Loveland loess underlying the Havana surface are poorly exposed in railroad cut.
116.6	Smithland surface.
119.6	Loosahatchie River.
122.2	Havana surface.
124.1	Peorian, Farmdale, and Loveland loess are exposed at drive-in theatre on left side of road.
125.7	Wolf River. Memphis.
130.2	Intersection of Lamar Avenue and Bellevue Boulevard.
134.3	Peorian, Farmdale, and Loveland (?) loess overlying early (?) Pleistocene sand.
136.9	Whitehaven City Limits.
139.9	Mississippi-Tennessee State Line.

Log No. 2

U. S. Highways 45E and 45, Kentucky State Line at Fulton to Mississippi State Line North of Corinth, Mississippi [1]

0.0	Tennessee-Kentucky State Line.
0.7	Smithland surface.
4.9	Late Pleistocene valley terrace.
6.2	Enter Weakley County.
6.3	North Fork of Obion River.
10.5	Martin.
21.4	Middle Fork of Obion River.
26.7	Oxidized "Peorian" loess.
27.8	South Fork of Obion River. Enter Gibson County.
30.3	Bradford.
32.9	Claiborne sand along ditch.
41.3	Milan City Limits.
42.9	Junction with U. S. 70A and 79.
44.7	Oxidized "Peorian" loess.
47.5–54.1	Exposures of Claiborne sand.
57.0	Middle Fork of Forked Deer River.
63.2	Claiborne sand on left.
64.5	Jackson City Limits.
69.5	South Fork of Forked Deer River.
70.8	Bemis.

[1] *By Melvin V. Marcher.*

PLEISTOCENE			Terrace sand and clay; loess (see fig. 2)
PLIOCENE			Iron-stained gravel and sand with local clay lenses
EOCENE	Jackson Group		Carbonaceous sand, silt, and clay
	Claiborne Group		Sand and clay lenses
	Wilcox Group		Silt and clay-ball conglomerate; sand; carbonaceous clay and silt
	Midway Group	Porters Creek Formation	Dark clay; glauconitic, silty, carbonaceous clay; and glauconitic sand
		Clayton Formation	Glauconitic, clayey sand; clayey, fossiliferous limestone in Hardeman County
CRETACEOUS	Ripley Formation	Owl Creek Tongue	Fossiliferous marl
		McNairy Sand Member	Cross-bedded, sandy clay
		Coon Creek Tongue	Fossiliferous, carbonaceous clay and marl
	Selma Formation		Calcareous clay and argillaceous, glauconitic sand
	Eutaw Formation		Sand in lower part; sand and clay in upper
	Tuscaloosa Formation		Gravel and sand

FIGURE 3.—*Cretaceous, Tertiary, and Quaternary strata of West Tennessee.*

72.7–74.6	Occasional outcrops of Wilcox sand.
79.1	Pinson.
80.6	Enter Chester County.
82.1	Wilcox sand.
84.3	Wilcox sand with ironstone layers.
85.0	Junction with State 100 in Henderson.

Optional side trip to Coon Creek fossil locality starts here.

0.0	Turn left on State 100 at junction with U. S. 45 in Henderson.
7.5	Turn right on Temporary State 22 at crossroads in northern edge of Jacks Creek Community.
7.7	Sharp left turn in Jacks Creek.
11.7	Fire tower on hill to left at crossroads.
16.1	Turn right off State 22, in western edge of Enville, onto the Adamsville-Leapwood-Enville Road.
18.2	Road on right to Center Hill School.
18.6	Slightly offset crossroads. Road to right ascends steep hill.
20.3	Turn left on gravel road, at gas-line crossing, where the Adamsville-Leapwood-Enville Road curves right.
21.1	Turn left at "T" road junction with a north-south road, and then almost immediately turn right on lane leading to home of the late Dave Weeks.
21.2	Park at the Weeks home, and walk about 500 feet east to Coon Creek. Walk about 400 feet to left, along west side of creek, to a small ravine joining Coon Creek from the west. Climb down into Coon Creek. (See Wade, 1926.)

86.5–96.4	Carbonaceous clay, silt, and sand of the Ripley formation.
90.0–96.4	Clayey and micaceous sand of the McNairy member of the Ripley formation.
99.6	Bethel Springs.
102.9	Clayey micaceous sand of the McNairy.
103.6	Junction with U. S. 64 in Selmer.
105.5	Carbonaceous clay of the Coon Creek tongue exposed at drive-in theatre.
105.6–105.8	Carbonaceous, fossiliferous clay of the Coon Creek tongue.
106.3	Coon Creek clay.
106.5	Junction with State 142.
111.9	Crossbedded McNairy sand.
114.5–116.9	Carbonaceous, fossiliferous clay of the Coon Creek.
117.7	Mississippi-Tennessee State Line.

Log No. 3

U. S. Highways 41A and 79, Kentucky State Line at Fort Campbell to U. S. Highway 70A at Atwood [1]

0.0	Kentucky-Tennessee State Line. Fort Campbell.
0.0–6.8	Red soil, white chert, and exposures of St. Louis limestone, the best being in the quarry right of highway at 2.5.
2.9	Cross Ringgold Creek.
6.8	Junction with U. S. 79. Turn sharply to right on Highway 79.
20.2	Enter Stewart County.
22.5	Redtop Road on left leads to Indian Mound Eocene deposits and Wells Creek Basin. (See Wilson, 1953, p. 753-768, index map, fig. 1, and Log 12.)
26.0	Guide left on U. S. 79.
26.7–30.5	Exposures of Tuscaloosa gravel.
35.8	Cross Cumberland River.
36.0	Stewart County Courthouse in Dover. Junction with State 49, which leads to Erin and Wells Creek Basin. (See Log 34 from junction of State 13 and 49.)
37.5	Entrance to Fort Donelson National Military Park.
38.3	Warsaw limestone on right. Warsaw chert between 33.8 and 40.8.
39.0	State 49 turns right.
40.5	Warsaw limestone on left.
40.8–42.5	Warsaw and St. Louis chert on Western Highland Rim.
42.5–44.0	Tuscaloosa gravel in pits at 42.5 and 44.0.
44.0–48.4	Mississippian chert on Western Highland Rim.
48.4–49.0	Gravel and sand deposits.
49.0–49.6	Fort Payne chert.
49.6	Fort Payne chert, Osage shale, and Maury shale member of Chattanooga shale. Chattanooga exposed south of highway a short distance west of 49.6.
50.0	East end of bridge over Kentucky Lake (Tennessee River). **(Remainder of Log by Melvin V. Marcher.)**
50.9	West end of bridge.
51.9	Fort Payne chert in cut on left.
54.3–55.4	Occasional exposures of the Coon Creek tongue of the Ripley formation.
56.3	McNairy sand member of the Ripley.

[1] *Western part of log by Melvin V. Marcher.*

58.6	Pliocene "Lafayette" gravel underlying the Smithland surface. (See Potter, 1955.)
60.9	Good view of the Smithland surface.
62.1	Roadside park on left.
66.8	Porters Creek clay shale exposed in ditch on right.
67.1	Junction with U. S. 641 on east edge of Paris.

Optional side trip to an active clay pit and a good fossil-leaf collecting locality. Continue straight ahead on U. S. 641.

0.0	Junction U. S. 79 and 641.
1.0	Turn right on U. S. 641.
1.7	Wilcox sand overlying Porters Creek clay shale.
1.7–4.0	Road cuts through sand and clay of the Wilcox.
4.9	Smithland physiographic surface.
12.6	Turn left on gravel road which leads to brick plant. Permission to enter clay pit may be obtained at office. The clay pit, which is about 100 yards west across railroad tracks, is in a clay lens in the lower part of the Wilcox group. The fossil leaves occur in a dark-brown plastic clay near the base of the quarry wall. Return to junction of Highways 79 and 641.

67.3	Porters Creek clay shale on right. The Porters Creek is mined for bleaching clay in Paris.
68.6–69.9	Wilcox sand and clay on left.
76.3	Henry.
79.1	Claiborne sand on left.
81.4	Enter Carroll County.
82.6	McKenzie City Limits.
83.8	Claiborne sand on left.
87.4	Claiborne sand and clay.
88.6	South Fork of Obion River.
93.2	Trezevant.
94.7	Claiborne sand and clay on right.
97.6	Junction with U. S. 70A.

Log No. 4

State Highways 69 and 114, Camden to Clifton

0.0	Turn south on State 69 off U. S. 70 in Camden. Camden chert overlain by Eutaw in large quarries to the south.
0.9	Underpass with Camden chert in vicinity.
2.3	Eutaw.
3.1	Camden chert.
3.3 & 6.3–6.5	Eutaw.
6.5	Center Hill School.
6.8	Camden chert.
7.8	Road to left in Gismonda leads about 1 mile to a quarry in Camden chert.
8.3	Road to left leads 2.5 miles to site of Allens Mill, where the Decatur and Birdsong are exposed.
8.3–8.9	Eutaw.
9.4	Fairview School.
10.0	Cross Turkey Creek.
10.1	Harriman chert.
10.2–10.9	Eutaw.
10.3	Birdsong glades in valley of Turkey Creek on left side of road.
11.5	Cross Coon Creek. Harriman chert in valley.
11.6–12.9	Eutaw.
13.3–13.4	Harriman chert overlain by Eutaw.
14.4	Turn left in Holladay.
14.5	Harriman chert.
14.8	Cross Sycamore Creek. Birdsong exposures to right along east side of creek. Eutaw exposed between this valley and that of Wolf Creek.
15.6	Cross Wolf Creek. Devonian cherts in valley. Decatur coral reef on left exposed along south side of creek.
15.7–20.4	Eutaw.
18.5	McIllwain.
19.4	Cross Eagle Creek.
20.4–21.7	Fort Payne chert.
22.2	Turn right in Sugar Tree.
22.9	Chattanooga shale.
24.4–27.2	Fort Payne chert.
24.8	Crossroads.

28.2	Turn right in Cozette.
28.2–28.4	Camden and Harriman cherts.
28.9	Cross Lick Creek.
29.0	Red Decatur limestone. Road to right, just beyond exposure, leads about 1 mile to Birdsong glades on both sides of the side road.
30.1	Devonian cherts.
30.4	Eutaw exposed in Jeannette.
30.6	Quarry in Devonian cherts to left of road.
30.6–31.5	Devonian cherts.
32.4	Cross Storms Creek.
32.8	Decatur limestone.
32.9	Birdsong.
33.0	Harriman chert quarries.
33.5–39.1	Eutaw.
33.8	Mountain Oak School.
37.1	Road to left leads 1½ miles to Birdsong glade.
37.8	Turn right on State 100.
38.1	Turn left on State 69 and 100 in Parsons.
39.1–39.6	Harriman chert, with some Decatur limestone.
41.0	Eutaw overlying Harriman chert.
41.2	Cross Beech River. Tucks Mill section of Decatur and Beech River formations at old bridge site to right, on south bank of river. Beech River glades around hill southwest of Tucks Mill.
41.3–41.6	Quarries in Decatur limestone, overlain by Birdsong.
41.9–42.0	Eutaw overlying Harriman chert.
42.8	Turn right at Decatur County Courthouse in Decaturville. Street to left leads about 3 miles to large glades in Brownsport group in the vicinity of Mt. Lebanon Church and School. About midway between these glades and Perryville is another large Brownsport glade.
42.9	Turn left on State 69, where State 100 continues straight ahead.
46.0	Cross Rushing Creek.
46.2–46.5	Dixon formation.
47.4–47.7	Eutaw.
48.5	Road to left. Exposures of Hermitage formation in valleys on both sides of main road.
49.7–49.9	Dixon formation.
53.0	Cross Gans Branch.

53.0–54.1	Wayne group. Brassfield in creek.
54.4	Dixon formation.
54.5	Turn left on State 114, where State 69 turns right.
54.8	Dixon formation.
55.3	Bath Springs section, beginning on hill to left and continuing southward to Sulphur Spring to right of road. Includes Beech River, Dixon, and Wayne beds.
55.6–56.6	Wayne limestone.
56.8	Road to left leads to Bobs Landing.
58.0	Side road to left. Brown iron ore in Harriman chert exposed to southwest of intersection.
58.8–61.0	Miscellaneous exposures of Brownsport, Dixon, and Wayne beds.
61.8–62.0	Terrace deposit.
63.4	Ferry to Clifton.

Log No. 5A

U. S. Highway 41A, Kentucky State Line at Fort Campbell to Nashville

0.0	Kentucky-Tennessee State Line at Fort Campbell.
0.0–6.8	Red soil, white chert, and exposures of St. Louis limestone, the best being in the quarry right of highway at 2.5.
2.9	Cross Ringgold Creek.
6.8	Guide left on U. S. 41 at junction with U. S. 79.
7.2	New Providence Community.
8.1–8.2	St. Louis limestone along highway and in two quarries.
8.3	Cross Red River.
9.6	Montgomery County Courthouse in Clarksville.
9.7	Turn left.
10.0	State 13 turns right to Erin and Wells Creek Basin. (See Log 34 from the junction of State 49 and 13.)
11.8–12.1	St. Louis limestone.
12.1–33.4	Western Highland Rim, covered with red soil and white chert formed by the weathering of St. Louis limestone. Some of the chert concretions are spherical.
12.5	Junction with State 12 and 76.
24.0	Enter Cheatham County.
30.6	Junction with State 49 in Pleasant View.
38.7	Enter Davidson County.

43.8–44.2	Large, angular blocks of reddish-brown, porous Warsaw chert.
43.9	Cross Old Hickory Boulevard.
44.2–44.8	Descend from the Highland Rim to the level of the Central Basin through a thick sequence of Fort Payne chert and Lower Shaly Osage. (See Wilson, 1949, for stratigraphy of the Central Basin.)
48.8	Leipers formation on left.
49.2	Cross King Lane.
49.5–49.6	Leipers on left.
50.2	Cross Whites Creek.
50.2–50.6	Bigby-Cannon and Catheys exposed along highway.
51.2	Bordeaux.
51.4	Cross Cumberland River. Bigby-Cannon and Lower Catheys exposed in bluff on north side of river. (See Wilson, 1948, for the geology of Nashville.)
52.5	Guide left onto Clay Street around entrance to cemetery.
53.3	Turn right on 8th Avenue North.
54.8	State Capitol to left.
55.4	Junction with U. S. 70 at 8th Avenue and Broadway.

Log No. 5B

U. S. Highway 41, Nashville to Georgia State Line near Chattanooga

0.0	South on 8th Avenue at intersection with Broadway. (See Wilson, 1949, for Ordovician stratigraphy of the Central Basin.)
0.3	Guide left on Lafayette Street.
1.3	Cross Wharf Avenue, which leads to left to quarry and railroad cut in Hermitage, Bigby-Cannon, and Catheys. Good section. (See Wilson, 1948, p. 12-13.)
1.7	Cross railroad tracks.
2.5	Exposures of Bigby-Cannon on left.
2.9	Underpass.
3.7–3.9	Hermitage-Carters contact well exposed along left of highway.
4.0–4.1	Lower Carters on right.
4.6	Thompson Lane on right, just before underpass.
8.7	Franklin Limestone Road leads 1.4 miles to right to large quarry in Carters limestone.

9.2–10.1	Erosional level developed on Hermitage formation.
10.6	Quarry on left in Carters.
10.6–13.7	Carters limestone.
13.7	Cross Old Hickory Boulevard at Carters-Lebanon contact.
13.7–19.0	Lebanon slabby limestone.
15.0	Enter Rutherford County.
19.3–24.2	Massive Ridley limestone. Ridley terrain is typically flat, characterized by rounded humps of limestone rising out of the soil and by lack of a well-developed drainage pattern. Large quarry in Ridley on left near end of interval.
20.3	Straight ahead in Smyrna, where State 102 turns left. (See Mississippi Geological Society Guidebook, 1954, p. 54-56, for trip through Central Basin starting here at trip-reading 21.5.)
22.5	Crossroads.
26.1	Overall Creek. Murfreesboro limestone in creek and in first cut south of bridge.
27.9	Quarry on right in Ridley.
29.0	Road to right leads across railroad tracks to Stones River National Military Park.
29.6	Cross Stones River.
30.7	Pierce limestone overlying Murfreesboro limestone.
30.7–31.6	Murfreesboro limestone and black chert.
31.6	Straight ahead on U. S. 41 in Murfreesboro, where U. S. 70 turns left.
32.0	Murfreesboro limestone in creek.
32.1	Cross State 96. Murfreesboro limestone in creek.
32.5	Cross U. S. 231.
32.9	Thick section of Murfreesboro limestone exposed at spring and on hill behind ice plant.
36.0	Cross creek.
36.0–40.4	Flat Ridley terrain with practically no surface drainage and infrequent exposures. The Highland Rim may be seen to the east, south, and west.
40.4	Crossroads.
41.3–45.4	Lebanon limestone. Good exposure on top of prominent hill in this interval.
45.4–48.9	Carters limestone. Hermitage-Carters contact well exposed at end of interval, opposite roadside table.
46.4	Road to right.

49.4	Enter Coffee County.
50.0	State 64 turns right in Beech Grove.
50.5–51.5	Cannon limestone.
51.5	Bridge at crossroads.
51.9–52.6	Let-down mass of blocks of Chattanooga shale and Fort Payne chert.
52.9–53.4	Catheys formation.
53.4–53.5	Chattanooga shale and Fort Payne chert on top of outlier of Eastern Highland Rim.
54.6	Bridge at crossroads.
55.1–56.3	Exposures of Catheys as highway ascends Highland Rim.
56.3–56.9	Chattanooga and Fort Payne chert to Rim level.
56.9–63.4	Fort Payne chert on Highland Rim.
62.4	Cross Duck River.
63.1	Road to right leads to old stone Indian fort.
63.7	Turn left at Coffee County Courthouse in Manchester.
63.8	Turn right at junction with State 53.
63.9	Turn left.
64.4	Cross State 55.
69.4	Tullahoma Road to right. Cumberland Plateau ahead.
69.4–84.6	Red soil and residual chert of the Warsaw and St. Louis limestones.
72.1	Crossroads in Hillsboro.
79.8	Enter Grundy County.
81.3	Junction with State 50 in Pelham.
84.6	Wonder Cave to left.
85.0–85.1	St. Louis limestone.
85.1–85.7	Ste. Genevieve and Gasper oolitic limestones.
85.7	Hardinsburg (?) sandstone at roadside table and spring.
85.7–86.2	Glen Dean limestone.
87.2–88.3	Pennsylvanian shales and sandstones, including the Sewanee conglomerate which locally caps the Cumberland Plateau.
88.3	Enter Marion County at junction with U. S. 64 across railroad tracks.
88.5	Railroad station in Monteagle.
89.0	Turn right, where State 56 turns left.
90.5–91.5	Pennsylvanian shales and sandstones as the highway descends the Cumberland Plateau, the Sewanee conglomerate forming the edge of the Plateau. Good section of Mississippian below Pennsylvanian.

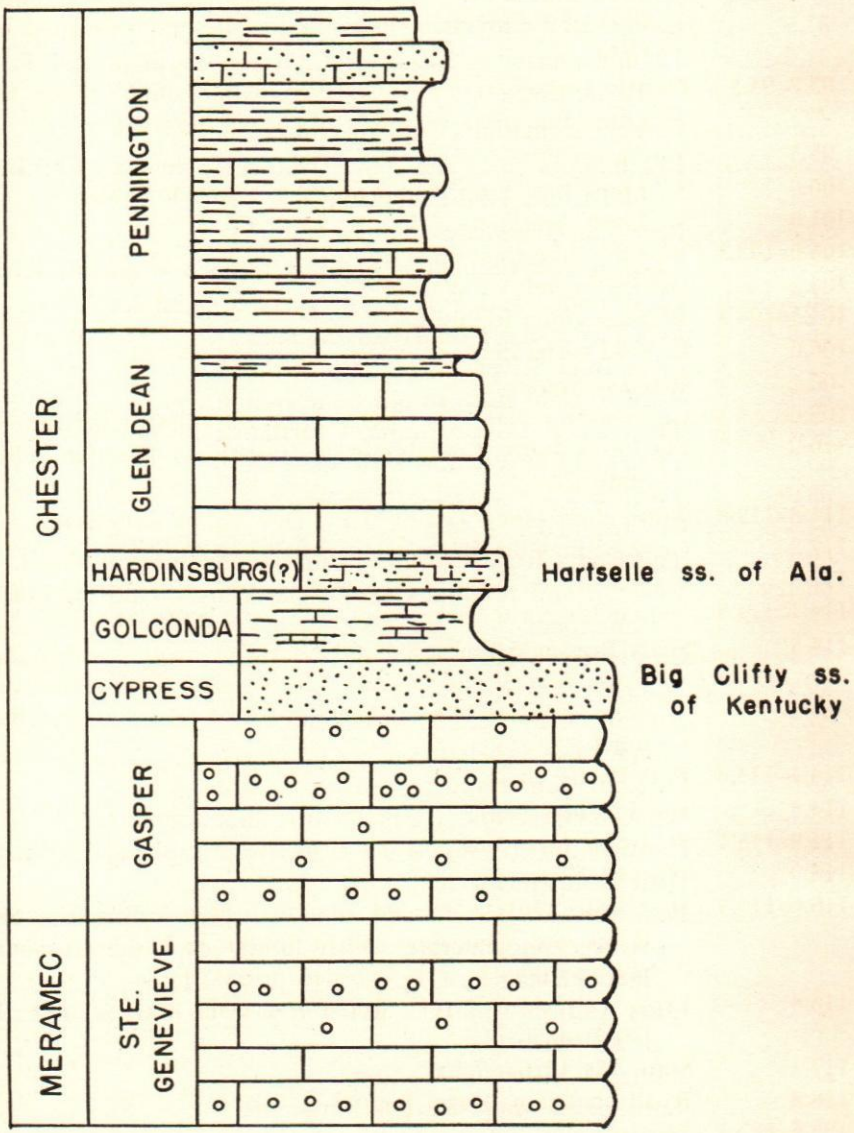

FIGURE 4.—*Mississippian strata of the Cumberland Escarpment.*

91.5–92.3	Pennington formation.
92.6–93.2	Glen Dean limestone.
93.2	Hardinsburg (?) sandstone and Golconda shale on both sides of highway in deep cut just beyond side road to right.
93.2–94.5	Oolitic Gasper and Ste. Genevieve limestones. Some St. Louis limestone exposed at end of interval.
95.3	Spring on left.
100.0	St. Louis limestone in cut opposite roadside table.
101.8	St. Louis limestone.
103.0–103.3	Warsaw limestone on left.
104.2	Quarry on left in Warsaw.
104.3–104.8	Warsaw along highway.
106.6	U. S. 72 turns right.
106.7	Warsaw limestone.
109.0	Cumberland Plateau to left capped by resistant sandstone.
110.9	Marion County Courthouse in Jasper, at junction with State 27.
111.8–112.8	Knox chert along axis of Sequatchie Valley anticline.
112.2	Cross Sequatchie River.
112.9	Crossroads.
114.1–114.3	Sequatchie formation.
114.3	Shaly Brassfield limestone and Niagaran shale, possibly the equivalent of the Osgood, Laurel, etc. Hematitic iron ore was formerly mined in the Brassfield 6 miles to the north.
114.4–114.6	Fort Payne chert.
114.8	State 28 turns left.
114.9–115.1	St. Louis limestone.
116.0	Warsaw limestone.
116.6–116.8	St. Louis. Only a few feet west of bridge over Tennessee River, Ste. Genevieve oolitic limestone has been dropped to highway level by small normal fault.
116.8	Cross Tennessee River. Hales Bar Dam may be seen to left from bridge.
117.4	State 134 turns right.
118.8	Road on left to Hales Bar Dam.
125.6–127.4	Mississippian limestone with some shale, largely Glen Dean and Pennington.
129.9	Enter Hamilton County. (See Rodgers, 1953, for geology of East Tennessee.)

130.7	Crystal City Cave to right.
131.4–131.9	Fort Payne chert.
131.9	Chattanooga shale.
132.1–132.3	Rockwood formation.
132.3	U. S. 41 joined by U. S. 11 on right.
132.6	Sequatchie formation in deep cut. Between here and 133.3 the axis of the Chattanooga anticline is crossed.
133.3	Rockwood formation on west side of underpass, and Fort Payne chert on east side.
133.6	Cross Lookout Creek.
134.0	State 148 turns right to Lookout Mountain and Lookout Mountain Caverns.
134.1–135.3	Mississippian limestones, including Ste. Genevieve and Gasper.
134.9	Road to right up Lookout Mountain.
135.8	Turn left, beneath underpass, on Broad Street in Chattanooga.
138.2	Turn right.
138.3	Turn right on U. S. 41 and 27 (Market Street), where U. S. 11 continues straight ahead.
138.9	Turn left on Main Street.
139.1	Straight ahead on Main Street, where U. S. 27 turns right.
141.3	Turn right on Dodds Avenue.
141.8	Turn left on Ringgold Road.
141.9–142.1	Upper Chickamauga limestone.
142.3	Turn left and enter tunnel through Missionary Ridge formed by Knox dolomite, which is exposed on east side of tunnel for approximately 1½ miles. Both Copper Ridge and Chepultepec dolomites occur here. Missionary Ridge fault near middle of tunnel thrusts Copper Ridge dolomite over Chickamauga limestone.
147.2	Cross West Chickamauga Creek.
147.4	Upper Knox dolomite and chert, forming prominent strike ridge.
147.6	Georgia-Tennessee State Line.

