

U.S. DEPARTMENT OF THE INTERIOR

U.S. GEOLOGICAL SURVEY

Geologic map of the Minnith 7.5 min. quadrangle,
Ste. Genevieve and Perry Counties, Missouri

by

Art Schultz and Richard W. Harrison¹

Open-File Report 94-421

This report is preliminary and has not been reviewed for conformity with U.S. Geological Survey editorial standards (or with the North American Stratigraphic Code). Any use of trade, product, or firm names is for descriptive purpose only and does not imply endorsement by the U.S. Government.

1. USGS Reston, Virginia

**Geology of the Minnith 7 1/2' quadrangle, Ste. Genevieve
and Perry Counties, Missouri**

by

Art Schultz and Richard W. Harrison

U.S. Geological Survey Open-File Report 94-421

This report presents the initial results of field mapping during 1992 and 1993. It is in part compiled from Weller and St. Clair (1928), particularly areas away from the Ste. Genevieve fault zone. There are some irregularities in contacts derived from Weller and St. Clair (1928) that were not investigated. This report and a related Open-File Report (Harrison and Schultz, 1994) are to be incorporated in an upcoming U.S. Geological Survey publication on the Ste. Genevieve fault zone. Cross sections included in this report are preliminary and subject to reinterpretation. We wish to acknowledge field assistance by NAGT students Greg Baker and Phil Larson.

DESCRIPTION OF MAP UNITS

- Qal Alluvium (Holocene)**- Gravel, sand, silt, and clay. Ranges from 0 to 100 ft (0-30.5 m) in thickness
- Qt Terrace deposits (Holocene and Pleistocene)**- Silt, sand, clay, and gravel. As much as 30 ft (9.2 m) thick
- Msl St. Louis Limestone (Upper Mississippian, Meramecian)**- Limestone, chert, and shale. Limestone is generally dense, medium to light gray, fine grained to sublithographic, fossiliferous, and in thick to medium beds. Locally, some parts are dolomitized. Shale occurs as thin partings. Chert occurs in distinct horizons and is gray, black, or rarely pink. Only lowermost 40 to 100 ft (12.2 to 30.5 m) of unit is present
- Ms Salem Formation (Upper Mississippian, Meramecian)**- Limestone and very minor shale partings. Limestone is light gray to white and is typically oolitic and devoid of chert. Occurs in medium to thick beds which are commonly cross bedded. Fragmented fossils are common. Numerous karst sinkholes are developed in this unit just north of Ozora, Missouri. As much as 130 ft (39.7 m) thick
- Mw Warsaw Formation (Upper Mississippian, Meramecian)**- Limestone and shale. Limestone is dominant in upper half of the formation, and in lower half, shale is dominant. Limestone is medium to dark gray, fossiliferous, and fine to medium grained. Locally contains chert nodules. A few beds are argillaceous. Shale is generally dark gray and calcareous. Approximately 130 to 150 ft (39.7 to 45.8 m) thick
- Mkb Keokuk and Burlington Limestones and Bushberg Sandstone, Undivided (Lower Mississippian, Osagean and Kinderhookian)**-
Keokuk Limestone- Limestone, chert, and minor shale. Limestone is medium gray, fine to medium grained, and very fossiliferous. Most numerous fossils are crinoids, brachiopods, and corals. Some beds are oolitic or silicified. Chert is light gray and occurs as nodules or thin beds. Shale occurs as

partings and thin interbeds. Approximately 80 to 100 ft (24.4 to 30.5 m) thick
Burlington Limestone- Limestone, chert, and minor shale. Similar description as Keokuk Limestone. Approximately 85 to 100 ft (25.9 to 30.5 m) thick

Mkbfg Keokuk and Burlington Limestones, and Fern Glen Formation, Undivided (Lower Mississippian, Osagean)-

