

FIGURE 1. MAP OF THE CORNETTSVILLE QUADRANGLE, KENTUCKY, SHOWING THE OUTCROPS OF THE PRINCIPAL COAL BEDS AND THE STRUCTURE OF THE FIRE CLAY COAL BED

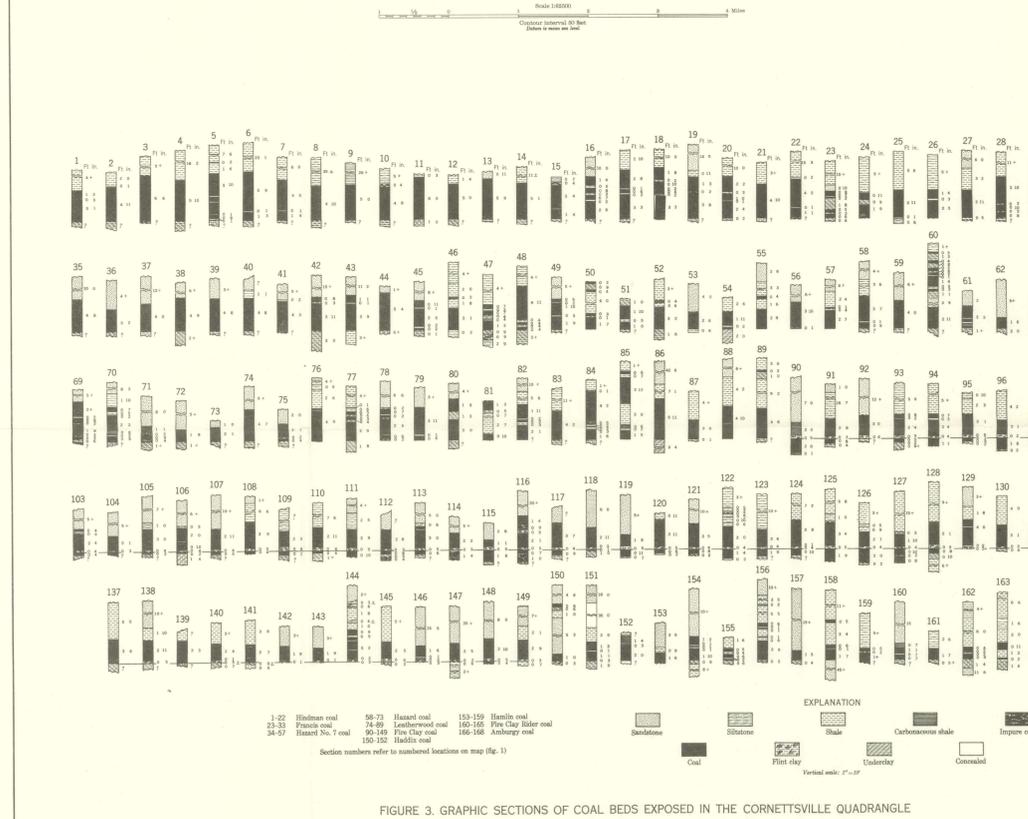
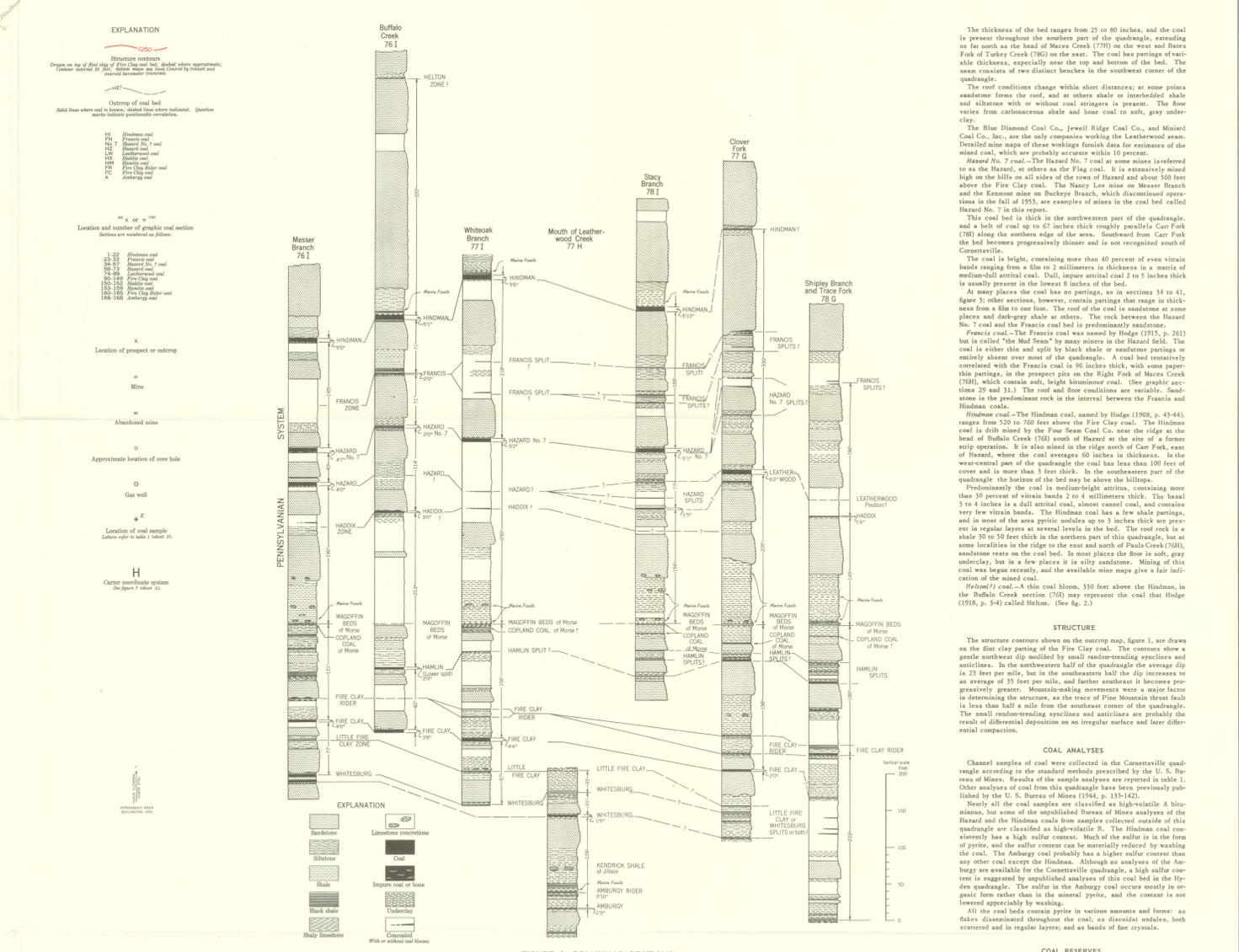