Log No. 6

State Highway 100, Etc. (Via Linden, Clifton, and Savannah), Nashville to Mississippi State Line South of Michie

0.0	Follow State 100 westward from 8th Avenue and Broadway in Nashville. (See Wilson, 1949, for Ordovician, Silurian, and Devonian stratigraphy.)
1.4	West End entrance to Vanderbilt University on left.
1.8	Centennial Park, on right, with replica of the Parthenon.
2.8	Underpass.
3.8	Nashville City Limits.
5.4	Cross Richland Creek.
5.4–6.2	Exposures of Bigby-Cannon limestone in creek along left of highway.
6.8	Follow State 100 at junction where U. S. 70S guides right.
8.0	Entrance to Percy Warner Park.
9.0	Uppermost Eden or lowermost Maysville on left.
9.2 & 9.4	Leipers on left.
10.1	Old Hickory Boulevard on left.
11.6	Cross Harpeth River.
15.3–15.7	Lower Shaly Osage in cuts.
18.1	Cross Harpeth River.
18.2	Chattanooga shale overlying Brassfield limestone.
18.5	Chattanooga shale overlying Brassfield limestone and Mannie shale on right.
19.3–19.9	Lower Shaly Osage.
19.9	Enter Williamson County.
19.9–51.6	Western Highland Rim, covered by residuum of Fort Payne chert with blocks of Warsaw and St. Louis chert that have been let-down.
24.3	Junction with State 96.
26.6	Cross Crow Cut Road. St. Louis chert in cut.
30.6	Enter Hickman County.
37.2	Bon Aqua Junction on State 46.
43.8	Brown iron ore was formerly mined in this vicinity. (See Burchard, 1934, for brown iron ore.)
48.7	Junction with State 48.
51.9–52.8	Chattanooga shale overlying Laurel and Osgood limestones.
53.0	Brassfield, Osgood, Laurel, and Waldron in quarry.
53.3	Cross Duck River.
53.7	Fort Payne chert with one small block of cherty limestone.
54.0	Courthouse Square in Centerville.

54.2	Fort Payne chert.
54.3–54.6	Chattanooga shale overlying Laurel, Osgood, and Brassfield.
54.7–55.1	Phosphatic Leipers on left. Local phosphate mining.
55.1	Straight ahead at junction with State 50.
57.6–58.6	Lower Shaly Osage and Fort Payne chert.
58.3	Underpass.
60.1	Cut illustrates deep weathering.
60.5	Junction with State 48.
61.7–69.0	Mississippian chert residuum on the Highland Rim.
66.2	Nacome Road.
69.0–70.3	Occasional exposures of Lower Shaly Osage.
71.4	Sinkhole a short distance to left of highway receives all the water of Upper Sinking Creek, which has paralleled the highway for some distance. The water reappears in a large spring 0.6 mile to the south, in the valley of Cane Creek.
73.0	Quarry in Bob limestone on right.
73.5	Cross Cane Creek. Osage from here to 73.9.
75.7–76.4	Deeply weathered Mississippian on Highland Rim.
75.9	Enter Perry County.
76.4–76.6	Lower Shaly Osage.
76.8	Bob and Beech River formations.
77.1	Bob limestone.
78.3	Cross Brush Creek. Beech River formation in cut beyond bridge.
78.8–78.9	Osage.
78.9–79.7	Deeply weathered Mississippian.
80.6	Beech River and Bob formations.
80.9	Cross Coon Creek. Beech River formation in cut.
81.0–81.3	Deeply weathered Mississippian.
82.4	Chattanooga shale overlying Rockhouse and Decatur limestones.
82.7	Cross Buffalo River.
82.9	Junction with State 13 on right. 3.7 miles to the north, Flat Gap and Ross formations are well exposed in deep cut, with Decatur limestone north of cut. Good Devonian section.
82.9–83.1	Chattanooga shale and Osage on left of highway. Hardin sandstone and Harriman limestone exposed near spring on right of highway.

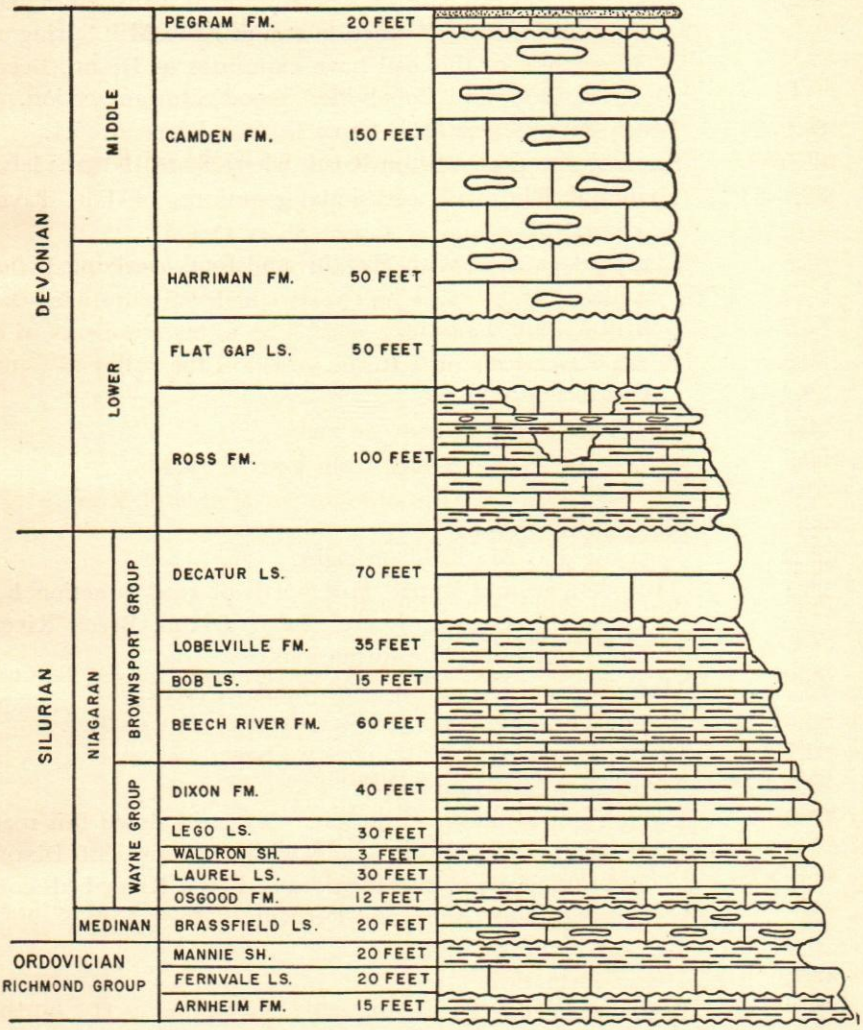

FIGURE 5.—*Ordovician (Richmond), Silurian, and Devonian strata in Central Tennessee.*

83.4	Turn left, at traffic light in Linden, on State 20 and 13. State 100 continues straight ahead.
84.2–84.3	Bob and Beech River beds. Cross Buffalo River at 84.3.
84.5	Straight ahead on State 13, where State 20 turns left. Quarry in hill to east of junction and at Rises Mill Spring on north side of this hill have exposures of Dixon, Beech River, Bob, and Lobelville. Good Silurian section.
84.9–85.1	Beech River formation. Cross Buffalo River at 85.1.
85.9	Straight ahead on Clifton Road, where State 13 turns left.
86.4–88.3	Highland Rim with occasional exposures of Fort Payne chert.
88.5	Chattanooga shale with Hardin sandstone overlying Lobelville.
88.6	Bob limestone on right.
88.8–89.0	Beech River beds on left.
89.2–90.0	Dixon formation.
90.4	Fernvale limestone.
90.6	Laurel limestone.
91.5	Road on left.
92.1	Dixon-Lego contact.
92.9	Fernvale and Brassfield on right.
93.0	Turn left around store. Hill north of road junction has Brassfield, Osgood, Laurel, Lego, Dixon, Beech River, Bob, and Lobelville formations.
93.2	Hermitage formation on south bank of creek.
93.6	Turn right. Fernvale and Brassfield on left to 94.1.
94.7	Chattanooga overlain by cherty Osage.
94.7–97.9	Weathered Mississippian.
95.9	Curve right at side road on left. One mile down this road is the Sewells Spring glade with exposures of Dixon, Bob limestone with *Conchidium,* Beech River beds containing many corals, and Decatur.
97.8	Beech River formation.
97.9	Dixon formation.
98.0	Straight ahead at crossroads.
98.2–99.3	Laurel and Osgood formations.
99.4	Osgood and Brassfield formations.
99.6–99.8	Laurel limestone.
100.4	Contact of Beech River and Dixon formations.
101.1	Mississippian chert in quarry on left, and Devonian formations in creek on right of road.

101.6	Beech River formation.
101.7–102.0	Dixon formation.
102.0	Straight ahead at crossroads.
102.2	Lego limestone.
102.7	Cross arm of Kentucky Lake.
103.0	Osgood on right.
103.2	Mannie shale on left.
103.8	Road to right leads to quarry on river in Laurel, Lego, and Dixon formations.
103.9	Laurel limestone.
103.9–104.4	Osgood formation.
104.4	Brassfield limestone and Mannie shale on left.
104.6–104.7	Mannie shale with Fernvale limestone.
104.9–105.3	Hermitage formation.
105.4	Brassfield and Osgood on right.
106.4–106.6	Dixon, Lego, and Laurel. To the north, across part of Kentucky Lake, quarry openings may be seen in the bluff.
107.5	Turn left on State 114, in Clifton, around Riverside Hotel.
107.8	Section in quarry and on hill to left includes Laurel, Waldron, Lego, Dixon, and Beech River.
109.1	Laurel limestone.
110.3–110.4	Beech River overlying Dixon.
111.8–112.3	Lego and Dixon.
113.2–113.5	Beech River formation.
114.5	Dixon formation.
114.6	Clifton Junction. Turn right on U. S. 64.
114.9	Hardin Creek.
115.3	Beech River formation on left.
115.4	Bob limestone.
115.6–116.5	Fort Payne on Highland Rim.
117.5	Enter Hardin County.
118.8	Cross creek.
119.4	Quarry on right in Decatur, overlain by Rockhouse limestone. Road to left leads 3/4 mile to exposures of Ross formation and ferruginous Bear Branch limestone in creek bed.
119.7	Chattanooga shale.
120.0	Road to right leads to good Devonian section with Decatur, Ross, and Flat Gap. Cross Indian Creek just west of this road.

120.4–120.6	Ross formation, Hardin sandstone, and Chattanooga shale. A complete 11-inch trilobite was found in the Ross here.
120.7	Olivehill. Thick Hardin sandstone exposed only a short distance south of highway.
121.7	Fort Payne chert.
121.9	High river terrace gravel overlying Eutaw sand on crest of hill at crossroads.
122.3	Osage.
122.6	Chattanooga shale.
123.2–123.3	Beech River and Dixon beds on left.
123.4	Cross Smith Fork.
124.2 & 127.3	Eutaw sand.
129.7	Road on right.
129.7–129.9	Beech River formation.
130.3	Road to Cerro Gordo on right. From here to Savannah the highway is on terrace gravel, except in the creek valleys.
134.2	Junction with State 69 on left.
134.5	Hardin County Courthouse in Savannah.
134.7	Guide left at Historical Marker for Cherry Home.
135.0	Cross Kentucky Lake (Tennessee River).
136.7	Junction with State 69 on right.
137.6–141.5	Terrace gravel.
138.6	Road on left in Crump.
138.8	Turn left on State 22, leaving U. S. 64.

Optional side trip to Coon Creek fossil locality starts here.

0.0	Straight ahead on U. S. 64, at junction with State 22 on left.
2.9	Enter McNairy County.
4.1	Crossroads in Adamsville, where State 22 turns right.
4.8	Eutaw sand.
6.1	Turn right on Adamsville-Leapwood-Enville Road.
8.3	Curve right at road intersection.
10.0 & 12.1	Eutaw sand.
13.0	Leapwood Post Office.
13.9–14.4	Eutaw sand.
14.4	Side road on left. Eutaw sand in cut.
15.3	Turn right on gravel road, at gas line crossing, where Adamsville-Leapwood-Enville Road curves left.
16.1	Turn left at "T" road junction with a north-south road, and then almost immediately turn right on lane leading to home of the late Dave Weeks.

16.2	Park at the Weeks home, and walk about 500 feet east to Coon Creek. Walk about 400 feet to the left, along the west side of the creek, to a small ravine joining Coon Creek. Climb down into Coon Creek. (See Wade, 1926.)

141.5–141.8	Eutaw sand and clay.
141.9	Cross bridge.
143.4–155.7	Terrace gravel.
144.7	Turn right on State 22 at crossroads in center of Shiloh National Military Park.
147.8	Straight ahead, where State 142 turns left to Pickwick Dam.
148.9	Enter McNairy County.
151.7	Cross State 57.
153.4–154.3	Gravel pits.
154.8	Road on right in Michie. Well drilled here for oil encountered Niagaran strata below Cretaceous.
159.5	Mississippi-Tennessee State Line.

Log No. 7A

U. S. Highway 31W, Kentucky State Line Near Mitchell to Nashville

0.0	Kentucky-Tennessee State Line near Mitchell.
0.0–11.2	Western Highland Rim, with exposures of Warsaw chert and limestone.
3.8	Junction with State 52, left to Portland.
6.7	Crestview Road to left at crossroads.
7.2 & 8.1–8.2	Warsaw limestone.
8.5	Cross State 25.
9.0	Warsaw limestone.
10.7	Road to left in deep cuts in red soil and chert of Warsaw.
11.2–11.7	Fort Payne chert.
11.8–18.4	Western Highland Rim with exposures of Warsaw chert.
12.7	White House.
18.4–19.1	Descend from Rim to Central Basin through Fort Payne chert and Lower Shaly Osage. Position of Chattanooga shale is at base of hill. (See Wilson, 1949, for Ordovician stratigraphy.)

19.5–21.0	Miscellaneous exposures of Arnheim and Leipers along creek a short distance left of highway.
21.2	Cross bridge at Millersville School.
23.3	Guide left at junction with U. S. 41.
23.5	Enter Davidson County at bridge over Mansker Creek.
23.9	Leipers on left.
24.6	Traffic light in Goodlettsville at junction with Long Hollow Pike to left.
26.1	Leipers on right.
29.5	Cross Old Hickory Boulevard.
30.4–30.5	Leipers on left.
31.3	About 10 feet of Leipers overlain by Arnheim in road cut and quarry in saddle. Hill to left of highway has exposures of Fernvale, Brassfield, Chattanooga, and Lower Shaly Osage.
32.7	Catheys on left at Sunset Drive.
33.7	Bigby and Dove-colored facies of Bigby-Cannon on right.
34.0	Cross Trinity Lane.
34.8	Nashville City Limits. (See Wilson, 1948, for geology of Nashville.)
34.9	Quarry on right in Catheys at Carver Street. (See Wilson, 1948, p. 15, for details.)
36.1	Straight ahead at bridge over Cumberland River on right.
36.6	Underpass on new bridge approach. Highway will probably turn right here after construction of bridge.
36.7	Turn right on Woodland Street.
36.9	Cross Cumberland River.
37.1	Turn right around Davidson County Courthouse.
37.4	Tennessee State Capitol Building on right.
37.6	Turn left on 8th Avenue.
38.0	8th Avenue and Broadway, junction with U. S. 70.

Log No. 7B

U. S. Highway 31, Nashville to Alabama State Line at Ardmore

0.0	8th Avenue and Broadway. (See Wilson, 1949, for Ordovican stratigraphy of Central Basin.)
2.2	City Limits of Nashville.
2.9	Cross railroad tracks.
3.4	Battle of Nashville Monument at Thompson Lane.

5.9	Tyne Boulevard to right.
6.0	Contact between Catheys and Bigby-Cannon limestones along right side of highway.
8.6	Bigby-Cannon limestone on right.
8.8–9.0	Railroad cut on left includes an almost complete section of Bigby-Cannon, overlain by Catheys. (See Wilson, 1948, p. 104, for details.)
9.0	Cross Old Hickory Boulevard in Brentwood.
9.1	Enter Williamson County.
10.7	Cross Little Harpeth River.
13.2	The hills that you are entering are outliers of the Western Highland Rim, capped by Fort Payne chert. All the high wooded hills to the west are edges of the Rim.
15.4	Bigby-Cannon to right.
15.9	Bigby facies.
18.0	Liberty Pike on left leads to small phosphate district.
18.4	Confederate soldier monument in Franklin square.
18.6	Guide left at junction with State 106. The street straight ahead at this intersection leads to a quarry developed in the Bigby-Cannon, overlain by Catheys, about 2½ miles to the west.
19.1	The Carter House on right.
19.7	Cross railroad tracks.
21.1	Roadside tables on right, including a relief model map of the Battle of Franklin.
21.1–23.6	Bigby-Cannon. At the crest of Winstead Hill (21.2) the contact with the Catheys is well exposed only a few feet above level of highway. The basal member of the Catheys is the *Constellaria* bed. The Battle of Franklin was fought between here and the Carter House.
25.3	Cross West Harpeth River.
27.5	Bigby-Cannon on left of highway and in railroad cut to right.
28.0	Crossroads. Road to right leads to Thompsons Station, north of which is a small phosphate-mining district.
28.7	Bigby facies on left.
31.2	Enter Maury County. (See Smith and Whitlatch, 1940, for phosphate.)
31.6	Spring Hill.

32.8–38.2	Leached Hermitage and Bigby with occasional exposures of bedrock. Good phosphate-reserve land between 32.8 and 33.9.
38.2–39.2	Carters limestone. Contact with Hermitage well exposed south of Rutherford Creek. Note absence of Upper Carters member at this unconformity. Good Ordovician section to 40.3.
39.0	Cross Rutherford Creek.
39.2–39.5	Hermitage formation.
39.5–40.3	Bigby facies. In cut at top of hill, 39.8, Bigby-Catheys contact may be seen on the right .
42.8	Cross Duck River, along which Carters limestone is exposed.
43.3	Straight ahead through Columbia at junction with U. S. 43 to right.
43.4	Turn left.
43.5	Turn right.
48.1	Crossroads on crest of low hill. Phosphate strip pits to right.
48.3	Cross tracks leading to phosphate pits on right.
49.6–50.0	Bigby.
50.6	Side road on right in McCains.
51.3	Laminated Argillaceous limestone and *Dalmanella* coquina members of Hermitage in cut.
53.7	Moores Lane on right.
54.1	Bigby in cut in saddle.
54.9	Phosphate strip pits up hollow on right. *Dalmanella* coquina member of Hermitage in front of house on right.
55.3	Culleoka Road to left.
55.9	Carters limestone on left.
56.1	Stiversville.
57.2	Enter Giles County. Fort Payne chert in cut has been lowered vertically by solution of underlying limestone.
61.4	Junction with State 129 in Waco.
61.9–62.4	Carters limestone.
63.0	Quarry on left in Lebanon limestone.
63.2–65.0	Carters limestone.

LOG 7B. NASHVILLE–ARDMORE

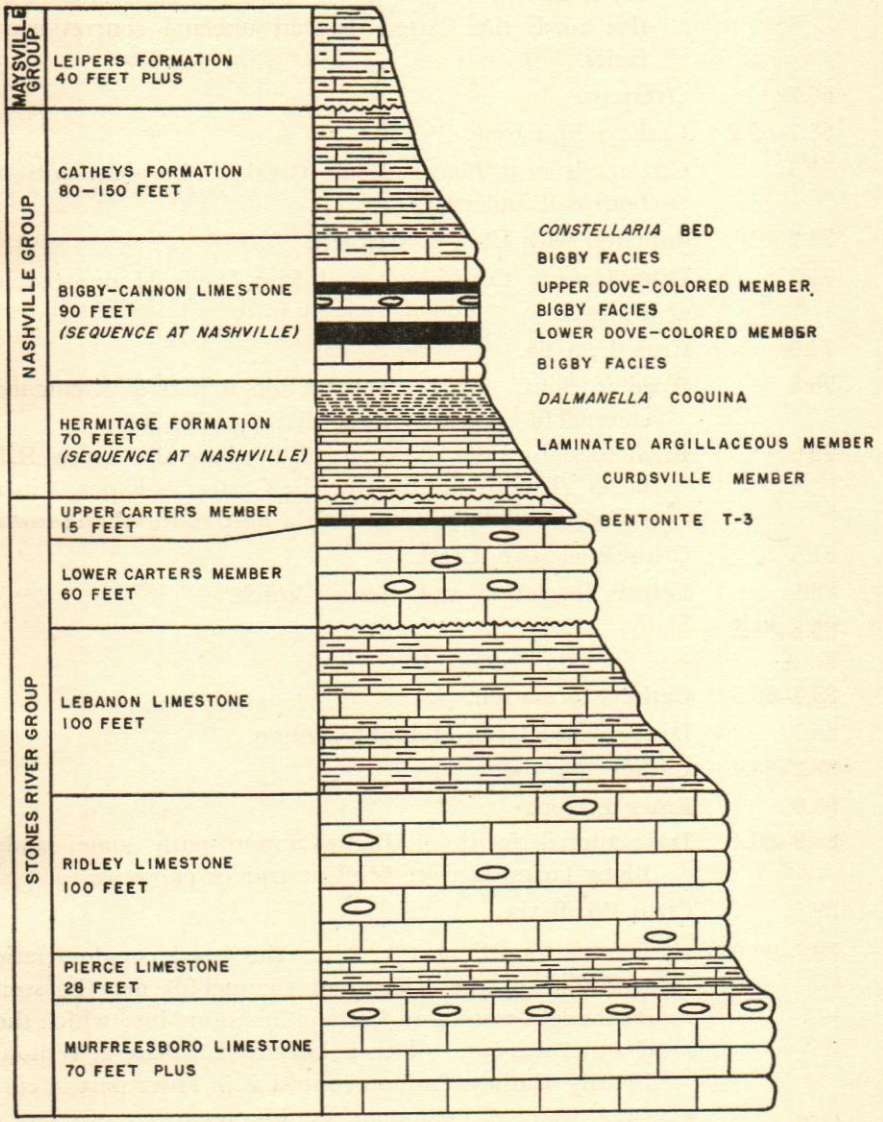

FIGURE 6.—*Stones River, Nashville, and Maysville strata in Central Tennessee.*

65.7	Road to right to Campbellsville, where the California Company drilled 5,750 feet to granite. In a small quarry south of this road, and on the large farm crossed by this road, the Carters has an unusual concretionary facies.
66.7	Overpass.
68.7–69.2	Catheys limestone.
71.5	Crossroads near Pigeon Roost Creek. Phosphate pits to both east and west.
74.2	Junction with U. S. 31A to left.
74.7	Giles County Courthouse and Sam Davis Monument in Pulaski.
74.9	Cross U. S. 64.
76.8	Road to right. Shale at intersection is part of Richmond channel-fill. (See Wilson, 1948a, p. 733-765.)
79.6	Road to right leads to Aspen Hill, where the Aspen Hill facies (Kimmswick-like) of the Carters is exposed in a railroad cut slightly less than a mile south of the town.
81.5	Cross Buchanan Creek.
82.5	Leipers formation at Ephesus Church.
83.8–84.8 & 85.7–86.5	Catheys formation.
86.7	Dove-colored facies of Bigby-Cannon.
88.2–88.4	Catheys on right.
88.9	Enter Elkton.
88.9–89.4	Dove-colored facies of Bigby-Cannon with some sandy Bigby facies in river bluff at end of exposure.
89.5	Cross Elk River.
89.7–90.0	In first cut south of Elk River the basal conglomeratic sandstone of the Richmond channel-fill may be seen on the left, resting on Catheys limestone into which the channel was cut. (This is Locality 25, Plate 2, Wilson, 1948a.) Catheys-Cannon contact is in lower part of cut.
90.4	Leached sandy beds overlain by Elk River terrace gravel opposite restaurant.
91.1	Carters limestone.
91.3–91.7	Bigby-Cannon, both Dove-colored and Bigby facies.

92.7	Leipers overlain by Fort Payne chert and Chattanooga shale.
92.7–93.7	Fort Payne chert.
93.7	Highland Rim level.
94.4	Alabama-Tennessee State Line at underpass in Ardmore.

Log No. 8

U. S. Highway 43, Columbia (Toward Florence, Alabama) to Alabama State Line South of Lawrenceburg

0.0	Turn right on U.S. 43 at junction with U. S. 31 in Columbia.
0.1	Home of James K. Polk on left.
0.6	Guide left at junction with State 50 and 99.
2.7	Cross Little Bigby Creek.
11.9	Confederate soldier monument in Mount Pleasant. Between here and 14.3 the highway is bordered by extensive phosphate mining. (See Smith and Whitlatch, 1940, for phosphate.)
14.3	Good exposures of Bigby along right of highway, illustrating mining of high-grade phosphate flake from joint-controlled "cutters."
17.2	Enter Rockdale.
17.7–19.1	Fort Payne chert, as the highway ascends above the Central Basin level.
19.1	Highland Rim level, all the way to Alabama, with exposures of leached Fort Payne chert.
20.0	Junction with State 20 on right.
20.3	Enter Lawrence County.
35.1	Cross U. S. 64 in Lawrenceburg.
56.0	Alabama-Tennessee State Line.

Log No. 9

U. S. Highway 31E, Kentucky State Line South of Adolphus to Nashville

0.0	Kentucky-Tennessee State Line south of Adolphus.
0.0–6.9	Lower Shaly Osage and Fort Payne chert on Western Highland Rim, exposed between 1.4 and 3.4.
6.1	Cross State 52.

