Middle Ordovician rocks at Potosi Hill, Wisconsin

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LOCATION

Roadcut at east side of U.S. 61 and Wisconsin 35 about 1 mi (1.6 km) northwest of bridge over Platte River and 4 mi (6.4 km) northwest of Dickeyville in the SE¼,NW¼,Sec.7, T.2N.,R.2W., Grant County, Wisconsin in the Potosi 7½-minute Quadrangle (Fig. 1).

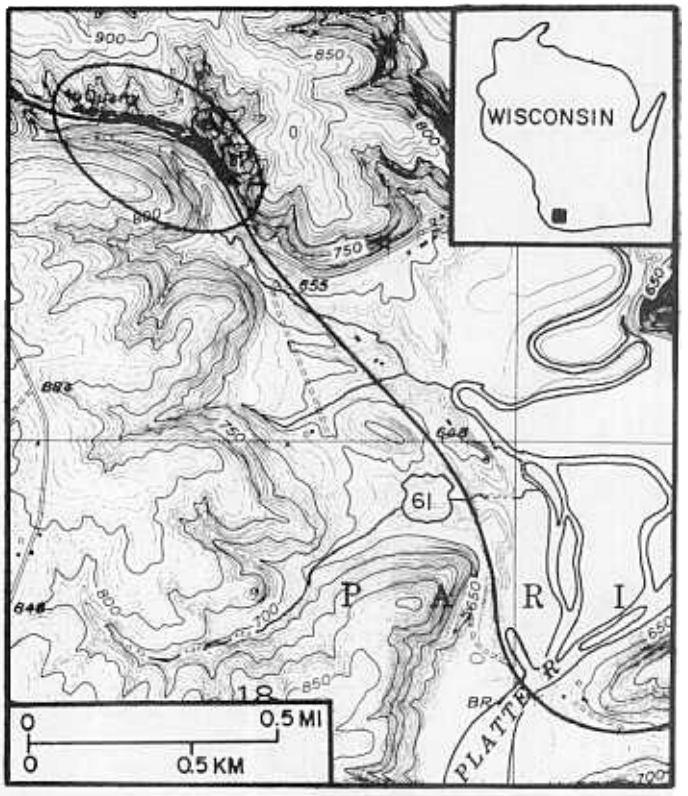


Figure 1. Location of exposure of Middle Ordovician strata in roadcut at Potosi Hill, Wisconsin.

SIGNIFICANCE

This is an excellent and easily accessible exposure of the upper few feet of the St. Peter Sandstone and the Glenwood Formation, Platteville Formation, Decorah Formation, and lower part of the Galena Formation (Fig. 2) (Ostrom, 1978). The Platteville, Decorah, and Galena Formations are the principal hosts of zinc and lead mineralization in the southwest Wisconsin zinc-lead mineralized district.

