



Base from U.S. Geological Survey, 1957, Photorevised 1972

Geology west of Great Smoky fault compiled from Swingle and others (1968); geology east of Great Smoky fault compiled from Merschat and Wiener (1973 and unpub. mapping) and North Carolina Geological Survey (1985)

EXPLANATION

- Tract Borders**
- Late Proterozoic Ocoee Supergroup—Permissive for massive sulfide and sedimentary exhalative copper, iron, sulfur, zinc, gold, and silver; and sedimentary-rock hosted, vein, and placer gold
 - Cambrian(?) Murphy belt—Permissive for secondary iron and residual manganese deposits, vein and placer gold, talc, and marble
 - Lower Cambrian through Middle Silurian rocks—Permissive for Mississippi Valley-type barite, zinc, lead, and fluorite deposits; residual barite; sedimentary iron; secondary iron and manganese; karst-type bauxite and clay; marble; and limestone and dolomite
 - Upper Devonian through Upper Mississippian rocks—Permissive for secondary manganese, phosphate, limestone, sand, ornamental sandstone, gypsum, uranium, and oil and gas from shale
 - Lower Pennsylvanian rocks—Permissive for coal, high-silica sand, and dimension stone (sandstone)
- Areas of Metallic Mineral Deposits**
- Al—Bauxite deposit
 - Au—Gold (Coker Creek gold district)
 - Ba, Zn, Pb, F—Barite, zinc, lead, and (or) fluorite deposit (major commodity listed first) and occurrence (includes Sweetwater barite district)
 - Cu-Fe-S—Copper-iron-sulfur (Ducktown massive sulfide district)
 - Fe-Sed—Sedimentary iron deposit (Clinton or red iron ore)
 - Fe-Sec—Secondary iron deposit (supergene, brown, or Oriskany iron ore)
 - Mn-Fe-Sec—Secondary manganese-iron deposit
 - Mn-Sec—Secondary manganese deposit

Summary of metallic mineral deposits in the Chattanooga 1°x2° quadrangle

Deposit type (model no.) ¹	Examples	Tract				
		1	2	3	4	5
Bedded Ba (31b)	Rockwood Formation	B	C	C	C	D
Clinton Fe		D	C	A	C	D
Sedimentary Mn (34b)		C	C	C	D	D
Volcanogenic Mn (24c)		D	C	D	D	D
Sedimentary phosphate (34c, d)		C	C	C	B	C
Sedimentary U (30c)	Chattanooga Shale	D	C	C	B	C
Sedimentary exhalative Zn-Pb (31a)	Ducktown	A-C	D	D	D	D
Besshi massive sulfide (24b)	Ducktown	A-C	D	D	D	D
Combined Besshi and sedimentary exhalative	Ducktown	A-C	D	D	D	D
Sediment-hosted Cu, Co, Ag, Zn (30b)	Chattanooga Shale(?)	B	C	C	B	C
Blackbird Co-Cu (24d)		D	C	D	D	D
Quartz-pebble conglomerate Au-U (29a)	Coker Creek	A	C	D	D	D
Homestake Au (36b)	Coker Creek(?)	A	C	D	D	D
Gold on flat faults (37b)		C	C	D	D	D
Low sulfide Au-quartz veins (36a)	Coker Creek	A	C	D	D	D
Hot-spring Hg (27a)		C	C	D	D	D
Metamorphosed massive sulfide	Ducktown	A	C	D	D	D
Metamorphic base metal veins		C	C	D	D	D
Metamorphic Sb veins		C	C	D	D	D
MVT ² -Pb, Zn (32a, b)	Sweetwater, central Tennessee	D	D	A	B	B
MVT-Ba (32a, b)	Sweetwater, central Tennessee	D	D	A	B	B
MVT-F	Sweetwater, central Tennessee	D	D	A	B	B
Placer Au-PGE ³ (39a)	Coker Creek	A	C	D	D	D
Secondary Fe	Ducktown	A	A	A	C	C
Secondary Mn	Sweetwater	C	A	A	A	C
Residual Ba	Sweetwater	D	D	A	C	C
Karst-type bauxite (38c)		D	D	A	C	C
Karst-type clay		D	D	A	C	C

¹Model number refers to Cox and Singer, 1986.
²MVT, Mississippi Valley-type.
³PGE, platinum-group elements.

A, known mineralization.
B, moderate potential, permissive environment.
C, permissive environment.
D, not permissive.