Keokuk Limestone- see above

Burlington Limestone- see above

Fern Glen Formation- Limestone, shale, and chert. Limestone is yellowish to reddish brown and greenish gray, generally fine grained, and commonly argillaceous. Shale occurs dominantly near base of unit and is reddish brown in color. Chert occurs only in uppermost portion of the unit as nodules and irregular beds. Locally, a yellowish brown quartz sandstone occurs at base of the unit that Weller and St. Clair (1928) identify as the Bushberg Sandstone. Approximately 30 to 50 ft (9.2 to 15.3 m) thick

Dsl St. Laurent Formation (Middle Devonian)-

Limestone, argillaceous limestone, arenaceous limestone, and minor sandstone. Lithologies interfinger and show great variability from one location to another. A common characteristic, however, is the presence everywhere of interbedded arenaceous limestones, sandstones, and limestones devoid of sand (Weller and St. Clair, 1928). Sand grains are rounded quartz. Limestones are typically fine grained. Overall, fossils are extremely rare. As much as 275 ft (83.9 m) thick

Dbv Beauvais Sandstone (Middle Devonian)- Sandstone.

Medium- to coarse-grained, quartz sandstone. Grains are well sorted and rounded. Virtually indistinguishable from the Ordovician St. Peter Sandstone, except for stratigraphic position. Approximately 50 ft (15.3 m) thick

Dgt Grand Tower Limestone (Middle Devonian)- Limestone

and minor cherty limestone. Light-gray to white, coarse to finely crystalline, and typically fossiliferous. Chert occurs in abundance only near the base. Ranges from 200 to 350 ft (61.0 to 106.8 m) thick

- Dls Little Saline Limestone (Lower Devonian)-**
Limestone. White to slightly pinkish white, coarsely crystalline, thick bedded, locally fossiliferous, and devoid of chert. Ranges from 25 to 100 ft (7.6 to 30.5 m) thick
- DSb Bailey Limestone (Lower Devonian and Upper Silurian, Niagaran)-** Limestone, argillaceous limestone, chert, and shale. Limestone beds are gray to light brown and typically fine grained. Argillaceous beds are generally fossiliferous. Chert is conspicuous and occurs as fossiliferous nodules within limestone and as continuous beds. Ranges from 200 to 250 ft (61.0 to 76.3 m) thick
- Sb Bainbridge Group, Undivided (Upper Silurian, Niagaran)-** Argillaceous limestone, shale, and limestone. Argillaceous limestone is dominantly red mottled with purple, green, or yellow, fossiliferous, and medium grained. Shale is brick red and calcareous. Limestone occurs at the base and is light to pinkish gray, fine to medium grained, and contains pink fossil fragments. From 0 to 150 ft (0 to 45.8 m) thick
- Om Maquoketa Group, Undivided (Upper Ordovician, Cincinnati)-** Sandstone, arenaceous shale, shale, and limestone. Sandstone is yellowish brown, fine grained, and consists of moderately well-sorted quartz grains. Arenaceous shale and shale are typically olive-green and weather to clay. Limestone occurs at the base and is gray, coarsely crystalline, and locally siliceous. Ranges from 30 to 75 ft (9.2 to 22.9 m) thick
- Ok Kimmswick Limestone (Middle Ordovician, Mohawkian)-** Limestone. Light-gray, coarsely crystalline, thick bedded, and fossiliferous. As much as 100 ft (30.5 m) thick
- Odp Decorah and Plattin Groups, Undivided (Middle Ordovician, Mohawkian)-**
Decorah Group- Shale and minor limestone. Green shale with intercalated lens and thin beds of limestone. From 0 to 35 ft (0 to 10.7 m) thick
Plattin Group- Limestone. Gray, fine grained to lithographic, typically thin bedded, and fossiliferous. Conspicuous horizontal burrow

