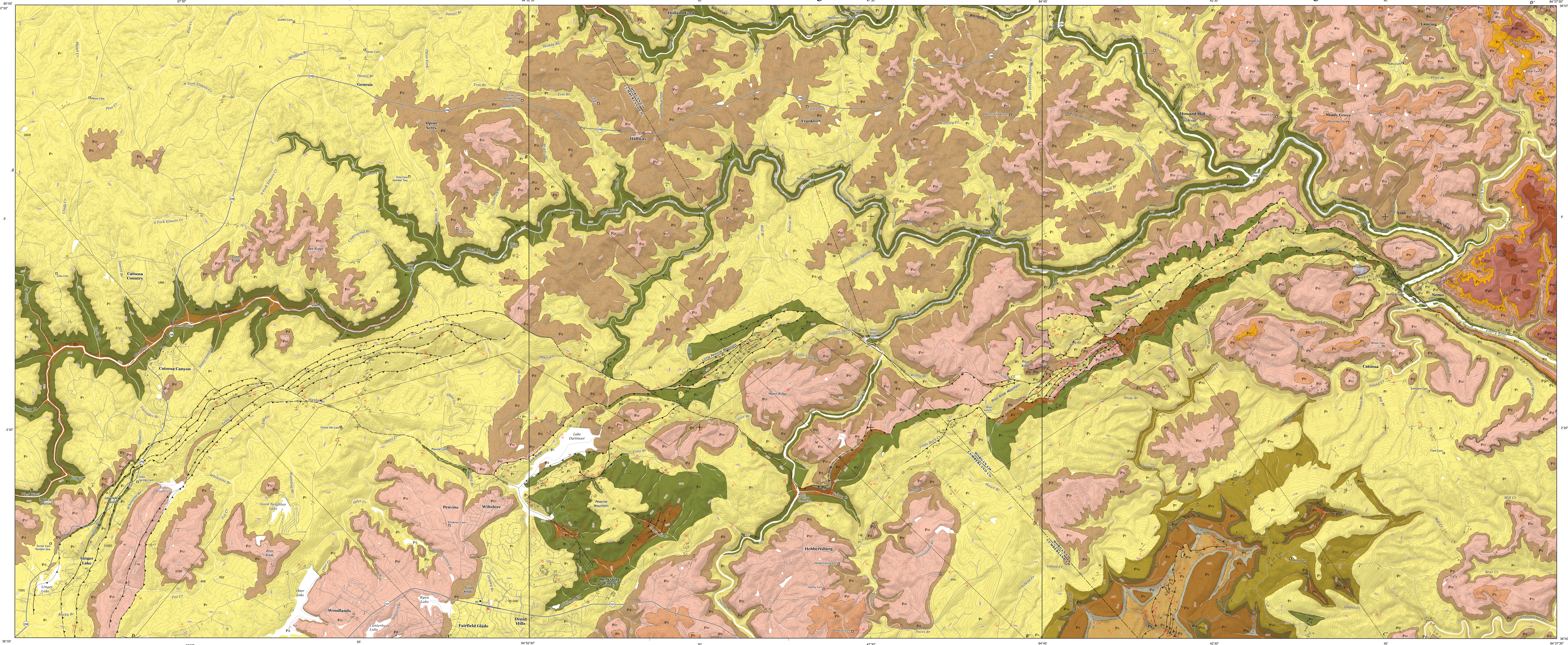


Plate I: Detailed geologic map of Fox Creek, Hebbertburg, and Lancing 7.5-minute quadrangles on the northern Cumberland Plateau, Tennessee