6.9–7.7	Descend Highland Rim through Osage to Central Basin level. (See Wilson, 1949, for Ordovician and Silurian stratigraphy.)
7.7	Chattanooga shale.
8.1–8.2	Bledsoe limestone, probably the equivalent of the Lego and Dixon formations.
8.3	Laurel, in creek on left, overlain by Waldron shale and Bledsoe limestone.
8.3–9.1	Exposures of Laurel, locally overlying Osgood formation in rock shelters and quarries near end of interval. The Laurel is in part dolomitic.
9.6	Cross bridge.
10.8	Road to left in Bransford. Sequatchie formation exposed on right of highway.
11.3	State 10A and U. S. 231 turn left.
11.6–11.8	Sequatchie formation.
12.4	Leipers formation.
13.5	Cross bridge. Enter Bethpage.
14.2–15.7	Occasional small exposures of Leipers.
16.7	Cross bridge at crossroads.
18.1	Road to right.
19.4	Deshea Creek at crossroads.
21.1	Leipers on crest of hill.
23.5	U. S. 31E joined by State 25 on left in Gallatin.
24.1	Sumner County Courthouse in Gallatin.
24.5	Guide left on U. S. 31E, where State 25 turns right.
25.9	Catheys exposed in cut.
26.8	Cross Camp Creek. Dove-colored facies of Bigby-Cannon limestone exposed on left of highway east of creek, and in quarry on left of highway.
28.2	Catheys in cut.
28.9	Cross Station Camp Creek. Dove-colored facies of Bigby-Cannon limestone exposed just east of bridge and in quarry on right of highway, east of the creek.
29.6	Crossroads. Road to right leads to quarry in Bigby-Cannon and Catheys limestones slightly more than half a mile from highway.
31.0–32.7	Catheys.
31.9	Saundersville.
33.2	Bigby facies of Bigby-Cannon limestone.
33.5	Dove-colored facies of Bigby-Cannon.

35.5	Cross Drake Creek. Catheys exposed in creek and in small quarry on right.
35.9	Crossroads in Hendersonville.
36.6	Road to left to Old Hickory Dam on Cumberland River.
36.7	Overpass.
37.0–37.5	Leipers in two large cuts.
37.7–37.9	Catheys and Leipers in deep cut. Contact at highway level in approximately the middle of the cut.
39.0	Cross Mansker Creek and enter Davidson County. Catheys in creek.
39.3–40.0	Catheys.
40.9	Crossroads. Goodlettsville to right.
41.8	Bridge over Dry Creek. Exposures of Catheys from here to Amqui, the best exposures being in railroad cuts to right of highway.
43.4	Cross Old Hickory Boulevard. Enter Madison.
45.1	Entrance to National Military Cemetery on right.
48.5	Nashville City Limits. (See Wilson, 1948, for geology of Nashville.)
49.7	Straight ahead on Main Street at Carnegie Library.
51.1	Join U. S. 31W.

Log No. 10A

U. S. Highway 231, Bransford to Walterhill

0.0	South on U. S. 231, leaving U. S. 31E in Bransford.
0.2	Cross railroad tracks before cut in Sequatchie formation.
1.4 & 1.9–2.2	Sequatchie formation.
2.2	Fault crosses road in cut at drainage divide. Sequatchie north of fault and Laurel limestone south of fault.
2.2–2.4	Laurel limestone. Waldron and Pegram formations on hill above Laurel.
2.4–2.5	Osgood, Brassfield, and Sequatchie formations.
3.6	Enter Trousdale County just before railroad tracks, bridge, and crossroads.
3.9–5.1	Catheys formation.
5.3–5.6	Leipers formation.
5.9	Lane to right.

5.9–6.0	Leipers formation.
6.4–6.5	Catheys formation.
6.6	Crossroads.
7.0	Cannon limestone with a thin zone of Dove-colored limestone.
7.4–7.5	Cannon and Dove-colored limestones.
7.8–8.0	Cannon limestone.
8.2	Cross State 25, joining State 10.
8.7	Carters-Hermitage contact at small pond on left.
9.2–10.1	Carters limestone, with bridge at end of interval.
9.4	Crossroads at creek.
11.1–13.4	Carters limestone.
14.7	Enter Wilson County at south end of bridge over Cumberland River.
14.7–18.2	Lebanon limestone.
18.3–18.4	Carters limestone, beginning south of side road on right.
18.7–21.3	Lebanon limestone.
21.3	Turn right. Highway will probably continue straight ahead here after construction is completed.
21.4	Turn left.
21.5	Cross U. S. 70N in Lebanon.
22.3	Turn left.
22.6	Merge with U. S. 231, now under construction.
23.5–23.6	Lebanon limestone.
23.6–24.7	Ridley limestone. Crossroads at end of interval.
24.7–26.0	Lebanon limestone. Crossroads at end of interval.
26.3–26.5	Lower Carters, bentonite T-3, and Upper Carters.
26.6	Hermitage formation in cut at top of ridge.
26.6–27.0	Carters limestone.
27.2–27.3	Upper Carters to side road on right, beyond which T-3 is exposed along right side of highway.
27.3–27.9	Carters limestone, ending just beyond crossroads.
28.4–28.5	Carters-Lebanon contact in cut.
29.0	Quarry on left in Lebanon.
29.0–30.2	Lebanon limestone, ending 0.1 mile beyond entrance to Cedars of Lebanon State Park to left.
30.3–30.9	Ridley limestone.
30.9–31.1	Lebanon limestone caps hill.
31.2–32.4	Ridley limestone begins at crossroads and continues to Hurricane Creek.

32.7–32.8 & 33.3–35.8	Lebanon limestone.
36.0	Cross Fall Creek and enter Rutherford County. Ridley limestone in creek.
36.5 & 37.1	Lebanon limestone in deep cuts.
37.1–37.9	Lebanon limestone.
38.1–40.8	Ridley limestone.
40.8	Crossroads in Walterhill.

Log No. 10B

U. S. Highway 231 and State Highway 10, Walterhill to Alabama State Line South of Fayetteville

0.0	Crossroads in Walterhill.
0.5	Power plant and dam on left are site of Pierces Mill, the type locality of the Pierce limestone. Here, it overlies massive, cherty Murfreesboro limestone, and is overlain by a few feet of Ridley limestone.
0.6	Cross East Fork of Stones River. From here to Murfreesboro the typical inner-level of the Central Basin is developed mostly on the Ridley limestone along the axis of the Nashville dome.
7.3	Turn left on U. S. 70S and 231 in Murfreesboro.
7.4	Turn right.
7.5	Straight ahead at James K. Polk Hotel, where U. S. 70S turns left.
7.6	Turn right.
7.7	Turn left.
7.8	Cross U. S. 41.
9.2	Ridley limestone. Central Basin developed on this limestone between Murfreesboro and Middle Fork of Stones River.
10.5	Cross Middle Fork of Stones River. Good exposures of Murfreesboro limestone to right of bridge.
11.2–11.4	Ridley limestone.
11.8	Winsted Community.
12.7–15.4	Ridley limestone, including several large quarries.
15.8–16.0	Murfreesboro limestone with black chert exposed along creek on right. Pierce limestone exposed in creek north of lane to right at beginning of interval, and on right

of bridge over Christmas Creek at south end of interval. This inlier of these older limestones is restricted to a small dome well illustrated here. All other inliers of these two formations are structurally similar, the Ridley being the limestone that floors the extensive inner-level of the Central Basin.

16.1–18.3 Ridley limestone, with exception of a hill at 17.8 that is capped with Lebanon limestone.

17.2 Side road to left in small community.

18.3–19.7 Lebanon limestone with typical cedar glades.

19.7–20.8 Ridley limestone.

20.4 Cross Stones River.

21.0 Road on left to Fosterville.

21.3 Enter Bedford County.

23.4–23.6 Lebanon limestone.

23.7 Carters limestone in saddle and in quarry on right of highway.

23.8–23.9 Lebanon limestone.

24.8 Crossroads in Deason.

25.2 Ridley limestone in creek.

25.9 State 83 turns left.

28.0 Lebanon limestone in small pits on both sides of highway.

28.1 Crossroads.

29.1–29.3 Ridley limestone in creeks.

30.7 Side road to right.

30.8 Lebanon-Carters contact.

30.8–31.2 Carters limestone.

31.3 Hermitage formation caps hill.

31.4–31.7 Carters limestone.

32.9 Cross U. S. 41A.

33.4 Follow highway signs around Bedford County Courthouse in Shelbyville.

33.6 Cross Duck River.

34.2 Straight ahead, where State 64 and 130 turn right.

35.1–35.5 Lebanon limestone in valley of Flat Creek.

35.5–36.7 Carters limestone.

37.1–37.2 Cannon and Dove-colored limestones, including a *Tetradium* reef.

38.3 Crossroads.

39.3–39.8 Cannon and Dove-colored limestones. Roadside table on right at end of interval.

40.3–40.7	Catheys formation in saddle. Hills on either side capped with Fort Payne chert.
41.0–42.6	Cannon limestone.
41.3	Cross Sugar Creek.
42.6	Basal Laminated Siltstone member of Catheys formation. This member is massive, has marked conchoidal fracture, but is not laminated in this area.
43.1–43.4	Catheys and Inman (25 feet thick) formations overlain by Chattanooga shale.
43.5–48.2	Fort Payne chert capping the Highland Rim strip between the Central Basin proper to the north and the Elk River Basin to the south.
43.8	Enter Moore County.
43.9	Enter Lincoln County.
48.2–48.3	Chattanooga shale.
48.7–49.8	Catheys formation. Catheys-Cannon contact exposed at end of this interval.
50.0	Cross headwater branch of Norris Creek. Cannon limestone forms bed of the creek from here to Belleville, but Catheys occurs along right side of highway between 50.0 and 50.1.
50.7	Belleville.
51.0–51.2	Catheys formation.
52.1	Cross Norris Creek.
52.3–52.4	Cannon limestone at level of highway, but Cannon-Catheys contact is only a few feet above road level on the left. Lower Catheys, including Basal Laminated Siltstone member, and the upper part of the Cannon are well exposed in quarry on left.
53.1–54.0	Catheys formation.
54.3	Cross Norris Creek.
56.9	Good section of Cannon in large quarry to left.
57.2–57.8 & 58.2–58.4	Catheys formation.
59.1	Join State 50.
59.3	Join U. S. 64.
60.0	Turn left at Lincoln County Courthouse in Fayetteville, where U. S. 64 continues straight ahead.
60.7	Cross Elk River. Cannon-Catheys contact at bridge level. Good exposure of Basal Laminated Siltstone member.
62.1	Straight ahead, where State 110 turns right.

62.4	Cannon-Catheys contact.
62.4–63.9	Catheys formation.
64.0	Chattanooga shale overlying Leipers formation.
64.0–71.5	Fort Payne chert on the Highland Rim.
71.5	Alabama-Tennessee State Line.

Log No. 11A

State Highway 28, Kentucky State Line at Static to Crossville

0.0	Guide left on State 28 at junction with State 42 in Static on Kentucky-Tennessee State Line. First 3 miles are on the Eastern Highland Rim with exposures of St. Louis chert. Sinkholes common. Outliers of the Cumberland Escarpment rise above the Rim level.
2.0	Road on right.
2.6	Road on left.
3.9	Ste. Genevieve on curve around crest of hill, where joined by road on right.
4.1	Prominent mountain on left is an outlier of the Cumberland Plateau and is capped by Pennsylvanian strata.
4.4	St. Louis limestone.
4.8–5.2	Warsaw limestone along right side of highway.
5.4	Bridge.
5.9	Garretts Mill sandstone member of Warsaw limestone overlain by St. Louis limestone.
5.9–6.1	St. Louis limestone.
6.1–6.2	Red soil and St. Louis chert.
6.3	Road on right.
7.0–7.1	Shaly Warsaw with sandy beds. The Warsaw is commonly clastic in this part of Tennessee.
7.1	Enter Fentress County.
7.3	Forbus Post Office at bridge over Caney Creek. There has been extensive drilling for oil and gas in this vicinity.
7.7–8.5	St. Louis limestone and chert.
9.1	Road on left.
9.1–9.3	Leached sandy Warsaw beds.
9.7–9.8	Warsaw limestone.
9.9	Bridge.
10.4	Note strip pit dumps ahead on left.

10.6	Road to left at beginning of curve leads to strip pits in which barite was mined on a large scale in St. Louis residuum. (See Jewell, 1947, p. 101-102.)
10.8–11.2	Warsaw.
11.5	Cross Wolf River in Pall Mall.
11.6	Home of Alvin York on left.
11.7–12.6	St. Louis and Ste. Genevieve limestones. Contact near side road on left at about 12.1.
13.7	Quarries and exposures in Ste. Genevieve limestone. Begin ascent of Cumberland Escarpment.
13.7–15.1	Ste. Genevieve and Gasper oolitic limestones.
15.1–15.2	Cypress sandstone. Entrance to quarry in Glen Dean limestone on right at 15.2.
15.2–15.7	Glen Dean limestone.
16.0	Contact between Pennington shale and Pennsylvanian sandy beds.
16.0–16.5	Pennsylvanian shale. (See Wilson, Jewell, and Luther, 1956.)
16.2	Road on right in saddle. The Sewanee, represented by only a few feet of shaly sandstone in the road intersection, becomes massive and as thick as 35 feet a short distance to the west, where the road follows the top of the sandstone.
16.5	Cumberland Plateau level. From here to Crossville, except where mentioned in log, highway is on Rockcastle conglomerate.
19.8	Road on left to Pickett State Park, where there is an interesting natural bridge in the Rockcastle.
20.5	York Institute.
21.8	Cross State 52 at Fentress County Courthouse in Jamestown.
23.6	Road to right leads to Buffalo Cove, where celestite was mined in the Glen Dean limestone during World War II.
24.6	Allardt Road on left.
25.6–27.4	Several roads on right lead to mines in Wilder coal.
33.9	Crossroads in Grimsley.
34.8	State 85 turns right to Wilder.
39.2	Crossroads in Clarkrange. Stone quarry in Rockcastle about 3 miles to the east.

40.6 Enter Cumberland County at bridge over Clear Creek. Sub-Rockcastle beds exposed in valley of creek for 0.8 mile, including Sewanee conglomerate in creek bed and lower part of valley.

45.7 Cross Lickfork Creek. Sub-Rockcastle beds for 0.2 mile in valley. Isoline coal mined in vicinity.

46.9 Cross No Business Creek in Isoline. Good exposures of Rockcastle. Mines on both sides of highway in Isoline coal, not far beneath Rockcastle conglomerate.

48.6 Prominent crossroads on a small low hill capped by Dorton shale.

53.9 Cross Obed River.

57.6 Straight ahead at junction with U. S. 70 on right in Crossville.

57.8 Straight ahead on State 28, where U. S. 70 turns left. Between here and the water tank is the Cumberland Plateau overthrust. (See Stearns, 1954.)

Log No. 11B

State Highway 28 and the East Valley Road, Crossville to Junction With U. S. Highway 64 East of Jasper [1]

0.0 Straight ahead on State 28, where U. S. 70 turns left. The Cumberland Plateau overthrust is present, but not exposed, between this junction and the water tank.

0.1–0.5 Cross southeastward-dipping beds of the Vandever formation. The ridges on which the water tank and the school are located are strike ridges formed by sandstones in this formation.

0.6–1.2 Rockcastle conglomerate.

1.2 Sandstone preparation plant.

2.8–3.3 Rockcastle exposed in valleys of two creeks in this interval, with Dorton shale on the hill between the creeks.

3.4–3.6 Dorton shale.

3.6–5.5 Crossville sandstone.

3.9 Turn right on State 28, where State 68 turns left in Homestead.

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[1] *With Robert L. Wilson, Professor of Geology and Geography, University of Chattanooga.*

Optional side trip to Grassy Cove on State 68.

0.0	Turn left on State 68, where State 28 curves right in Homestead.
0.0–2.9	Crossville sandstone.
2.2	Turn right.
2.9–3.6	Dorton shale.
3.4	Cross Daddys Creek. Rockcastle in creek bed.
3.6–3.9	Crossville sandstone.
4.1–4.3	Rockcastle and Sewanee conglomerates. Strip pits at end of interval.
4.3–5.2	Descend through strata of lower Pennsylvanian. Pennsylvanian-Pennington contact at end of interval.
5.2–5.4	Pennington formation.
5.4–5.8	Glen Dean limestone in quarry on left.
5.8–6.4	Belt of Cypress, Ste. Genevieve-Gasper, and St. Louis formations. No exposures along highway.
6.4–6.7	Garretts Mill sandstone member of the Warsaw formation, and Warsaw cherty limestone. Grassy Cove Creek flows into Mill Cave west of here.
6.8–6.9	Warsaw and Fort Payne chert.
7.3	Bridge at crossroads in Grassy Cove Community. This is near the center of the cove, an elongate drainage basin about 6 miles long and 2 miles wide. All drainage goes underground in caves or sinks. The Pennsylvanian "rim-rock" encircles the cove.

4.6	Entrance to Cumberland Mountain State Park on right.
5.6–7.5	Rockcastle conglomerate.
7.5	Crossroads in Linary. Crab Orchard Mountains ahead.
8.8–9.0	Dorton shale.
9.0–9.2	Rockcastle. Good exposure at mill on Daddys Creek at middle of interval.
9.5–11.2	Road follows strike of Rockcastle conglomerate, which dips westward off the Sequatchie Valley anticline.
11.1	Road to Big Lick turns right, as highway curves left across strike of beds.
11.4–11.6	Shale.
11.6–11.8	Sewanee conglomerate.
12.4	Gizzard beds.
12.5–14.5	Pennington formation, beginning just above large switchback. Road on left at 12.8 leads to quarry in Glen Dean limestone.

14.3	Cross Sequatchie River.
14.8–15.1	Fort Payne formation, with some St. Louis and Pennington, in complex fault relationship.
15.3–15.4	Cannon limestone in quarry on left. Hermitage formation and Upper Carters limestone are exposed along side road to left just south of quarry.
15.6	Cross Sequatchie River.
16.6	Catheys, Inman, Leipers, and Sequatchie formations exposed on ridge to right of highway.
16.9	About 200 feet of Catheys limestone exposed on ridge to right.
17.7	Enter Bledsoe County.
17.9–18.8	Lebanon limestone.
18.6	Turn left at crossroads, leaving State 28, which continues straight ahead. Excellent section of Carters, Hermitage, Cannon, and Catheys exposed along road to right at crossroads and along creek to right.
18.8–19.3	Ridley limestone.
18.9	Cross Sequatchie River.
19.0	Axis of Sequatchie Valley anticline.
19.4	Turn right at crossroads. Section of Cannon, Catheys, and younger formations begins 0.8 mile straight ahead at crossroads.
19.4–20.5	Stones River group.
21.0	Crossroads.
23.3–24.4	Stones River group, including Lebanon limestone near end of interval.
24.3	Red Hill Church on left.
25.1	Cross Beatty Creek.
26.2	Crossroads.
26.3	Cross creek. Lebanon and Ridley along creek to left, and Ridley and Murfreesboro to right.
26.8	Lebanon limestone.
28.3	Smyrna Church on right.
28.6	Lebanon in road and in quarry on right of road. Northwestward from the quarry there are exposures of Ridley and Murfreesboro.
29.2	Lebanon along road, Ridley and Murfreesboro to the right, and Carters to the left.
29.7	Cross creek. Ridley in road and Murfreesboro to right.

30.3	Murfreesboro exposed to left of road. The abrupt rise in topography a few hundred feet to the right represents the topographic expression of the top of the Knox. The Knox is exposed along the axis of the anticline for about 4 miles.
30.4	Road to right.
33.1	Cross Sequatchie River.
33.3	Turn left on State 28 one block south of the Bledsoe County Courthouse in Pikeville.
33.8	Straight ahead on State 30, where State 28 turns right.
34.4	Straight ahead on the East Valley Road, where State 30 turns left.
34.6–34.9	Knox chert.
38.3	Cross Crystal Creek.
40.7	Ridley, Lebanon, Carters, Hermitage, and Cannon exposed along creek to left and on hill south of this creek.
41.3–41.6	Oak Grove Church on left at beginning of interval of exposures of Murfreesboro.
41.9–42.2	Shaly bed in the Murfreesboro well exposed in old road to right of road at end of interval. This is a finger of shale from the Valley and Ridge Province. There is some Murfreesboro limestone in this interval.
42.4	Crossroads.
42.7	Center Point Church.
43.1–43.5	Lebanon along road, with Carters to left. Quarry in Carters on left, near end of interval. Lower Carters, bentonite T-3, and Upper Carters are present in quarry.
43.3	Cross creek.
43.7	Lebanon limestone.
44.2	Stones River beds.
45.6	Crossroads and bridge over Killian Branch.
45.9	Sunnyside School.
47.8	Road leads 0.5 mile to left to thick Brassfield in creek.
48.2–49.0	Lebanon limestone.
49.4	Enter Sequatchie County.
50.8	Cross Swanner Branch. Road in Catheys formation. Inman, Leipers, and Sequatchie formations are exposed up hill on left and south of Swanner Church.
51.7	Crossroads.
52.7	Cannon limestone on hill to left. To the right the section continues to the top of the Knox.

53.3 Henson Road to left.

53.4–54.7 Stones River beds, with shaly zone in Murfreesboro along right of road in last 0.1 mile of this interval.

55.0 Road on right to Dunlap.

55.6 White Murfreesboro limestone.

57.4–57.9 Stones River group, including Lebanon limestone.

57.9 Rejoin State 28, by continuing straight ahead, crossing State 8 at oblique crossroads. There is a quarry in the Catheys formation 1.0 mile to the left on the right side of State 8. This quarry is overlain by younger formations, and by Chattanooga, Fort Payne, Warsaw, and St. Louis formations along the highway, including a quarry in the St. Louis limestone. Note fluorspar along stylolite just above the top of the underground part of the quarry. Between this crossroads and Dunlap, back to the right, State 8 and 28 cross the axis of the anticline with good exposures of Knox chert.

58.9 Cross Easterly Branch. Ridley and Lebanon to left along south side of branch, and Murfreesboro and Knox to right along lane just south of branch.

59.9 Road to right crosses Sequatchie River.

61.4 White Murfreesboro limestone in creek and on hill southeast of bridge.

63.6 Enter Marion County just south of crossroads.

64.4 Lebanon fossils along lane to left.

66.4 Road to right.

67.4 Carters limestone in front of house on left.

69.2 Cross State 27 in Powells Crossroads. 0.9 mile to left, on south side of State 27, is a quarry in the Leipers, overlain by Sequatchie, etc. Coal mine dumps are visible above Whitwell to the right.

71.1 Road to right.

71.6 Lebanon and Carters along creek to right of road.

72.7 Catheys along road and on hill to left; Cannon, Hermitage, and Carters on right side of road.

74.4 Church with large cemetery on left.

75.7 Section at Inman, up hill to left to old red iron ore mines in the Brassfield. The road here is in Catheys, which is overlain by Inman (type section), Leipers, Sequatchie, Brassfield, and Niagaran. Road and bridge on right just south of section.

76.9	Road to right.
77.3	Mineral Springs Community. Up hill west of school there are exposures of Sequatchie, Brassfield, Niagaran, and Chattanooga. The Sequatchie contains Fernvale limestone interbedded with its clastic equivalent.
77.5–78.2	Fort Payne chert.
78.2	Crossroads.
78.7	Fort Payne chert.
78.8–78.9	Brassfield limestone and shale.
79.6	Turn left on State 28 at Ebenezer Church, where a secondary road continues straight ahead.
79.9–80.2	Sequatchie (?) formation.
80.7	Turn right on State 28, where road to Hales Bar Dam turns left.
81.6–82.5	Fort Payne chert, with possibly some younger chert. Junction with U. S. 64.

Log No. 12

U. S. Highway 27, Kentucky State Line Near Winfield to Harriman Junction on U. S. Highway 70[1]

0.0	Kentucky-Tennessee State Line. (See Wilson, Jewell, and Luther, 1956.)
1.1–1.3	Wartburg sandstone in ravine. U. S. 27 in Tennessee cannot match the colorful exposures of Corbin (Wartburg of Tennessee) between Whitley City, Kentucky, and the State Line.
1.7	Lane to right leads to railroad cut, not far from highway, in which the Wartburg sandstone is replaced laterally by shale.
2.9	Railroad station in Winfield.
3.3–5.7	Frequent exposures of shale immediately overlying the Wartburg and the topmost irregular beds of this sandstone.
4.3	Overpass.
5.7–7.2	Shale and sandstone above the Wartburg.
7.2	Sandstone in cut at crest of hill overlies the Blue Gem coal, which is locally absent.
9.5	Turn right in Oneida.

[1] *With Robert L. Wilson.*

12.2	Crossroads at crest of hill.
12.2–12.8	Shale above Wartburg. Poplar Creek coal exposed at end of interval.
13.1	Lane to right leads to excellent exposure in railroad cut just west of highway. Channeling and channel-fills in upper beds of the Wartburg.
13.1–18.5	Wartburg.
15.0	Road to left leads to Helenwood mining district. Some strip pits visible from highway.
16.5	State 63 turns left.
18.4–18.5	Excellent exposure of channeling in base of Wartburg (or in beds just below Wartburg) opposite scenic overlook on left.
18.5–20.8	Shale and sandstone below Wartburg in New River gorge.
19.0	Underpass. Park at New River railroad station on left side of highway, and walk northward along tracks for about ¾ mile for interesting features of sedimentation, including channeling.
19.2	Cross New River. Topmost beds of Rockcastle conglomerate in bed of river.
20.8–21.7	Wartburg. Note channeling base of this sandstone as highway ascends to top of south rim of New River gorge.
21.4	Side road cuts back sharply to right.
21.7–47.1	Shale and sandstone between the Wartburg and Rockcastle, except as cited below.
21.9	Mountains far ahead in distance are cut into essentially flat-lying Pennsylvanian strata.
23.9	Railroad station in Robbins.
24.5	Abandoned brick plant up valley to left formerly used Pennsylvanian shale.
26.1	State 52 turns right in Elgin (Rugby Road).
27.8	Underpass.
28.4	Glenmary, center of small oil field.
29.8	Enter Morgan County.
32.0–32.2	Top few feet of Rockcastle.
35.2	Crossroads in Sunbright. Several small oil and gas fields in vicinity.
37.3	Overpass.
38.7	Topmost Crossville at intersection with road to right, and along creeks in Pilot Mountain Community.
42.2–42.4	Crossville sandstone.

