STRUCTURAL TRENDS IN THE PECATONICA QUADRANGLE BASED UPON DECORAH STRATIGRAPHY

C. L. BIEBER
North Central College, Naperville

The Pecatonica quadrangle in northern Illinois is located on the southern flanks of the Wisconsin arch. Rock exposures are plentiful in the north half of the area where the glacial drift cover is thin. Southeastward the drift thickens and bedrock exposures are less numerous. The stratigraphic formation upon which this report is based, and upon which the structural trend map is drawn, is the relatively thin transition zone between the Platteville and Galena formations, interpreted herein as Decorah.

Rocks of Decorah age average from 10 to 20 feet thick over the crest of the Wisconsin arch in the Pecatonica quadrangle. The formation comprises thin to medium-bedded fossiliferous dolomites, interspersed sparingly with blue-green shaly partings. The lower Decorah beds consist of a greenish-blue shaly facies which is distinctive when exposed on fresh surfaces. Locally the shaly phase is absent.[1] *Sowerbyella* is commonly present in the lower Decorah beds. Zones crowded with *Dalmanella* are scattered throughout the Decorah,[2] but tend to be more plentiful upward. Ramose bryozoans are concentrated locally with the *Dalmanella* zones.

Lithologically, the upper beds of the Decorah grade into the buff-colored sugary and commonly cherty Galena (Prosser member). The Decorah-Galena contact cannot be drawn with certainty, but herein is taken to be where crowded *Dalmanella* zones cease and green shaly partings give way to the typical Galena lithology. Dwarf forms of *Receptaculites* are scattered in the transitional upper Decorah horizon.

The contact between Platteville and Decorah beds is drawn at the base of the blue-green shaly dolomite. The Spechts Ferry member of the Platteville formation is not surely recognized in the area, but may be included in the dense, buff, locally cherty beds which commonly underlie the Decorah. The Spechts Ferry member is reported in south central Wiconsin.[3] The number three and four beds of the Harrison section may represent the Spechts Ferry member. At a roadside exposure in the north part of the quadrangle in the SW.¼ SW.¼ sec. 36, T. 29 N., R. 9 E., *Pionodema subaequata* is in shaly dolomite underlying Decorah beds. In the west part of the area, upper Platteville rocks near the Decorah contact exhibit buff to brown shaly partings on wavy bedding planes.

[1] DuBois, E. P., Subsurface relations of the Maquoketa and "Trenton" formations in Illinois: Illinois Geol. Survey Rept. Inv. 105, pp. 21-23, 1945.

[2] Bays, C. A. and Raasch, G. O., Mohawkian relations in Wisconsin: Guidebook of the 9th. Ann. Field Conference Kansas Geol. Soc., p. 298, 1935.

[3] Bays, C. A. and Raasch, G. O., op. cit.

ROADSIDE QUARRY, THREE MILES SOUTHEAST OF HARRISON, CENTER OF SEC 36, T. 28 N., R. 11 E., ROCKFORD QUADRANGLE

	Covered.	Thickness Ft.	In.
10.	Dolomite, buff, massive, cherty, sugary, weathered	6	
9.	Dolomite, buff, a few green shaly partings, weathers sugary; *Dalmanella*, bryozoans, fucoids	10	
8.	Dolomite, gray, blue-green shaly partings common, beds 2 to 10 inches thick; fucoids profuse on the bedding planes below		8
7.	Dolomite, buff, massive, a few shaly partings at top, iron stains, sparingly fossiliferous	1	6
6.	Dolomite, thin-bedded, a few blue-green shaly partings, *Dalmanella* sparing	0	8
5.	Dolomite, buff to blue, blue wavy shaly partings, fossiliferous	0	7
4.	Dolomite, buff, thin-bedded, brown shaly partings; siliceous, rotting, weathers white; fossiliferous in center with *Sowerbyella* and *Holopea*	2	2
3.	Dolomite, buff, chert common, beds 2 to 6 inches thick; a few solution pocks upward; small *Strophomenids* center	10	
2.	Dolomite, buff, massive; *Strophomena* and *Streptelasma*	2	6
1.	Dolomite, buff, thin-bedded, iron stains; fucoids, small gastropods	3	
	Base of quarry		