FIGURE 2. GRAPHIC SECTIONS OF COAL BEDS EXPOSED IN THE CORNETTSVILLE QUADRANGLE



PRELIMINARY COAL MAP OF THE CORNETTSVILLE QUADRANGLE, PERRY, KNOTT, LETCHER, HARLAN, AND LESLIE COUNTIES, KENTUCKY

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INTRODUCTION

This report on coal beds and reserves of the Cornettsville quadrangle, Ky., is a part of the Geological Survey's current program of study of the geology of eastern Kentucky and is preliminary to a more complete report on the geology of the area. The Cornettsville quadrangle covers about 235 square miles and lies primarily in Perry County, Ky., but includes parts of Knott, Letcher, Harlan, and Leslie Counties on the east, south, and west respectively. The area is wholly within the mature Cumberland Plateau and has a maximum relief of about 1,600 feet and a local relief of about 900 feet. Most streams in the quadrangle drain into the Blue Gem belt of the Kentucky River, which flows northward across the quadrangle in a meandering course. However, the streams in Leslie County flow northward and westward into the Middle Fork of the Kentucky River.

The largest town in the area is Hazard, county seat of Perry County and the center of the Hazard coal field. The town is in the northern edge of the quadrangle and about 3 miles from the southwest corner. All-weather roads follow the valleys of the Mouth Fork of the Kentucky River, Carr Fork, and Leatherwood Creek, and secondary roads permit ready access to small valleys and many of the interstream areas. The Louisville & Nashville Railroad follows the Mouth Fork of the Kentucky River on a track formerly operated by the Lexington & Eastern Railroad and has subsidiary lines along Carr Fork and Leatherwood Creek. Field work on the Cornettsville quadrangle was done between May 1 and November 1, 1950, by W. L. Lukison, K. J. England, D. A. Robertson, L. E. Shirley, A. D. Williamson, and the author, under the general supervision of J. W. Huddle. Elevations on coal beds and horizons were obtained by aneroid barometers or transit traverses. The observations were recorded on topographic maps, enlarged to a scale of 1:51,080. M. B. McFaul and J. Sherman composed the coal reserves.

The data furnished by coal companies and individuals of this area greatly facilitated field work. Mr. A. D. Sisk of the Kentucky Department of Mines and Minerals was helpful in making reports and mine maps available.

The coal sections measured and described by Hodge were reported in several Kentucky Geological Survey publications between 1909 and 1915. Harold R. Wanless discussed the Pennsylvania stratigraphy of the region and included many measured sections in two reports (1939 and 1946).

The following structural maps on the Fire Clay coal were published for counties in the vicinity of the Cornettsville quadrangle by the Kentucky Geological Survey: Perry County (Hudall, 1924); Knott County (Browning and Withers, 1930); Letcher County (Robinson and Cider, 1930); Harlan County (Miller and Withers, 1927); Leslie County (Hudall et al., 1927).

COAL GEOLOGY AND GENERAL STRATIGRAPHY

The exposed rocks of early Pennsylvanian age range in thickness from about 1,150 feet in the northern part of the quadrangle to 4,000 feet in the southern part, available information suggests that there may be as much as 1,200 to 1,500 feet of older Pennsylvanian strata at depth. The rocks of the Pennsylvanian system consist predominantly of sandstone, siltstone, and shale, but calcareous concretions and thin limestone beds are calcareous shale occur in minor intervals throughout the sequence. Coal beds and associated sandstone and siltstone beds are present throughout the sequence, but they represent only a small portion of the total rock section exposed. The thickness lines are generalized and do not show small local areas of this coal within which a coal bed or local areas of this coal are present.

The maps (figs. 4 and 5) show the thickness, excluding partings, of the Fire Clay, Hazard, Leatherwood, and Hazard No. 7 coals and the probable variations in thickness of the coal beds prior to the dissection of the present stream valleys. The thickness lines are generalized and do not show small local areas of this coal within which a coal bed or local areas of this coal are present.

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STRUCTURE

The structure contours shown on the outcrop map, figure 1, are drawn on the fire clay parting of the Fire Clay coal. The contours show a gentle southwest dip modified by small anticlinal synclines and anticlines. In the northwest half of the quadrangle the average dip is 2 to 3 feet per mile, but in the southeastern half the dip increases to an average of 35 feet per mile, and further southeast it becomes progressively greater. Mounting movements were a major factor in determining the structure, as the trace of Fire Clay Rider coal, at places represented by two benches, was found to exceed 14 inches thickness at only a few localities. (See sections 160 to 165, fig. 3.)

At many places the roof rock of the Fire Clay Rider coal contains limestone concretions that serve as a stratigraphic marker over most of the quadrangle.

Hindman coal.—The Hindman coal, named by Hodge (1909, p. 43-44), ranges from 520 to 760 feet above the Fire Clay coal. The Hindman coal is thin mined by the Hazard Coal Co. near the ridge at the head of Buffalo Creek (70) south of Hazard at the site of a former strip operation. It is also mined in the ridge north of Carr Fork, east of Hazard, where the coal averages 60 inches in thickness. In the west-central part of the quadrangle the coal has less than 100 feet of cover and is more than 3 feet thick. In the southeastern part of the quadrangle the horizon of the bed may be above the hillslope.