LOG 12. WINFIELD–HARRIMAN JUNCTION

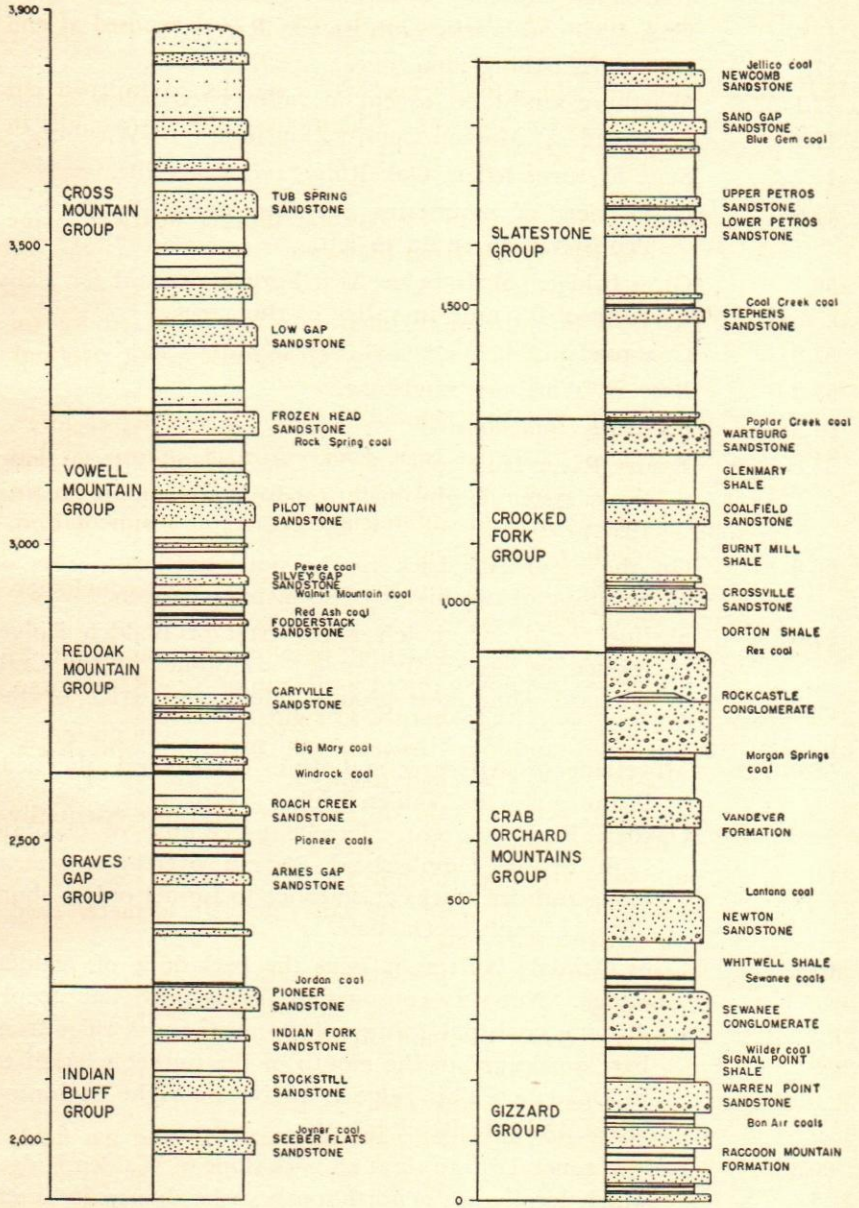


FIGURE 7.—*Pennsylvanian strata of the Cumberland Plateau, Tennessee. (After Wilson, Jewell, and Luther, 1956)*

42.9–43.5	Occasional exposures of topmost Rockcastle.
45.0	Cross railroad tracks and Emory River.
47.1	Base of Wartburg sandstone.
47.1–53.2	Wartburg sandstone, except in valley cited below.
47.3	Crossroads at Morgan County Courthouse in Wartburg.
47.7	State 62 turns left to Oak Ridge and Knoxville.
47.9	Good view of mountains cut into essentially flat-lying Pennsylvanian strata to left.
50.1	Cross bridge. Shale below Wartburg is exposed for a distance of 0.7 mile in valley of this creek.
52.9	Crossroads.
53.2	Base of Wartburg sandstone.
54.3–54.4	Crossville sandstone.
55.8–56.2	Emory River fault zone of the Cumberland Plateau overthrust system, beginning at roadside table. (See Stearns, 1954.)
56.8	On the mountains back to the north-northeast, scars of stripping of two high coal seams may be seen.
57.6	Skyline ahead and to left is the crest of Walden Ridge, formed by essentially vertical sandstones of the Crab Orchard Mountains group. Here, the strike of the ridge is N. 75° E.
58.0–59.6	Miscellaneous exposures and dips. In general, the beds begin to rise up Walden Ridge.
59.6	Oakdale Road to right. Excellent exposure of Oakdale fault of the Cumberland Plateau overthrust system along railroad tracks at entrance to tunnel only a short distance south of Oakdale.
60.2	Cross Oakdale fault as it joins the back-slope of Walden Ridge. Not very conspicuous in highway, but steeply dipping sandstone forms a sharp north-south ridge from here northward to the mouth of the tunnel referred to in Oakdale. This ridge is visible on right beginning at the Oakdale Road junction.
60.3	Beds in general dip to right off back-slope of Walden Ridge, which locally has a north-south strike due to its intersection with the Oakdale fault. The ridge may locally be seen to the left.
62.1	Walden Ridge as seen straight ahead, or slightly to the

right, has a N. 70° E. strike, being beyond the influence of the Oakdale fault that controlled the local change in ridge strike.

62.3 Enter Roane County.

62.7–63.2 Highway cuts through Crab Orchard Mountains group in Walden Ridge. Vertical attitude of beds is well exposed along railroad tracks across Emory River to right.

64.1 Turn right at junction with State 61 just beyond overpass in Harriman.

64.7 Turn left on U. S. 27.

65.0 Turn right.

65.1 Turn left onto bridge over Emory River.

65.3 Road to right off south end of bridge leads to large quarry in Knox dolomite.

65.3–65.8 Knox dolomite along highway.

66.1 Guide left on U. S. 27, where State 61 continues straight ahead in South Harriman.

66.9–67.4 Exposures of shale of Conasauga group.

67.4 Underpass.

67.8–68.9 Rome shale and sandstone in strike ridge.

69.4 Junction with U. S. 70 in strike valley cut into Conasauga shale.

Log No. 13

U. S. Highway 27, From Junction With U. S. Highway 70 South of Rockwood, to Chattanooga

0.0 Drive south on U. S. 27, where U. S. 70 turns right.

0.0–4.2 Knox chert.

4.5 Enter Rhea County at bridge over Whites Creek.

5.1–5.6 Knox chert.

6.5 Chickamauga limestone on right.

6.6 Crossroads in Roddy.

6.9–29.9 Highway follows Knox-Chickamauga contact, with exposures of Knox chert and dolomite along the left ridge, and valley cut into Chickamauga limestone along the right. Low strike ridge on left is formed by Knox chert, and skyline on right is the Eastern Escarpment of the Cumberland Plateau, formed by resistant Pennsylvanian beds.

13.7	Cross Piney River and enter Spring City.
14.3	State 68 turns right in Spring City.
17.1	State 68 turns left at railroad crossing.
24.6	Road on right to Evensville. Knox dolomite well exposed along left of highway.
31.1	State 30 turns left at Rhea County Courthouse in Dayton.
33.6	Highway is in the valley cut into Chickamauga limestone, with a Knox ridge along the left, and a Fort Payne ridge along the right. Eastern Escarpment forms skyline on right.
35.5–35.7	Highway curves right across strike and crosses Fort Payne ridge, which has paralleled the highway south of Dayton. Exposures of Rockwood and Fort Payne formations in cuts. Pits visible to right at end of interval are in Pennington shale.
35.7–42.3	Valley cut in Mississippian limestones.
36.0	Road on right to Graysville.
37.4	Enter Hamilton County.
38.2–39.7	Mississippian limestone.
41.1	Cross creek. Enter community of Sale Creek.
42.3–42.7	Cross Fort Payne strike ridge, which has been on left side of highway south of Graysville. Exposures of Fort Payne on left side of highway in first cut as highway begins to ascend ridge.
42.7–42.8	Chattanooga shale and Rockwood formation in second cut.
42.8–44.5	Valley in Chickamauga limestone. Ridge to left is formed by Knox, which is thrust over Chickamauga along the Chattanooga fault at base of ridge.
44.5	Crossroads in Bakewell. Cross Chattanooga fault, Knox over Chickamauga.
45.1–47.7	Knox chert.
47.9–48.8	Chickamauga Reservoir on left.
49.2–50.5	Knox chert.
50.1	Soddy-Daisy School on left.
50.5	Cross Chattanooga fault, Knox over Chickamauga, at crossroads.
50.5–50.8	Valley cut into Chickamauga limestone.
50.8–50.9	Ridge on left formed by Fort Payne formation.
50.9–57.8	Valley cut into Mississippian limestone.
51.6	Railroad overpass. Enter Daisy.
54.9	Road to Montlake on right.

55.0 Cross North Chickamauga Creek.

55.7–57.8 Ridge on right formed by Fort Payne formation along north end of Chattanooga anticline. The ridge some distance to left is Knox ridge along east side of Chattanooga fault, Knox over Mississippian.

57.5 Cross Falling Water Creek.

57.8–63.3 Strike valley cut into Mississippian limestone. Fort Payne ridge on right, and Knox ridge on left. Log follows old highway through Red Bank.

63.3 Red Bank.

65.1–66.5 Fort Payne ridges on both sides of highway, which follows a narrow synclinal valley in Mississippian limestone. High ridge in background on left is formed by the Knox beyond the Chattanooga fault. State 8 turns right at end of interval.

66.5–67.4 Fort Payne formation from highway junction through tunnel. Enter Chattanooga.

67.6 Rockwood formation in pits on right.

68.7 Cross Tennessee River. Lookout Mountain ahead, slightly to right. Signal and Raccoon Mountains of Walden Ridge to right. These three mountains are capped by Pennsylvanian beds. Low ridge on right, on south side of bridge, is formed by Fort Payne.

69.8 Join U. S. 11, 41, and 64 in Chattanooga.

Log No. 14

U. S. Highway 25W, Kentucky State Line at Jellico to Knoxville [1]

0.0 Kentucky-Tennessee State Line in northern edge of Jellico. The strip mines just passed in Kentucky are in the Poplar Creek coal. The Blue Gem and Jellico seams have been extensively mined in the hills west and southwest of Jellico. (See Wilson, Jewell, and Luther, 1956.)

0.3 Turn left in Jellico.

1.1 Hills to right and left consist of flat-lying Pennsylvanian strata. Straight ahead is Pine Mountain, the northwestern escarpment of the Cumberland thrust block. (See Rich, 1934, for the geology of this thrust block.)

[1] *With Robert L. Wilson.*

2.9	Road to left across bridge leads to exposures of Rockwood formation nearly 1 mile from highway.
3.4	Cross the approximate position of the Pine Mountain thrust, Rockwood thrust over Pennsylvanian.
3.5	Road to right passes exposures of Rockwood and Fort Payne and leads to a large quarry in Warsaw, St. Louis, and Ste. Genevieve limestones.
4.3–7.5	Steep dip, in sandstones and conglomerates of the Crab Orchard Mountains group forming Pine Mountain, gradually flattens to the southeast.
7.5–11.7	Rockcastle conglomerate, beginning at roadside table on crest of hill.
8.2	State 90 turns left in Morley.
11.7–21.0	Sandstone and shale of post-Rockcastle age.
14.5	Road to left in Habersham. Coal Creek coal has been extensively mined in this vicinity.
15.7–15.8	Small mines in Coal Creek coal.
18.1	Drainage divide of Cumberland thrust block. Sandstone in gap underlies Blue Gem coal, the youngest beds seen along U. S. 25W.
19.5	Underpass.
21.0–23.9	Steeply dipping beds of the Crab Orchard Mountains group on the northwest side of Walden Ridge; however, the beds are essentially flat-lying in the hills to right.
23.9	Road to right leads to Ivydell, site of old mines in Rex, etc., coals.
23.9–24.3	Gorge through vertical sandstones and conglomerates of Crab Orchard Mountains group.
24.3	Road to left leads to quarry in Mississippian limestone. Mississippian-Pennsylvanian contact in creek just above bridge. Chattanooga shale exposed in creek downstream from quarry. Cross bridge just beyond road to quarry. (See Rodgers, 1953, for geology of East Tennessee.)
24.9	Turn right in LaFollette at junction with State 63.
25.6	Guide left.
26.7–27.3	Knox dolomite at highway level on left.
27.5	Overpass.

27.8–29.3	Exposures of Chickamauga limestone. To the right is the escarpment of the Cumberland thrust block. The mountains straight ahead consist of flat-lying Pennsylvanian strata. Several levels of coal mining are apparent. These flat-lying beds are south of the Jacksboro fault which has a northwest-southeast strike at right angles with the strike of the escarpment of Cumberland Plateau. This tear fault causes a major offset in this escarpment, the resistant Pennsylvanian strata having been pushed northwestward on the northeast side of the fault.
30.0	Campbell County Courthouse in Jacksboro.
32.2	Entrance to Cove Lake State Park on right.
32.4–34.0	Exposures of Knox dolomite and chert.
33.0	State 63 turns right. This highway follows the valley along the Jacksboro fault northwestward. The entrance to this valley can be seen back to the right across the lake.
34.2	Indian Gap, through which the Jacksboro fault passes. Knox dolomite forms hills to left, whereas Pennsylvanian beds form hills to right.
34.5	Sharp-pointed hill straight ahead is the north end of vertical beds of the Crab Orchard Mountains group, where they are sheared off by the Jacksboro fault. This hill is the northern end of Walden Ridge, which forms the edge of Cumberland Plateau to the south.
35.2	Underpass.
35.2–35.8	Copper Ridge dolomite and chert. Highway parallels Walden Ridge on right.
36.1	Underpass.
36.2–37.9	Conasauga shale.
38.0–38.3	Rome formation. Enter Anderson County in this interval.
38.5	Overpass.
38.5–38.7	Conasauga shale.
39.2	Junction with U. S. 441 on left in Lake City.
39.8	Cross bridge over Coal Creek in Lake City. Water gap through Walden Ridge on right.
40.4–45.7	Highway follows strike valley in Conasauga shale, bordered by a Knox ridge on left and a Rome ridge on right.
41.1	Crossroads.
42.7	School on right.
45.7	Sharp curve to left, as highway leaves Conasauga valley.
46.0–48.5	Copper Ridge dolomite.

49.0	Underpass. Enter Clinton.
49.3	Anderson County Courthouse in Clinton.
49.6	Turn left on U. S. 25W at junction with State 61.
49.9	Bridge over Clinch River.
50.0	Chickamauga limestone.
50.2	Reedsville shale.
50.3–50.6	Rockwood and Sequatchie formations in deep cut.
51.8–52.2	Rome formation in strike ridge. Between 50.6 and 51.8 the highway crosses the Whiteoak Mountain fault, Rome over Chickamauga, the latter not being exposed.
52.2–52.7	Conasauga shale.
52.6	Crossroads.
52.7	Knox chert and red soil.
53.3	Crest of Knox ridge.
53.8	Well-exposed erosional contact between Knox dolomite and Chickamauga maroon siltstone on left.
53.9	Curve left at Zion Church and cemetery.
53.8–54.6	Exposures of Chickamauga siltstone, limestone, and chert.
54.3	Crossroads in Claxton.
54.7	Cross Copper Creek fault, Rome over Chickamauga.
54.7–55.0	Rome formation.
55.3	Cross bridge.
55.4–55.8	Conasauga shale and limestone.
55.8–55.9	Maynardville-Copper Ridge contact well exposed at sharp curve to left. Dark chert is in Copper Ridge dolomite.
55.9–58.4	Knox dolomite and chert.
57.2	Enter Knox County.
58.3	Crossroads in Beaver Valley, which is developed in poorly exposed Chickamauga limestone.
58.5	Cross bridge.
59.5	Road intersection.
59.7	Cross split of Beaver Valley fault, Knox over Moccasin, the latter not exposed.
59.7–60.1	Knox chert and residuum.
60.1	Cross well-exposed Beaver Valley fault, Rome over Knox, at crest of ridge just before a sharp turn to left.
60.1–60.2	Rome formation.
60.3–60.8	Conasauga shale.
61.1–62.7	Knox chert and residuum.
63.0	Crossroads in Norwood in a valley developed in Chickamauga.

64.6	Quarry in Knox dolomite on right.
64.7	Cross Saltville fault, Rome over Knox and younger beds. City Limits of Knoxville.
64.7–64.8	Rome formation.
65.2	Turn left beneath underpass, and curve right onto Central Avenue just beyond underpass.
67.2	Turn right at junction with State 33 and 71, at intersection of Central Avenue and Broadway.
67.6	Junction with U. S. 11 and 70, at intersection of Broadway and Magnolia Avenue.

Log No. 15

U. S. Highway 25E, Virginia State Line at Cumberland Gap to U. S. Highway 11W Near Tate Springs[1]

0.0	Virginia-Tennessee State Line. (See Rodgers, 1953, for geology of East Tennessee.)
0.4	Sharp left turn in the town of Cumberland Gap.
0.6	Underpass.
0.6–1.2	Highway ascends dip slope of Rockwood formation to crest of ridge.
1.3	Sequatchie formation.
1.5–1.6	Reedsville shale.
2.0	Lincoln Memorial University in Harrogate.
2.4–2.9	Exposures of Chickamauga limestone.
3.4	Junction with State 63 on right. For the next 9 miles the highway crosses the Knox group on the Powell River anticline. Good section of Knox.
3.4–3.9	Mascot dolomite.
3.9–4.1	Kingsport formation.
4.1–4.4	Longview dolomite.
4.4–4.7	Chepultepec dolomite. Good exposures of basal sandy member on left.
4.7–8.7	Copper Ridge dolomite. Note change from light- to dark-colored dolomite at contact with Chepultepec.
5.4	Cross bridge over Powell River near axis of anticline.
7.4	Roadside table on left.
8.3	Small quarry on left in Copper Ridge dolomite.
8.7–11.0	Chepultepec.

[1] *With Robert L. Wilson.*

10.4	Rural road to right, small quarry in Chepultepec on left.
11.0–11.4	Longview.
11.4–11.7	Kingsport.
11.7–12.4	Mascot.
12.7–12.9	Chickamauga limestone.
13.3	Claiborne County Courthouse in Tazewell.
13.4	Turn left on U. S. 25E at junction with State 33 on right. Large quarry a short distance to right is in Chickamauga.
13.5–14.5	Chickamauga limestone.
14.6	Wallen Valley fault, Maynardville over Chickamauga.
14.9	Small quarry in Maynardville limestone on left.
15.0–16.4	Knox dolomite and chert.
16.6	Rural road to right.
16.7	Chickamauga limestone.
16.9	Ottosee shale and limestone.
17.4	Crossroads.
17.5–18.2	Chickamauga limestone.
18.3	Cross split of Hunter Valley fault, Rome over Chickamauga and Reedsville.
18.8–18.9	Rome formation in cut on left.

ORDOVICIAN	Mascot	Fine-grained, well bedded dolomite. Chert balls near top; heavy chert near middle; and chert-matrix sandstone at base. 500 feet.
	Kingsport	Aphanitic light-colored dolomite with fossils and local limestone. 200 feet.
	Longview	Limestone and dolomite, in part coarsely crystalline. Several sandstones. Much chert. *Lecanospira*. 250 feet.
	Chepultepec	Light gray, fine-grained dolomite, some dark layers and silty laminae. Basal 200 feet. Contains sandy dolomite layers. 650 feet.
CAMBRIAN	Copper Ridge	Upper 200 feet consists of well bedded, light-gray dolomite with prominent oolitic chert and the lowest sandstone bed in the Knox; *Cryptozoon* at base. Lower 700 feet is dark, massive, knotty, granular dolomite, with some light-colored, fine-grained, silty dolomite. *Cryptozoon*.

FIGURE 8.—*Subdivisions of the Knox group in East Tennessee. (After Rodgers, 1953)*

18.9	Junction with State 33 on left.
19.0	Cross bridge over Norris Lake.
19.1	Conasauga shale and limestone.
19.8	Cross Hunter Valley fault, Rome over Conasauga, at bridge near road to right.
20.7–20.9	Exposures of Conasauga shale and limestone.
21.6–23.2	Crossroads at gap in ridge.
22.0	Bridge over Clinch River. Enter Grainger County.
23.2–23.8	Chickamauga limestone.
23.8–24.3	Moccasin formation.
24.3	Copper Creek fault, Rome over Moccasin.
24.3–24.5	Rome formation.
24.5	Bridge over Norris Lake.
24.7–27.1	Thorn Hill section. (See Hall and Amick, 1934; Rodgers and Kent, 1948.) Formational boundaries are apparent along highway.
24.7–25.2	Rutledge limestone, Rogersville shale, Maryville limestone, Nolichucky shale, and Maynardville limestone of the Conasauga group.
24.8	Quarry on left in Maryville limestone.
25.2–26.3	Copper Ridge, Chepultepec, Longview, Kingsport, and Mascot formations of the Knox group.
25.6	Cross bridge.
26.3–26.7	Chickamauga limestone, beginning in quarry on left.
26.8	Crossroads in Thorn Hill. State 131 turns right.
26.8–27.1	Moccasin formation.
27.2–28.6	Martinsburg shale up Clinch Mountain.
28.7	Juniata formation exposed on northwest side of gap at crest of mountain.
28.7–31.4	Highway descends Clinch Mountain on dip slope of Clinch sandstone.
30.7	Rural road to right.
31.4–32.4	Highway turns left, at base of mountain, into a strike valley in Chattanooga shale.
32.8	Road to left. Good exposure of Chattanooga on right.
33.0–33.7	Grainger formation of the Mississippian system.
33.7	Cross Saltville fault, Rome over Grainger.
33.7–33.9	Rome formation.
33.9	Junction with U. S. 11W.

Log No. 16

U. S. Highway 11W, Virginia State Line at Bristol to Knoxville [1]

0.0	Enter Tennessee. For the last 1½ miles the highway has followed the Virginia-Tennessee State Line along State Street in Bristol. (See Rodgers, 1953, for geology of East Tennessee.)
1.0–4.2	Exposures of Knox dolomite and chert. Strike ridge on left of highway is formed by Sevier shale rising above valley cut into Knox group.
7.6	Junction with State 37 in Blountville.
8.7–16.0	In this interval the highway crosses many belts of Knox and Conasauga repeated by folding and faulting.
14.5	Road to left in Indian Springs.
16.0–18.5	Conasauga limestone (Honaker).
18.5	Crest of ridge formed by Conasauga limestone.
18.6	Cross Pulaski fault, Conasauga over Knox.
18.6–19.8	Knox dolomite.
21.2	Prominent mountain to left is formed by Bays sandstone in axis of Bays Mountain synclinorium.
21.3	Join U. S. 23 on left in Kingsport.
22.4	Junction with State 81 on left.
23.2	Straight ahead where U. S. 23 guides right.
24.2	Cross bridge just south of junction with highway from Gate City.
24.7	Underpass.
24.7–26.7	Exposures of limestone in Sevier shale. Highway parallels Holston River for several miles.
26.7	Road to right leads to large quarry in Knox group. Cross bridge over Holston River and enter Hawkins County.
28.9–42.2	Highway follows strike of Knox group with exposures of Mascot formation.
33.4	Underpass in Church Hill.
42.2	Cross bridge. Enter Surgoinsville.
42.9–45.2	Exposures of upper Knox beds.
45.2–46.7	Highway curves right across strike of a Knox ridge.
47.1–52.1	Strike belt in greenish Rogersville shale and Rutledge limestone (red soil), Conasauga group. Maryville limestone of this group forms strike ridge on left of highway, and Rome formation forms ridge on right.