Paul Levader Scruggs



SYSTEM AND SERIES	GROUP	FORMATION AND BED	LITHOLOGY	THICKNESS IN FEET	EXPLANATION
QUATERNARY	Pleistocene & Holocene	Mine fill		0-40	Surficial Deposits Mine fill - Unconsolidated rock, mud, and mine tailings. Most prominent near abandoned entry mines between Rock Creek and Camp Branch. Also occurs in the north.
		Debris flow			Debris flow - Boulders, cobbles, pebbles, angular to rounded.
		Warburg Sandstone		15-70	Ps Warburg Sandstone (lower member) Sandstone, light to medium-gray, fine- to medium-grained, thin to thick-bedded, very finely cross-bedded. Only lower member present in northeastern part of quad.
		Glenmary Shale		100-160	Ps Glenmary Shale Shale, olive-gray to olive-black and medium-gray, silty to sandy, silty-olaceous, olive-gray to fine- to medium-grained, thin-bedded, typically interbedded with shales and siltstones.
		Coeffield Sandstone		50-80	Ps Coeffield Sandstone Sandstone, light-gray to medium light and olive-gray, very fine- to medium-grained, thin to medium-bedded, silty-shaly, typically poorly cemented; middle part typically shaly, olive-gray to olive-black, sandy, with siltstone laminae and beds.
		Burnt Mill Shale		40-120	Ps Burnt Mill Shale Shale, dark-gray to olive-black, clayey to silty, siltstone. Olive-gray to olive-black, locally interbedded with laminae and thin beds of sandstone, silty to medium light gray to fine- to fine-grained with shale laminae, hopper coal and associated thin earth. Dark gray to olive-gray, nodular, occurs locally near base of formation.
		Hopper Coal		0-15	Pb
		Crossville Sandstone		40-240	Pv Crossville Sandstone Sandstone, light-gray, stained to various shades of reddish-yellow, weathers yellowish-gray, very fine- to fine-grained, very thin- to thick-bedded, upper third predominantly shaly, sandy silty, and thin bedded sandstone. Lower beds typically thin- to medium-bedded, cross-bedded, intervals thickened and interfused with sandstone. Lower beds olive to olive-black, silty, with thin interbeds of sandstone. Where faulted, sandstone microcracked into yellowish-gray, dense, jointed catclasse.
		Fingers Fall coal		0-18	Pb
		Dorton Shale		10-140	Ps Dorton Shale Shale, silty to sandy and with a few layers of ironstone, medium dark to dark gray and olive gray, siltstone, olive-gray to olive-black, with laminae and beds of sandstone, light gray, very fine grained, banded and burrened. Partings of coal near top and bottom, but not near base of formation.
PENNSYLVANIAN	Lower Pennsylvanian	Reis Coal		0-12	Pb
		Rockcastle Conglomerate		90-170	Ps Rockcastle Conglomerate Sandstone, light-gray, fine- to coarse-grained, medium to very thick bedded, generally cross-bedded, small scattered quartz pebbles, pebbles, predominantly in the lower half. Unit locally interbedded with partings and thin beds of medium dark gray shale. Upper part silty, silty-olaceous, siltstone interbedded with sandstone, medium light gray, very fine to fine-grained. Top of unit is sandy, silty, and persistent thin bed of sandstone usually seen only in well logs. Persistent thin bed of sandstone near top and base of upper shale unit. Where faulted, sandstone microcracked into yellowish-gray, dense jointed catclasse.
		Norris Coal		0-13	Pb
		Vanderford Shale		140-260	Ps Vanderford Shale Shale and siltstone, silty, medium dark gray to olive-gray, persistent at top, middle, and base of formation. Internally laminated with sandstone, very fine- to fine-grained, partings light gray, rippled, banded and burrened sandstone, very fine- to fine-grained, light-gray, fissured with irregular partings of medium dark gray shale, persistent just above and below middle. Divided into upper and lower units about middle sandstone member in southwest portion of quad.
		Newton Sandstone		90-205	Ps Newton Sandstone Sandstone, pale pink, very light gray to yellowish brown, fine- to coarse-grained with quartz pebbles locally, thin to thick-bedded, cross-bedded in part, micaceous, well-cemented.
		Whitwell Shale		15-40	Ps Whitwell Shale Shale, medium dark gray to grayish-black and black, silty, with part fossiliferous medium light gray to olive-gray, carbonaceous adjacent to coal, interlaminate with sandstone, very fine-grained, silty shale. Base of coal occurs at or near base and thin Swanton coal occurs locally just above middle. Both occur beneath Richard coal, nodded claystone, medium- to dark gray to olive-black.
		Swanton Conglomerate		15-260	Ps Swanton Conglomerate Sandstone, medium light to medium-gray, fine- to coarse-grained, medium- to thick- and very thick-bedded, cross-bedded, sparsely to very conglomeratic, numerous pebbles as much as 1 inch in diameter. Commonly well-cemented but with friable zones.
		Gizzard Group		250	Ps Gizzard Group Shale and siltstone, light- to very dark-gray, silty, with interbedded laminae of silty sandstone and ironstone catclasse, some medium light gray to olive-gray, very fine-grained, thin- to medium-bedded, shaly, siltstone, medium gray, mottled and fossiliferous. Base of coal occurs in two to three feet. Fine, spongy shale and sandstone horizons sheared and shattered by Cambrian/Pennsylvanian overthrust fault. Exposed only in limited areas in the west (near Harfield Mountain) and southwest parts of the quad.
		Boon Air Coal			
		Gizzard Group		250	

Explanation of map symbols

- Geologic structures**

 - ① Horizontal bedding
 - $\frac{1}{16}$ Strike and dip of inclined bedding
 - $\frac{1}{16}$ Strike of vertical bedding
 - $\frac{1}{16}$ Trend and plunge of small, inclined fold hinge
 - $\frac{1}{16}$ Trend and plunge of mineral lineation

Mining and mineral resources

 - ✕ Open pit or quarry
 - ✕ Abandoned quarry
 - ✕ Location of coal outcrop (historical)
 - ✕ Mine prospect (historical)
 - ✕ Adit or tunnel entrance (historical)
 - ✕ Oil/gas well showing TP permit number
 - ✕ Strip, mine, dashed where inferred (historical)