Primarily the coal is medium-bright attrite, containing more than 30 percent of vitain bands 2 to 4 millimeters thick. The basal 3 to 4 inches is a dull attrite coal, almost cannel coal, and contains very few vitain bands. The Hindman coal has a few shale partings, and in most of the area pyritic nodules up to 3 inches thick are present in regular layers at several levels in the bed. The roof rock is a thin to 20 feet thick in the northern part of this quadrangle, but at some localities in the ridge to the east and north of Pauls Creek (70), sandstone rests on the coal bed. In most places the floor is soft gray underly, but in a few places it is silty sandstone. Mining of this coal was begun recently, and the available mine maps give a fair indication of the mined coal.

Hazard coal.—A thin coal bloom, 330 feet above the Hindman, in the Buffalo Creek section (70) may represent the coal that Hodge (1918, p. 3-4) called Hindman. (See Messer Branch (76) and Clover Fork (75) sections, fig. 2.)

The thickness of the bed ranges from 25 to 80 inches, and the coal is present throughout the southern part of the quadrangle, extending as far north as the head of Meacs Creek (77B) on the west and Bates Fork of Turkey Creek (78C) on the east. The coal has partings of variable thickness, especially near the top and bottom of the bed. The seam consists of two distinct benches in the southwest corner of the quadrangle.

The roof conditions change within short distances; at some points sandstone forms the roof, and at others shale or interbedded shale and siltstone with or without coal partings is present. The floor varies from carbonaceous shale and bone coal to soft, gray underly coal.

The Blue Diamond Coal Co., Jewell Ridge Coal Co., and Miner Coal Co., Inc., are the only companies working the Leatherwood seam. Detailed mine maps of these workings furnish data for estimates of the mined coal, which is probably accurate within 10 percent.

Hazard No. 7 coal.—The Hazard No. 7 coal is an attrite coal referred to as the Hazard, at other as the Flag coal. It is extensively mined high on the hills on all sides of the town of Hazard and about 160 feet above the Fire Clay coal. The Nancy Lee mine on Messer Branch and the Kennam mine on Buckeye Branch, which discontinued operations in the fall of 1955, are examples of mines in the coal bed called Hazard No. 7 in this report.

This coal bed is thick in the southwestern part of the quadrangle, and a belt of coal up to 67 inches thick roughly parallels Carr Fork (78) along the southern edge of the area. Southward from Carr Fork the coal becomes progressively thinner and is not recognized south of Corneville.

The coal is bright, containing more than 40 percent of even vitain bands ranging in size to 2 millimeters in thickness in a matrix of medium-dull attrite coal. Dull, impure attrite coal 2 to 5 inches thick is usually present in the lower 8 inches of the bed.

At many places the coal has no parting, as in sections 34 to 41, figure 3; other sections, however, contain partings that range in thickness from a few inches to 6 inches. The roof of the coal is sandstone or some places and dark-gray shale at others. The rock between the Hazard No. 7 coal and the Francis coal is predominantly sandstone.

Francis coal.—The Francis coal was named by Hodge (1918, p. 5-6) but is called "the Mud Seam" by many miners in the Hazard field. The coal is either thin and silty or black shale or sandstone partings or entirely absent over most of the quadrangle. A coal bed tentatively correlated with the Francis coal is 96 inches thick, with some paper-thin partings, in the prospect pits on the Right Fork of Meacs Creek (76B), which contain soft, bright bituminous coal. (See graphic sections 29 and 31.) The roof and floor conditions are variable. Sandstone is the predominant rock in the interval between the Francis and Hindman coals.

Hindman coal.—The Hindman coal, named by Hodge (1909, p. 43-44), ranges from 520 to 760 feet above the Fire Clay coal. The Hindman coal is thin mined by the Hazard Coal Co. near the ridge at the head of Buffalo Creek (70) south of Hazard at the site of a former strip operation. It is also mined in the ridge north of Carr Fork, east of Hazard, where the coal averages 60 inches in thickness. In the west-central part of the quadrangle the coal has less than 100 feet of cover and is more than 3 feet thick. In the southeastern part of the quadrangle the horizon of the bed may be above the hillslope.