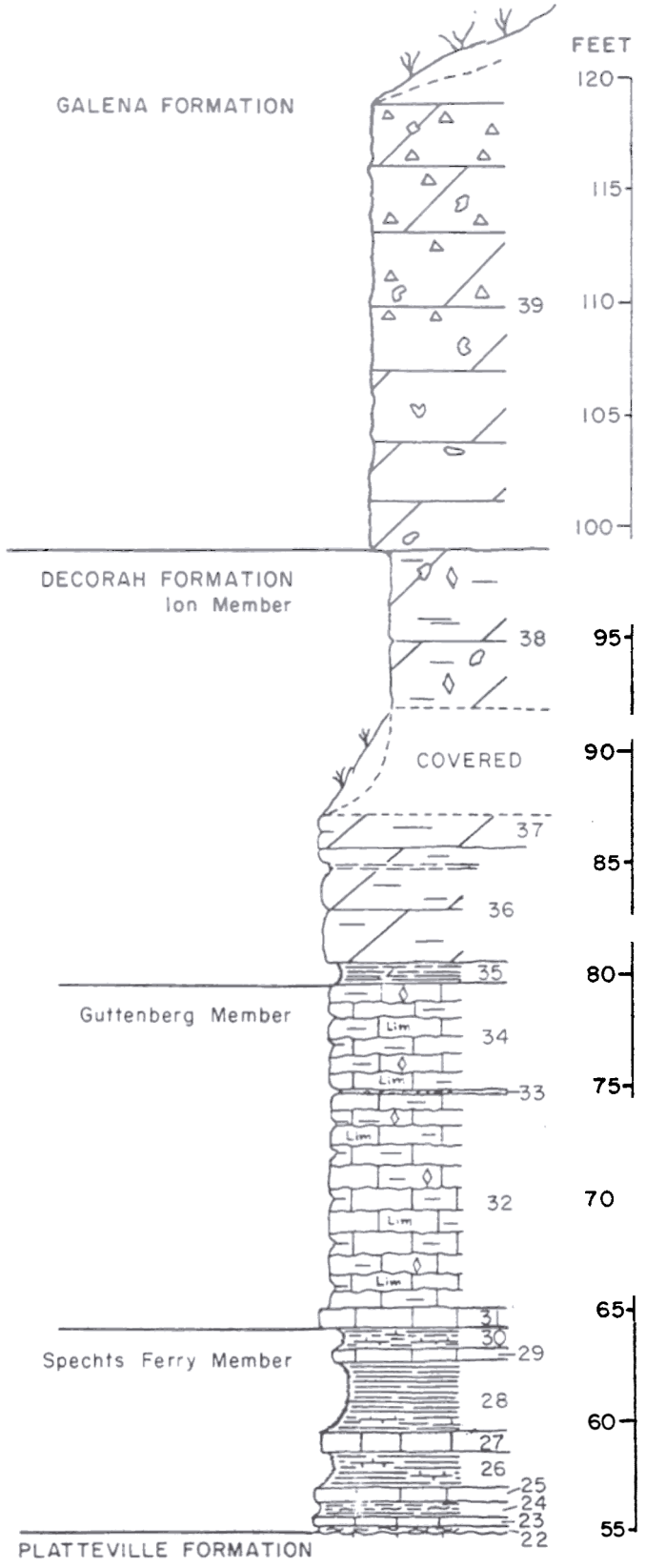
The St. Peter Sandstone was named by Owen (1847) for exposures along the St. Peter River (now the Minnesota River) near St. Paul, Minnesota. The St. Peter consists of very light yellowish gray to white, fine to coarse, subrounded to rounded quartz sand grains. It is typically very friable. It is cross-bedded, thick bedded to thin bedded, and locally massive. In the district it is from 0 to more than 300 ft (0 to 90 m) in thickness and averages about 40 ft (12 m). Variations in thickness are attributed to deposition on an erosion surface. The only fossils noted in the St. Peter are *Skolithos* (vertical straight burrows) and *Corophoides* (U-shaped burrows).

The St. Peter Sandstone is conformably overlain by the Glenwood Formation. The Glenwood was named by Calvin (1906, p. 75) from exposures in Glenwood Township (T.98N.,R.7W.) near Waukon, Iowa. Three members are recognized in the Glenwood Formation in southwest Wisconsin (Templeton and Willman, 1963; Ostrom, 1969). In the base of the Glenwood is the Nokomis Member, which consists principally of sandstone and is transitional with the St. Peter. It is distinguished from the St. Peter Sandstone by a more yellowish and greenish coloration and by a notable change in bedding character from cross-bedded, even-bedded, and uniform-textured sandstone to reworked, burrowed, and poorly sorted sandstone with more or less green clay. It is both silty and argillaceous. The Nokomis ranges from 8 ft (2.4 m) thick near Beetown (16 mi; 26 km northwest of Potosi Hill) to less than 1 ft (0.3 m) thick in the vicinity of New Glarus (about 65 mi; 105 km to the east).

The Nokomis Member is conformably overlain by the Harmony Hill Member, which consists of pale green to greenish gray shale with scattered rounded clear quartz sand grains. It decreases from 3.5 ft (1 m) thick in the western part of the district to zero in the east. The Harmony Hill is conformably overlain by the Hennepin Member. The Hennepin consists of brownish and locally calcareous shale with scattered phosphatic nodules and clear rounded quartz sand grains. It thins from 5 ft (1.5 m) thick in the western part of the district to zero in the east.

