

FIGURE 1. GEOLOGIC MAP OF THE CAMPTON QUADRANGLE, KENTUCKY, SHOWING POSITIONS OF COAL BEDS AND STRUCTURE OF THE BASE OF THE BREATHITT FORMATION

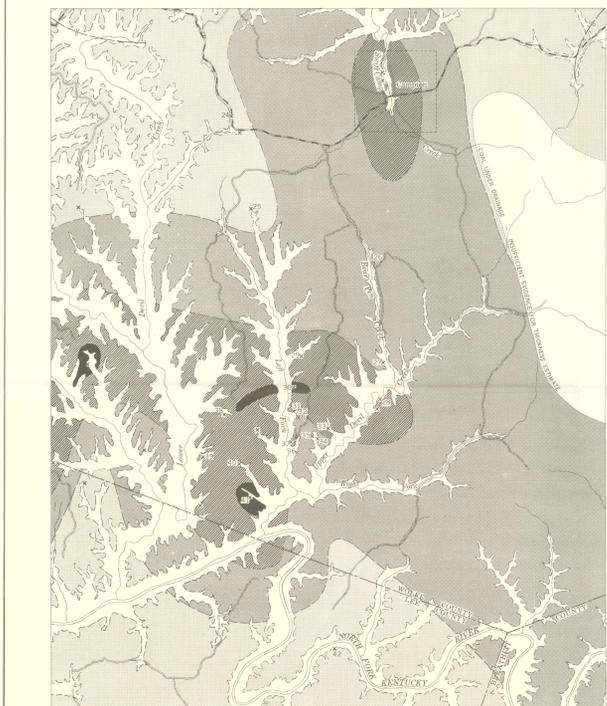


FIGURE 3. THICKNESS MAP OF THE ZACHARIAH COAL BED

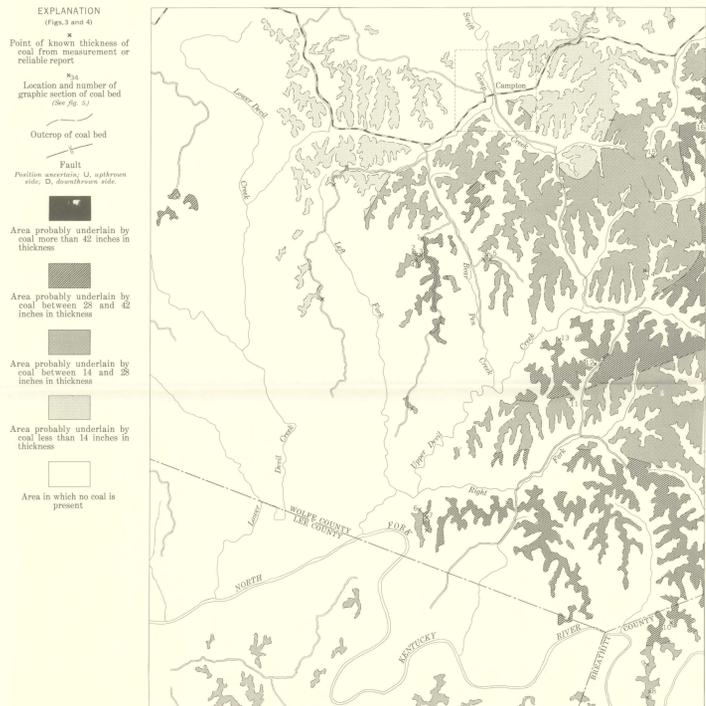
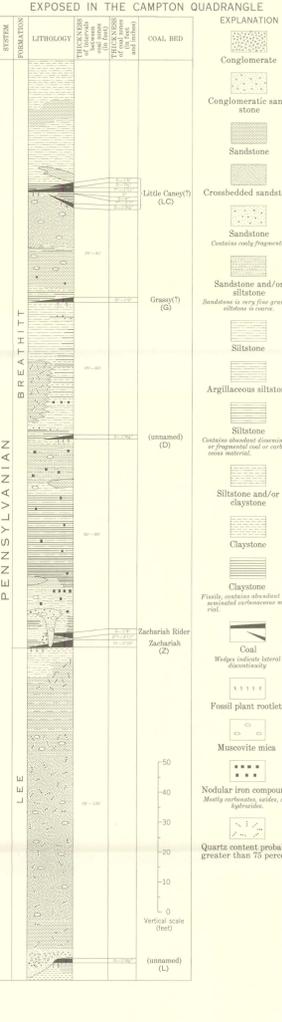


FIGURE 4. THICKNESS MAP OF THE LITTLE CASEY(?) COAL BED

FIGURE 2. COMPOSITE COLUMNAR SECTION OF PART OF THE ROCKS OF PENNSYLVANIAN AGE EXPOSED IN THE CAMPTON QUADRANGLE



INTRODUCTION

The Campton quadrangle covers an area of approximately 59 square miles in Wolfe, Lee, and Breathitt Counties of eastern Kentucky. It is bounded on the north by the county seat of Wolfe County (Fig. 1). The only hard-surface all-weather roads in the quadrangle are State Highway 15, which runs through Campton roughly east-west, and State Highway 11, which runs the length of the quadrangle. The nearest railroad facilities are at Jackson, 20 miles southwest of Campton, and at Beattyville, 24 miles southwest of Campton. An Interstate, long transportation route, the Kentucky River, is located in the Campton area.