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Geologic symbols and notations used in the field notes collected by James L. Moore, Richard G. Stearns, and Bailey Rancee

Mining and mineral resources

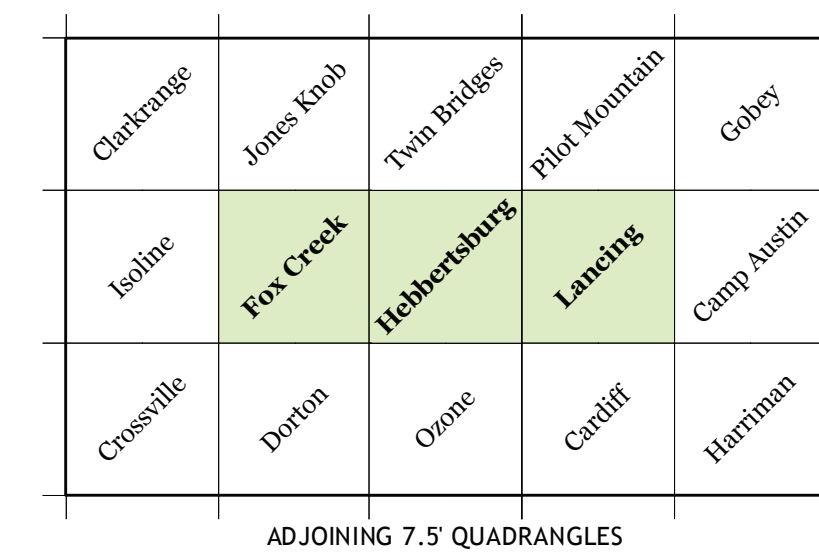
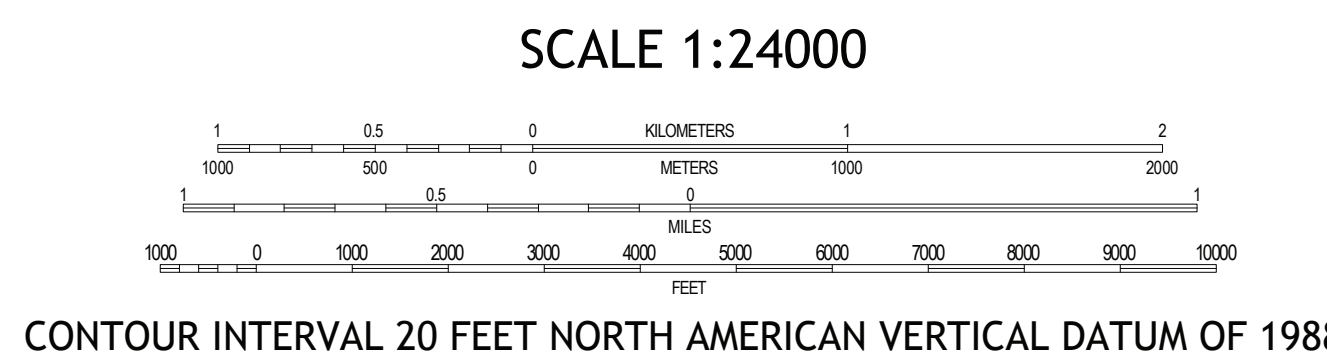
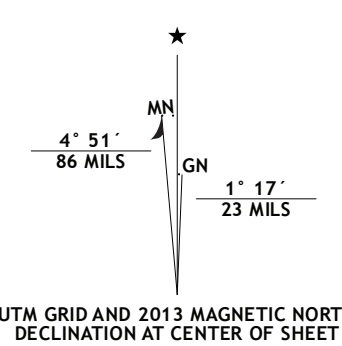
-  Open pit or quarry
-  Abandoned quarry
-  Location of coal outcrop (historical)
-  Mine prospect (historical)
-  Adit or tunnel entrance (historical)
-  Oil/gas well showing TN permit number
-  Strip mine, dashed where inferred (historical)

Fault contacts

- Strike-slip fault, arrows indicate movement sense**
(solid where certain, long dashes where approximate, dotted where concealed)
In cross section A and T denote relative movement away and toward viewer
- Thrust fault, teeth on hanging wall**
(solid where certain, long dashes where approximate, dotted where concealed)

Stratigraphic contacts

- (bold where certain, long dashes where approximate, dotted where conceded)



Topographic map produced by the
United States Geological Survey, 2013

North American Datum of 1983 (NAD83)
World Geodetic System of 1984 (WGS84). Projection and
1 000-meter grid: Universal Transverse Mercator, Zone 16N
10 000-foot ticks: Tennessee Coordinate System of 1983

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Contributions by Andrew L. Wunderlich, Bryan R. Hansen, Robert D. Hatcher, Jr, and Justin R. Rehrer.