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Nomenclature of Some Pennsylvanian Upper Cherokee (Desmoinesian Series) Coals of Iowa

STEPHEN A. HALL¹

Abstract. The nomenclatural history of some Upper Cherokee coals of Iowa is reviewed, beginning with the 1870 geological survey. The Lacona, Panora, Wheeler, Marshall, and Lonsdale coals were named by St. John. The two more important coal beds, the Panora and Wheeler, are discussed in detail. The Panora, described in Guthrie County, was in 1927 renamed Whitebreast by A. L. Lugin for exposures in Lucas County within half a mile of St. John's type section of the Wheeler Coal. At the time of description both coals were measured at each type section in NE $\frac{1}{4}$ sec. 33, T. 73 N., R. 22 W., Lucas County, Iowa, and in April 1969 both coals were still exposed, although the Whitebreast was found only at the Wheeler locality and the Wheeler at the Whitebreast locality. The Bevier Coal has been interpreted to split, the lower bench then called the "Wheeler" and the upper bench called the "Bevier." A palynological investigation of these coal beds by Habib indicated that the lower bench of the split Bevier is not the Wheeler Coal. The Bevier Coal is poorly documented in Iowa. The Lacona Coal occurs 20 to 40 feet below the Whitebreast and may be of only local importance. The Marshall and Lonsdale coal beds occur in the Marmaton Group above the Cherokee.

In 1870 a geological survey under the supervision of Charles A. White published two volumes on the geology of Iowa. These works are mainly general sketches by Dr. White on aspects of regional geology and economic resources of the state. A few chapters were written by the survey's assistant, Orestes H. St. John, in which he included his reconnaissance of the stratigraphy and paleontology of Guthrie, Dallas, Warren, and Lucas counties in south-central Iowa. In these counties he named 5 coal beds, in stratigraphic sequence, the Lacona, Panora (later called Whitebreast), Wheeler, Marshall, and Lonsdale. Since St. John's work, little has been published on the Desmoinesian stratigraphy of Iowa which will allow detailed correlations. Local thinning and pinching-out of coal beds that might otherwise serve as marker beds plus the prevalence of now unfamiliar and discarded terminology in the old literature contributes largely to the uncertainty that clouds Desmoinesian stratigraphy in Iowa. The object here is to review the histories of nomenclature of some Upper Cherokee coal beds, beginning with the work of St. John, and to acknowledge the type localities of the Whitebreast and Wheeler coals which, until recently, had been lost. Iowa terminology will be followed so as not to imply stratigraphic relationships that may not exist.

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HISTORY

Lacona Coal. The Lacona Coal was named from exposures near the town of Lacona in the southeastern corner of Warren County. The type section of St. John (1870, p. 65-66) occurs at Dunkin's mine, on Flak Creek, NE $\frac{1}{4}$ sec. 4, T. 74 N., R. 22 W., where the coal is 20 to 30 inches thick. St. John reports the Lacona Coal in 4 sections from Guthrie, Dallas, and Warren counties. The Lacona evidently occupies a stratigraphic position above the Wiley Coal and 20 to 40 feet below the Whitebreast Coal. The name Lacona is not in use today, and it is not known how extensive the coal bed may be, although St. John believed that the coal was not persistent.

Whitebreast Coal. The Panora Coal was named by St. John (1870, p. 107-108) and recognized in 10 measured sections which allows correlation from southeastern Guthrie County to north-central Lucas County. St. John describes the type section: "in the vicinity of Panora Mills on the Middle Raccoon, section 31, township 80, range 30 [Guthrie County], several interesting exposures of Middle coal strata occur, including the horizon of the lower persistent coal of the formation, which we have designated as the Panora Coal, for the locality where its peculiarities may be best studied, and which is represented by a two inch seam in the exposure just above the mills." One of St. John's (1870, p. 86-87) detailed sections containing the Panora and Wheeler coals (type section of the Wheeler) was measured in 1867 from "the immediate vicinity of Wheeler's mill" on Whitebreast Creek, NE $\frac{1}{4}$ sec. 33, T. 73 N., R. 22 W. (Liberty Township), Lucas County, and was visited in 1924 by A. L. Lugn who was mapping the geology of Lucas County for a master's thesis (1925) at the State University of Iowa, Iowa City (Lugn, 1927, p. 122). Less than half a mile south of St. John's section on Whitebreast Creek, Lugn found the same units exposed and described a section (surface section no. 36) "south of Wheeler's bridge near the middle of section 33, Liberty township" [T. 73 N., R. 22 W., Lucas County] where he renamed St. John's Panora Coal the Whitebreast Coal (Lugn, 1927, p. 144, 161).