DESCRIPTION OF MAP UNITS

CUMBERLAND PLATEAU, HIGHLAND RIM, AND NASHVILLE BASIN

- Pu Pennsylvanian rocks, undivided**
- Cross Mountain, Vowell Mountain, Redoak Mountain, Graves Gap, Indian Bluff, and Slatestone Formations*—Shale, sandstone, siltstone, and coal
Crooked Fork Group—Sandstone, shale, and siltstone; conglomeratic layers and coal beds locally
Crab Orchard Mountains Group—Shale, siltstone, and sandstone; conglomeratic sandstones in upper and lower parts, includes coal beds
Gizzard Group—Shale, siltstone, and sandstone
Fentress Formation (lateral equivalent to Gizzard and part of Crab Orchard Mountains Group)—Shale with siltstone and sandstone
- MDu Mississippian and Devonian rocks, undivided**
- Pennington Formation*—Reddish and greenish shale and siltstone; includes dolomite, limestone, and sandstone
Bangor Limestone—Thick-bedded dark-brownish-gray limestone
Hartselle Sandstone—Sandstone and shale; limestone locally
Monteagle Limestone—Mainly fragmental and oolitic limestone
St. Louis Limestone—Fine-grained, brownish-gray, dolomitic, cherty limestone
Warsaw Limestone—Medium- to coarse-grained, crossbedded limestone; includes sandstone and shale
Fort Payne Formation—Calcareous and dolomitic sandstone; includes bedded chert, cherty limestone, and shale
Chattanooga Shale—Black, fissile, carbonaceous shale
- SOu Silurian and Ordovician rocks, undivided**
- Brassfield Limestone*—Cherty limestone and calcareous shale
Sequatchie Formation—Shaly limestone with calcareous shale
Leipers Limestone—Nodular shaly limestone and fine- to coarse-grained limestone
Innan Formation—Thin-bedded to laminated limestone with calcareous shale
Nashville Group (*Cathey's Formation, Bigby Limestone, Cannon Limestone, and Heritage Formation*)—Mainly limestone; includes shale and sandy to shaly limestone
Stones River Group (*Carters, Lebanon, Ridley, Pierce, and Murfreesboro Limestones*)—Mainly limestone; includes calcareous shale and shaly limestone; Carters Limestone contains thin bentonite beds
Wells Creek Formation (as used by Swingle and others, 1966)—Limestone and dolomite; includes chert blocks and fragments and calcareous shale
- Ok Knox Group (part), undivided (Lower Ordovician)**—Cherty dolomite and limestone of the Mascot Dolomite, Kingsport Formation, and Chepultepec Dolomite

VALLEY AND RIDGE AND BLUE RIDGE

- MDu Mississippian and Devonian rocks, undivided**
- Pennington Formation*—Highly variegated shale; includes siltstone and sandstone
Neuman Limestone—Limestone, shaly limestone, shale, siltstone, and sandstone
Fort Payne Formation—Bedded chert and minor shale
Greasy Cove Formation—Limestone, calcareous shale, siltstone, and sandstone
Grainger Formation—Shale with siltstone and glauconitic sandstone; quartz-pebble conglomerate locally
Chattanooga Shale—Black, carbonaceous shale
- SOu Silurian and Ordovician rocks, undivided**
- Rockwood Formation*—Brown to maroon shale, thin siltstone, sandstone, and hematite beds
Clinch Sandstone—Well-sorted sandstone; includes siltstone and shale
Sequatchie Formation—Shaly limestone and interbedded calcareous shale and siltstone
- Oc Chickamauga Group, undivided (as used by Swingle and others, 1966) (Upper and Middle Ordovician)**—Consists of Reedsville Shale, Moccasin Formation, Bays Formation, Otosee Shale, Holston Formation, Lenoir Limestone, Athens Shale, and Sevier Shale. Predominantly limestone in the northwestern part of the Valley and Ridge, becomes thicker and more clastic to the southeast
- Ock Knox Group, undivided (Lower Ordovician and Upper Cambrian)**—Siliceous dolomite and magnesian limestone of the Mascot Dolomite, Kingsport Formation, Longview Dolomite (as used by Swingle and others, 1966), Chepultepec Dolomite, and Copper Ridge Dolomite
- Cc Conasauga Group, undivided (Upper and Middle Cambrian)**—Consists of Maynardville Limestone, Nolichucky Shale, Maryville Limestone, Rogersville Shale, Rutledge Limestone, and Pumpkin Valley Shale. Mostly shale in the northwestern Valley and Ridge, to the east becomes limestone, dolomitic limestone, dolomite, siltstone, and shale
- Crs Rome Formation and Shady Dolomite, undivided (Middle and Lower Cambrian)**
- Rome Formation*—Shale, siltstone, and sandstone
Shady Dolomite—Dolomite and limestone with shaly limestone and calcareous shale