markings are common throughout.
Approximately 200 ft (61.0 m) thick

- Oj Joachim Dolomite (Middle Ordovician, Mohawkian)-**
Dolomite, shale, and sandstone. Dolomite is brown, fine grained, evenly bedded, rarely fossiliferous, and contains occasional shale partings. Shale is greenish gray and dolomitic. A 2 to 3 ft (0.6 to 1.0 m) thick sandstone bed occurs near the base of the unit (Amos, 1986). Approximately 150 ft (46 m)
- Ospe St. Peter Sandstone and Everton Formation, Undivided (Middle Ordovician, Mohawkian and Whiterockian)-** Combined thickness ranges from 170 to 200 ft (51.9 to 61.0 m)
- St. Peter Sandstone (Mohawkian)-** Sandstone. Light brown, fine grained, well sorted and thick bedded to massive. Grains are rounded and commonly frosted quartz. Cross bedding and ripple marks are common. Approximately 100 ft (31 m) thick
- Everton Formation (Whiterockian)-** Limestone, dolomite, sandstone, and shale. Limestone is gray, fine grained, locally cross bedded, and contains common floating grains of rounded quartz. Dolomite is brownish to dark gray, fine grained, and contains sporadic grains of quartz. Sandstone consists of fine grained, well sorted, rounded quartz, and has a carbonate cement. Shale is gray, dolomitic, and occurs as thin beds or partings. Ranges from 70 to 100 ft (21.4 to 30.5 m) in thickness
- Op Powell Dolomite Lower Ordovician, Canadian)-**
Dolomite, chert, and sandstone. Dolomite is light to brownish gray, fine grained, and in part is argillaceous. Chert occurs as gray to brown nodules and discontinuous beds of soft ferruginous material. Sandstone is light brown, fine grained, calcareous, and occurs as thin beds in upper half of the unit. Approximately 200 ft (61 m) thick
- Oc Cotter Dolomite (Lower Ordovician, Canadian)-**
Dolomite, chert, sandstone, and shale. Dolomite is gray to brown, fine grained, slightly fossiliferous, characteristically oolitic, and locally argillaceous. Chert is gray to brown and occurs as irregular nodules

and thin beds. Sandstone is light brown, fine to medium grained, calcareous, and thinly bedded. Shale is greenish gray and calcareous. Approximately 100 ft (31 m) thick

Ojc Jefferson City Dolomite (Lower Ordovician, Canadian)- Dolomite, sandstone, chert, and shale. Dolomite is brown to gray, fine grained to lithographic, evenly bedded, and commonly argillaceous. Sandstone is reddish brown, medium grained, and typically case hardened. Chert is dark blue to white, commonly fossiliferous, and occurs as nodules and thin beds of which some are conglomeratic. Shale is greenish gray, largely dolomitic, and occurs as thin beds or partings. Residuum of unit is a distinctive red, plastic clay. As much as 200 ft (61 m) thick

Or Roubidoux Formation (Lower Ordovician, Canadian)- Sandstone, dolomite, and chert. Sandstone is reddish brown, medium grained, and characteristically cross bedded. Grains are subangular to subrounded quartz. Dolomite is light gray, fine grained, locally argillaceous, and occurs in discontinuous beds. Chert is white to gray and highly variable in texture, although Cryptozoan and conglomeratic varieties are most common. As much as 140 ft (42.7 m) thick

Og Gasconade Dolomite (Lower Ordovician, Canadian)- Dolomite, chert, and sandstone. Dolomite is light gray, generally coarse grained, and locally silicified. Chert is typically white. occurs as nodules and thin to thick beds, and has characteristic Cryptozoan, cellular, and ropey varieties. Sandstone beds are typically thin and discontinuous, except for basal Gunter Sandstone Member which consists of as much as 30 ft (9.2 m) of white to brown, medium grained quartz sandstone and orthoquartzite. Approximately 300 ft (92 m) thick

OCep Eminence and Potosi Formations, Undivided (Lower Ordovician and Upper Cambrian, Canadian and Croixian)- Combined thickness is approximately 200 ft (61 m)

Eminence Formation (Canadian and Croixian)- Dolomite and chert. Dolomite is gray, medium

to coarse grained, and typically contains vugs lined with dolomite crystals. Chert is characteristically conglomeratic
Potosi Formation (Croixian)- Dolomite and chert. Dolomite is light to dark brown, medium to coarse grained, and characterized by numerous cavities lined with crystalline or chalcedonic quartz druse. Chert is honeycombed with druse-lined cavities and contains numerous quartz stringers