In April 1969 the writer located what appeared to be Lugn's type section of the Whitebreast Coal. The exposure is on the east bank of Whitebreast Creek about 400 yards south of the bridge over Whitebreast Creek and can be reached easily by an abandoned trail along the creek. The legal description of the site is SW $\frac{1}{4}$, SW $\frac{1}{4}$, NE $\frac{1}{4}$ sec. 33, T. 73 N., R. 22 W., Lucas County. The Whitebreast Coal was not exposed at the time, because the creek was abnormally high, and the coal bed is within 5 feet of water level as measured by Lugn in 1924. A portion of the section is slumped, but there can be no doubt about the identity of the in-

dividual units described by Lugn, particularly the Two Layer Limestone (later called Ardmore Limestone) just below the trail which Lugn named at this locality and the Wheeler Coal 6 to 8 feet above the trail which St. John named at the exposure cited earlier less than half a mile north.

Lugn knew that St. John originally called the coal bed Panora, but he disregarded the name Panora and in its place introduced the name Whitebreast. L. M. Cline (1938) pointed out the equivalency of the two names. Although the name Panora has priority and is well defined with both a type locality and a type section, Panora has fallen into disuse. The name Whitebreast is also well defined, and it is the name now commonly applied to the coal bed. It is suggested that Whitebreast Coal be retained in preference to Panora Coal. Lugn spelled Whitebreast as two words, "White Breast," but it is suggested that the name be continued as a single word in compliance with the spelling in current literature.

D. G. Stookey (1935, p. 72) in his unpublished doctoral dissertation at the State University of Iowa, Iowa City, correlated the Whitebreast Coal with the Tebo Coal of Missouri: "examinations of sections in northern Missouri have convinced the writer that the Whitebreast coal and the marine beds above it are equivalent to the Tebo coal and associated strata." Cline (1938) concurred with the correlation. The coal bed to which Stookey and Cline traced the Whitebreast Coal is the Lower Ardmore Coal named by G. H. Gordon (1893, p. 21) for exposures near the small mining town of Ardmore in southern Macon County, Missouri. H. Hinds (1912, p. 349) commented with a footnote in a section on the coal deposits of Randolph County just south of Macon County that the Lower Ardmore Coal had been correlated with the Tebo Coal of Henry County, Missouri. Henry County is about 100 miles southwest of Randolph County and is the area where Winslow (1891, p. 134) in a footnote established the name Tebo. B. Smart (1957) redescribed the Tebo type locality and credited W. V. Searight with a statement that the Tebo Coal apparently pinches out between southern Jackson County and the Missouri River, and that the coal earlier identified as the Tebo in northern Missouri is probably the Croweburg Coal. The Whitebreast-Croweburg correlation generally has been accepted although the evidence is almost entirely stratigraphic. The same sort of evidence is the basis for correlating the Whitebreast Coal of Iowa with the Colchester (No. 2) Coal of Illinois (Weller, et al., 1942).

Both the Croweburg Coal of Oklahoma and the Colchester (No. 2) Coal of Illinois have been examined for palynomorphs and the results are partially available, although similar studies of associated strata are largely unpublished theses. Of the 48 species of

sporomorphs reported by Wilson and Hoffmeister (1956) from the Croweburg of Oklahoma, 21 species occur also in the Colchester of Illinois. The Whitebreast Coal of Iowa has yet to be examined for sporomorphs.