ROADSIDE EXPOSURE, THREE MILES SOUTHEAST OF ROCK CITY, EAST BLUFF OF ROCK RUN CREEK, NW.¼ NW.¼ Sec. 2, T. 27 N., R. 9 E., PECATONICA QUADRANGLE

	Covered.	Thickness Ft.
13.	Dolomite, buff, weathers sugary	1
12.	Dolomite, buff, a few traces of green shale, weathers sugary	7
11.	Dolomite, buff, greenish, shaly; *Dalmanella* common	1
10.	Dolomite, sugary, a few shaly partings; crinoid fragments, *Sowerbyella*, *Strophomena*, dwarf *Receptaculites* above	4
9.	Dolomite, buff, green, shaly	3
8.	Dolomite, weathers sugary; cf. *Sowerbyella*, cf. *Pionodema*	5
7.	Dolomite, partly covered, buff, beds two to six inches thick, chert sparing	8
6.	Dolomite, buff, iron-stained, thin-bedded, fucoidal	1
5.	Dolomite, buff, scattered chert; silicified *Streptelasma* and *Columnaria;* solution pocks scattered	4
4.	Dolomite, buff, cherty	1
3	.Dolomite, buff; silicified *Streptelasma* above	6
2.	Dolomite, buff, medium to fine grain; sparingly fossiliferous	3
1.	Dolomite, buff, fucoids sparing; *Strophomena*, *Streptelasma*, *Leperditia* profuse	1

Criteria found useful in determining the relative placement of Decorah strata in the area follow:

1. Zones crowded with *Dalmanella*, and scattered crinoid fragments with *Glyptorthis*.

2. An occasional dwarfed form of *Receptaculites* associated with, or a few feet above, the *Dalmanella* zones in transitional upper Decorah beds.

3. *Leperditia cf. fabulites* commonly scattered 8 to 15 feet below the *Dalmanella* zones.

4. Silicified fossils, scattered in upper Platteville, most common of which are *Columnaria* and *Streptelasma corniculum*.

5. Profuse fucoids scattered on the bedding planes mostly in the upper Platteville, but extending up into the Galena formation.

6. Blue-green shaly partings on wavy bedding planes, more common in lower Decorah strata.

7. Black and dark brown mineral specks, probably manganese, with dendrites.

8. Locally, buff to brown shaly partings in upper Platteville beds.

9. Locally, *Pionodema* underlying Decorah shales.

The base of the shaly dolomite Decorah formation can be identified at exposures with a fair degree of accuracy. The Platteville-Decorah contact is therefore used as a key horizon in mapping structural trends in the quadrangle. Outcrop elevations on the top of the Platteville, which provides most of the control, are estimated from contour maps. Use of well logs is limited because the Decorah formation is not delimited in the older wells.

