















Location of data collection points on topographic map base for West Part.

Geologic Map of the Batesville Manganese District and surrounding area with emphasis on the Cason Formation, Independence, Izard, Sharp, and Stone Counties, Arkansas (West Part) Angela K. Chandler, Richard S. Hutto, Thomas J. Liner, Scott M. Ausbrooks, Ciara M. Mills, and John T. Gist

2022 Scott M. Ausbrooks, Director and State Geologist



Stratigraphic Column







## References



Suggested citation:

sheets, 1:24,000.

Chandler, A.K., Hutto R.S., Liner, T.J., Ausbrooks, S.M., Mills,

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Manganese District and surrounding areas with emphasis on the Cason Formation, Independence, Izard, Sharp, and Stone Counties, Arkansas: Arkansas Geological Survey Digital

Geologic Map, DGM-AR-BMD-W-001 and GM-AR-BMD-E-002, 2

Map and cross-section digitized by Jerry Clark, Brian Kehner, and Kerstein Finan.

Formation.



Formation.



Boone Formation (Lower Mississippian, Osagean and Kinder-

light gray in the upper sections to dark gray or blue gray in the lower section. Springs, caves, and sinkholes are common. Red

clay mixed with angular chert fragments from the Boone and the

St. Joe Limestone Member (Kinderhookian) - thinbedded reddish to gray coarsely crystalline limestone. Locally

contains white crinoid fragments in a red fine-grained matrix. Was seen at two localities in the area and mapped separately only in the Bethesda area. Up to approximately 20 feet (6 meters)

The following units are discontinuous and typically too thin to

be mapped at this scale and are therefore grouped with adjacent units. Because the focus of the map is the Cason Formation, it is mapped separately wherever possible and thickness may be

**Chattanooga Shale (Upper Devonian)** - clay shale that is black on fresh surfaces and weathers dark gray to black.

Contains thin siltstone beds and abundant limonite concretions at one location on the Grange quadrangle. The Sylamore Sandstone Member is present at one locality on the Bethesda

quadrangle and is approximately 2.5 feet thick. Unconformable

with the underlying Penters Chert. Penters Chert is included

where Chattanooga is mapped seperately. Up to 20 feet (6

**Penters Chert (Lower to Middle Devonian)** - medium to thick bedded chert. Gray and white banding is common but red,

prange, and white mottling is also present. Commonly recciated and highly fractured. Contains drusy quartz and manganese oxide coatings. Sandstone boulders are locally

preserved above or in place of the chert. Sandstone is clean,

white, silica-cemented, and contains chert fragments. Chert is

present as residual boulders on hilltops throughout the area. Historically mined for manganese. Unconformable with the underlying Lafferty Limestone. Ranges from approximately 15

**Lafferty Limestone (Ludlow to Wenlock)** - sparsely fossiliferous, finely crystalline limestone. Medium gray with red

green clay, pyrite, and nautiloid fossils. Historically mined for manganese. Conformable with the underlying St. Clair Limestone. Up to approximately 20 feet (6 meters) thick where

St. Clair Limestone (Wenlock) - coarsely crystalline fossiliferous limestone. Locally contains abundant trilobite fossil fragments and green clay. Light gray to white on fresh surfaces but weathers medium gray. Unconformable with the

underlying Cason Formation. Up to approximately 15 feet (5

Cason Formation (Upper Ordovician) - thin to medium

bedded, reddish brown to buff siltstone interbedded with silty shale. Locally contains white chert fragments, glauconite grains, limonite blebs, and flattened button-shaped impressions. Manganiferous buttons contained in green shale and red siltstone are present in Love Hollow and Midwest Lime quarries. This unit was previously mined for phosphate and

manganese. Unconformable with the underlying Fernvale Limestone. Up to approximately 20 feet (6 meters) thick where

Fernvale Limestone (Upper-Middle Ordovician) - medium-to

coarsely crystalline limestone. Medium to thick or massive

bedded. Light pink to reddish on fresh surfaces, and weathers

dark gray to brown. Contains barrel-shaped crinoids, brachio-

pods, bryozoans, and corals. Caves and sinkholes are abun-

dant. Manganese oxide is present in nodules and thin horizontal

zones within the upper section. The top of this unit is heavily

solutioned and was mined for manganese at multiple locations.

Unconformable with the underlying Kimmswick Limestone where

Kimmswick Limestone (Middle Ordovician) - medium crystal-

line, gray to white, stylolitic limestone. Locally contains chert

fragments. Contains brachiopods, bivalves, crinoids, horizontal

trace fossils, and Prismostylus, a type of red algae that was previ-

ously identified as Tetradium (Steele-Petrovich, 2011) Uncon-

formable with the underlying Plattin Limestone. Up to approxi-

Plattin Limestone (Middle Ordovician) - very thin- to medi-

and is locally mottled. Contains gastropods, brachiopods, bryo-

zoans and stromatolites. Horizontal and vertical trace fossils are

locally infilled with silt, especially in the upper section. Very thin

shale layers are present in the top of the unit. Interbedded dolos-

tone is present in the lower section making it difficult to locate

the lower contact. Limestone glades containing abundant solu-

tionally enlarged orthogonal joint sets are present throughout the

area. Sinkholes and springs are abundant. The top of the unit is

heavily solutioned and contains manganese prospects at various

locations. Conformable with the underlying Joachim Dolomite.