The Glenwood Formation is conformably overlain by the Platteville Formation, which is subdivided in ascending order into the Pecatonica, McGregor, and Quimbys Mill members. The Pecatonica Dolomite Member was named by Hershey (1894, p. 175) from exposures in the Pecatonica River valley in southwestern Wisconsin near the Illinois border. The Pecatonica is predominantly medium-grained, granular, thick- to thin-bedded dolomite. The lowermost bed, the Chana Member of Templeton and Willman (1963), contains phosphatic pellets and rounded clear quartz sand grains. The Pecatonica ranges from 20 to 25 ft (6 to 7.6 m) in thickness in the district.

The McGregor Limestone Member was named by Kay (1935, p. 286) from an exposure near McGregor, Iowa. It is from 25 to 30 ft (8 to 9 m) thick and consists of irregularly bedded, thin- to medium-bedded, light gray to buff argillaceous dolomite



Ordovician System
Champlainian Series
Sinnipee Group

Galena Dolomite Formation
Cherty Unit

39. Dolomite, yellowish-buff, medium- to coarse-grained, vuggy, abundant white chert in upper 10 ft (3 m).

Decorah Formation
Ion Dolomite Member
(Gray Unit)

38. Dolomite, buff, medium- to coarse-grained, thick- to massive-bedded, vuggy, green shale partings throughout, sparry calcite present. Covered interval.
37. Dolomite, buff, medium-grained, medium-bedded, with green shale partings.

(Blue Unit)

36. Dolomite, purplish-gray, medium-grained, slightly fossiliferous. Green shale present as partings, and as a 0.5 ft (15 cm) bed 0.8 ft (25 cm) below the top of the interval.
35. Shale, green. 0.3 ft (9 cm) green dolomitic shale in middle of interval.