Cdd Doerun, Derby, and Davis Formations, Undivided (Upper Cambrian, Croixian)- Shown only on cross sections. Combined thickness is approximately 150 ft (46 m)

Doerun Formation- Dolomite. Gray, fine grained, and locally argillaceous; contains little to no chert

Derby Formation- Dolomite. Gray, fine grained, and locally argillaceous; contains little to no chert

Davis Formation- Shale and dolomite. Shale is green, fissile, and calcareous. Dolomite is brown to gray, fine grained, typically argillaceous, and contains partings or thin interbeds of green shale

Cbt Bonneterre Formation (Upper Cambrian, Croixian)- Dolomite, and minor shale and sandstone. Dolomite is brown to gray to green, fine to medium grained, and locally argillaceous, arenaceous, and glauconitic. Shale is yellowish green and typically grades laterally into argillaceous dolomite. Sandstone is characteristically glauconitic and occurs only in lowermost section, where it interfingers with dolomite. Shown only in cross section. Approximately 350 ft (107 m) thick

Cl Lamotte Formation (Upper Cambrian, Croixian)- Sandstone and conglomerate. Sandstone is yellow, fine to coarse grained, and consists of rounded quartz grains. Conglomerates contain pebbles, cobbles, and boulders of Middle Proterozoic lithologies. Shown only in cross section. Unit was deposited upon a very irregular erosional surface, and thus its thickness varies from 100 to 250 ft (30.5 to 76.3 m). However since the actual configuration in the subsurface is unknown, the unit is generalized as having a constant






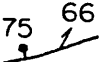
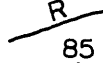

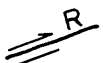
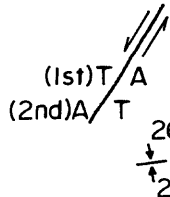





250 ft (76.3 m) thickness on the cross sections

Yc Middle Proterozoic crystalline rocks, Undivided-
Plutonic rocks. Compositions vary from granite to granodiorite and diorite to gabbro. Silicic varieties are locally intruded by diabase and granitic dikes, and commonly contain metamorphic xenoliths. Shown only on cross section

REFERENCES

- Amos, D.H., 1986, Geologic map of the Lithium 7 1/2' quadrangle, Perry and Ste. Genevieve Counties, Missouri: Missouri Department of Natural Resources, Division of Geology and Land Survey, Open-File Report OFM-86-233-GI, scale 1:24,000, 1 sheet.
- Harrison, R.W., and Schultz, A., 1994, Geologic map of the Coffman 7 1/2' quadrangle, Ste. Genevieve County, Missouri: U.S. Geological Survey Open-File Report 94-419, scale 1:24,000.
- Weller, S., and St. Clair, S., 1928, Geology of Ste Genevieve County, Missouri: Missouri Bureau of Geology and Mines, v. 22, Second Series, 352 p., scale 1:62,500.

LEGEND

-  **Contact-** Approximately located
-  **Strike and dip of beds**
-  **Horizontal beds**
-  **Vertical beds**
-  **Normal fault-** Bar and ball on downthrown block, dashed where approximately located, dotted where covered
-  **Normal fault-** Showing dip of surface and rake of slickenside striations (half arrow) measured in the plane of the fault; dashed where approximately located, dotted where covered
-  **Reverse fault-** R on upthrown block
-  **Strike-slip fault-** Half arrows show direction of relative horizontal movement, full arrow shows dip of fault surface
-  **Fault-** Multiple periods of movement, on map only
-  **Fault-** Multiple periods of movement, on cross sections only; arrows indicate relative dip slip, A-away, T-towards, (1st)- first period of movement, (2nd)-second period of movement
-  **Syncline,** showing troughline and dips of limbs, dashed where approximately located
-  **Joint-** Vertical
-  **Joint-** Surface contains horizontal slickenside striations, direction of movement undeterminable
-  **Joint-** Surface contains horizontal slickenside striations, arrow shows direction of relative movement
-  **Water well hole-** Showing file number recorded at the Missouri Department of Natural Resources, Division of Geology and Land Survey, Rolla, Mo.