

THE NOBLE LIMESTONE MEMBER (CONEMAUGH GROUP, PENNSYLVANIAN): NEW OCCURRENCES IN NOBLE AND GUERNSEY COUNTIES, OHIO¹

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ABSTRACT

Originally described from limited exposures in central Noble County, Ohio, the Noble Limestone Member (Congemaugh Group, Pennsylvanian) has recently been discovered at three additional localities in northern Noble County and eastern Guernsey County. The Noble Limestone Member overlies the fresh-water Ewing Limestone Member and occurs beneath the Rock Riffle Run Limestone Member, at a position about thirty feet below the Ames Limestone Member. Both lithology and fossil content serve to distinguish the limestone and shale of the Noble Limestone Member from that of other Conemaugh marine members. The Noble Limestone Member is now known to occur in an outcrop belt at least 25 miles long and is deserving of recognition as a formal rock-stratigraphic unit.

INTRODUCTION

The Noble Limestone Member of the Pennsylvanian Conemaugh Group was first described by Murphy and Picking (1967) from three outcrops in central Noble County. Lithologically this marine unit is composed of dense, white-to-gray limestone, which is nodular and brecciated in part, and is interbedded with gray-green clay shale. Both the shale and the limestone contain an abundant marine fauna comprised primarily of crinoid and brachiopod remains. Stratigraphically, the Noble Limestone Member lies immediately above the fresh-water Ewing Limestone Member, or is separated from it by a few inches of nonfossiliferous, silty clay shale. In relation to other marine members of the Conemaugh Group, the Noble Limestone Member lies 30 to 35 feet below the Ames Limestone Member and 50 to 60 feet above the Portersville Limestone Member.

ORIGINAL LOCALITIES

The type section of the Noble Limestone Member (Locality 1 of this paper, Locality 2 of Murphy and Picking, 1967) is exposed in the shale pit of the Ava Brick Company, seven miles northwest of Caldwell, in Noble County (SE $\frac{1}{4}$ NW $\frac{1}{4}$ sec. 31, Buffalo Twp.) Here this marine unit is 4' 9" thick, its base lying 61' 3" above the top of the Anderson coal (base of the Portersville Limestone Member) and 69' 0" above the top of the Cambridge Limestone Member. An interval of 2' 2" of unfossiliferous clay shale, included by Murphy and Picking (1967) within the base of the Noble Limestone Member, is here excluded from this unit. A nearly identical section (Locality 2 of this paper) lies a short distance south of the type locality (in south-central sec. 30, Buffalo Twp.), in another abandoned shale pit. The third outcrop originally noted by Murphy and Picking (1967) lies seven miles to the south, in the abandoned King Brothers quarry, one mile north of Caldwell, at Florence (in the north-central part of sec. 33, Noble Twp., Noble County). Here the marine zone ranges up to five feet in thickness.

The presence of the Noble Limestone Member at these localities has been corroborated by Smith (1969), but he errs in stating that the fossils are merely "attached to upper [outer?] surfaces of limestone." Numerous invertebrate fossils have been noted within the nodular limestone, some protruding from the surface of the nodules, as well as in the associated calcareous clay shale.

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ADDITIONAL OCCURRENCES

Field work during the summer of 1971 revealed the presence of the Noble Limestone Member at three additional outcrops, occurring in a belt that extends northeastward from the type section to near Middlebourne, in east-central Guernsey County. All of these new localities (nos. 4-6), as well as the original three (nos. 1-3) are shown in Figure 1.