Ardmore Limestone. The Two Layer Limestone was named by Lugn (1927, p. 161) in the same type section with the Whitebreast Coal and has been correlated by Cline (1938) with the Ardmore Limestone of Missouri. The Ardmore Limestone was named by Gordon (1893) in the same area of Macon County, Missouri, where the Lower Ardmore Coal was described as cited earlier. Cline (1941, p. 54) commented on the Ardmore Limestone that "it is the best developed limestone in the Cherokee group and it is also the best datum plane, being easy to recognize and constant in lithologic characters." Both St. John and Lugn realized the persistence of the unit, and it is on this criterion in addition to its easy identification that the Whitebreast Coal below the Ardmore and the Wheeler Coal above are correlated for long distances.

R. C. Moore (1936, p. 56) recognized that the Ardmore Limestone and the Verdigris Limestone, named from exposures near the Verdigris River, Rogers County, Oklahoma, are equivalent. The limestone is now called Verdigris in Oklahoma, Kansas, and Missouri, but the name Ardmore has been retained for the present in Iowa.

The correlation of the Ardmore Limestone by fossil evidence has yet to be demonstrated, although Desmoinesian fusulinid studies are increasing. M. L. Thompson identified *Fusulina kayi* and *Wedekindellina euthysepta* from the shale parting in the Ardmore at a locality in Van Buren County, Iowa, according to Stookey (1935, p. 71). Thompson (1934) also described a number of fusulinids from two horizons below the Whitebreast Coal. *Wedekindellina euthysepta* (?), *W. dunbari*, *W. elfina*, *W. uniformis*, *Fusulina leei*, and *F. kayi* occur 35 feet below in the Munterville Limestone and *Fusulinella iowensis* 90 feet below the Whitebreast Coal in the Seville Limestone (this is the Seville of Illinois which is different from the Seville of Missouri according to H. L. Strimple, personal communication, 1969). Thompson reported these fusulinid horizons only as 35 and 90 feet below the Whitebreast. O. Van Eck informed the writer of the identity of the units. The Whitebreast is found from 6 to 12 feet below the Ardmore Limestone in Iowa. Alexander (1954) described *Fusulina equilaqueata* from the Verdigris Limestone of Oklahoma and recognized *Wedekindellina euthysepta* and *Fusulina leei* from the caprock of the Fleming Coal which is the next major coal bed below the Croweburg Coal in northeastern Oklahoma. Bebout (1963) identified *Wedekindellina euthysepta*, *Fusulina euryteines*, *F. leei*, *F. cadyi*, and *F. boonensis*

from the Verdigris Limestone of Missouri in addition to other forms below and above the Verdigris.

Wheeler Coal. The Wheeler Coal was established by St. John (1870, p. 86) in a measured section on Whitebreast Creek, NE $\frac{1}{4}$ sec. 33, T. 73 N., R. 22 W., Lucas County, Iowa, in the same quarter-section that Lugn named the Whitebreast Coal and the two Layer Limestone. The writer located what may be St. John's section on the east bank of Whitebreast Creek about 300 yards north (downstream) of the bridge crossing the creek (NW $\frac{1}{4}$ NW $\frac{1}{4}$ NE $\frac{1}{4}$ sec. 33). The Wheeler Coal is now slumped and not exposed, but the Whitebreast Coal is well exposed here. The Wheeler Coal does outcrop, however, at the northwest corner of the bridge (Wheeler's bridge) over Whitebreast Creek and directly across the dirt road at the foot of a small embankment within 50 feet of the bridge. Just east of Wheeler's bridge is another bridge which crosses the creek of Swede Hollow. About 100 yards upstream from there on the east bank of the Swede Hollow creek is another exposure. The black shale above the Whitebreast Coal was found at water level and the Ardmore Limestone was seen above, but the Wheeler Coal was covered. The Wheeler is well exposed at the Whitebreast Coal type section.

St. John measured 2 sections containing the Wheeler Coal, both in Lucas County. He stated (p. 86) that he did not find the coal bed north of its type locality. Lugn measured 6 sections of the Wheeler. The distance of the Wheeler above the Ardmore Limestone in these sections, all in Lucas County, ranges from 3 to 16 feet.