[1] *With Robert L. Wilson.*

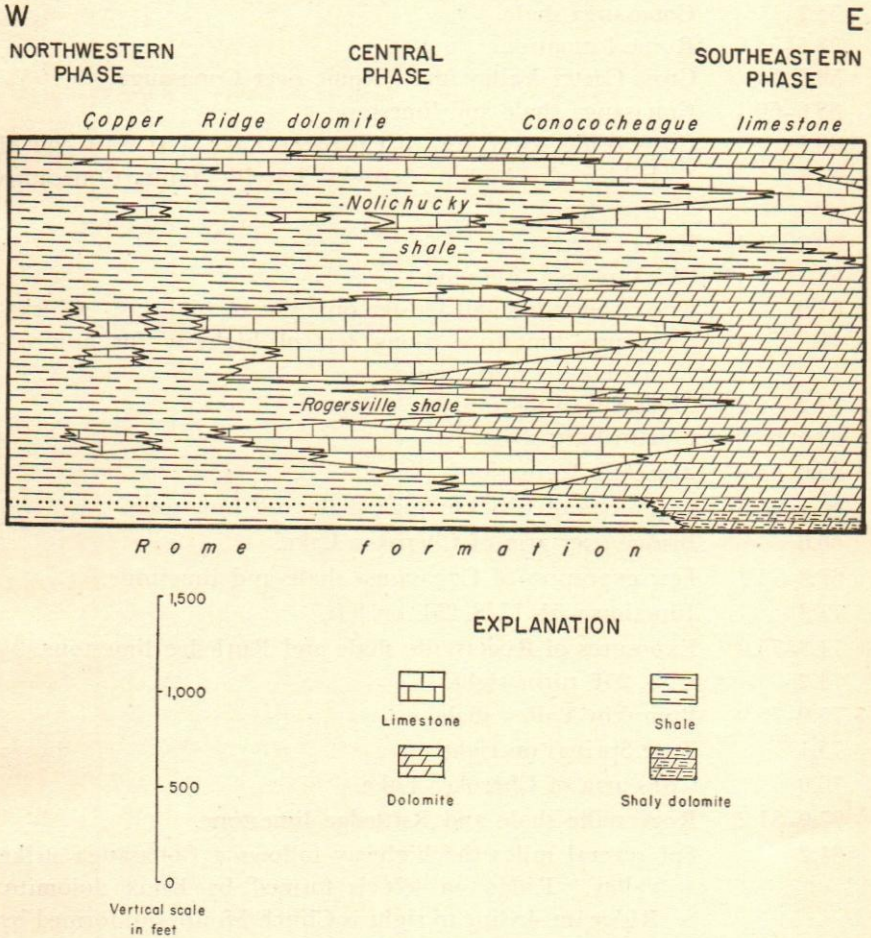


FIGURE 9.—*Facies relationships in the Conasauga group and equivalent rocks in East Tennessee and southwest Virginia. (After Rodgers, 1953)*

51.9	Junction with State 70 on right.
52.6	Maryville limestone on hill to left.
53.8	State 66 on left in Rogersville.
54.7	State 66 turns right.
55.0–57.9	Conasauga shale and limestone.
58.1	Conasauga shale.
58.5–58.6	Rome formation.
58.6	Cross Carter Valley fault, Rome over Conasauga.
58.6–60.1	Conasauga shale and limestone.
60.1	Cross bridge over arm of Cherokee Lake. At west end of bridge the highway crosses Saltville fault, Conasauga over Knox.
60.2–61.4	Knox chert.
61.7	Chickamauga limestone.
62.0	Knox chert in small fenster on right of highway. Chickamauga limestone along left of highway for approximately the next 2 miles.
64.2–64.4	Moccasin formation.
64.6–65.0	Martinsburg shale.
65.0–65.9	Moccasin formation.
66.1–66.6	Exposures of Chickamauga shale and limestone.
66.6	Bridge over arm of Cherokee Lake.
67.3–71.3	Few exposures of Conasauga shale and limestone.
71.3	Junction with U. S. 25E on left.
71.3–75.0	Exposures of Rogersville shale and Rutledge limestone.
74.2	U. S. 25E turns right.
75.0–76.9	Pumpkin Valley shale.
75.1	Tate Springs on right.
76.0	Cross arm of Cherokee Lake.
77.0–81.2	Rogersville shale and Rutledge limestone.
81.2	For several miles the highway follows a Conasauga strike valley. Ridge on left is formed by Knox dolomite. Ridge on skyline to right is Clinch Mountain, formed by Clinch sandstone.
81.2–82.9	Exposures of Rutledge limestone.
83.1–83.6	Rogersville shale.
83.8–85.2	Rutledge limestone.
85.2	Cross bridge. Enter Rutledge.
85.6	Junction with State 92 at Grainger County Courthouse in Rutledge.

86.0–98.9	Highway follows belt of Rutledge limestone. Exposures of Rogersville shale to left of highway.
91.4	Road to left in Joppa.
98.9–106.1	Strike valley in Conasauga shale and limestone.
100.1	Junction with State 61 in Blaine. Southern extremity of Clinch Mountain on right.
101.9	Enter Knox County.
106.1	Road to left at roadside table. Maryville limestone in hill behind table.
106.7–110.6	Knox dolomite and chert.
107.7	Road on left to Mascot, situated in the Mascot-Jefferson City zinc-mining district. (See Secrist, 1924, and Bridge, 1945.)
111.6	Quarries to left across railroad yards are in Lenoir and Holston formations.
112.9	Overpass. Road to left across overpass leads back to quarries.
113.5	Crossroads. Road to right leads through underpass.
114.9	Holston marble. (See Gordon, 1924, for marble industry in Knoxville.)
115.2	Merge with U. S. 11E, 25W, and 70 in Knoxville. Continue on Magnolia Avenue.
118.0	Overpass.
118.8	Turn left on Broadway at junction with U. S. 25W and 441. U. S. 11 will continue straight ahead here after construction of expressway.

Log No. 17

U. S. Highway 11E, Virginia State Line at Bristol to Knoxville [1]

0.0	Virginia-Tennessee State Line in Bristol. Turn left on U. S. 11E, off U. S. 11, where U. S. 11W continues straight ahead.
0.2	Turn right with U. S. 411.
0.8	Turn onto divided street.
3.3–5.4	Knox. Ridges along both sides are formed by Sevier shale occupying two synclines. Note convergence of Sevier ridges to southwest, along axis of pitching intervening anticline followed by highway.

[1] *With Stuart W. Maher, Principal Geologist, Tennessee Division of Geology.*

4.7	Cross creek.
5.4–6.5	Alternation of Sevier shale and Knox. At end of interval cross Cross Mountain tear fault, Sevier against Knox.
7.5–9.1	Knox.
9.6–9.8	Conasauga shale. State 37 turns right in middle of interval.
9.8–21.3	Knox.
10.6	Cross South Fork of Holston River and enter Bluff City. Good exposures of Knox along north bank of river.
12.4	Continue straight ahead where U. S. 19E turns left.
18.1	Enter Washington County.
18.8	Cross Watauga River.
20.1	Knobs to left in Sevier shale.
21.5–21.6	Sevier shale.
22.0	Junction with U. S. 23.
22.1–24.1	Knox. Enter Johnson City at end of interval.
25.0	Turn right on U. S. 11E in Johnson City.
25.3	Turn right.
26.4–31.9	Knox.
32.3	Washington County Courthouse in Jonesboro. This is the type area for Ulrich's Jonesboro limestone—a limestone phase of the Knox.
32.7	State 81 to Kingsport turns right.
33.5–33.7	Shales and limestones of Conasauga group.
34.3–35.8	Knox.
35.9–37.3	Shales and limestones of Conasauga group, thrust over Knox along Spurgeon fault at end of interval. From crest of ridge Bays Mountain may be seen to right; this is a synclinal mountain capped by Ordovician Bays sandstone.
37.3–38.7	Knox. Sevier shale exposed at end of interval.
39.4–39.6	Sevier shale.
39.6–41.4	Knox.
41.7–42.4	Sevier shale, beginning just beyond bridge and crossroads. Village of Limestone to left at end of interval.
42.4–42.9	Knox.
43.3–43.5	Honaker dolomite.
43.5	Bridge over Jockey Creek at crossroads. This is north end of excellent Jockey Creek section (Oder, 1934); here, the entire Knox is visible in vertical beds along creek. The old highway crossed the upper, or stratigraphically

young, end of the section, whereas, the new highway crosses the lower end. Section is complete between Sevier shale and Conasauga group.

44.1 Join old highway.

45.4 Knox.

46.5–48.6 Honaker dolomite. Cross bridge in Chuckey at beginning of interval.

48.6–54.8 Knox. Cross Dunham Ridge fault, Honaker over Knox, at beginning of interval.

49.3 Railroad overpass.

51.5 Tusculum College on left, just beyond junction with State 107.

54.8 Enter Greeneville.

55.0 Sevier shale.

56.3 Greene County Courthouse in Greeneville.

56.4 Turn right on U. S. 11E, where U. S. 411 continues straight ahead.

57.3 Conasauga shale and Honaker dolomite.

59.2 Cross Pulaski fault, Honaker over Sevier.

59.2–63.9 Sevier shale.

63.8 Road to right in Mosheim. This is the beginning of the Mosheim anticline.

63.9–64.2 Mascot-Kingsport.

64.2–64.3 Longview.

64.3–64.7 Chepultepec.

64.7–65.8 Copper Ridge on axis of anticline.

65.8–66.0 Chepultepec.

66.0 Longview.

66.0–66.3 Mascot-Kingsport.

66.7 Cross Lick Creek.

66.7–72.1 Sevier shale.

72.1–72.3 Bays formation exposed in Bulls Gap through Bays Mountain, north end of which is at Kingsport.

72.3–78.6 Sevier shale. Knox exposed on ridge to right near end of interval.

73.6 State 66 turns right in Bulls Gap village.

74.7 Enter Hamblen County.

77.0 Bent Creek Church in Whitesburg.

79.1–98.4 Mascot and Kingsport formations of the Knox group. Good farms and karst topography typify this belt.

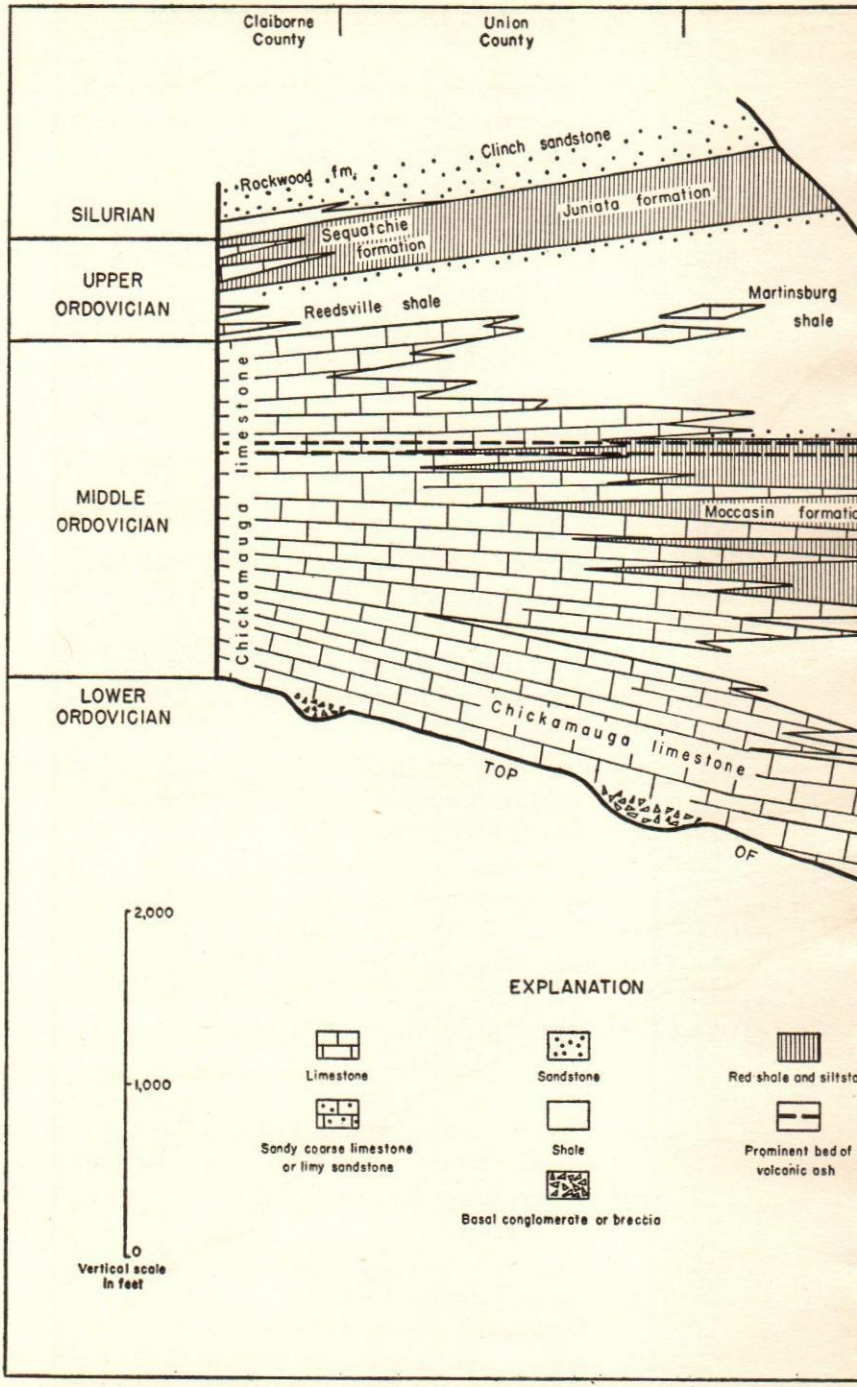
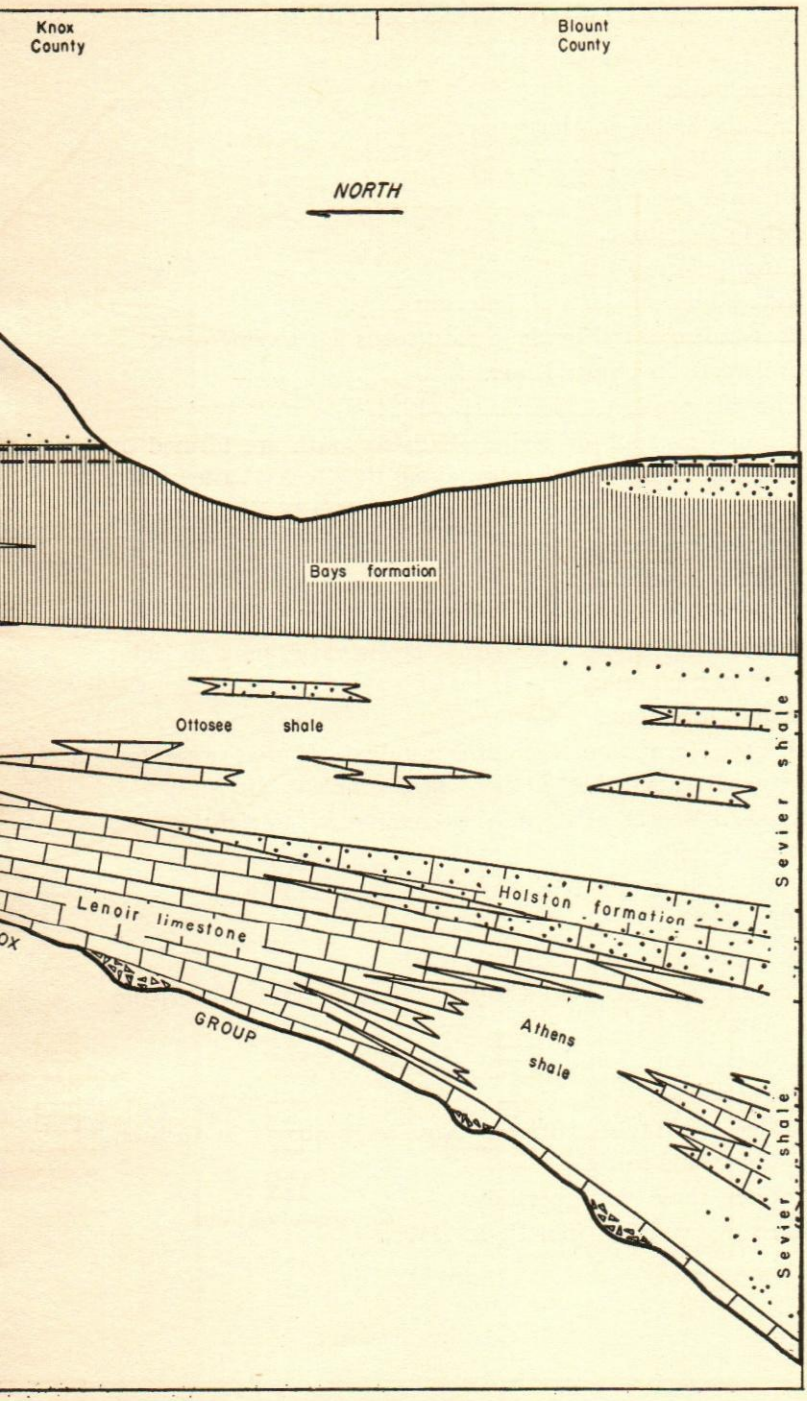


FIGURE 10.—*Facies relationships in Middle and Upper Ordovician rocks of the Valle*



nd Ridge province of East Tennessee. (After Rodgers, 1953)

80.8	Russellville.
86.9	Cross U. S. 25E in Morristown.
95.9	Enter Jefferson County.
97.6	Railroad overpass.
98.4–98.7	Lenoir limestone.
100.1	Enter Jefferson City.
100.5	State 92 on outskirts of Jefferson City.
100.9	Cross railroad tracks where road turns left to zinc plant.
102.2	Crossroads in Upper Knox.
103.6	Zinc mine to left. (See Secrist, 1924.)
107.3–108.2	Lenoir limestone on right. Hills to south are formed by Knox thrust over Lenoir, along the Rocky Valley fault.
108.4	Railroad spur to zinc mine on left. Upper Knox.
109.3–109.5	Lenoir limestone.
109.5–110.7	Holston limestone.
110.9–111.6	Sevier shale with marble lentils.
111.6–112.0	Holston limestone. Crossroads, Strawberry Plains to right, at end of interval.
112.0–113.1	Lenoir limestone.
113.4–113.6	Holston formation, including sandy beds that were formerly called the "Tellico" sandstone.
113.6	Road to Mascot, a zinc-mining community, to right.
113.8–117.2	Ottosee shale.
116.3	Turn right at junction with U. S. 25W and 70.
117.3–117.4	Holston limestone.
117.5–119.9	Ottosee shale with marble lentils.
120.7	Crossroads at St. Paul Church. Terrace gravel overlying Ottosee shale.
121.2–121.3	Holston formation.
121.4–121.6	Ottosee shale.
121.8	Bridge over Holston River. Note large quarry in Holston limestone to right.
122.0–122.3	Ottosee shale, locally sandy.
124.6	Enter Knoxville. Join U. S. 11W.

Log No. 18

U. S. Highway 11, From Junction With U. S. Highway 70, to Georgia State Line Near Chattanooga [1]

0.0	Begin at Dixie-Lee Junction. Short distance south of junction highway crosses Saltville fault, Knox over Chickamauga. (See Rodgers, 1953, for geology of East Tennessee.)
0.2–10.8	Knox residual soil and chert.
5.3	Fort Loudon Dam to left in Lenoir City.
5.9	Junction with State 95 on right.
10.3	Overpass.
10.8	High terrace gravel.
11.4	Cross Watts Bar Lake.
12.1	Junction with State 72 on left in Loudon.
12.4	State 72 turns right.
14.0	Knox dolomite.
15.9–17.0	Exposures of Knox on right. Lenoir limestone in low hills to left of highway.
17.7	Crossroads. Philadelphia to right. From here to Sweetwater there are many manganese prospect pits along highway. (See Reichert, 1942.)
18.0–18.4	Mascot formation of Knox on left.
18.9	Enter Monroe County.
19.7	Small quarry in Lenoir limestone on right.
20.9	Typical red soil of Holston formation on hill ahead on left.
22.4	Overpass.
22.6	Knox dolomite, chert, and red soil.
24.6	Road to left in Sweetwater leads about 2 miles to Ballard mine and other barite pits. (See Laurence, 1939.)
24.8	State 68 turns right. Barite mines along this highway several miles out of Sweetwater.
26.7	Barite milling plant left of highway.
27.7	Enter McMinn County. Ridge on left paralleling highway is formed by Copper Ridge dolomite.
28.1–30.4	Knox.
32.6	Crossroads in Niota.
33.1–54.3	Highway follows Knoxville fault, Conasauga over Knox. Exposures of Knox chert on right. Valley on left of

[1] *With George D. Swingle, Assistant Professor of Geology, University of Tennessee, and Robert L. Wilson.*

	highway is in Conasauga, the only exposure being Nolichucky shale at 33.1.
33.7–34.0	Knox dolomite in field on left.
35.0	Straight ahead on U. S. 11 at Athens By-pass.
45.1	Athens By-pass rejoins U. S. 11 in Riceville.
51.7	Knox dolomite on right.
52.3	Enter Bradley County at north end of bridge over Hiwassee River. Charleston across bridge.
54.3–55.9	Highway leaves Knoxville fault and curves right across strike of Knox belt with exposures of Knox chert.
55.9–57.3	Follow strike valley in Conasauga group. Exposures of Maynardville limestone and chert along left side of highway, and other Conasauga limestone and shale on right. This valley is between Rome ridge on right and Knox ridge on left.
57.3–66.2	Conasauga shale and limestone.
64.2	Guide right at Confederate soldier monument in Cleveland.
64.6	State 60 and U. S. 64 on left.
64.7	Turn right on U. S. 11 and 64.
65.8	Copper Ridge dolomite forms ridge on left. Highway has just crossed Saltville fault, Conasauga over Knox.
66.2	Cross Beaver Valley fault, Conasauga over Knox.
66.2–67.0	Copper Ridge chert well exposed.
67.0–72.1	Conasauga shale. Exposure of Apison member of Rome at 70.6 and of Rome at 71.3.
72.1–72.7	Apison member of Rome formation.
72.7	White Oak Mountain fault, Apison over Knox.
72.7–73.2	Knox chert.
74.4	Enter Hamilton County.
74.4–74.6	Rockwood formation.
74.7	Grindstone Mountain, capped with Pennsylvanian strata, on left. Highway is in valley cut into Mississippian.
76.2–76.3	Fort Payne chert.
76.3	Chattanooga shale.
76.6–76.7	Rockwood formation in deep cut.
77.6	Crossroads in Ooltewah.
77.9–81.3	Good exposures of Knox dolomite and chert.
78.6	Straight ahead at Summit By-pass.
81.3	Overpass.

81.7	Maynardville limestone on left.
82.5	Junction with State 2A in Silverdale.
82.7–84.9	Poorly exposed Conasauga shale and limestone.
84.9	Crossroads in Hickory Valley. Knox ridge ahead.
85.5–86.2	Knox dolomite and chert.
86.2	Cross Kingston fault, Knox over Chickamauga.
86.6	Overpass.
87.9	South Chickamauga Creek.
88.6	Chattanooga City Limits.
90.3–91.1	Knox chert in cut on right.
91.1	Tunnel on McCallie Avenue through Missionary Ridge formed by Copper Ridge dolomite. Missionary Ridge fault near middle of tunnel, Copper Ridge dolomite over Chickamauga. Good view of Signal Mountain, which is an outlier of Cumberland Plateau, ahead at exit from tunnel.
93.2	Overpass on McCallie Avenue, over railroad yards.
93.4	Turn left on U. S. 11 on Central Avenue.
93.7	Turn right on East 11th Street.
94.0	Lookout Mountain to left and Signal Mountain ahead, both capped by cliff-forming Pennsylvanian sandstone.
94.7	Cross U. S. 27 (Market Street) at junction with U. S. 41.
94.8	Turn left on U. S. 11 (Broad Street).
97.2	Turn right beyond underpass.
97.7–98.9	Mississippian limestone at base of Lookout Mountain. Tennessee River meanders on right.
98.1	Road to Lookout Mountain and Lookout Mountain Caverns on left.
99.0	State 148 turns left up Lookout Mountain.
99.4	Cross Lookout Creek. Prominent exposures ahead in Fort Payne chert.
99.7	Underpass. Fort Payne exposed on east side, and Rockwood on west side. Between here and 100.4 the axis of the Chattanooga anticline is crossed.
100.4	Sequatchie formation in deep cut.
100.7	Guide left on U. S. 11, where U. S. 41 continues straight ahead.
100.7–102.4	Rockwood formation.
101.5	Crossroads.
102.5	Sequatchie formation.

102.7	Underpass.
103.2–103.4	Chickamauga limestone on right.
103.8	Georgia-Tennessee State Line.

Log No. 19

U. S. Highway 411, Maryville to Georgia State Line [1]

0.0	Drive south on U. S. 411 and 129 at junction with State 73 in Maryville.
1.9–8.6	Knox residuum.
6.5	U. S. 129 turns left.
9.0–18.3	Conasauga group.
13.6	Greenback Road to right.
16.9	Enter Monroe County.
18.3	Bridge over Little Tennessee River. Knox exposed on bluff left of bridge.
18.3–21.1	Knox.
20.4	State 72 turns right in Vonore.
21.1–29.1	Conasauga group.
29.1	State 68 turns left in Madisonville.
29.1–40.5	Conasauga group.
35.8	Enter McMinn County.
39.1	State 39 turns right in Englewood.
40.6	Cross Chestuee Creek.
40.8–43.7	Knox soil.
43.7–45.9	Athens shale.
44.2	Railroad overpass.
46.9	Railroad station in Etowah.
47.4–47.6	Athens shale.
47.8–50.3	Knox soil.
50.4	Railroad overpass.
50.6–52.6	Conasauga group.
53.3	Cross Hiwassee River.
54.0	State 30 turns left.
56.1–56.3	Conasauga group, locally covered by gravel.
56.4	Cross creek.
56.5–63.1	Knox soil, locally covered by gravel.
60.4	Crossroads in Benton.

[1] *With Herbert A. Tiedemann, Geologist, Tennessee Division of Geology.*

63.3	Railroad overpass.
63.5–66.6	Conasauga group.
66.1	Underpass beneath U. S. 64.
67.9–68.0	Conasauga group.
68.5–76.2	Knox soil.
76.2	Georgia-Tennessee State Line.

Log No. 20

U. S. Highway 421, Bristol to North Carolina State Line [1]

0.0	Turn south on U. S. 421 off U. S. 11 in Bristol. Follow highway markers through Bristol.
3.3	Cross Bristol fault, Sevier over Honaker, the latter not exposed.
3.3–3.7	Sevier shale.
4.6	Knox (Jonesboro limestone).
5.0–5.2	Sevier shale forming a ridge.
5.2–9.7	Knox.
5.4	Road to Holston Dam on right.
5.8	Bristol Caverns in Lower Knox on left.
9.1	State 44 turns left.
9.7–13.7	Sevier shale well exposed.
10.2	Cherokee National Forest Boundary.
10.7	Cross South Holston Reservoir.
13.7–15.8	Terrace of South Fork Holston River capped by gravel.
15.8–16.9	Unicoi formation. Cross Holston Mountain fault, Unicoi over Sevier, at beginning of interval.
16.9–20.4	Hampton and Erwin formations.
18.7	Enter Johnson County at Low Gap.
20.4	Base of Shady dolomite. This is the horizon of manganese, which has been mined around Shady Valley. (See King, Ferguson, Craig, and Rodgers, 1944.)
21.5	Cross State 91 and 133.
21.8	Rome formation, the youngest exposed along axis of Shady Valley syncline.
22.7	Manganese horizon. Shady underlain by Erwin.
22.7–24.4	Erwin formation.
24.4–26.0	Hampton and Erwin formations.