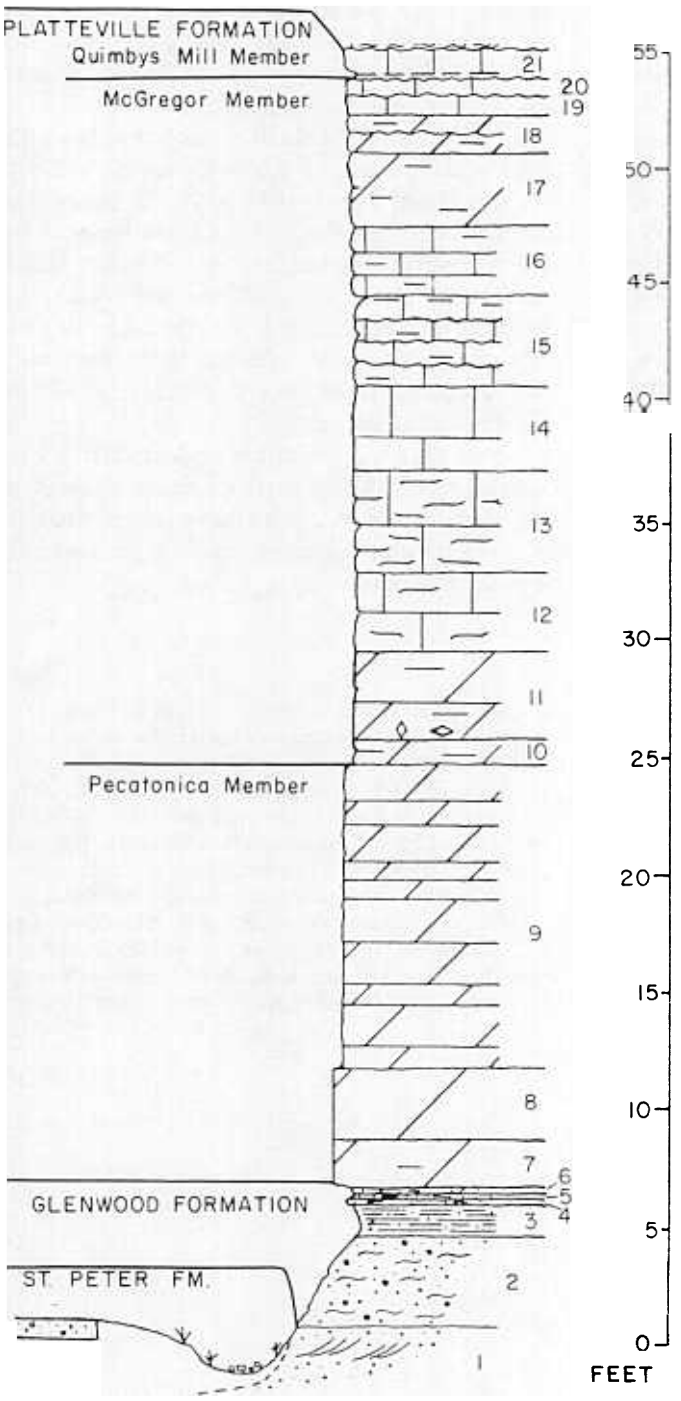
Guttenberg Limestone Member

34. Limestone, purplish-brown, fine-grained to sub-lithographic, fossiliferous, upper 1 ft (30 cm) fine- to medium-grained, brown shale present as partings, calcite and limonite after iron sulfide present in small amounts.
33. Metabentonite, brownish orange, crumbly, sticky when wet.
32. Limestone, purplish-brown, sublithographic, thin wavey bedding, fossiliferous, brown carbonaceous shale present as thin beds and partings, calcite and limonite present. Thin metabentonite bed at base.
31. Limestone brown-gray, fine-grained, thick-bedded.

Spechts Ferry Shale Member

30. Shale, orange-gray, calcareous, and limestone, tan-gray, fine-grained; limestone 0.4 to 0.7 ft (12 to 20 cm) above base.
29. Limestone, gray, fine-grained, thin-bedded.
28. Shale, gray, green, brown, fissle, some beds fossiliferous, limestone present as thin lenses near middle of the interval.
27. Limestone, tan, with iron oxide mottling, fine-grained, thin-bedded.
26. Shale, gray-green-brown. Fissle, with thin lenses of gray fine-grained limestone.
25. Limestone, dark to light gray, thin-bedded fossiliferous.
24. Shale, brown-green-orange-gray, brown carbonaceous shale parting at top, metabentonite near middle.
23. Limestone, purplish-brown, fine-grained, thin-bedded, very fossiliferous, fucoids at base.
22. Metabentonite, orange, sticky when wet, with brown shale partings.

Figure 2 (this and facing page). Section exposed in roadcut at Potosi Hill, Wisconsin.



Platteville Formation
Quimbys Mill Member

21. Limestone, purplish-ray-brown, sublithographic, thick-bedded, conchoidal fracture, irregular upper surface, shale at base. Metabentonite in top of shale.

McGregor Limestone Member

20. Limestone, purplish-gray-brown, fine to medium crystalline, thick-bedded; wavy upper surface.
19. Limestone, light gray, very fine crystalline, thin-bedded, fossiliferous; wavy upper surface.
18. Dolomite, yellowish-brown, fine crystalline, sugary texture, argillaceous, thin-bedded; discontinuous beds/nodular appearance.
17. Dolomite, light olive-brown, fine crystalline, sugary texture, argillaceous, thick bedded.
16. Limestone, light brown to greenish-brown, medium to fine crystalline, with some argillaceous partings; some fossil shells and fucoids on bedding planes.
15. Limestone, light brown to light greenish-brown, fine to medium crystalline, thin-bedded and uneven beds with nodular appearance, shale partings. Argillaceous in upper 0.6 ft (18 cm) with abundant fossils.
14. Limestone, light brownish-gray, medium to fine crystalline in medium to thick beds.
13. Limestone, light greenish-gray, fine and medium crystalline, thick-bedded with abundant discontinuous wavy shale partings. Shale partings are greenish-gray, mottled and very fossiliferous.
12. Limestone, same as above but fewer shale partings.
11. Dolomite, light gray, fine crystalline, slightly argillaceous, very fossiliferous, in medium beds, discontinuous faint shale partings. Some clear calcite and dolomite in lower 0.5 ft (15 cm).
10. Dolomite, light gray to light brownish-gray, fine crystalline with thin shale partings up to 1 in (2 cm) thick between beds. Shale is bluish-green and brown. Fossiliferous.