The coal beds and associated rocks exposed in the Campton quadrangle were mapped during May and June 1954, as a part of the U. S. Geological Survey's program of coal investigations in eastern Kentucky. The geologic and coal resources data were determined in part by field mapping, and in part by photogeologic techniques. Field mapping consisted of measurement of exposed sections of coal beds and rocks associated with the tops of the cliffs formed near the top of the formation; and lateral tracing, wherever practicable, of coal beds and the prominent cliff tops. Field elevations for geologic purposes were established by aneroid barometer readings, and in a few places by hand leveling from points of known elevation. Horizontal locations of these control points were obtained by intersection or by compass traverse.

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The field mapping of this quadrangle was greatly facilitated by the cooperation of the Wolfe County Coal Commission, which has provided the necessary permits and the files of the U. S. Geological Survey and the Kentucky Geological Survey. Analysis of the Zachariah, Zachariah Rider, and Little Casey(?) coal beds was made by the U. S. Bureau of Mines. To all these persons and organizations the writer is indebted.

PREVIOUS WORK

The early publications of the Kentucky Geological Survey contain information about the coal beds in the Campton quadrangle. Moore (1878), in conducting a preliminary survey for possible railroad locations, reported coal beds which he numbered 1, 2, and 3, and Moore (1887), in 1887, used the same numbers for the coal beds in his report.

Several geologic maps of Wolfe County, Kentucky, 1877, Lee County (1877), and Breathitt County (Breuninger, 1927) have been published by the Kentucky Geological Survey. These maps were intended primarily for use by the petroleum industry and do not show the locations of coal outcrops. Coal beds are shown in general block sections accompanying these maps, but most of these coal beds cannot be reliably correlated with the beds mapped in the present report on the Campton quadrangle. The name Zachariah coal bed and the use of the bed as the marker indicating the top of the Lee formation in this area originated in the Lee County columnar section of 1911 (1927).

GEOGRAPHY

The most conspicuous physiographic features of the quadrangle are the cliffs in the Lee formation, which, in this area, extend up all streams tributary to the North Fork of the Kentucky River. These cliffs form the western boundary of the Cumberland Plateau in this region (Fleming, 1938, p. 115-116). The area below the cliffs is considered to be as the edge of the Plateau (Fleming, 1938, p. 115-116). Above the Cumberland escarpment the flood plains are generally narrow, the valleys are steep-walled, and the hills rise and rise up to the quadrangle. The drainage is relief may be as much as 350 feet. Narrow, discontinuous flood plains occur in the upper part of the Lee formation and the valleys which they occupy are 275 feet below the tops of the cliffs. The drainage throughout the quadrangle is a dendritic system, which is relatively close to the contour lines (Fleming, 1938, p. 115-116). The Lee formation is generally covered by sandstone, which is covered by the weathered surface of the Lee formation. This is most evident in the Upper Devil Creek area in the northeastern part of the quadrangle, on the North Fork of the Kentucky River in the middle of the quadrangle. These former meander courses of the North Fork of the Kentucky River in the Lee formation are now covered by the Lee formation, which is covered by the weathered surface of the Lee formation. The Lee formation is generally covered by sandstone, which is covered by the weathered surface of the Lee formation. The Lee formation is generally covered by sandstone, which is covered by the weathered surface of the Lee formation.

STRATIGRAPHY

The rocks exposed in the Campton quadrangle about 375 feet in thickness, and include the upper part of the Lee formation and the lower part of the Breathitt formation, both of Pennsylvanian age (Fig. 2).

LEE FORMATION

The Lee formation was originally described by Campbell (1893, p. 56-57) in Lee County, Va. This formation has been defined in the present report on the basis of the Pennsylvanian system in eastern Kentucky. Ehl (1927) defined the Lee formation as all the Pennsylvanian rocks above the base of the Lee formation and below the base of the Breathitt formation. In this report the top of the Lee formation is lowered to the top of the Zachariah coal bed. Locally the Zachariah has thin coal beds, especially at the base of the Zachariah coal bed. In some instances the Lee formation is covered by the weathered surface of the Lee formation. The Lee formation is generally covered by sandstone, which is covered by the weathered surface of the Lee formation. The Lee formation is generally covered by sandstone, which is covered by the weathered surface of the Lee formation.

BREATHITT FORMATION

Campbell (1893) named the Breathitt formation from its occurrence in Breathitt County, Ky., apparently considering the whole county as the type locality. He defined the Breathitt formation as all the Carboniferous rocks above the top of the Lee formation and below the base of the Breathitt formation. In this report the top of the Lee formation is lowered to the top of the Zachariah coal bed. Locally the Zachariah has thin coal beds, especially at the base of the Zachariah coal bed. In some instances the Lee formation is covered by the weathered surface of the Lee formation. The Lee formation is generally covered by sandstone, which is covered by the weathered surface of the Lee formation. The Lee formation is generally covered by sandstone, which is covered by the weathered surface of the Lee formation.