[1] *With Stuart W. Maher.*

25.9	Crest of Iron Mountain.
26.0–29.1	Unicoi formation, with amygdaloidal basic flows at 27.3–27.4.
29.1	Unicoi formation overlying pre-Cambrian rocks on a spur from which a small village may be seen off to the left in Mountain City valley.
29.3	Cross Iron Mountain fault, pre-Cambrian over Shady.
29.4–29.7	Rome formation.
32.1	Enter Mountain City.
32.9	Straight ahead, joining State 67 in Mountain City.
34.3	Spur formed by Erwin formation across creek.
35.2	Crossroads.
35.5–35.8	Deep cut in Rome, just beyond oblique crossroads. The east side of this ridge was prospected for manganese by the U. S. Bureau of Mines. Extensive mining has occurred both to the north and south along the strike.
36.8–37.0	Shady dolomite.
37.2	Large quarry in Shady.
38.1–38.4	Erwin formation.
38.8–39.5	Unicoi formation.
39.6	Cross Stone Mountain fault, pre-Cambrian over Unicoi.
39.7	Pre-Cambrian "Cranberry" granitic crystalline rocks.
40.8	Injection gneiss.
44.1	State 67 turns left in Trade.
45.0	North Carolina State Line.

Log No. 21

U. S. Highway 19E, From Near Bluff City on U. S. Highway 11E, to North Carolina State Line [1]

0.0	Drive south on U. S. 19E, leaving U. S. 11E.
0.0–0.4	Knox.
0.4–0.7	Sevier shale.
0.8–1.3	Knox.
1.3–5.9	Sevier shale.
3.4	Enter Carter County.
5.9	Cross Holston Mountain fault, Honaker over Sevier.
5.9–7.0	Honaker dolomite.

[1] *With Stuart W. Maher.*

7.0	Road to Keenburg on left. Ridge to left is formed by Rome formation. About 1½ miles north of Keenburg is a deposit of bauxite and lignite reported by Safford (1869), and interpreted by Bridge (1950) to be a sink-hole deposit.
7.8–8.5	Rome formation.
8.6	Cross Watauga River.
9.3	Turn left with State 91 in Elizabethton.
9.6	Turn right with State 67.
10.3	Large quarry in Honaker on ridge to left across Watauga River.
11.9	Old dump on left contains ore, from the Cranberry iron mines (Avery County, N. C.), that was formerly processed in Johnson City and Valley Forge.
11.9–13.0	Rome formation.
12.7	Cross Doe River.
13.0–13.4	Shady residuum, overlain by terrace gravels. Mines along Shady strike belt. (See King, Ferguson, Craig, and Rodgers, 1944.)
13.4–13.9	Erwin formation.
13.9–14.3	Hampton shale.
14.1	Cross Doe River gorge.
14.3–14.7	Unicoi, containing basic flows near beginning of interval.
14.7	Cross Iron Mountain fault, Unicoi over Rome, the latter not exposed.
14.9	Straight ahead in Hampton. Manganese mines in this vicinity. (See King, Ferguson, Craig, and Rodgers, 1944.)
17.7–17.8	Erwin formation.
18.2	Near here a northwest-southeast tear fault has moved pre-Cambrian rocks on the right against the Chilhowee group on the left.
18.8–23.4	"Cranberry" crystallines. Biotite gneiss, probably intrusive into the "Cranberry," at beginning of interval.
19.8	Side road to right. Terrace deposits overlying weathered granite.
20.5	Highway turns left where Tiger Valley Road turns right.
20.6–20.8	Cranberry complex cut by many basic dikes and one acidic dike. Feldspathic porphyritic diorite dike at end of interval.
21.4–21.5	Ophitic grabbro body in Cranberry granite.
21.6	Sunset Church.

23.4–25.7	Beech granite. Fine-grained type of this granite starts at a crossroads at beginning of interval. Just north of this crossroads is a cut in brecciated granites, a mixture of Cranberry and Beech types. Keith (1907) suggested that the Cranberry is older than the Beech because it is more sheared and foliated. It contains more dikes and more mafic minerals.
24.3	Fluorspar-bearing pegmatite in Beech granite. In this exposure xenoliths of Cranberry occur in Beech granite.
24.4	Basic dike in Beech granite on right. On White Rocks Mountain to left are cliffs of Beech granite.
24.7	Road to Nelson Lake turns right. Note granite "balds" on mountain ahead. In next 0.7 mile, Beech granite becomes much coarser in texture.
25.8	Cross creek.
25.9–26.7	Cranberry granite, beginning just beyond road to right.
26.4	Injection gneiss into Cranberry complex on left.
26.7–27.2	Re-enter Beech granite in cut, just north of concrete bridge over Doe River, on right. Quarry in this granite at end of interval. The log from here to the state line follows the old highway rather than the new one under construction in 1955. Mileages will therefore vary from those in this log. New cuts are not indicated, as they were not available.
28.0	Roan Mountain village.
28.3	State 143 turns right to Roan High Knob.

Optional side trip to Roan High Knob from Roan Mountain village on State 143. Scenic drive with good exposures.[1]

0.0	Turn right on State 143.
0.6–4.3	Cranberry granite in creek on right and along road.
4.5–4.6	Beech granite.
4.6–5.1	Cranberry granite.
5.6–6.4	Type area of Roan hornblende gneiss. Village of Burbank at beginning of interval.
6.0	Acidic dike.
6.1	Basic dike.
6.4	Gabbro.
6.6	Cranberry granite intruding Roan gneiss.
6.9	Bakersville gabbro, believed by Keith (1907) to be Triassic.
7.0	Roan gneiss and gabbro.

[1] *By Stuart W. Maher.*

7.6	Scenic view at roadside tables.
9.1	Bakersville gabbro intruding Cranberry granite and Roan gneiss.
11.5	Cranberry and Roan.
12.3	Scenic overlook and tables.
12.7	North Carolina-Tennessee State Line at Carvers Gap, elevation 5,512 feet. Turn right.
12.7–14.6	Roan gneiss and gabbro from Carvers Gap to parking area.
29.9	Shell Creek village.
32.9	North Carolina-Tennessee State Line.

Log No. 22

U. S. Highway 23, Kingsport to North Carolina State Line[1]

0.0	Leave U. S. 11W on U. S. 23 in Kingsport.
1.3	Cross The Cliffs fault, Knox over Sevier.
2.6	Cross Pulaski fault, Honaker over Knox.
3.1	Honaker dolomite exposed on both sides of bridge over South Fork of Holston River.
3.8	Railroad overpass.
4.2–5.2	Knox.
5.2	Cross minor fault, Conasauga and Honaker over Knox.
5.2–6.8	Conasauga and Honaker. Cross Dunham Ridge fault in this interval, Conasauga and Honaker over a thin slice of Knox.
6.8–8.9	Knox.
8.5	Crossroads.
8.9	Cross Spurgeon fault, Conasauga and Honaker over Knox.
8.9–9.4	Conasauga and Honaker forming a ridge.
9.4–11.3	Knox.
11.0	Oblique crossroads.
11.5–12.2	Conasauga and Honaker.
12.7–14.1	Knox. Crossroads at beginning of interval.
14.1–14.7	Conasauga and Honaker forming Indian Ridge.
14.9–24.1	Knox.
15.6	Junction with U. S. 11E, 19W, and 411.
18.8	Straight ahead on U. S. 23, where U. S. 11E and 411 turn right in Johnson City.
20.1	State 67 turns left.

[1] *With Stuart W. Maher.*

21.7	Enter Carter County.
23.9	Enter Unicoi County. Quarry in Knox just beyond County Line.
25.1–25.3; 25.9; & 27.4–28.0	Honaker dolomite.
28.8	Rome shale on left in village of Unicoi.
28.9	State 107 turns left. Erwin quartzite well exposed a short distance along this road.
29.5–30.0	Rome formation forms a ridge along left of highway, and a valley in the Honaker along the right, beyond which is Buffalo Mountain capped by a thrust sheet of Unicoi clastics. Iron and manganese mines and prospects along left of highway. (See King, Ferguson, Craig, and Rodgers, 1944.)
34.2	State 81, which turns right in Erwin, leads about 5 miles to mining village of Embreeville in Bumpass Cove. (See Rodgers, 1948.)
34.4	Unicoi County Courthouse in Erwin. Prominent ridge to right is type area of Erwin quartzite.
34.5	Left on U. S. 23.
35.0	Turn right.
36.0	Guide right. Highway follows valley of Nolichucky River, which is cut in Rome and Shady formations, for about the next 2 miles. Mountains formed by Chilhowee group on both sides of valley.
37.2	Cross Nolichucky River.
38.3	Shady dolomite.
38.8	Deep cut containing Shady dolomite and an unidentified shale.
39.1–40.5	Erwin quartzite on left.
40.9	Cross creek at Temple Hill School. Near here a major fault brings Ocoee beds into contact with Chilhowee. This is approximately the northernmost occurrence of Ocoee beds, as north of here Chilhowee rests directly on pre-Cambrian crystalline rocks.
41.4–41.7	Ocoee.
41.7–42.1	Pre-Cambrian crystallines. Unakite well exposed near end of interval.
42.4	U. S. 19W turns left just beyond a cut in deeply weathered granite.

43.5	Ocoee.
43.6–55.2	Pre-Cambrian crystallines with a few thin slices of Ocoee.
47.1	Quarry in crystallines.
47.4	Crossroads between bridges. Deep cut in unakite 0.15 mile beyond bridge.
49.4	Flag Pond Post Office on left.
55.2	North Carolina-Tennessee State Line at Sams Gap, elevation 3,800 feet.

Log No. 23

U. S. Highways 25W and 70, From Their Junction With U. S. Highway 11E, to Hot Springs, North Carolina [1]

0.0	Turn east on U. S. 25W and 70 at their junction with U. S. 11E.
0.6–1.4	Ottosee shale.
1.2	Crossroads.
1.5	Cross Rocky Valley fault, Lenoir over Ottosee.
1.7–9.5	Knox.
4.0	Enter Sevier County.
5.8	State 139 turns right.
7.0	Enter Jefferson County.
9.6–10.0	Lenoir limestone.
10.1–11.0	Cross unnamed fault, Knox over Lenoir. Knox to end of interval.
11.0–15.4	Limestones and shale of Conasauga group, including Nolichucky shale at 13.8 and Maynardville limestone at 14.4 in a gap.
15.4–24.1	Knox.
19.3	Cross State 92 in Dandridge.
24.1	Bridge over Douglas Reservoir.
24.6–28.9	Sevier shale.
29.9	Enter Cocke County.
31.4	U. S. 411 turns right.
33.0–34.7	Thin thrust slices of Knox in Sevier shale. English Mountain to the south is formed by massive Chilhowee and Ocoee beds thrust over Knox dolomite along the Great Smoky fault.
34.5	U. S. 25E on left.

[1] *With Herbert A. Tiedemann.*

36.1	U. S. 411 turns left in Newport.
36.3–42.6	Knox.
40.9	Cross French Broad River.
42.6	On right side of river, Rome may be seen thrust over Knox, and Chilhowee thrust over Rome, along slices of the Pulaski fault.
42.9–44.8	Chilhowee group.
45.5	Enter gorge cut into Unicoi beds.
46.6–47.5	Unicoi. State 107 leads to Del Rio on right at end of interval. (See Ferguson and Jewell, 1951, for the geology and barite deposits of this area.)
47.5–49.9	Gorge cut in Unicoi.
49.9–56.6	Unicoi.
51.1	State 107 turns left.
52.3	Cross French Broad River.
55.7	North Carolina-Tennessee State Line. Log is continued into North Carolina, as beds in Hot Springs fenster are not exposed in Tennessee along this highway. They are present in Tennessee south of highway.
57.3–61.0	Cross Mine Ridge fault. Rome formation in Hot Springs fenster.
58.5	Cross Shutin Creek.
61.0–61.8	Shady dolomite in fenster.
62.1	School in Hot Springs.

Log No. 24

U. S. Highway 441, Great Smoky Mountains National Park Service Headquarters to Knoxville [1]

0.0	Follow U. S. 441 and State 71 northward from junction with State 73 at Park Service Headquarters.
1.4	Leave Great Smoky Mountains National Park and enter Gatlinburg.
2.6	State 73 turns right.
3.8	Cross bridge over West Fork of Little Pigeon River.
4.5–7.0	Metasiltstone of foothill sequence of the Ocoee series.
4.9	Road on right crosses old bridge.
7.4	Metasiltstone in old quarry on left.
7.6	Cross bridge.

[1] *With Robert L. Wilson.*

8.2	Curve left at intersection. Highway leaves gorge of West Fork of Little Pigeon River. Cross Dunn Creek fault, resistant rocks of the foothill sequence thrust over valley-forming shale of the same unit.
9.6	Pigeon Forge. Shale in upper part of foothill sequence exposed in cut behind building on left.
11.6	Cross bridge over West Fork of Little Pigeon River. Approximate position of Great Smoky fault, metamorphosed shale of the Ocoee series thrust over Sevier shale.
11.9–26.5	Sevier shale, locally covered by terrace gravel.
12.9	Cross bridge.
14.3–14.5	Inlier of Knox limestone.
15.6	Join U. S. 411 on right in Sevierville.
15.9	Sharp left turn.
16.2	State 66 turns right at bridge.
17.0	Cross Guess Creek fault, Sevier over Sevier.
25.6	Curve right at junction with side road.
27.8–29.9	Knox chert.
28.9	U. S. 411 turns left.
30.1–31.4	Conasauga shale and limestone. Rome strike ridge ahead on skyline.
31.0	Rogersville shale.
31.4	Enter Knox County in Shooks Gap. Pumpkin Valley shale and Rome formation in gap.
31.6	Rome formation.
31.7	Cross Dumplin Valley fault, Rome over Knox.
31.9–32.3	Knox chert.
32.2	Side road on left.
32.4–32.5	Lenoir limestone.
32.6	Small pit on right in sandy member of Holston formation.
32.8–33.7	Ottosee shale.
33.4	Crossroads.
33.8–33.9	Bays formation.
33.9–34.4	Ottosee shale.
34.4	Bays formation.
34.5–35.6	Ottosee shale.
35.7–35.8	Holston formation.
35.9–38.0	Lenoir limestone preserved in shallow syncline.
37.3	Lake Forest.
38.1–38.2	Holston formation.

38.4–38.5	Sandy member of Holston formation, deeply weathered in large cut on left.
38.7–39.6	Ottosee shale with lenses of marble.
39.6	Junction with U. S. 129 on left.
39.9–40.3	Sandy member of Holston.
40.3–40.4	Holston marble in old quarry on right. (See Gordon, 1924, for marble industry in Knoxville.)
40.5	Cross railroad tracks. Lenoir limestone on right.
40.7	Cross Henley Bridge over Tennessee River in Knoxville.
41.0	Junction with U. S. 11 and 70.

Log No. 25

State Highway 73, Knoxville to Great Smoky Mountains National Park Service Headquarters [1]

0.0	Turn left on State 73 at junction with U. S. 11 and 70 at University of Tennessee College of Agriculture in Knoxville.
0.4	Cross bridge over Fort Loudon Lake (Tennessee River).
0.7–1.1	Knox chert and red soil.
1.2–1.3	Exposures of Lenoir limestone on left.
1.7–2.1	Holston formation in bluff along river.
2.1	Woodson Drive on left.
2.2–2.9	Sandy member of Holston formation, formerly called Tellico sandstone.
2.4	Mont Lake Drive on right.
3.2–4.2	Exposures of Ottosee shale.
4.3	Overpass.
4.6–5.3	Deeply weathered sandy member of Holston formation, locally covered by terrace gravels.
5.9	Enter Blount County at bridge.
6.1–6.3	Pinnacles of Holston formation on left.
6.4	Side road on right.
6.4–6.9	Ottosee shale.
7.9	Crossroads.
8.4	Cross Chestuee fault, Knox over Holston.
8.4–11.9	Knox chert.
9.9	Crossroads. Plant of Aluminum Company of America on left.

[1] *With Robert L. Wilson.*

10.7	Knoxville Municipal Airport on right.
11.5	Crossroads. Main Alcoa plant on left.
11.9	Cross Dumplin Valley fault, Conasauga over Knox.
12.0–13.1	Conasauga shale and limestone.
13.0	Cross railroad tracks on south side of bridge in Alcoa.
14.6	Conasauga shale.
14.9	Junction with U. S. 411 and 129 in Maryville.
15.2	Curve left.
15.5–17.8	Knox chert.
17.8–17.9	Conasauga shale.
18.2–20.9	Knox chert.
20.0	Cross bridge.
21.2–22.2	Exposures of Athens shale.
22.5	Weathered and fresh exposures of sandy member of Holston formation. Ahead is Little River Gap through Chilhowee Mountain.
23.0	Side road.
23.3	Cross Great Smoky fault, Chilhowee group thrust over Sevier shale. (See Neuman, 1951; and King, Hadley, and Neuman, 1952, for geology of the region.)
23.9–24.4	Sandstone, shale, and quartzite of Chilhowee group. Across river, on old highway, section is more complete and better exposed.
24.5	Road to left in Walland.
24.9	Road intersection.
25.0–25.7	Shady dolomite, with an inlier of Rome at 25.4.
25.8	Cross Miller Cove fault, slate of the foothill sequence of the Ocoee series thrust over Shady dolomite.
25.8–29.3	Slate, siltstone, sandstone, and conglomerate of the foothill sequence of the Ocoee series.
29.3	Crossroads. Bridge over Little River on old highway on left. Enter Tuckaleechee Cove fenster.
29.5	Great Smoky fault exposed in small hill on right, slates of Ocoee series thrust over Knox limestone.
29.8 & 31.0	Knox limestone.
30.4	Knox group in bluff on north side of river.
31.1	Enter Townsend.
33.0	Wear Cove Road, on left, leads to Wear Cove fenster.
33.7	Knox group in Cedar Bluff across river. Bluff is capped by phyllites of the Ocoee series.

34.2–34.3	Long cut on right. Great Smoky fault exposed at southeast end of cut on east side of fenster. Ocoee sandy phyllite thrust over Sevier shale, Lenoir limestone, and Knox limestone, with a thin slice of Knox immediately underlying the thrust.
34.5	Entrance to Great Smoky Mountains National Park.
34.5–39.4	Phyllites and metasiltstones of foothill sequence of Ocoee.
35.2	Cades Cove Road, on right, leads to another fenster.
38.3	Indian Head Rock, a block of phyllite overhanging highway.
39.4	Bridge over Little River. Just beyond bridge phyllites of the foothill sequence are replaced by coarse graywacke of the mountain sequence—part of a klippe of the Greenbrier fault.
41.2	The Sinks, cut into massive metagraywacke of the klippe.
43.2	Wear Cove Road on left.
43.4	Metcalf Bottoms, eroded in phyllite of foothill sequence between the klippe, 39.4–41.2, and the Greenbrier fault.
44.1	Cross Greenbrier fault, coarse-grained metagraywacke of the mountain sequence thrust over phyllite of the foothill sequence.
45.6	Cross bridge over Little River.
48.1	Elkmont Road on right.
49.3	Fighting Creek Gap. Straight ahead is Mount LeConte, elevation 6,593 feet.
53.0	Intersection with U. S. 441 and State 71. Park Service Headquarters on left of junction.

Log No. 26

U. S. Highway 441 and State Highway 71, Great Smoky Mountains National Park Service Headquarters to North Carolina State Line at Newfound Gap [1]

0.0	Follow U. S. 441 and State 71 southward from junction with State 73 at Park Service Headquarters.
0.8	Cross bridge over Sugarland Branch. Road on right just across bridge leads to quarry in metasandstone of the foothill sequence of the Ocoee series.
1.1	Mount LeConte across valley to left.

[1] *With Robert L. Wilson.*

2.1	Sugarland Overlook at the Greenbrier fault, which separates the foothill sequence from the mountain sequence of the Ocoee series.
3.6	View of The Chimneys. Sugarland Mountain straight ahead.
4.7	Chimneys camp ground. Curve left on bridge over West Fork of Little Pigeon River.
5.5	Chimneys Overlook. Metasandstone, conglomerate, slate, and metagraywacke of the mountain sequence. Across the valley are The Chimneys, formed in phyllite overlying metasandstone.
6.9	Lower Tunnel. Note "block fields," on adjacent slopes, covered by huge angular blocks of metagraywacke.
8.9	Alum Cave Bluffs parking area.
10.6	Cross bridge over Walker Camp Prong.
10.6–13.4	Coarse metagraywacke, dark phyllite, siliceous dolomite, and intraformational conglomerate of the mountain sequence.
11.5	"Smooth" green patches on ridges are "laurel slicks" formed by dense growth of rhododendron, mountain laurel, etc. They are surrounded by trees common in forests at lower elevations a thousand miles to the north.
12.5	Upper tunnel.
13.4	Newfound Gap, North Carolina-Tennessee State Line, in metagraywacke and phyllite. To the southwest is Clingmans Dome, elevation 6,642 feet, the highest mountain in Tennessee.

Log No. 27

U. S. Highway 129, From Junction With U. S. Highway 411, to North Carolina State Line, Via Calderwood [1]

0.0	Turn south on U. S. 129, leaving U. S. 411.
0.0–1.0	Knox soil and chert.
1.6–3.2	Nolichucky shale along axis of small anticline.
3.2–3.6	Red soil formed by weathering of Maynardville limestone.
3.6–6.6	Knox.
6.7–8.6	Athens shale.

[1] *With Herbert A. Tiedemann.*

7.5	Cross Ninemile Creek.
8.7	Holston formation.
8.8–9.4	Ottosee shale.
9.4–12.6	Bays formation.
10.0	Cross Fourmile Creek.
10.5	Chattanooga shale and Grainger formation overlie Bays formation above road level in prominent drainage divide. Mississippian beds form the crest of Little Mountain to the northeast.
11.0	State 72 turns right.
12.6–12.8	Sevier shale.
12.8	Cross Great Smoky fault, Sandsuck over Sevier, with a thin slice of Knox.
12.8–24.2	Fine-grained Ocoee.
13.8	On left of highway, Cochran conglomerate is exposed along Miller Cove fault.
15.5	Dam on Little Tennessee River under construction in 1955. Log follows old highway above dam.
18.3	Post Office in Chilhowee.
21.5	Leave river valley as highway turns left.
22.6	Road on right leads to Calderwood. Along this side road the Knox, surrounded by Ocoee, is well exposed in a small fenster. There is a small exposure of Knox on left side of highway just beyond road junction.
24.2	Calderwood Dam overlook. In this vicinity the fine-grained Ocoee is replaced by the Great Smoky conglomerate. The highway is in the conglomerate all the way to the State Line.
33.2	North Carolina-Tennessee State Line.

Log No. 28

State Highway 68, Madisonville to Coker Creek [1]

0.0	Turn left (south) on State 68 at Monroe County Courthouse in Madisonville, where U. S. 411 continues straight ahead.
0.8–1.4	Conasauga shale.
1.9–4.9	Knox group. Newala formation well exposed near end of interval.

[1] *With Herbert A. Tiedemann.*

4.8	Highway turns left, and cuts across the strike, where a secondary road continues straight ahead.
4.9–6.6	Athens shale.
6.6	Road on left to Bethlehem Church.
6.8–7.2	Holston formation.
7.3	Ottosee shale.
8.7	Crossroads in Mt. Vernon, near axis of Laurel Mountain syncline. The Bays formation occupies the axis of this structure to the north. This is the southern end of Little Mountain.
8.7–9.0	Ottosee shale.
9.2–9.6	Holston formation.
9.5	Road on left.
10.2–12.5	Athens shale.
12.5–13.7	Knox soil.
13.8	Cross Bullet Mountain fault, Rome over Knox, near crossroads. Rome is not exposed.
15.1	Curve right in Tellico Plains, which is located in a broad flat valley cut into Shady dolomite.
17.0	Turn left, leaving valley and crossing Sylco Creek fault, fine-grained Ocoee over Shady.
22.1	Road to right in small community.
22.6	Vein quartz along road.
23.0	Crossroads.
23.6	Road to left at school.
24.8–25.4	Coker Creek Community. Post Office at end of interval. (See Ashley, 1911, for occurrence and mining of gold in this vicinity.)
27.8	Witt Branch crosses highway to join Coker Creek along left side of highway.
28.7	Crossroads at Ironsburg. Road to left leads to mining district at mouth of Dalton Branch.
30.2	Cross Coker Creek at Historical Marker describing gold mining. Vein quartz exposed along highway 0.2 mile beyond bridge.

Log No. 29

U. S. Highway 64, Cleveland to Georgia-Tennessee State Line at Copperhill [1]

0.0	Turn left (east) on U. S. 64, in Cleveland, at junction with U. S. 11. (See Rodgers, 1953, for geology of East Tennessee.)
0.5	State 60 turns right.
1.0–2.0	Exposures of Knox chert.
2.0	Cross Knoxville fault, Conasauga over Knox.
2.0–3.6	Conasauga shales and limestones.
3.1	Crossroads. Hill formed by Knox chert in foreground. Ahead on left is a quarry in Maynardville limestone.
3.6–5.9	Highway crosses Athens syncline. Good sequence of lower Knox beds exposed.
3.6–4.3	Copper Ridge dolomite.
4.3–4.8	Basal sandy member of Chepultepec dolomite.
4.8–5.2	Chepultepec dolomite.
5.2	Longview dolomite, occupying axis of Athens syncline.
5.3–5.5	Chepultepec dolomite.
5.5–5.6	Basal sandy member of Chepultepec dolomite.
5.6–5.9	Copper Ridge dolomite.
5.9–9.8	Conasauga shales and limestones.
9.3	Enter Polk County.
9.6	Overpass, crossing U. S. 411.
11.2–12.0	Athens shale and sandstone, forming a strike ridge.
12.0–13.2	Knox chert and residual soil.
12.4	Ocoee River.
13.4–13.5	Unconformity between Athens shale and overlying terrace sand and gravel, reposing at an unusually high angle.
13.7	Knox soil and chert.
14.1	Enter Cherokee National Forest. Quarry across river is in Knox dolomite.
14.4	Cross Great Smoky fault, well exposed Chilhowee sandstone thrust over Knox and Athens, across highway from Ocoee Dam No. 1 and power plant.
14.5–20.8	Sandstone and shale of the Sandsuck shale of the foothill sequence of Ocoee series. As compared with rocks of the mountain sequence of this series, the Sandsuck is

[1] *With George D. Swingle and Robert L. Wilson.*

less clastic and more calcareous, and bedding predominates over cleavage. Quartz veins are lacking.