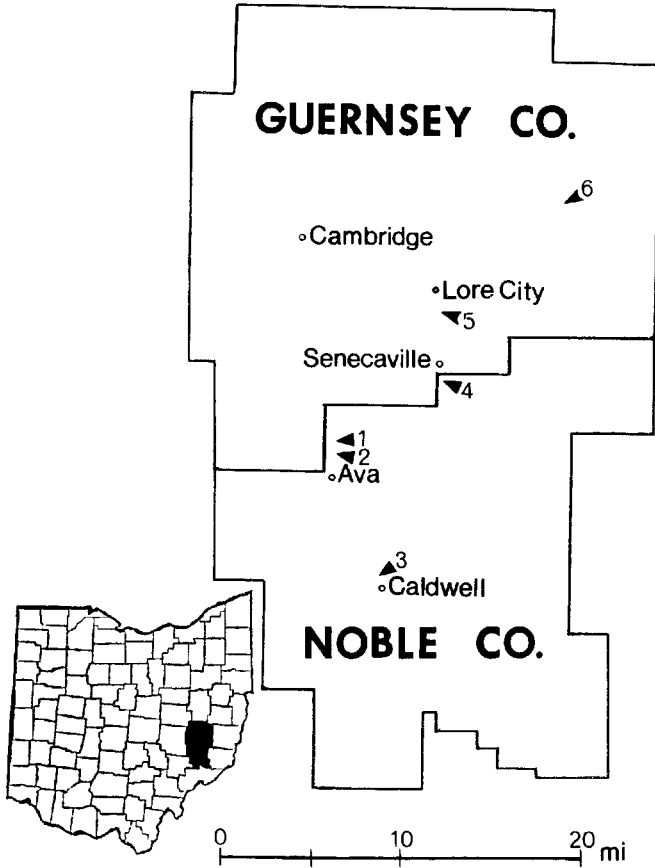


FIGURE 1. Map of Guernsey and Noble Counties, Ohio, showing location of previously known (locality numbers 1-3) and recently discovered (numbers 4-6) outcrops of the Noble Limestone Member.

The best exposure of the three new outcrops occurs in a road cut along I-70 (Locality 6), one mile east of Middlebourne (north-central part of NW $\frac{1}{4}$ sec. 25, Oxford Twp., Guernsey County). A stratigraphic section measured at this locality with the use of a Locke hand level and Paulin altimeter is given below:

Pennsylvanian:

Conemaugh Group:

Ames Limestone:

Limestone, nodular, tan, fossiliferous, marine, embedded in tan to gray-green, fossiliferous clay shale.....	2	3
Limestone, dense, crystalline, ferruginous, fossiliferous, greenish-gray to tan, with red-brown iron-oxide strain.....		5

Clay shale, slightly silty, green-gray, fossiliferous.....		4
Covered interval, slumped shale in part, containing small nodules of fresh-water limestone embedded in gray clay shale.....	16	6
Clay shale, red, with nodular fresh-water limestone and hematite in lower half of unit.....	5	3
Clay shale, mottled red and green, limestone nodules rare or absent.....	6	9
Noble Limestone Member:		
Clay shale, light-green, fossiliferous, containing numerous dense white-to-gray limestone nodules up to 6" in diameter, also containing marine fossils; both upper and lower contacts covered.....		4
Covered interval.....	10	6
Ewing Limestone:		
Limestone, dense, yellow-brown, containing abundant <i>Spirorbis</i> worm tubes.....		3
Clay shale, green, containing non-marine limestone nodules.....		8
Limestone, brecciated, greenish-gray, weathering light-brown, containing <i>Spirorbis</i> and abundant paleoniscoid fish teeth, scales, and bone fragments.....		8
Clay shale, green, calcareous, non-bedded.....	2	3
Cow Run Sandstone:		
Clay shale, silty, variegated red and green near top of unit, grading downward into tan shale and siltstone containing ironstone concretions and poorly preserved plant fragments.....	31	6
Sandstone, fine-grained, calcareous, conglomeratic in part, containing poorly preserved marine fossils.....		9
Shale, silty, thin-bedded, gray, no fossils noted, to base of section.....	3	
Elevation of the base of the Ames Limestone Member in the above section, by Paulin altimeter, is 958 feet.		

The marine fossils found in the conglomeratic sandstone near the base of the Cow Run interval could alternatively be interpreted as indicating the uppermost portion of the Portersville Limestone Member, although the fossils are worn and probably slightly reworked. The characteristic Portersville brachiopod *Chonetinella flemingi* was noted. The Anderson coal is not exposed in this section, but, judging from the succession of strata immediately above the Anderson coal in a nearby exposure, it should not lie more than five to ten feet below the base of the measured Middlebourne section. Unfortunately, grading activities and minor slumping have obscured both the top and basal contacts of the Noble Limestone Member at this locality, so that the thickness of the unit cannot be measured precisely, but at least four feet of fossiliferous clay shale and limestone are exposed. These have yielded numerous crinoid fragments, abundant *Crurithyris planoconvexa* (Shumard), and rare specimens of the brachiopods *Orbiculoidea missouriensis* (Shumard), *Chonetinella flemingi* (Norwood and Pratten), and *Antiquatonia* sp. Bryozoans are represented by small specimens of *Rhombopora* sp. and *Septopora* sp. Ostracod carapaces noted in the clay shale include representatives of the genus *Kirkbya*.