TABLE 1.—ESTIMATED COAL RESERVES IN THE LEE AND BREATHITT FORMATIONS IN THE CAMPTON QUADRANGLE, KENTUCKY

Formation	Coal bed	County	Measured and indicated		Inferred		Totals, all categories	
			In beds 28 to 42 inches thick	In beds 14 to 28 inches thick	In beds 14 to 28 inches thick	In beds 28 to 42 inches thick	In beds 14 to 28 inches thick	In beds 28 to 42 inches thick
Breathitt	Little Casey(?)	Wolfe	4,483	5,741	10,224	6,491	14,444	10,974
	Grassy(?)	Breathitt	487	556	10,752	191	11,443	350
	Unnamed coal	Wolfe	4,236	6,092	10,752	1,124	11,876	25,724
Lee	Zachariah Rider	Wolfe	1,052	664	664	1,710	2,766	1,710
	Zachariah	Wolfe	1,052	664	664	1,710	2,766	1,710
	Coal under ss.	Wolfe	9,960	14,007	24,865	39,174	32,583	30,040
Totals			17,020	27,227	10,752	22,227	32,583	67,438
TOTAL ESTIMATED ORIGINAL RESERVES			17,020	27,227	10,752	22,227	32,583	67,438
TOTAL ESTIMATED RECOVERABLE RESERVES (50 percent recovery)			8,510	13,613	5,376	11,113	16,291	33,719
TOTAL ESTIMATED REMAINING RECOVERABLE RESERVES			8,510	13,613	5,376	11,113	16,291	33,719

FIGURE 5. GRAPHIC SECTIONS OF COAL BEDS IN THE CAMPTON QUADRANGLE, KENTUCKY

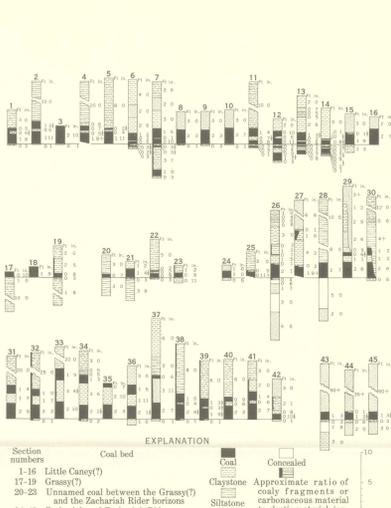


FIGURE 5. GRAPHIC SECTIONS OF COAL BEDS IN THE CAMPTON QUADRANGLE, KENTUCKY

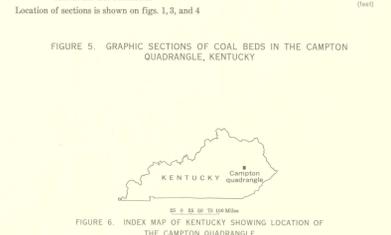


FIGURE 6. INDEX MAP OF KENTUCKY SHOWING LOCATION OF THE CAMPTON QUADRANGLE

TABLE 2.—ANALYSES OF THE LITTLE CASEY(?), ZACHARIAH RIDER, AND ZACHARIAH COAL BEDS IN THE CAMPTON QUADRANGLE, KENTUCKY

Section number	Coal bed	Analysis (as received)										Moisture (percent)	Ash (percent)	Sulfur (percent)	Phosphorus (percent)	Calorific value (Btu per pound)	Brimmability (percent)	Caking index
		Moisture	Volatile matter	Fixed carbon	Hydrogen	Carbon	Oxygen	Nitrogen	Sulfur	Phosphorus	Calorific value							
1-16	Little Casey(?)	6.0	82.0	12.0	7.0	66.0	11.0	14.0	1.0	1.0	11.0	12.0	1.0	1.0	11,200	12.0	High volatile "C"	1
17-19	Grassy(?)	6.0	82.0	12.0	7.0	66.0	11.0	14.0	1.0	1.0	11.0	12.0	1.0	1.0	11,200	12.0	High volatile "C"	1
20-23	Unnamed coal between the Grassy(?) and the Zachariah Rider horizons	6.0	82.0	12.0	7.0	66.0	11.0	14.0	1.0	1.0	11.0	12.0	1.0	1.0	11,200	12.0	High volatile "C"	1
24-42	Zachariah and Zachariah Rider	6.0	82.0	12.0	7.0	66.0	11.0	14.0	1.0	1.0	11.0	12.0	1.0	1.0	11,200	12.0	High volatile "C"	1
43-45	Unnamed coal beneath the sandstone unit in the Lee formation	6.0	82.0	12.0	7.0	66.0	11.0	14.0	1.0	1.0	11.0	12.0	1.0	1.0	11,200	12.0	High volatile "C"	1

FIGURE 6. INDEX MAP OF KENTUCKY SHOWING LOCATION OF THE CAMPTON QUADRANGLE