20.1 Turn right on U. S. 64 at junction with State 30.

20.8 Cross Sylco Creek fault, fine-grained part of foothill sequence thrust over Sandsuck shale.

20.8–26.9 Fine-grained part of Ocoee series, phyllites and other metasediments of low-grade metamorphism, with numerous quartz veins and well displayed bedding-cleavage relations.

23.5 Cross Caney Creek.

23.9 Ocoee Power House No. 2. Flume on mountain to right brings water to plant.

25.8 Goforth Creek.

LOWER CAMBRIAN		Rome formation, a heterogeneous mixture of variegated shales, with sandstones and limy zones. Approximately 1,000 feet thick.		
		Shady dolomite, approximately 1,000 feet thick.		
	Chilhowee Group	*Southwest*	*Northeast*	
		Hesse sandstone Murray shale Nebo sandstone	Erwin formation	Massive quartzite and interbedded shale 1,000-1,500 feet thick.
		Nichols shale	Hampton fm.	Shale with sandstone 800-2,500 feet thick.
		Cochran cgl.	Unicoi fm.	Typically coarse, conglomeratic sandstone. 1,000-5,000 feet thick.
PRE-CAMBRIAN	Ocoee Series	*Mountain belt*		*Foothill belt*
		Nantahala slate and phyllite with some sandstone. 2,000 feet thick.		Sandsuck shale and sandstone; Pigeon siltstone; and Fine-grained part of Ocoee series. More than 15,000 feet thick.
		Great Smoky conglomerate. Conglomeratic sandstone and graywacke. 6,000 feet thick.		
		Lowest part of Ocoee series. Graywacke and slate. At least 2,000 feet thick.		

FIGURE 11.—*Older strata in East Tennessee. (After Rodgers, 1953)*

26.9–32.8	Great Smoky conglomerate, the coarse clastic part of the mountain sequence—resistant rocks of low and middle metamorphic grade that form the higher mountainous areas.
28.2	Dam and beginning of flume for Ocoee Plant No. 2.
29.2	Ocoee Power Plant No. 3.
32.8	Gap. Entrance to Copper Basin, an intermontane basin formed by erosion of structurally complex and metamorphosed fine- and coarse-grained rocks of the Great Smoky conglomerate, which are also highly mineralized. (See Emmons and Laney, 1926.)
34.0	Cross bridge, leaving Cherokee National Forest. Note reforestation efforts on hills in foreground. All hills in this area were formerly denuded of vegetation by acid fumes given off in smelting processes at Copperhill. Note heavy silting of stream.
36.0	Underpass.
36.8–40.8	Area of extensive gullying, resulting from deforestation.
37.6	Turn right at junction with State 68. Ducktown is approximately a mile to the north. On the hill north of the junction is the Burra Burra mine, and to the south the shafts of the Central and Boyd mines may be seen.
37.7	Straight ahead on State 68, where U. S. 64 turns left.
38.3	Central mine shaft on left.
39.2	Road to Mary and Calloway mines on left.
40.4	Highway curves to left around main plant of Tennessee Copper Company.
41.3	Georgia-Tennessee State Line in Copperhill.

Log No. 30A

U. S. Highway 70, Knoxville to Crossville [1]

0.0	Turn left off Magnolia Avenue onto Broadway on U. S. 11 and 70, at junction with U. S. 25W and 441 in Knoxville.
0.4	Guide slightly to left at 5-points intersection.
0.7	Turn right on U. S. 11 and 70 where U. S. 441 continues straight ahead.

[1] *With Robert L. Wilson.*

1.2	Main Campus of the University of Tennessee. Retaining wall on right side of street is constructed of Lenoir limestone.
2.0	Underpass.
2.1	State 73 turns left at the College of Agriculture.
4.4	Deeply weathered Holston limestone at crest of hill.
6.9–9.2	Knox residuum and chert.
9.6–16.3	Highway follows strike valley in Conasauga.
14.3	Road on right to Oak Ridge.
15.5	Cross bridge at side road on left.
16.5–18.8	Knox chert and residual soil.
18.8	Cross bridge at approximate location of Saltville fault, Knox over Chickamauga.
19.9	Enter Loudon County.
20.0	Straight ahead on U. S. 70, where U. S. 11 guides left.
20.0–21.2	Chickamauga shale and limestone.
22.1–23.9	Knox chert and red soil.
24.3	Junction with State 95 on left.
24.6–25.8	Conasauga shale.
24.8	State 95 turns right to Oak Ridge.
25.8	Cross Beaver Valley fault, Conasauga over Knox.
25.8–32.2	Knox dolomite and chert.
32.2	Large quarry on right in Maynardville limestone and Copper Ridge dolomite. Contact near top of quarry.
32.6–33.2	Conasauga shale.
33.2–33.3	Cross Copper Creek fault, ridge-forming Rome over valley-forming Chickamauga.
34.1–35.0	Good exposures of Knox chert.
35.1	Road to Oak Ridge on right.
35.2–35.6	Conasauga shale.
35.6–35.9	Ridge formed by Rome formation. Cross White Oak Mountain fault, Rome over Knox, on west side of ridge.
38.9	State 58 turns left in Kingston.
39.2	Conasauga shale on left near Kingston fault, Conasauga over Knox.
39.8–40.6	Knox red soil and chert.
40.5	Cross Clinch River. To right is T.V.A. Kingston Steam Plant.
40.7	Conasauga shale and limestone.
40.9	Intricately folded Conasauga beds on left.

41.2–45.3	Highway follows strike valley in Conasauga. Serrate Rome ridge on right, and even-crested Knox ridge on left.
43.2	Junction with U. S. 27 on right.
45.4–46.5	Rome formation.
45.8	Watts Bar Lake on left.
46.6	Cross Chattanooga fault, Rome over Knox and Chickamauga.
46.9	Knox chert.
47.3–47.4	Conasauga shale.
47.8–50.0	Knox chert and red soil.
49.0	Crossroads on crest of a Knox ridge. Straight ahead is Walden Ridge.
50.1	Curve left into Rockwood at junction with State 61.
51.9	Quarry to right near base of Walden Ridge is in Mississippian limestone.
52.4	Pennington sandstone and shale exposed a short distance to right of highway.
52.6–53.0	Knox chert.
52.9	Turn right on U. S. 70, where U. S. 27 continues straight ahead.
53.2	Crumpled Pennington shale and sandstone on right.
53.3	Overpass.
53.3–53.4	Fort Payne chert, Chattanooga shale, and Rockwood formation are exposed to left of highway in fault relation with Pennsylvanian sandstone.
53.6–54.9	Ascend Walden Ridge up steeply dipping Pennsylvanian sandstone.
54.9	Gap on crest of Walden Ridge. On clear days the Great Smoky Mountains can be seen off to left, approximately 40 miles east. (See Wilson, Jewell, and Luther, 1956.)
54.9–55.2	Deformed sandstone and shale of the Crab Orchard Mountains group.
55.2	Road to right leads to Roosevelt Mountain Lookout. Scenic view.
55.4–55.7	Westward-dipping Pennsylvanian shale and sandstone on west side of Walden Ridge.
55.8	Enter Central Time Zone. Cross bridge over Piney Creek into Cumberland County. Essentially flat sandstone illustrates abrupt flattening of beds off Walden Ridge.
56.7–57.4	Crossville sandstone on Cumberland Plateau.

57.4	In the distance ahead Crab Orchard Mountain, the northern extension of the Sequatchie Valley anticline, rises above the level of Cumberland Plateau.
57.9–58.9	Rockcastle conglomerate.
60.0–60.5	Crossville sandstone.
60.7–61.2	Rockcastle conglomerate.
60.8	Cross bridge over Fall Creek in Ozone. Just ahead on left is parking area for a view of Ozone Falls, which drops 110 feet over massive Rockcastle.
61.2–62.9	Lower Pennsylvanian beds rise gently to west on east flank of Sequatchie Valley anticline.
62.9	Cross bridge.
63.5–63.7	Pennington formation on east flank of the anticline.
64.1	Glen Dean limestone on left. Crest of mountain to right is capped by cliff-forming Sewanee conglomerate.
64.9	Ste. Genevieve-Gasper limestones in large upper quarry on right; lower quarry in St. Louis. Quarries are near axis of anticline.
65.4	Railroad station in Crab Orchard.
66.0–66.5	Steeply dipping sandstones of Crab Orchard Mountains group on west flank of Sequatchie Valley anticline.
66.5–72.7	Crossville sandstone.
68.3	Cross Daddys Creek.
73.6	Crossroads. Road to left leads to Crab Orchard stone quarries, in Crossville sandstone; road to right to preparation plant.
75.0–75.3	Cross Crossville fault of Cumberland Plateau overthrust system, indicated by steeply dipping sandstones of Lee group. (See Stearns, 1954.)
75.7	Turn right on U. S. 70 at junction with State 28.
75.8	Cumberland County Courthouse in Crossville.
75.9	Junction with State 28.

Log No. 30B

U. S. Highway 70N, Crossville to Nashville

0.0	Turn left in Crossville, where State 28 continues straight ahead.
0.8	Guide right on U. S. 70N at junction with 70S. For next 18.1 miles highway continues on the Cumberland Plateau formed by resistant Rockcastle conglomerate. At 3.6 a stream has cut through the conglomerate and exposed underlying shale. (See Wilson, Jewell, and Luther, 1956.)
13.0	Mayland.
18.7	Enter Putnam County.
18.9	Highway drops below base of Rockcastle into underlying shale and thin sandstones down to Sewanee conglomerate at 21.7, on which the highway continues for 5.4 miles. This conglomerate contains zones crowded with small, rounded quartz pebbles.
22.0	Turn left in Monterey.
22.7	Road to left leads 0.8 mile to scenic overlook with excellent view of the Cumberland Escarpment. Good exposure of Sewanee at overlook.
23.4	State 84 turns left.
24.0	Sand pit on left in Sewanee.
27.1	Base of Sewanee. The highway descends through lower Pennsylvanian beds on its way down the Cumberland Escarpment.
27.7–28.6	Variegated shales, limy zones, and sandstones of Pennington formation.
28.6–29.1	Glen Dean limestone, best exposed in quarry.
29.1–29.7	Bench formed by Cypress sandstone, which is well exposed at 29.7. This bench is a prominent topographic feature of the escarpment.
29.7–30.4	Descend through Gasper and Ste. Genevieve oolitic limestones to the St. Louis limestone.
30.6	Floor of this valley is at level of Eastern Highland Rim. For next 7.8 miles, highway continues on this level, with exposures of St. Louis limestone and the white chert and red soil formed by its weathering.

33.2 Drainage of the valley, followed from 30.6, goes underground in a small cave a short distance to right of highway.

33.8 Hills on all sides are capped by Cypress sandstone.

34.1 Garretts Mill sandstone member of Warsaw limestone on right.

34.2 Cross bridge over Falling Water River.

38.4 Roadside tables. For next 8.3 miles, Eastern Highland Rim is covered with chert and red soil produced by weathering of the Warsaw, but there are no exposures of the limestone. Within this distance some of the stream valleys have cut down into residuum of Fort Payne chert, and occasional blocks of St. Louis chert have been locally let-down.

39.5 Putnam County Courthouse in Cookeville.

45.6 Junction with State 56 on right in Double Springs.

47.4 State 56 turns left.

49.6 Next 12.8 miles follows a tortuous spur of the frayed edge of the Rim, covered with residuum of Fort Payne chert, the only fresh exposure of which is on a dangerous curve at 58.7 where the formation contains many small geodes. The soil is less red than that formed from the St. Louis and Warsaw limestones. Blocks of let-down Warsaw chert occur locally within the first 2 miles of this distance.

56.0 Crossroads in low gap. Chattanooga shale overlies Leipers not far below gap.

57.3 Roadside tables. From several points near here Short Mountain may be seen, many miles to the south, rising above the Highland Rim level. This outlier is capped by Pennsylvanian sandstone overlying Glen Dean limestone, the Pennington formation having been overlapped. This outlier demonstrates that Pennsylvanian sediments formerly covered Central Tennessee.

59.2 Enter Smith County.

61.7 Junction with State 53 in Chestnut Mound. This road may be followed northward to the community of Flynns Lick, from which a secondary road leads to Flynn Creek disturbance centered at Clenny. (See Wilson and Born, 1936.)

62.3–62.4	Chattanooga shale overlying Leipers formation as highway descends into the Central Basin. From here to Round Lick Creek (78.2) outliers of the Rim display a steepening of slope at the horizon of the Chattanooga shale; this is emphasized by the fact that the hills have been cultivated to this level and remain wooded above it.
62.7–63.4	Exposures of Catheys formation. (See Wilson, 1949, for Ordovician stratigraphy.)
65.1–66.3	Cannon limestone.
65.4	Enter Elmwood.
67.5	Cross Caney Fork River.
67.9–68.7	Cannon limestone.
68.8–69.0	Hermitage formation on left.
69.2	Cannon limestone caps hill and overlies Hermitage.
69.6	Contact of Carters limestone and Hermitage formation on right. This is the major unconformity in the Ordovician of the Central Basin. Parking is easier at 70.1 for this same contact.
69.6–71.2	Good Ordovician section.
69.6–69.9	Hermitage formation.
70.1	Carters-Hermitage contact on left.
70.1–70.4	Carters limestone.
70.5–71.0	Hermitage formation along highway at base of bluff. Hermitage-Cannon contact at 71.0, just beyond "End 40 Mile Speed" sign.
70.7	Carthage on right, across bridge over Cumberland River.
71.0–71.2	Cannon limestone along highway at base of bluff. Catheys formation exposed on bluff above highway level.
71.3	Cross Hogan Creek.
72.0–72.7	Terrace gravel deposit of Cumberland River.
73.4	Hermitage formation, including a thin rolled-up zone, caps hill and overlies Carters limestone on east side of deep cut.
75.4	Cannon limestone caps hill.
75.7–75.9	Hermitage formation.
76.4–78.2	Carters limestone. Bentonite bed T-3 is exposed in cut on east side of Round Lick Creek. Large quarry in Carters to south of bridge and on east side of creek.
76.5	Artesian sulfur well on left. Well was drilled for oil.

78.2	Cross Round Lick Creek just above its junction with Cumberland River. Lebanon limestone exposed in bluff of creek below level of bridge.
78.7–82.0	Lebanon limestone.
81.3	Enter Wilson County.
82.0–82.2	Carters limestone on hill.
83.3	Carters limestone on hill. Chert below horizon of T-3 is well exposed.
85.4–86.0	Carters limestone.
86.0–86.2	Lebanon limestone.
87.1	Carters limestone at cut in saddle between two prominent hills rising above general level of the Central Basin.
87.1–88.2	Carters limestone. Carters-Lebanon contact in Spring Creek below bridge level.
88.2	Spring Creek.
88.2–89.9	Lebanon limestone.
89.9–90.1	Carters limestone.
90.1–90.8	Lebanon limestone. Ridley limestone exposed a short distance south of highway at 90.8.
91.2	Junction with State 26.
91.6	Confederate soldier monument in Lebanon Square.
93.3	Cross Bartons Creek.
93.9	Large quarry on right in Lebanon limestone. This is near the axis of the Nashville dome, the Lebanon being the oldest formation along U. S. 70 in Central Tennessee.
93.9–95.0	Lebanon limestone, including several cedar glades characteristic of this slabby formation.
95.2–95.4	Carters limestone.
96.8–97.0	Upper Carters member caps hill.
98.7	Carters limestone overlying Lebanon limestone.
98.8	Walnut Grove Road to left.
99.5	Cross railroad tracks.
100.2–102.0	Carters limestone.
102.6	Beckwith Road to left.
103.3–104.2	Carters limestone.
104.4	Cross Cedar Creek.
106.7–108.7	Topographic level developed on the relatively resistant Hermitage formation.
107.1	Green Hill Road to left.
109.1	Enter Davidson County.

110.5	Junction with Old Hickory Boulevard. The Hermitage, home of Andrew Jackson, is only a short distance to the right on this road.
111.0	Old Hickory Boulevard turns left.
111.7	Cross railroad tracks.
112.9	Cross Stones River, in which steeply dipping Hermitage and Carters are exposed.
115.2	Traffic light at Donelson Pike in Donelson.
115.6	Overpass. Hill to right is capped by Leipers.
117.4	Cross Mill Creek.
118.1–119.5	Topographic level developed on Hermitage formation.
119.8	Quarry on right in Carters limestone, which contains three bentonite beds. (See Wilson, 1948, p. 17, for details, and also for geology of Nashville.)
120.6	Nashville City Limits at railroad tracks.
121.4	Cross Wharf Avenue. Quarry about a block to right is in Hermitage and Bigby-Cannon limestones. Bluff along Cumberland River and railroad tracks consists of Bigby-Cannon and Catheys limestones. This section continues as far as the Tennessee Central Railway station. Good Ordovician section. (See Wilson, 1948, p. 12-13.)
122.0	Guide right on 1st Avenue South.
122.2	Tennessee Central Railway station. North end of section beginning in quarry on Wharf Avenue.
122.3	Turn left on Broadway.
122.9	8th Avenue and Broadway, junction with U. S. 41A and 70S.

Log No. 30C

U. S. Highway 70, Nashville to Camden

0.0	8th Avenue and Broadway. (See Wilson, 1949, for Ordovician and Silurian stratigraphy.)
1.4	West End entrance to Vanderbilt University.
1.8	Centennial Park on right, with replica of the Parthenon.
2.8	Underpass.
3.8	Nashville City Limits.
5.4	Cross Richland Creek.
5.4–6.2	Bigby-Cannon limestone in creek along left of highway.
6.8	Guide right on U. S. 70S at junction with State 100.

8.1	Catheys on left.
8.4	Leipers in quarry on right. Overlying the Leipers along the highway are Arnheim, Fernvale (Calcareous mudstone), weathered Chattanooga, and Lower Shaly Osage. Fort Payne chert in cut at top of Nine Mile Hill, at 8.9, an outlier of the Western Highland Rim.
9.0–9.1	Lower Shaly Osage.
10.4	Old Hickory Boulevard to right.
10.8	Cross Hicks Road.
11.1	Leipers-Arnheim contact near middle of cut. The facies of these two formations are identical here, but the faunas are different.
11.8	Sawyer Brown Road.
12.8–13.1	Leipers and Catheys are exposed at highway level along base of bluff. Western part of exposure at highway level is all Catheys.
13.7	Arnheim in saddle on right.
14.5	Join U. S. 70N (Charlotte Pike). Pegram limestone and sandstone are exposed on hillside and up ravine just north of junction.
14.8	Brassfield, Osgood, and Laurel on right in, or near, old quarry a short distance up the hill. Road to left leads to Newsom Station, in the vicinity of which are two large quarries in Silurian beds. (See Wilson, 1948, p. 82-83, for details.)
15.6	Roadside table. Good Silurian section. East limb of a faulted anticline well exposed for 1 mile. Fernvale limestone is exposed at crest of anticline 0.7 mile from table. Brassfield, Osgood, Laurel, Waldron, Lego, Dixon, Beech River, oolitic Bob, Decatur, Pegram, and Chattanooga shale are exposed. The faults visible at east side of the anticline near the table are post-Decatur, pre-Pegram in age, the Beech River, Bob, and Decatur being locally preserved on the down-side of the faults. (See Wilson, 1948, p. 83-84.) Loose slabs of Osage crinoidal limestone may be found on hill above highway.
16.8	Waldron and Laurel on right of highway. Laurel in quarry on left side of highway.
17.0	McCrory Lane to left.

17.5 Hidden Lake Hill on left. On south side of this hill are three quarries with Osgood, Laurel, Waldron, Lego, and Pegram. (See Wilson, 1948, p. 84.)

17.6 Laurel on right.

17.7 Brassfield on right.

18.1 Enter Cheatham County.

18.6 Laurel and Waldron.

19.0 Pegram Community.

19.8 Abandoned meander loop of Harpeth River, now partially utilized by a nursery.

20.0 Dixon on right.

20.3 Chattanooga, Pegram, Beech River, and Dixon in railroad cut to left.

20.5 Top few feet of Pegram overlain by Chattanooga and Lower Shaly Osage at curve in highway opposite road to Kingston Springs.

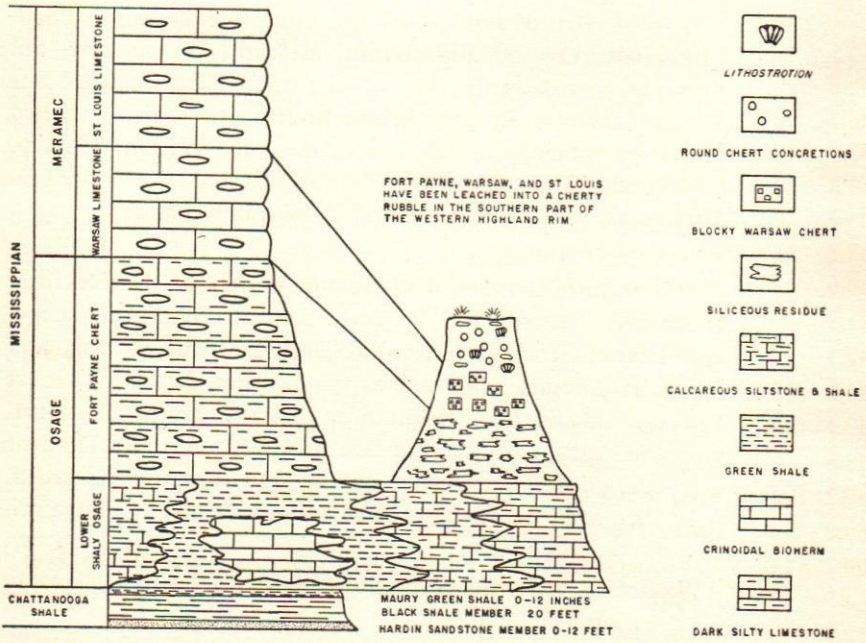


FIGURE 12.—*Chattanooga and Mississippian strata in Central Tennessee.*

20.6–20.8	Note truncation of strata in cut ahead.
20.9–21.3	Twenty-two feet of Beech River beds are truncated by Pegram limestone. Dixon mudstones, etc., Beech River, and Pegram exposed along bluff. (See Wilson, 1948, p. 85.)
21.4	Chattanooga shale with Hardin sandstone and Maury shale members.
21.5	Lower Shaly Osage.
22.5	Dixon and Beech River on left at curve in highway.
22.8	Cross Harpeth River. Section along bluff to left of highway includes Dixon, Beech River, Pegram, Chattanooga, and Lower Shaly Osage. (An optional side trip to The Narrows of Harpeth River is described by Wilson, 1948, p. 86-87.)
23.5	Small Indian mound on top of hill to left of Historical Marker.
23.5–25.8	Lower Shaly Osage and Fort Payne chert as highway gradually ascends above the Central Basin.
25.8	Western Highland Rim. For the next 33.7 miles the Rim is covered with soil and chert formed by weathering of Fort Payne, Warsaw, and St. Louis formations. Tuscaloosa gravel locally present on Rim.
27.8	Enter Dickson County.
30.7	Junction with State 47 in White Bluff.
33.9–34.5	Fort Payne chert.
34.3	Entrance to Montgomery Bell State Park on left.
34.5	Most of the chert for the next 3.7 miles is Warsaw.
38.2	Warsaw limestone.
40.9	Junction with State 48 at main intersection in Dickson.
41.9	Overpass.
42.3	Spherical chert concretions characteristic of the St. Louis.
46.1	Pit in Tuscaloosa gravel opposite roadside table.
47.4–48.4	Frequent exposures of Tuscaloosa gravel.
48.6	Enter Tennessee City.
49.2–49.9	Frequent exposures of Tuscaloosa gravel.
50.2	Enter Humphreys County.
50.7–51.9	Exposures of Tuscaloosa gravel, including one large gravel pit.
52.6	Cross Hurricane Creek.
55.5	McEwen.

59.9	Gorman. The highway has now descended into the valley of Trace Creek below the level of the Rim.
60.9	Large quarry on right in Warsaw limestone.
65.2	Junction with State 13 in Waverly. This highway to right leads to Erin and Wells Creek Basin. (See Log 34 from junction of State 13 and 49.)
70.5–72.8	Exposures of cherty limestone of Osage age beginning at roadside table.
73.2	Road to Denver on right.
73.2–73.9	Fort Payne chert to top of hill.
74.3–76.4	Tennessee River terrace veneered with poorly rounded terrace gravel.
77.3	Road on right to Johnsonville Steam Plant.
78.0	Enter Benton County at east end of bridge over Kentucky Lake (Tennessee River).
78.8	West end of bridge.
80.3	Chattanooga shale exposed on right where the old highway guides right.
80.8	Camden chert pushed over Chattanooga shale by reverse fault.
80.8–82.0	Frequent exposures of Chattanooga shale to service station on right of highway at crest of hill.
82.0–82.2	Camden chert.
83.4	Clay of Cretaceous age, overlying Tuscaloosa gravel just south of crossroads.
83.5	Crossroads.
83.6–84.7	Camden chert exposed along highway and in a large gravel pit. Chattanooga is exposed at three places within this interval, either because of faulting or because of contortions due to leaching of Camden limestone to Camden chert.
84.7	Overpass. Note well-displayed colorful unconformity—red Eutaw sand on white Camden chert near top of quarry to left of approach to overpass. Note absence of Tuscaloosa gravel.
85.0	Junction with State 69.
85.4	Turn left on U. S. 70 at Benton County Courthouse in Camden, where State 69 continues straight ahead.