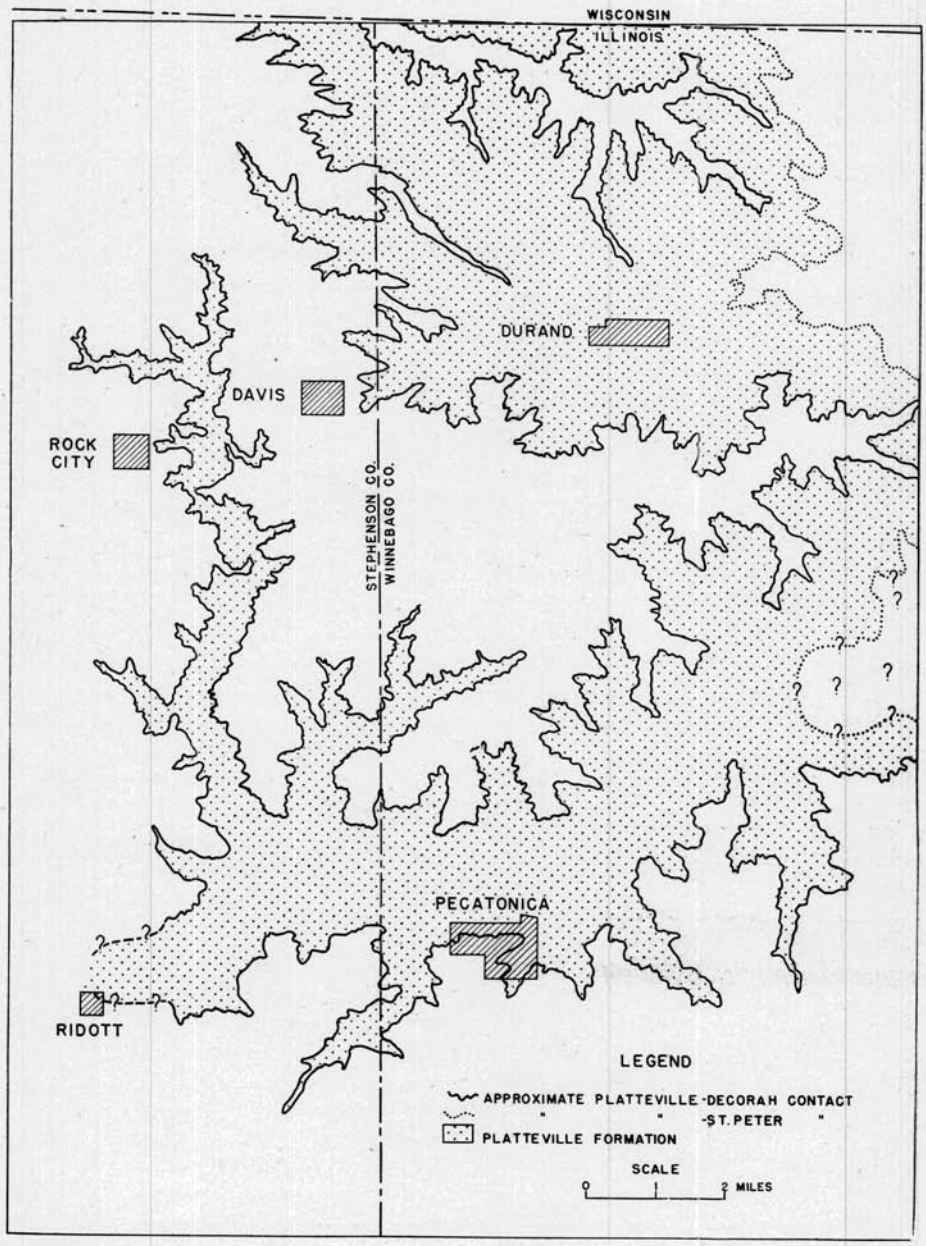
Two maps are presented. Fig. 1 shows the approximate Platteville-Decorah contact. Fig. 2 shows structural trends by contours drawn on the top of the Platteville formation.

In general, the structural trends in the area follow maps drawn on the top of the Galena.[4] The west part of the area shows a marked syncline with north-south axis, named herein the Rock Run syncline. The north center exhibits a gentle arch pitching southward at about 25 feet per mile. The axis is approximately north-south through the central part of the quadrangle and marks the south central margin of the Wisconsin arch. The village of Pecatonica is on the crest of the arch, near its southern extremity. In the extreme northeast a syncline trends northwest-southeast, the axis of which is near the village of Avon, Wisconsin. From the east-center margin of the quadrangle a small flexure pitches southeastward in the direction of Rockford. A structural sag is in the southern part of the quadrangle, whose long axis trends east-west. This feature is probably a part of structure referred to as the Ogle county line syncline.[5]

