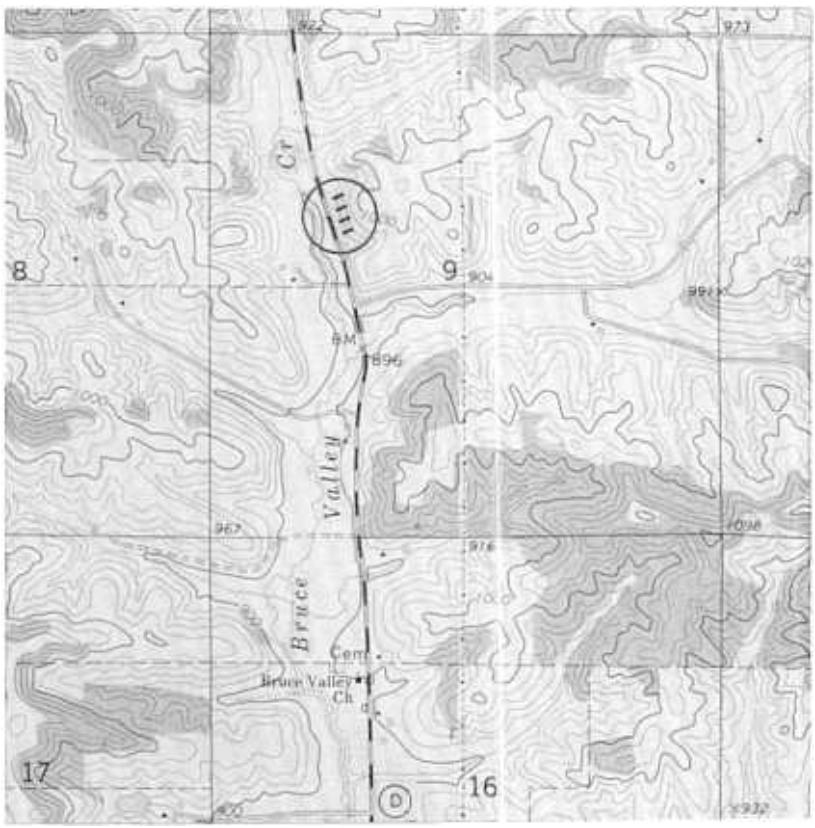
Title: Bruce Valley Quarry

Location: Abandoned quarry located at east side of County Highway "D" 1.2 miles north of Bruce Valley Church in the NE$\frac{1}{4}$, SE$\frac{1}{4}$, NW$\frac{1}{4}$, of Sec. 9, T.23N., R.8W., Trempealeau County (Pleasantville 7.5-minute topographic quadrangle, 1973).



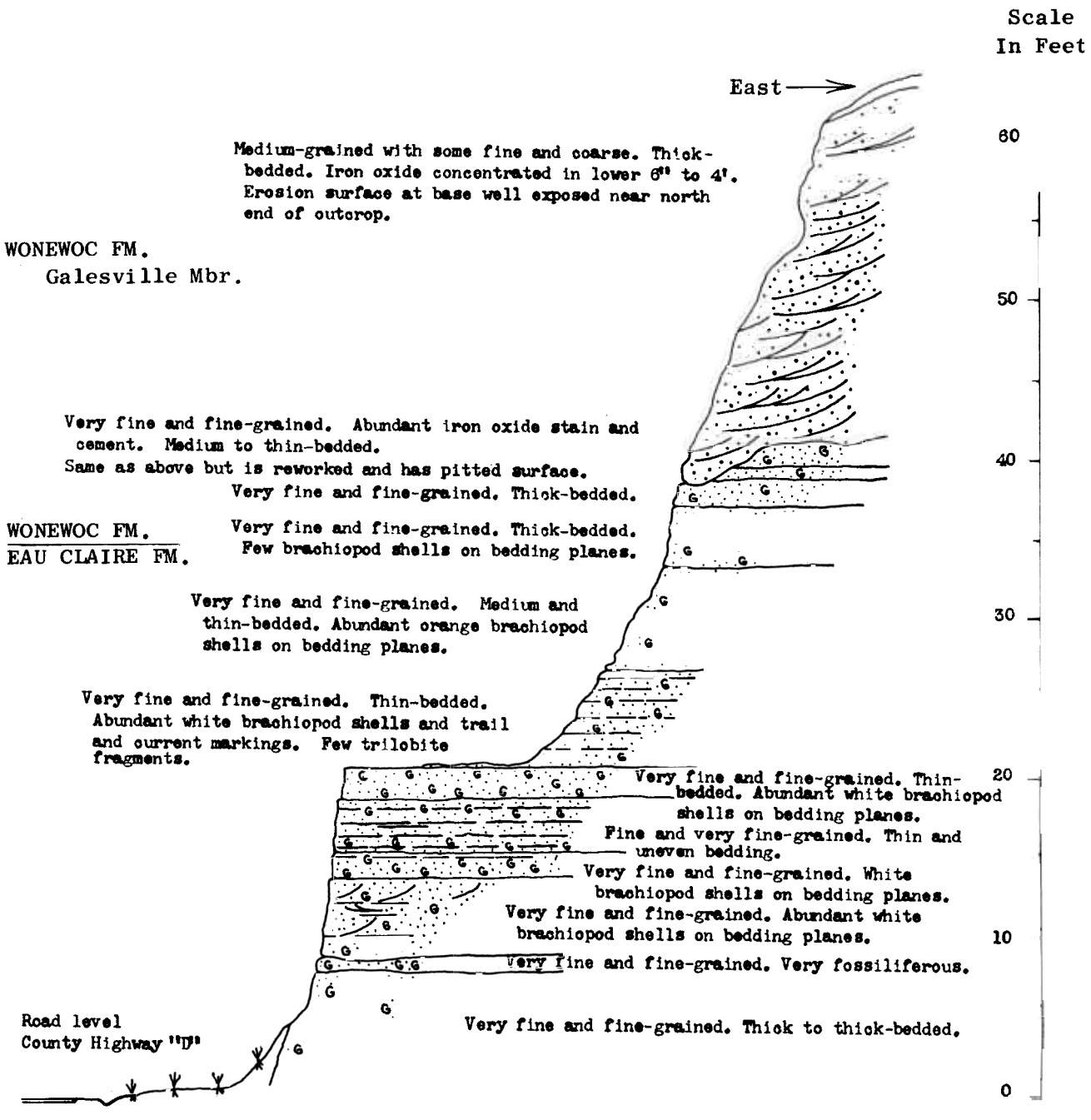
Author: M. E. Ostrom (modified from Ostrom, 1970)