Pecatonica Member

9. Dolomite, brownish-gray, fine to medium crystalline, sugary texture, thin- to medium-bedded, even-bedded, beds 0.1 to 18 in (2 mm to 45 cm) thick. Weathered surface shows distinct but discontinuous thinner beds.
8. Dolomite, brownish-gray, fine crystalline, in single bed, upper 0.5 in (1 cm) stained brown. Scattered dark brown fossil molds and traces. Weathered surface shows wavy horizontal bedding features.
7. Dolomite, brownish-gray, fine crystalline, faint horizontal shale traces, dark brown phosphatic pebbles up to 2 mm, abundant dark brown fossil hash.

Glenwood Formation
Hennepin Member

6. Dolomite, very silty, yellowish-brown, very fine crystalline, abundant phosphatic pellets up to 2 mm, scattered round medium quartz sand grains.
5. Sandstone, brown, very fine- and fine-grained with little medium-grained, abundant grayish-green shale.
4. Sandstone, dark brown, fine- and medium-grained, argillaceous, poorly sorted, iron-oxide cemeted, abundant phosphate pellets up to 2 mm.

Harmony Hill Member

3. Shale, brown and bluish-green in upper 2 in (5 cm) grading downward to bluish-green with some reddish-brown; little rounded medium grained quartz sand.
2. Sandstone, mottled light yellowish-green, light greenish-yellow, and reddish-brown, medium- and fine-grained with some very fine and very coarse grains, poorly sorted, abundant pale green clay in matrix, reworked/bioturbated texture.

St. Peter Formation
Tonti Member

1. Sandstone, light yellowish-gray, very fine- to medium-grained, some light brown stains cross bedded.

Base of exposure in drainage ditch.

and limestone. The overlying Quimbys Mill Member was named by Agnew and Heyl (1946, p. 1585) from a quarry exposure about 5 mi (8 km) west of Shullsburg, Wisconsin. Its thickness varies in the district from less than 1 ft to more than 18 ft (0.3 to 5.5 m) thick and consists of purplish gray-brown, sublithographic, thick-bedded, conchoidally fractured limestone with an uneven upper surface and with shale at its base.

The Platteville Formation is overlain disconformably by the Spechts Ferry Shale Member of the Decorah Formation named from exposures in the city of Decorah, Iowa (Calvin, 1906, p. 61). It thins eastward from 8 ft thick to less than 1 ft (2.4 to 0.3 m). The Spechts Ferry Member consists of fossiliferous, gray-brown limestone with green shale interbeds. At this exposure two thin beds of "metabentonite" occur near its base. The metabentonites are orange to light reddish brown and about 2 in (5 cm) thick. Phosphatic nodules occur locally in the upper 1 ft (0.3 m).

The Spechts Ferry Member is conformably overlain and transitional with the Guttenberg Limestone Member, which consists of hard, fine crystalline, thin-bedded, fossiliferous, light brown limestone with brown petroliferous shale partings and interbeds. The presence of these interbeds has led to the member being referred to as the "Oil Rock." In the district the Guttenberg Member thins eastward from more than 14 ft to less than 7 ft (4 to 2 m).

The Spechts Ferry is conformably overlain by the Ion Member, which is a gray to blue dolomite, medium-crystalline, and medium to thick bedded with green shale interbeds. The amount of shale decreases to the east. The Ion maintains a thickness of about 20 ft (6 m) across the district.

The Decorah Formation is conformable with and transitional with the overlying Galena Dolomite Formation. The Galena was named (Owen, 1840, p. 19, 24) from exposures in the vicinity of the city of Galena in northwest Illinois. It is a light buff to drab, cherty, thick-bedded, vuggy dolomite with medium to coarse sugary grains. A zone of *Prasopora insularis* Ulrich marks the top of the Ion Member in some areas, but is absent here. In most of the district the Galena is dolomitized and the sparse fossils are poorly preserved. It is from 220 to 230 ft (67 to 70 m) thick throughout the district.

Near the north end of the roadcut, there is a quarry, now occupied by a junkyard, in which, on the southeast wall, can be seen an example of "pitch-and-flat" structure, which is the principal site of zinc and lead mineralization in the district. Here there is no mineralization.

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