Primarily the coal is medium-bright attrite, containing more than 30 percent of vitain bands 2 to 4 millimeters thick. The basal 3 to 4 inches is a dull attrite coal, almost cannel coal, and contains very few vitain bands. The Hindman coal has a few shale partings, and in most of the area pyritic nodules up to 3 inches thick are present in regular layers at several levels in the bed. The roof rock is a thin to 20 feet thick in the northern part of this quadrangle, but at some localities in the ridge to the east and north of Pauls Creek (70), sandstone rests on the coal bed. In most places the floor is soft gray underly, but in a few places it is silty sandstone. Mining of this coal was begun recently, and the available mine maps give a fair indication of the mined coal.

Hindman? coal.—A thin coal bloom, 330 feet above the Hindman, in the Buffalo Creek section (70) may represent the coal that Hodge (1918, p. 3-4) called Hindman. (See Messer Branch (76) and Clover Fork (75) sections, fig. 2.)

RESERVES

To compute the reserves of this quadrangle, the outcrop of each coal bed was plotted on a topographic map enlarged to the scale of 1:51,080, and the coal-bearing area was measured with a planimeter. Coal within 2 miles of an observation point was considered measured and indicated undifferentiated coal and coal mines at observation points was considered reserved. All coal beds were divided into three thickness ranges: 14 to 28 inches; 28 to 42 inches; and more than 42 inches.

Table 2 contains conservative tonnage figures in thousands of short tons for the Hindman, Hazard No. 7, Hazard, Leatherwood, and Francis coals; each coal bed is reported by five-minute rectangles, thickness ranges, and reliability groups.

The coal estimated original reserves for the Hindman coal are 61,946,000 short tons, of which 16,938,000 short tons is estimated to be mined or lost in mining. The Fire Clay Rider coal, at places represented by two benches, was found to exceed 14 inches thickness at only a few localities. (See sections 160 to 165, fig. 3.)

The coal estimated original reserves for the Hazard No. 7 coal are 250,475,000 short tons, of which 19,591,000 short tons is estimated to be mined or lost in mining. The coal estimated remaining reserves as of January 1, 1950, are 230,884,000 short tons.

The coal estimated original reserves for the Hazard coal are 158,023,000 short tons, of which 1,508,000 short tons is estimated to be mined or lost in mining. The coal estimated remaining reserves as of January 1, 1950, are 156,515,000 short tons.

The coal estimated original reserves for the Leatherwood coal are 260,965,000 short tons, of which 3,839,000 short tons is estimated to be mined or lost in mining. The coal estimated remaining reserves as of January 1, 1950, are 257,126,000 short tons.

The coal estimated original reserves for the Fire Clay coal are 651,560,000 short tons, of which 19,591,000 short tons is estimated to be mined or lost in mining. The coal estimated remaining reserves as of January 1, 1950, are 631,969,000 short tons.

Approximately 50 percent of the remaining reserves may be considered recoverable by present-day mining methods.

Mined and remaining reserves are computed for each coal bed from mine maps and reports of the Kentucky Department of Mines and Minerals or were estimated from field data. The figures are reported in table 2 by beds and sections, but for many areas these figures are based on inadequate information.

The Francis coal is a reserve and is placed in a single-thickness category. The coal estimated original and remaining reserves in the Francis bed are 105,160,000 short tons and 105,160,000 short tons, respectively (76B and 76C).

The estimated original and remaining reserves in the Hazard bed are 251,560,000 short tons for the whole quadrangle. Reserve figures for both coals are as of January 1, 1950. The estimated coal remaining reserves in the foregoing area total are 10,133,000 short tons.

The reserves in the Hazard coal were not calculated because the available information was not sufficient to make a reliable estimate. Other coal beds were too thin to be considered as reserves. All beds were assumed to be covered by less than 1,000 feet of overburden.

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