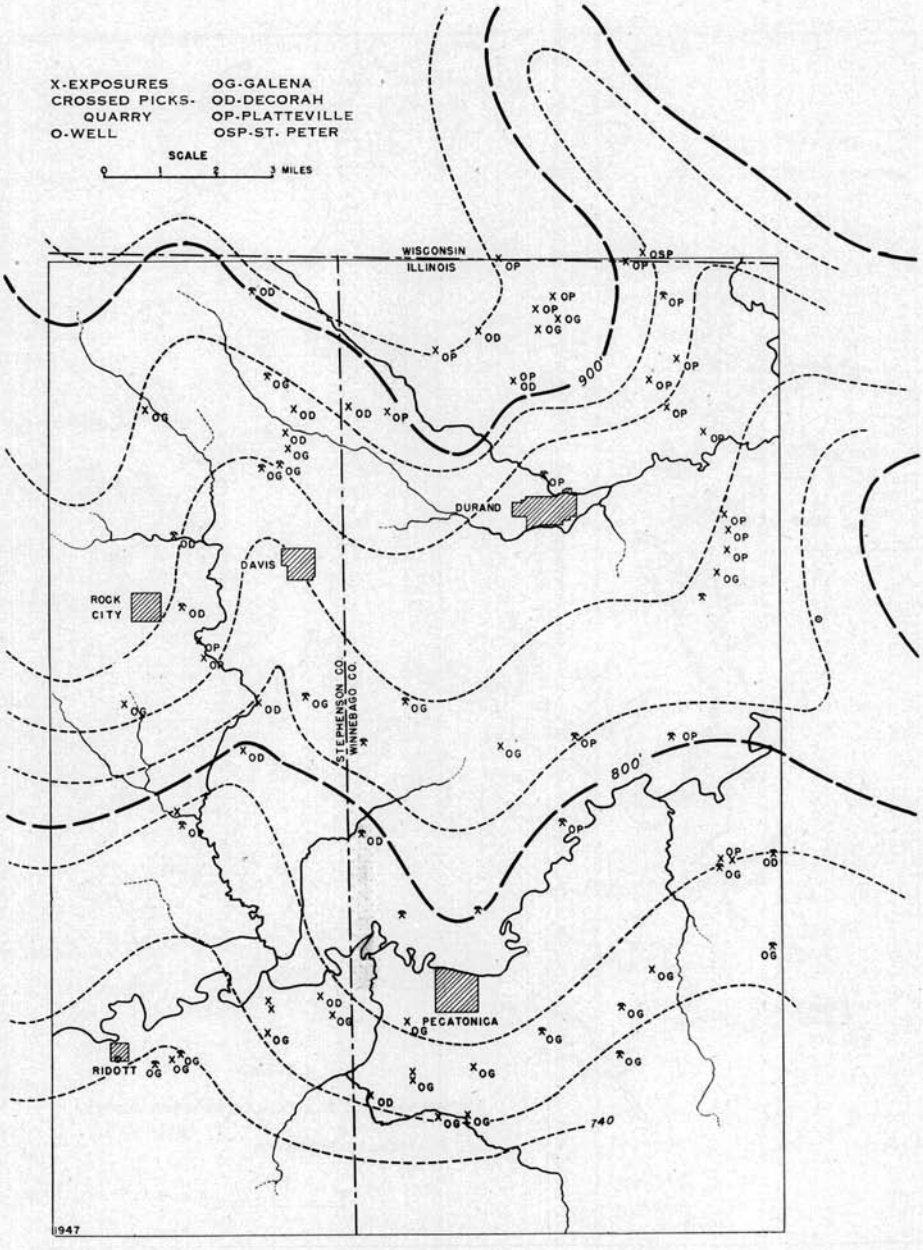
Strata exhibiting moderate dips of from 5° to 10° are at two locations: (1) Three miles southeast of Rock City, east bluff of Rock Run Creek at roadside, NW. ¼ NW. ¼ sec. 2, T. 27 N., R. 9 E., and (2) two miles south southeast of Ridott, SE. ¼ SE. ¼ SW. ¼ sec. 4, T. 26 N., R. 9 E. This latter location may represent slump in an area of solution.

[4] Horberg, Leland, Preglacial erosion surfaces in Illinois: Illinois Geol. Survey Rept. Inv. 118, p. 185, 1946.

[5] Cady, G. H., Structure of the LaSalle anticline: Illinois Geol. Survey Bull. 36, p. 132, 1920.



Generally, the area is one of gentle warping and southward pitch, in which nearly all exposures exhibit strata horizontal in attitude. Exten-



sion of structural trends studied northward across the state line into Wisconsin indicate cross structures present in the northern part of the South Wayne, Monroe, and Brodhead quadrangles.