talline sandy dolostone that is thin to medium bedded. Medium

Mudcracks are common. Locally contains calcite blebs and

veins, stromatolites, and dolostone breccia. Caliche is present at

and springs. A thin oolitic interval is present near the top of the

able with the underlying St. Peter Sandstone. Ranges from 20

unit. Galena and sphalerite are present in one mine. Conform-

to massive- bedded sandstone. Commonly cross bedded. Quartz

grains are sub-angular to sub-rounded. White to light gray on

fresh surfaces, but weathers light brown. Commonly case hard-

ened in outcrop but otherwise friable when broken. Commonly

silica-cemented and quartzitic near faults. Balds or glades are

common. Long ridges or walls composed of tightly spaced defor-

mation bands commonly stand in relief along faults. Sandstone

pipes are present locally near monoclines or faults. Currently

of Mt Pleasant Sinkholes and caves are common Un

mined at Guion, west of Cave City, and historically near the town

able with the underlying Everton Formation. Ranges from

**Everton Formation (Middle Ordovician)** - consists primarily of

interbedded dolostone, sandy dolostone, and sandstone. Dolos-

Medium gray on fresh surfaces, but weathers light gray and is

locally mottled. Locally petroliferous when broken and contains

calcite blebs and mudcracks. Sandstone is very thin to medium

bedded and locally silica cemented. Quartz grains are fine to

coarse and sub-rounded to well-rounded. Ranges from 60-300

tone is thin to medium bedded and fine to coarsely crystalline.

St. Peter Sandstone (Middle Ordovician) - fine-grained, thin-

one location. Contains solutionally enlarged fractures, caves,

Op um-bedded micritic to finely crystalline limestone. Light to

medium gray on fresh surfaces but weathers white to light gray

Approximately 100-200 feet (30-60 meters) thick.

Joachim Dolomite (Middle Ordovician) - fine to medium crys-

to dark gray on fresh surfaces, but weathers light gray to white.

present. Ranges from 20-240 feet (6-73 meters) thick.

noidal fragments or blebs on fresh surfaces and weathers ight gray. Locally contains light red finely crystalline limestone. Thin to thick bedded and commonly stylolitic along bedding

Locally contains manganese dendrites and nodules,

-60 feet (5-18 meters) thick where present.

locally exaggerated.

meters) thick where present.

neters) thick where present.

mately 20 feet (6 meters) thick.

-120 feet (6-36 meters) thick.

40-200 feet (24-67 meters) thick.

feet (18-116 meters) exposed in this area.

present.

underlying Penters Chert (where present) form a thick regolith throughout the area. Unconformable with underlying forma-

**hookian)** - fine-grained limestone interbedded with anastomos-

ing and bedded chert. Light to medium gray on fresh surfaces but weathers dark gray. The chert varies in color from white to

tions. Ranges from 60-400 feet (18-120 meters) thick.







Fernvale Limestone.



## Introduction



Description of Map Units Alluvium and terrace deposits (Quaternary) - unconsolidated clay, silt, sand, and gravel, including deposits on one or more terrace levels along larger tributaries. Approximately 10-15 feet (3-5 meters) thick. Young terrace and active channel deposits (Quaternary) <sup>y</sup> unconsolidated clay, silt, sand, and gravel in gravel bars and sandy point bars along the White River. Includes the youngest terraces above the river which are primarily clay, silt and sand. Uppermost surfaces are generally flat but are locally hummocky and dissected by tributaries. Approximately 20-30 feet (6-9

ous sites to aid in classification and petrographic analysis.

meters) thick.



erosion. Upper surface is hummocky where overlain by gravel deposits. Unconformable with Paleozoic rocks below. Ranges from 40-80 feet (12-24 meters) thick. Batesville Sandstone (Upper Mississippian, Chesterian) - fine to medium-grained, sub-angular, moderately sorted, iron-cemented sandstone. Thin to medium bedded and flat bedded, but locally cross bedded. White to buff, tan, orange, and light brown on fresh surfaces and commonly banded. Weathers light to dark gray and dark brown. Conformable with the Moorefield Formation. Up to approximately 100 feet (30 meters) exposed in the southwest corner of the map. Moorefield Formation (Upper Mississippian, Chesterian,

shapes consistent with Liesegang banding. Highly prone to gully

bedded siltstone and micrite. Shale is dark gray to black on fresh and weathered surfaces. Siltstone is dark gray to brown on fresh surfaces but weathers a light gray to buff color. Solutioning along joints is common in calcareous zones. Sparsely fossiliferous with mostly crushed brachiopods. Unconformable with the underlying Boone Formation. Approximately 80-100 feet (24-30 meters) thick in the southwest corner of the map.

Mm **Meramecian**) - fissile shale interbedded with very thin to thin



Interbedded shale and siltstone in the Cason Formation