Log No. 30D

U. S. Highways 70 and 70A, Camden to Memphis [1]

0.0	Turn left on U. S. 70 at Benton County Courthouse in Camden. (See Whitlatch, 1949, for clays of West Tennessee.)
2.2 & 2.7	Coon Creek tongue of the Ripley formation.
3.0	Hardy Sand Company on left utilizes McNairy sand.
4.9–6.5	McNairy sand member of the Ripley formation.
7.1	Enter Carroll County.
7.2	McNairy sand on left.
8.3	Bruceton.
11.4 & 13.6	McNairy sand.
19.0 & 19.4	Porters Creek clay on right.
19.6	Huntingdon City Limits.
20.5	Turn right on U. S. 70A.
23.8	Sandy clay of the Wilcox on left.
24.7	Claiborne sand overlain by Pleistocene terrace sand and gravel on left.
29.1	McLemoresville.
30.8	Claiborne sand overlain by oxidized "Peorian" loess.
35.2	Junction with U. S. 79. Continue on U. S. 70A.
36.6	Atwood.
37.3	Enter Gibson County.
37.9	Late Pleistocene terrace along Rutherford Fork.
39.8	Milan Arsenal.
41.2	Milan City Limits.
45.0	Claiborne sand on right.
51.6	Humboldt City Limits.
55.0	Middle Fork Forked Deer River. Enter Crockett County.
56.1	Late Wisconsin valley terrace.
57.1	Oxidized "Peorian" loess.
58.5	Claiborne sand in railroad cut.
58.8	Gadsden.
62.8	Late Wisconsin valley terrace.
63.9–65.3	Occasional exposures of Claiborne sand and clay overlain by oxidized "Peorian" loess.
66.3	Bells.
66.8	South Fork Forked Deer River. Enter Haywood County.

[1] *By Melvin V. Marcher.*

69.5	Claiborne clay overlain by Pleistocene terrace sand and "Peorian" loess.
77.0	Brownsville City Limits.
80.3 & 85.4	Claiborne clay on right.
85.6	Hatchie River.
90.3	Stanton.
95.1	Enter Tipton County.
98.8	Mason.
99.9	Enter Fayette County.
105.3 & 107.8	Pits in Pliocene gravel overlain by "Peorian" loess.
108.2	Loosahatchie River.
109.1–109.7	Broad late Wisconsin valley terrace. A slight terrace (probably early Wisconsin) can be seen off to left.
114.9	Pliocene gravel overlain by "Peorian" loess on left.
116.7	Sand, silt, clay, and carbonaceous material of the Jackson (?) formation overlain by Pleistocene terrace sand and "Peorian" loess.
126.0	Wolf River.
126.6	Memphis City Limits.
141.5	East end Tennessee-Arkansas bridge over Mississippi River.

Log No. 31

State Highway 26, Sparta to Lebanon

0.0	Straight ahead on State 26, where U. S. 70S turns left (south) in Sparta.
0.0–2.0	Red soil and chert formed by weathering of St. Louis limestone on the Eastern Highland Rim.
1.8	Large quarry on right in Ste. Genevieve-Gasper, etc.
2.9	Crossroads. Road to right leads to quarry at 1.8.
3.7–3.9	Contact between Warsaw and St. Louis in deep cut.
3.9–12.0	Red soil and chert largely derived from Warsaw, but some from Fort Payne and St. Louis.
11.0	Enter DeKalb County.
12.0	Crossroads.
13.7–14.2	Descend Eastern Highland Rim through Fort Payne chert.
14.2–14.3	Chattanooga shale. This is the Sligo Bridge section that has been described in detail by Stockdale and Klepser. (See Mississippi Geological Society Guidebook, 1954, p. 56-57.)

14.3–14.5	East end of bridge over Caney Fork River.
14.7	West end of bridge. (See Wilson, 1949.)
14.7–15.1	Catheys and Leipers formations.
15.1–15.2	Chattanooga shale.
15.2–15.8	Fort Payne chert.
15.8–25.6	Exposures of Fort Payne chert on Eastern Highland Rim.
21.0	Underpass beneath State 56 in Smithville.
23.4	Oblique crossroads.
25.6–26.6	Descend Rim through Fort Payne chert. This is the beginning of the best exposed and longest section in Central Tennessee.
26.6–26.7	Chattanooga shale.
26.7–27.4	Leipers and Catheys formations.
27.4–28.1	Cannon limestone.
28.1–28.7	Laminated Argillaceous limestone and Silty Nodular limestone members of Hermitage formation.
28.7	Straight ahead at crossroads.
28.9	East end of twin bridges.
29.1–29.3	Laminated Argillaceous limestone overlain by Silty Nodular limestone member.
29.5–29.7	Laminated Argillaceous limestone member.
29.9	Crossroads. Dowelltown to right.
30.0–30.1	Hermitage-Upper Carters contact.
30.4–30.5	Silty Nodular limestone member.
30.5–30.8	Cannon limestone in deep cut.
30.9	Crossroads.
31.2	Cross Smith Fork.
31.2–31.9	Laminated Argillaceous member. Liberty on left.
32.0–32.2	Upper Carters limestone and Laminated Argillaceous limestone in cut. Flowstone, stalactites, etc., along joints. State 53 turns left at end of cut.
32.5–32.8	Lower Carters overlying Lebanon limestone along right of highway. Lebanon more typically exposed along creek to left of highway. Quarry on right at end of this interval is in Lower Carters, with some Lebanon in lower part of quarry.
33.1–33.3	Lower Carters, bentonite bed T-3, and Upper Carters.
33.4	State 96 turns left.
33.6–34.3	Laminated Argillaceous limestone member.
34.4	*Stromatocerium pustulosum* zone at base of Cannon limestone on right.

34.4–35.5	Cannon limestone (Cannon facies of the Bigby-Cannon limestone) with a 4-foot zone of Dove-colored facies near highway level.
35.6–35.7	Silty Nodular limestone member.
35.7–36.1	Laminated Argillaceous limestone member. The bentonitic clay zone, T-5, is probably exposed at north end of cut.
36.4	Old highway turns left.
36.5–36.7	Excellent exposure of Hermitage-Upper Carters contact. About 1 foot of Curdsville limestone member of Hermitage formation present. Curdsville-Upper Carters contact is "frozen," as it is at many localities. Bentonite T-3 is exposed at north end of cut.
36.7–37.7	Lower Carters. T-3 exposed at 37.3.
37.5	Curve left on State 26, where the old highway and State 53 continue straight ahead into Alexandria.
37.7–37.8	T-3 overlain by Upper Carters.
38.0–38.2	Laminated Argillaceous limestone member on crest of hill.
38.4–39.9	Lower Carters.
38.8	Bridge at crossroads.
40.0	New highway grade (in December 1954) ends at bridge near DeKalb-Wilson County Line. The log, therefore, follows the old highway from here to Watertown and Lebanon.
40.0–41.6	Lower Carters.
41.6–42.0	Hermitage formation.
41.9	Hearn Hill Road to left at crest of hill.
42.0–47.5	Carters limestone.
44.4	Cross railroad tracks. Enter Watertown.
46.4	Beech Log Road to left.
47.9–48.8	Laminated Argillaceous limestone member. Bentonitic clay, T-5, exposed on right of road near end of interval. Trammel Lane to left at end of interval.
48.8–50.8	Carters limestone.
50.5	Shop Springs.
50.8	Hill ahead on right is an outlier of the Highland Rim capped by Fort Payne chert. Such outliers have made it possible to trace changes in facies in the Nashville group across the Central Basin.
52.7	Cross Spring Creek.

53.6–54.7	Lebanon limestone.
55.0–55.7	Carters limestone.
56.9	Ridley limestone on left of highway.
57.1	Ridley limestone on left of highway in depression behind hospital.
57.5	Junction with U. S. 70N in Lebanon.

Log No. 32

U. S. Highway 70S, Crossville to Murfreesboro

0.0	Guide left on U. S. 70S where U. S. 70N turns right in Crossville. (See Wilson, Jewell, and Luther, 1956.)
0.0–3.8	Rockcastle conglomerate.
3.8–4.5	Vandever formation in valley of Littlefield Branch.
4.5–6.3	Rockcastle conglomerate.
5.2	Crossroads in Pomona.
6.3–6.6	Vandever formation.
6.6–8.6	Newton sandstone, which is locally being quarried.
7.9	Cross Caney Fork.
8.6–10.4	Vandever formation poorly exposed.
10.4	Pleasant Hill. Rockcastle caps hill to right.
10.4–12.5	Vandever formation.
12.5–12.7	Rockcastle.
12.7–18.8	Vandever formation, with Rockcastle capping several of the higher hills.
17.7	De Rossett.
18.8–22.4	Sewanee conglomerate.
20.9	Bon Air, formerly an important coal-mining center.
22.4	Base of Sewanee at roadside table. Note relationship between the sandstone and shale.
22.5–22.8	Gizzard group, including limy marine zones and thin coal beds.
23.1–23.8	Pennington formation.
23.8–24.1	Glen Dean limestone.
24.2–24.4	Cypress sandstone forming a topographic bench on the Cumberland Escarpment.
24.4–25.4	Gasper-Ste. Genevieve limestones. Ste. Genevieve-St. Louis contact exposed at end of interval. Note chert zone near base of Ste. Genevieve.

25.5–42.0	Karst topography of the Eastern Highland Rim developed on St. Louis limestone.
28.3	White County Courthouse in Sparta.
28.4	St. Louis limestone exposed on right.
29.1	Turn left on U. S. 70S, where State 26 goes straight ahead.
35.5	State 111 turns left in Doyle.
35.8	Quarry on right in Ste. Genevieve-Gasper.
39.9	Quebeck.
42.5	Cross Caney Fork.
43.4	Rock Island.
43.4–58.6	Eastern Highland Rim developed on St. Louis and Warsaw limestones.
51.5	State 30 turns left.
53.8	Cross Collins River. Leached Warsaw on west side of valley.
57.1	Warren County Courthouse in McMinnville.
57.9	Warsaw limestone on right.
58.6	Warsaw in branch on left at roadside tables.
58.6–66.5	Eastern Highland Rim developed on Warsaw and Fort Payne.
66.5	Crossroads in Centertown.
66.5–76.5	Fort Payne chert.
71.0	State 146 turns right.
73.3–74.1	Geodes, which are for sale along highway, occur in the Fort Payne.
75.9	Roadside tables on right. Good view of Short Mountain to north. This mountain is an outlier of the Cumberland Plateau and is capped by Pennsylvanian sandstone overlying Glen Dean limestone, the normally intervening Pennington formation being overlapped. This outlier demonstrates that Pennsylvanian strata formerly covered Central Tennessee.
76.5–76.6	Chattanooga shale overlying Leipers limestone. (See Wilson, 1949.)
76.8–77.1	Catheys formation.
77.1–77.2	Cannon limestone.
78.0	State 53 turns right. (Log of this highway is in Mississippi Geological Society Guidebook, 1954, p. 55.)
78.1	Columns at entrance to driveway on left are made of quartz-lined geodes from the Fort Payne.
78.8	Cannon County Courthouse in Woodbury.

79.5	State 145 turns right.
79.5–80.6	Carters limestone.
80.6–82.4	Lebanon limestone.
82.5	Cross East Fork of Stones River.
82.5–83.4	Carters limestone.
83.1	Road to right leads to zinc mine that was operated during World War II.
83.8–84.3	Lebanon limestone.
84.4	Carters limestone caps hill, where side road turns right.
84.7–85.0	Lebanon limestone.
85.3	Section on hill behind mill on right in Readyville includes Ridley, Lebanon, and Carters. (This section was published by Safford, 1869.)
85.4	Cross East Fork of Stones River just west of Readyville. Ridley limestone exposed between bridge and mill.
86.5–87.1	Lebanon limestone.
87.1–88.0	Carters limestone. Upper Carters-Curdsville contact well exposed in cut at highest point (87.6) in this interval. Peaks Hill to north is an outlier of the Highland Rim capped with Fort Payne chert.
88.3–89.3	Lebanon limestone, including several typical Lebanon "cedar glades."
89.3–90.5	Ridley limestone.
90.5	Cross Cripple Creek.
90.5–90.7 & 91.4–93.7	Lebanon limestone.
93.7–95.1	Ridley limestone.
94.1	Enter Double Springs.
98.5	Turn right at James K. Polk Hotel in Murfreesboro.
98.6	Turn left.
98.7	Cross U. S. 231 and State 10.
99.3	Merge into U. S. 41.

Log No. 33

U. S. Highway 64, Monteagle to Clifton Junction on State Highway 114

0.0	Curve left on U. S. 64, where U. S. 41 curves right in the western edge of Monteagle. (See Wilson, Jewell, and Luther, 1956.)
2.2	Enter Franklin County at railroad crossing. Sand pit in Sewanee conglomerate on left.
2.2–2.9	Sewanee conglomerate.
2.9–3.6	Whitwell shale.
3.6–6.1	Sewanee conglomerate.
5.2	University of the South in Sewanee.
6.1–6.7	Upper Gizzard shale.
6.7	State 56 turns left.
7.2–7.3	Warren Point sandstone.
7.4	Base of Pennsylvanian.
7.4–7.6	Pennington formation.
8.7	Quarry in upper part of Glen Dean limestone on left.
8.7–10.0	Glen Dean, Gasper, and Ste. Genevieve limestones. Hardinsburg-Golconda-Cypress zone is very thin.
10.0–20.0	Eastern Highland Rim developed on St. Louis limestone.
12.7	Cross railroad tracks in Cowan. Street to left leads to large quarries (supplying cement plant) in Ste. Genevieve-Gasper limestone, above which Cypress, Golconda, and Hardinsburg are exposed.
19.0	Turn left at Franklin County Courthouse in Winchester.
20.0–31.3	Highland Rim developed largely on Warsaw limestone, with some St. Louis chert.
25.5	Cross railroad tracks leaving Belvidere.
29.9	Crossroads in Old Salem.
31.3	State 97 turns left.
31.3–42.2	Highland Rim developed largely on Fort Payne chert with some Warsaw chert on higher hills near beginning of interval.
34.2	Enter Lincoln County.
37.9	State 121 turns left.
42.2	Chattanooga shale overlying Leipers formation as highway descends into the Central Basin. (See Wilson, 1949.)
42.7–43.5	Catheys formation.

44.8	Kelso.
46.0	Cross Elk River. Cannon limestone beneath bridge.
46.6–47.2; 48.2–48.3; & 50.4	Catheys formation.
51.1	Basal Laminated Siltstone member of Catheys formation overlies Bigby facies of Bigby-Cannon limestone on west side of Norris Creek.
51.3	U. S. 231 turns right.
52.0	Straight ahead at Lincoln County Courthouse in Fayetteville, where U. S. 231 turns left.
53.4	Basal Laminated Siltstone member of Catheys formation overlies Bigby-Cannon limestone. Good intraformational conglomerate just above basal member of Catheys.
53.8	Pit in terrace gravel on left.
54.3	Cross Cane Creek.
54.7–55.0	Bigby-Cannon limestone.
55.3	Hermitage formation.
55.4–55.8	Bigby-Cannon limestone.
55.9	Hermitage formation.
56.7–57.2	Hermitage formation along creek, overlain by Bigby-Cannon.
57.5–58.5	Bigby-Cannon limestone.
58.6	Crossroads.
58.7–59.1	Hermitage formation.
59.2–59.6	Bigby-Cannon limestone in drainage divide.
60.1	Hermitage formation.
60.1–60.8	Carters limestone.
60.8–61.6	Hermitage formation.
61.3	Cross creek.
61.7–62.4	Bigby-Cannon limestone, including some leached phosphatic Bigby facies.
62.4–62.6	Hermitage formation.
62.6	Cross Swan Creek. Carters limestone in creek.
63.2	Boonshill Road to right.
63.2–64.0	Bigby-Cannon limestone.
64.2	Cross McAfee Creek.
64.3–64.5	Catheys formation.
64.5–64.8	Bigby-Cannon limestone.
64.8–67.3	Catheys formation.
68.1	McBurg.

68.3–68.6	Catheys formation.
69.0–69.3	Leipers formation in drainage divide.
69.3	Enter Giles County.
70.6	Railroad underpass. Enter Frankewing.
71.9	Crossroads.
71.9–72.1	Leipers formation.
72.4	Chattanooga shale.
72.4–73.3	Fort Payne chert on Highland Rim level.
73.3	Chattanooga shale.
73.8	Campbell Spring in Catheys limestone on left.
74.7	Catheys formation.
76.3	Catheys formation along Buchanan Creek.
76.7–77.0	Leipers, Richmond, and Brassfield. Brassfield in saddle at 77.0.
77.9	Cross Leatherwood Creek.
78.0–78.2	Brassfield limestone.
78.9	Leipers formation.
79.7	Fort Payne chert caps hill.
80.6–81.5	Bigby facies of Bigby-Cannon limestone. In this part of Giles County the entire Bigby-Cannon is Bigby facies.
82.3	Contact between Hermitage and Bigby facies on left.
82.4	Cross U. S. 31 in Pulaski.
82.9	Basal shale of Catheys formation overlying Bigby.
83.7–83.9	Bigby limestone in cut beneath railroad.
84.5–85.0	Bigby limestone.
85.2–85.3	Hermitage formation.
86.5	Cross Richland Creek.
88.4	*Dalmanella* coquina member of Hermitage on right.
89.1	Catheys formation.
90.2	Bodenham.
93.5	Chattanooga shale.
93.7–94.0	Ascend Western Highland Rim through exposures of Fort Payne formation.
94.0–100.8	Western Highland Rim, developed on Fort Payne. Enter Lawrence County at beginning of interval.
100.8	Cross U. S. 43 in Lawrenceburg.
101.5–102.5	Fort Payne formation in valley of Shoal Creek. Note joint-controlled "rock chimneys" to right.
103.0–129.5	Western Highland Rim with local exposures of fresh Fort Payne. Rim is covered by Fort Payne soil and chert, with some let-down St. Louis and Warsaw chert.

117.2	Enter Wayne County, 0.1 mile east of Natchez Trace Parkway.
122.8	Cross Fortyeight Creek. Ridgetop facies of Fort Payne exposed on east side of creek.
123.9	Wayne Furnace Historical Marker.
125.6	Road to Natural Bridge turns right. Bridge is developed in Osgood and Laurel limestones.
129.5	Turn left around Wayne County Courthouse in Waynesboro, at junction with State 13. 1¼ miles north of Waynesboro, on State 13, is a good exposure of Laurel, Waldron, and Lego in quarry.
129.5–131.9	Fort Payne chert, including bands of iron oxide.
133.6	Quarry on left in Wayne group.
135.7–136.4	Wayne limestone, beginning approximately at side road to left.
136.5	Cross bridge over Gunn Hollow Creek.
136.6	Large blocks of Hardin sandstone on right.
136.8–136.9	Wayne limestone.
137.4	Cross creek.
138.1	Beech River formation overlain by Bob limestone.
139.1–139.3	Dixon formation.
141.4	Join State 114 on right.

Log No. 34

Wells Creek Basin, Stewart and Houston Counties

0.0	Log begins at intersection of State 49 and 13 about a mile east of Erin. Drive west on 49 toward Erin. (See Bucher, 1936, p. 1066-1070 and 1074.)
0.2 & 0.5	Fort Payne chert on left is in the outer horst, which is structurally at the normal level of the region or only slightly above this level.
0.7	Turn right on side road at north end of overpass on State 49, where it crosses railroad tracks at east edge of Erin.
0.7–0.9	Fort Payne chert on left in the outer horst.
0.9	The ravine at large spring on left has cut through the east-west fault that separates the outer horst on the south (and in which the preceding exposures of Fort Payne are located) from the outer graben on the north. Fort Payne in the outer horst south of the fault is exposed

on both sides of the mouth of the ravine near the road, on the west between 0.7 and 0.9, where it is overlain by Warsaw limestone, and on the east between 0.9 and 1.0. St. Louis limestone in the outer graben on the north side of the fault is exposed at the spring.

0.9–1.0 Fort Payne along left side of road on south side of fault and in the outer horst.

1.0–1.3 St. Louis limestone on north side of fault and in the outer graben.

1.3 The western part of this quarry is in St. Louis limestone of the outer graben, as at 1.0–1.3. The outer graben is very narrow here, for in this quarry is the "east-west" fault that separates the outer graben on the south (and in which the exposures of St. Louis are located) from the inner horst on the north. The Fort Payne, which occurs in the eastern part of the quarry, has been faulted up relative to the level of the St. Louis of the outer graben.

1.8–2.1 On west of road Fort Payne dips southward in the inner horst.

2.9–3.1 Residual chert of the St. Louis. This St. Louis is in the inner graben, for somewhere between 2.1 and 2.9 the road crosses the east-west fault that separates the inner horst on the south (and in which the exposures of Fort Payne between 1.3 and 2.1 are located) from the inner graben on the north.

3.5 Cross Wells Creek. On right of road and in railroad cut, Warsaw and St. Louis limestone of the inner graben are exposed.

3.9 Road to left leads to third side trip, described later in this log.

4.1 Ridgetop facies of the Lower Shaly Osage dips southward in railroad cut on right of road. This dip is off the central uplift. This is the gateway to Wells Creek Basin.

4.2–4.6 Exposures of southward-dipping Silurian limestone.

4.6 Road to left leads to second side trip, described later in this log. The traverse, thus far, has been across the strike. Lego and Laurel limestones are exposed in large yard of house on left, or north, side of road.

4.7 Southeastward-dipping Hermitage on left of road, which is now beginning to follow the strike around the eastern periphery of the central uplift.

4.9 Park and walk along road to right for the most continuous section in the area. Lego, Dixon, Beech River, Bob, Lobelville, Decatur, Ross, and Lower Mississippian beds dip to the southeast off the central uplift.

4.9–5.3 Hermitage hogback along left side of road, and exposures of Silurian limestone along right side of road.

5.3 Prominent ridge on right is the Fort Payne hogback that encircles Wells Creek Basin.

5.3–6.2 Scattered exposures of Silurian limestone.

6.8 Road to left leads to first side trip, described later in this log.

7.2 Northeastward-dipping Harriman chert and limestone and Chattanooga shale in cut on right.

7.4 Turn left. Main road to right leads to Cumberland City.

7.5 North-northeastward-dipping Fort Payne on left of road.

8.0 Between 7.5 and 7.9 Harriman chert, etc., form a hogback along left side of road. At 8.0 Harriman chert forms a small hill left of road. South of this Harriman hill the dip-slope of the Hermitage hogback may be seen, presumably dipping northward, or vertical. The Harriman hill occurs in a topographic gap 1,000 feet wide, between the Fort Payne-Harriman-Decatur hogbacks to the east and west, and in which these beds dip north-northeastward and north-northwestward at 7.5 and 8.2, respectively.

Along the road and river bank immediately north of the Harriman hill, Ross and Decatur limestones dip southward. This is the only known locality at which beds of Late Niagaran and Devonian age dip into, rather than away from, the central uplift. Although older beds form essentially continuous outcrop belts around the central uplift, they are locally vertical and even overturned.

8.2 Fort Payne chert and Chattanooga shale dipping north-northwestward on left.

9.0 Cross Wells Creek.

9.0–9.1 & 9.3–9.5 St. Louis chert and limestone in inner graben.

10.2 Turn around and return 3.4 miles to 6.8 for first side trip.

First side trip, beginning at 6.8 of main trip.

0.0 Turn right, or west.

0.2 Cross segment of Hermitage hogback, offset from those that may be seen to the southeast and northwest.

0.3 Railroad crossing. Hermitage in railroad cut to right. Carters and Lebanon along road west of crossing.

0.6 Park and walk to west behind large brick house. Stones River and Knox beds are exposed along a field road for some distance to west. This northern prolongation of the Knox to the central uplift points toward 8.0 of the main trip. To the south may be seen the low, rounded hill formed by the resistant Knox, in which a quarry has been opened 0.45 mile south of the house. Excellent display of brecciation, etc., in quarry. Turn around and return to 4.6 of the main trip for second side trip.

Second side trip, beginning at 4.6 of main trip.

0.0 Park and walk to railroad tracks a short distance to west. In railroad cut Laurel, Osgood, Brassfield, Fernvale, and Hermitage are exposed from south to north, all overturned and dipping northward. To the south, along the tracks, the Hermitage hogback may be seen on west side of tracks, offset from the Hermitage in the cut. Return to 3.9 of main trip for third side trip.

Third side trip, beginning at 3.9 of main trip.

0.0 Turn right, or west, and cross Wells Creek.

0.1 Fort Payne chert.

0.8–1.0 Cross Hermitage hogback. From top of hogback may be seen the low rounded hill about a mile to the north, formed by the Knox in the central uplift. Note the encircling Fort Payne hogback around the basin.

1.2 Road to right, or north.

1.5 Park and walk southwestward, crossing creek, skirting topographic spur, and following small ravine along west edge of spur. The section here includes Decatur, Ross, Harriman, Chattanooga, and green-red Osage shale. In a small glade-like exposure near cedar trees on west side of spur, a block of Hermitage occurs at the level

of the Osage, Chattanooga, and Harriman. Return to cars via top of the spur for good view of the basin. Turn around.

1.8 Turn left, or north, on road at 1.2 of third side trip. Carters limestone between 1.8 and 2.0.

2.0 Turn left onto field road, and park. Walk northward to low rounded hill less than a mile to the north. This hill is formed by the resistant Knox dolomite. A 2,000-foot core was drilled near the top of this hill. About 650 feet south of the well are several small exposures of Knox dolomite. One block of dolomite is vertical and has a strike of N. 20° E. Axes of the horizontal shatter cones in this block, and in other nearby exposures, have an average strike of N. 7° W.

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