Two poorer exposures have also been found between the Middlebourne section and the type locality of the Noble Limestone. The southernmost of the new outcrops (Locality 4 in fig. 1) exposes fossiliferous green clay shale and interbedded nodular white-to-gray limestone typical of the Noble Limestone Member at an elevation of approximately 880 feet, in the ditch on the east side of State Route 285 (in the NW $\frac{1}{4}$ NW $\frac{1}{4}$ sec. 6, Wayne Twp., Noble County). Here, 0.2 mile south of the Guernsey-Noble County line, the unit is poorly exposed on both the north and south sides of a low ridge and the thickness of the unit cannot be measured. Float blocks of ferruginous, coarsely crystalline Ames Limestone are also present, lying in the pasture immediately to the east of the road ditch, but the lithology of the Ames is easily distinguishable from that of the Noble Limestone Member. In this area south of Senecaville, the Noble Limestone Member lies

about 50 feet above the Portersville unit and 65 feet above the Cambridge Limestone Member. Invertebrate fossils noted in the Noble Limestone Member at Locality 4 include numerous crinoid fragments and four species of brachiopods: *Composita subtilita* (Hall), *Pulchratia ovalis* (Dunbar and Condra), *Crurithyris planconvexa* (Shumard), and *Antiquatonia* sp.

The third of the new outcrops (Locality 5 in fig. 1) lies two miles north of Senecaville, where the Ewing Limestone Member is well exposed in a cut of the abandoned Baltimore and Ohio Railroad, at an elevation of approximately 920 feet (in the SE $\frac{1}{4}$ SW $\frac{1}{4}$ of sec. 10, Richland Twp., Guernsey County). In the pasture to the east of this railroad cut, less than five feet above the Ewing Limestone Member, fossiliferous limestone nodules representing the Noble Limestone Member occur in badly weathered greenish clay shale. Crinoid stems are the only fossils noted in the Member at this locality. Float blocks of ferruginous, fossiliferous Ames Limestone occur only a few feet higher, near the top of the small knoll above the railroad cut. As at Locality 4, the chalky, white-to-gray nodular limestone of the Noble Limestone Member may be readily distinguished lithologically from the ferruginous, coarsely crystalline Ames Limestone. At none of these localities can float material from the Ames member be mistaken for fragments of Noble Limestone.

Attempts to trace the Noble Limestone Member northward into Tuscarawas County and eastward into Harrison County have been unsuccessful thus far. Aural T. Cross (personal communication, 1967) reports the presence of a marine zone between the Portersville and Ames Members in the Burning Springs Anticline of West Virginia, and this may represent a southern extension of the Noble Limestone Member. Preliminary field work in Pleasants County, West Virginia, has failed to locate any exposure of a marine zone immediately above the Ewing Limestone Member. Grimsley (1905, p. 240) gives a measured section made at Huntington, Cabell County, West Virginia, in which fossiliferous red shales immediately overlie the "Ewing Limestone." The shale pit in which this section was measured has since been covered and filled by modern construction work, but roadside cuts along Interstate 64 suggest that the fossiliferous zone represents the Ames Limestone Member rather than the Noble Limestone. Very possibly, the underlying Rock Riffle Run Limestone was misidentified as the Ewing Limestone Member, for early workers have confused these two fresh-water units elsewhere in West Virginia (Murphy, 1971, p. 265).

Murphy and Picking (1967) tentatively suggested that a marine shale in the vicinity of Bakerstown, Allegheny County, Pennsylvania, might represent the Noble Limestone Member. Subsequent field work in the Bakerstown area indicates that such a correlation is incorrect or at least premature. The fossiliferous roof shales exposed at Pennsylvania Turnpike interchange 4, located 1.2 miles south of Bakerstown, are now believed to lie over the *Lower* Bakerstown coal. These shales are identical in lithology and fossil content with the "Friendsville Shale" cropping out in Somerset County, Pennsylvania, and probably represent the Portersville Limestone of Ohio. No exposures of the *Upper* Bakerstown coal are known in the Bakerstown region, and at present no evidence exists of a fossiliferous marine zone overlying the Upper Bakerstown coal in Pennsylvania, so consequently there is no evidence of an eastward equivalent of the Noble Limestone Member.

CONCLUSIONS

The Noble Limestone Member is now known to occur in an outcrop area 25 miles in length, extending from central Noble County northeastward into eastern Guernsey County. It is a distinctive rock-stratigraphic marine unit in the mid-Conemaugh Group, lithologically and paleontologically distinguishable from adjacent beds and other Conemaugh marine units. It is deserving of formal recogni-

tion and should be looked for elsewhere in southeastern Ohio, neighboring portions of West Virginia, and western Pennsylvania.

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