The Wheeler Coal does not have a limestone caprock in its type area in Lucas County, but a caprock is mentioned by Searight (1958, p. 29) in Henry County, Missouri, and Branson and Huffman (1965, p. 40) report a limestone at the stratigraphic position of the Wheeler caprock in Craig County, northeastern Oklahoma, although the Wheeler Coal does not occur in Oklahoma. Howe (1956, p. 72) extends the non-occurrence of the Wheeler and its associated underclay to southeastern Kansas and western Missouri.

Habib (1960) examined the sporomorphs of the Wheeler Coal from two localities (NW $\frac{1}{4}$ SE $\frac{1}{4}$ SW $\frac{1}{4}$ sec. 18, T. 42 N., R. 28 W., and SW $\frac{1}{4}$ SW $\frac{1}{4}$ SE $\frac{1}{4}$ sec. 17, T. 40 N., R. 28 W.) in Henry County, Missouri. An exposure (SE $\frac{1}{4}$ SW $\frac{1}{4}$ sec. 7, T. 51 N., R. 13 W., Boone County, Missouri) of the Bevier Coal which splits into two benches also was collected and examined for spores. The lower bench evidently is the "Wheeler" Coal and the upper bench is the "Bevier" Coal by Searight's interpretation (Searight and Howe, 1961, p. 88). Habib concluded from palynological evidence that the Wheeler Coal of Henry County is not equivalent to the lower bench "Wheeler" of the Boone County locality.

Bevier Coal. Some confusion has existed concerning the identity of the Wheeler, Bevier, and Bedford coal beds. Stookey (1935, p. 74-75) called the coal bed directly above the Ardmore Limestone the Bevier and applied the name Bedford to the coal bed above what he called Bevier. Cline (1941) treated these coals similarly. This interpretation stems from the reported occurrence of the Bevier Coal separated by a few inches of clay into 2 benches at its type locality in Macon County, northern Missouri. The upper bench was called Bedford by Hinds (1912, p. 15). The Bedford was reported by Cline (1941) about 15 feet above the Bevier in Livingston and Carroll counties, Missouri, and some 30 miles east in eastern Linn and Chariton counties the interval between the Bevier and Bedford decreases forming a single bed. The Bevier and Bedford were reported about 20 feet apart in Lucas County, Iowa (Stookey, 1935, p. 75-76). It appears that, in Iowa, the Bevier of Stookey and Cline is the Wheeler Coal as named by St. John, and that, based on stratigraphic evidence, the Bedford is the Bevier.

Sporomorphs of the Bevier Coal from 6 localities in Kansas and from one locality (NW $\frac{1}{4}$ NW $\frac{1}{4}$ NE $\frac{1}{4}$ sec. 5, T. 41 N., R. 28 W.) in Henry County, Missouri, were examined by Habib (1960) who concluded that the Bevier of southeastern Kansas is palynologically equivalent to the Bevier in western Missouri. Both benches of the split Bevier (cited earlier with the Wheeler Coal discussion) in Boone County, Missouri, separately and combined, contain spore assemblages similar to the Bevier Coal of southeastern Kansas and western Missouri. The Bevier Coal is documented so poorly in Iowa that the writer is hesitant to speculate on its identity.

Marshall and Lonsdale coals. In a review of coals in Iowa, Hinds (1909, p. 363-364) reported a wrong sequence of St. John's coal beds in Guthrie County as, from bottom to top, Marshall, Panora, and Lonsdale. The correct sequence is Panora (now Whitebreast), Marshall, and Lonsdale. The Marshall and Lonsdale coals named in Iowa (St. John, 1870, p. 119-120, and p. 125, respectively) occur in the Marmaton Group above the Cherokee. The Marshall has been called the Lower Mystic Coal, and the Lonsdale Coal may be of only local importance. The Lonsdale Coal of Iowa should not be confused with the Lonsdale Limestone and associated strata described by A. H. Worthen (1882, p. 257-258) near Peoria, Illinois.

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