- CZcw Chilhowee and Walden Creek (part) Groups, undivided (Lower Cambrian and Late Proterozoic)**
- Chilhowee Group**
- Helenmode Formation*—Sandstone and shale
Hesse Sandstone—White quartzite
Murray Shale—Silty, sandy, micaceous shale with shale and siltstone
Nebo Sandstone—White quartzite, in part feldspathic
Nichols Shale—Silty, sandy, micaceous shale and siltstone
Cochran Formation—Quartz-pebble conglomerate, pebbly arkose, siltstone, and shale
- Walden Creek Group**
- Sandsuck Formation*—Shale, feldspathic sandstone, and quartz-pebble conglomerate
- BLUE RIDGE**
- Murphy belt sequence**
- Cmb Mineral Bluff Formation of Hurst (1955) (Cambrian?)**—Quartz-sericite schist and phyllite with thin quartzite layers and minor interbedded graphitic schist, garnet-mica schist, staurolite schist, cross-biotite schist, and dark-colored slate
- Cnam Nottely Quartzite, Andrews Formation, and Murphy Marble of Hurst (1955), undivided (Cambrian?)**—Calcareous to dolomitic marble, calcareous cross-biotite schist, and meta-orthoquartzite with slate
- Cb Brasstown Schist of Hurst (1955) (Cambrian?)**—Cross-biotite schist and quartzite
- Ctn Tusquee Quartzite and Nantahala Formation of Hurst (1955), undivided (Cambrian?)**—Slate, metasilstone, and feldspathic quartzite

Ocoee Supergroup

- Zw Walden Creek Group, undivided (Late Proterozoic?)**—Consists of the Sandsuck, Wilhite, Shields, and Licklog Formations. Slate to metasilstone, locally calcareous; poorly sorted, feldspathic metasandstone to metaconglomerate; minor limestone
- Zc Cades Sandstone (Late Proterozoic)**—Graywacke and feldspathic sandstone with siltstone and slate; graded beds; includes conglomeratic layers
- Zg Great Smoky Group, undivided (Late Proterozoic)**
- Zgd Dean Formation**—Sericitic schist with cross-biotite, staurolite, and garnet porphyroblasts; metagraywacke and quartz-pebble metaconglomerate
- Zgh Hotchuse Formation**—Metagraywacke with interbedded mica schist
- Zghu Hughes Gap Formation**—Characterized by staurolite-mica schist and thick zones of garnet-mica schist with beds of calc-silicate granofels
- Zgw Wehuty Formation**—Slate to schist interbedded with metagraywacke and metaconglomerate
- Zgc Copperhill Formation**—Metagraywacke, massive, graded bedding common; includes slate, mica schist, metaconglomerate, and calc-silicate granofels lenses
- Zgf Farner formation (informal unit of Wiener and Merschat, 1978)**—Phyllite with metagraywacke
- Zgb Buck Bald formation (informal unit of Wiener and Merschat, 1978)**—Quartz-feldspar pebble metaconglomerate, interbeds of metagraywacke, slate, and metasilstone
- Zgbg Boyd Gap Formation**—Sulphidic slate and metasilstone; includes metagraywacke, metasandstone, and metaconglomerate
- Zs Snowbird Group(?), undivided (Late Proterozoic)**—Consists of Pigeon Silstone (Slate), Metcalf Phyllite, Roaring Fork Sandstone, Longarm Quartzite, and Wading Branch Formation. Thin-bedded to laminated metasilstone and phyllite; interbedded metasandstone; metaconglomerate in basal layers

EXPLANATION OF MAP SYMBOLS

- Contact
- Thrust fault—Sawtooth on upper plate
- - - Undifferentiated fault—Dashed where probable; queried where uncertain

GEOLOGY AND MINERAL RESOURCE POTENTIAL OF THE CHATTANOOGA 1°x2° QUADRANGLE, TENNESSEE AND NORTH CAROLINA

Clark, S.H.B., Spanaki, G.T., Hadley, D.G., and Hofstra, A.H., 1993. Geology and Mineral Resource Potential of the Chattanooga 1°x2° Quadrangle, Tennessee and North Carolina—A Preliminary Assessment. U.S. Geological Survey Bulletin 2005.