Description: At this stop the contact of the Eau Claire Formation with the overlying Galesville Formation is marked by an unconformity which is especially well shown near the top at the north end of the quarried face. The unconformity is interpreted to signify retreat of the sea and subareal erosion. The Galesville is believed to have formed by a process of intermingling of beach deposits during the succeeding transgressive episode (Ostrom, 1964) during which the sea advanced over the eroded land surface.

Close examination of this contact indicates sharp and marked lithologic and/or textural change and often erosion of the top of the Eau Claire. The lower few feet of the Galesville quite often contains clasts of Eau Claire sandstone and shale. An excellent example of these features will be seen at the Galesville stop, the type section of the Galesville Formation.

Additional discussion of the relationships and significance of the rocks shown at this exposure is given in the discussion of the Irvine Park Stop.

Bruce Valley Quarry
NE¼, NW¼, Sec. 9, T. 23N., R. 8W



Horizontal to vertical scale approx. 1:2

Significance: Previous stops at Irvine Park, Mt. Simon, Rest Haven Gardens Town Road, and Strum have established a sequence of lithologic types that is repeated five times in the Cambrian and Ordovician sections of Wisconsin. The repetition is interpreted (Ostrom, 1964) to signify a cyclical pattern of geologic events, environmental conditions, sedimentation, and rock formation. Each cycle consists of four major rock types called lithotopes and is commonly bounded at top and bottom by an erosion surface which marks an unconformity. The basal unit of a cycle is an orthoquartzite sandstone such as the Mt. Simon, which was deposited in a shallow nearshore marine environment as the sea advanced over the eroded land surface.

This is succeeded by a transitional zone, such as in the upper 40 feet of the Mt. Simon, which consists primarily of alternating beds of poorly-sorted silty sandstone which has been disturbed by burrowing animals and of well-sorted coarse-grained and cross-bedded sandstone. Commonly small phosphatic brachipod shells are present and rarely trilobites are present. This unit is interpreted to have formed offshore in an area of deeper water, slow to no deposition, and alternating periods of higher and lower wave and current activity.

It is overlain by a unit, such as the Eau Claire Formation, which consists of calcareous and shaly fine-grained, fossiliferous, glauconitic, and thin-bedded sandstone and of pale green shale that is calcareous, sandy, and silty with scattered glauconite, and is locally fossiliferous. This unit is interpreted to have formed in a low energy area of slow but essentially continuous deposition on a continental shelf area seaward of the zone previously described. Occasional storm episodes produced high energy which caused materials to be torn from the bottom and incorporated in overlying sediment layers.

The fourth unit of a cycle is not present in the first cycle. It consists of carbonate rocks formed as layers of fossil debris and reef interbeds on top of other shelf sediments. If one traces the Eau Claire Formation south into Illinois and Missouri it is overlain by such a deposit, namely the Bonneterre Dolomite Formation.

At this exposure the contact of the first cycle with the second cycle is well exposed. How do you interpret this contact? Why is there no carbonate rock at the top of the first cycle? How was the abrupt lithologic change from one cycle to the next produced? Examine the Galesville Sandstone closely. How does it differ from the Mt. Simon Sandstone? In what ways is it similar to the Mt. Simon? How do you explain glauconite in the Eau Claire Formation?

References: Twenhofel, Raasch, and Thwaites, 1935; Ostrom, 1964 and 1970.