GEOLOGIC MAP OF THE FIFTYSIX QUADRANGLE, STONE COUNTY, ARKANSAS

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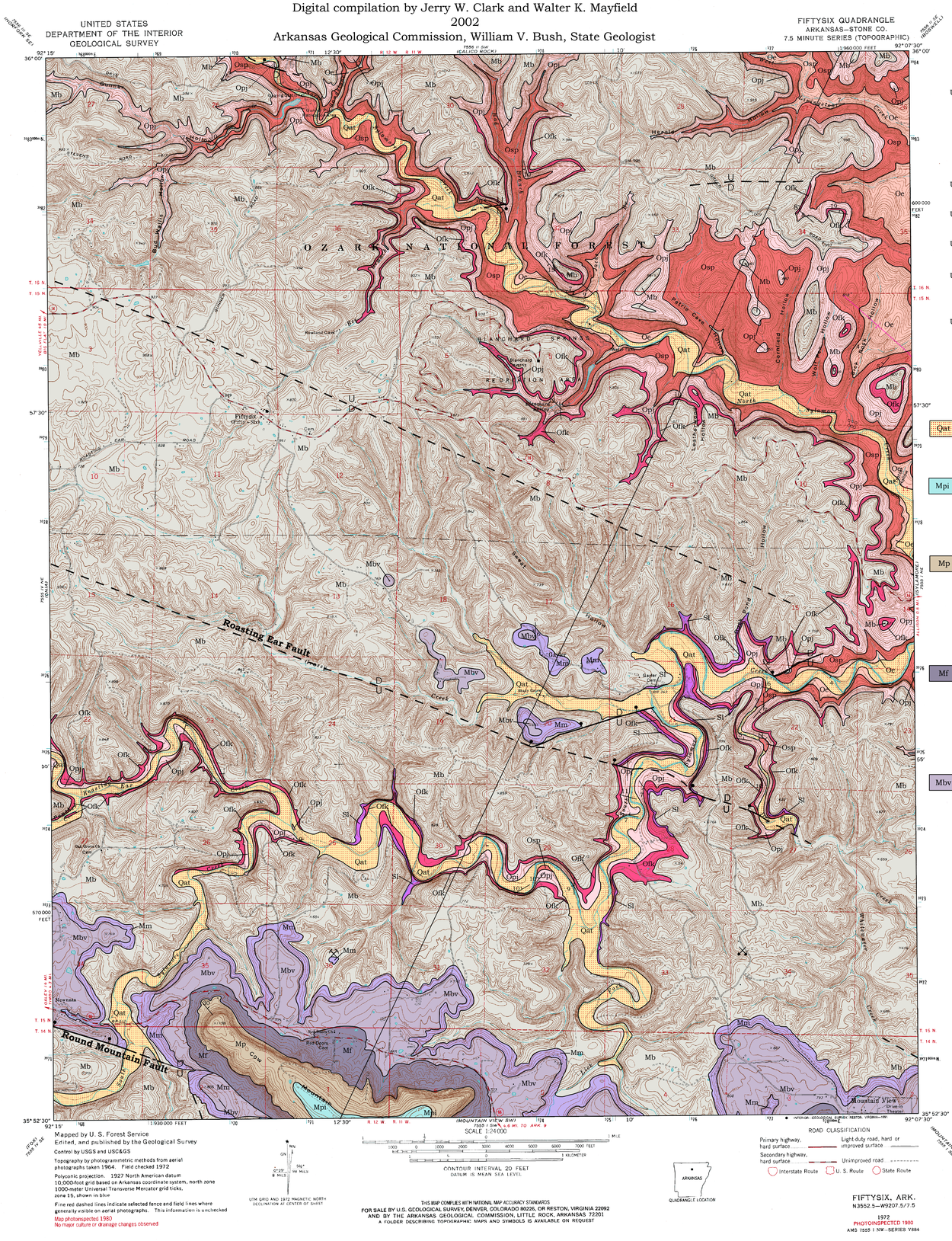

Mapped by U. S. Forest Service
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Topography by photogrammetric methods from aerial photographs taken 1964. Field checked 1972

Polyconic projection. 1927 North American datum
10,000-foot grid based on Arkansas coordinate system, north zone
1000-meter Universal Transverse Mercator grid ticks, zone 15, shown in blue

Fine red dashed lines indicate selected fence and field lines where generally visible on aerial photographs. This information is unchecked

Map photoinspected 1980
No major culture or drainage changes observed

Correlation of Map Units

Qat	Holocene and Pleistocene	Quaternary	
Unconformity			
Mpi	Chesterian	Mississippian	
Mp			
Mf			
Mbv	Meramecian		
Mm			
Unconformity			
Mb	Osagean and Kinderhookian		
Unconformity			
Sl	Upper	Silurian	
Unconformity			
Ofk	Upper Ordovician	Ordovician	
Unconformity			
Opj	Middle Ordovician		
Osp			
Unconformity			
Oe			

Description of Map Units

Qat — **Alluvium and terrace deposits (Quaternary)** - Unconsolidated clay, silt, sand and gravel including deposits on one or more terrace levels.

Mpi — **Pitkin Formation (Upper Mississippian, Chesterian) –** Informally divided into two members: the Imo shale and the Pitkin Formation (Smith and Hutto, 2007).

Imo interval - A very fine to fine-grained, moderately sorted, iron-cemented sandstone. Varies in color from white to light brown and various shades of reddish brown in fresh exposure. Usually weathers a dark gray or light brown. Unidentifiable plant fragments found at one locality. This unit occurs as loose blocks of sandstone above the Pitkin Limestone at the top of Cow Mountain in the southern part of this quadrangle. The contact with the Pitkin was not seen and could be unconformable. Approximately 20-60 ft. thick.

Mp — **Pitkin Limestone** - A fine to coarsely crystalline often fossiliferous limestone containing crinoidal fragments, *Archimedes*, gastropods, and coral (rugose and colonial). Occasionally seen were oolites and oncolites. Varies from light gray to dark gray on fresh surface but usually weathers to a light or medium gray. Medium to massive bedded. Often has a petroliferous odor on freshly broken surfaces. Near contact with Fayetteville Shale is a zone of anastomosing shiny black chert. This limestone forms a bluff making up most of Cow Mountain. The Pitkin limestone is conformable with the Fayetteville Shale throughout this quadrangle. Approximately 240 - 300 ft. thick.

Mf — **Fayetteville Shale (Upper Mississippian, Chesterian)** - A black fissile clay shale. Alternating beds of micrite with shale occur in the upper portion of the formation to the contact with the overlying Pitkin Limestone. Black chert can be found within the micrite. This chert is distinguished from the Pitkin chert by its dull color and grainy appearance. This shale forms a gentle slope upon the Batesville plateau surface; however the micritic beds in the upper portion form resistant ledges that support the Pitkin bluff on Cow Mountain. The Fayetteville Shale is conformable with the underlying Batesville Sandstone throughout this quadrangle. Approximately 120-180 ft. thick.

Mbv — **Batesville Sandstone (Upper Mississippian, Chesterian)** - A fine to medium-grained, sub-angular, moderately sorted, iron-cemented sandstone. Thin to medium bedded. Light brown to cream colored on fresh surface. Weathers light to dark gray. This sandstone forms a fairly flat plateau surface in the southern portion of this quadrangle. The Batesville Sandstone is conformable with the Moorefield Formation throughout this quadrangle. Approximately 60-160 ft. thick.

Mm — **Moorefield Formation (Upper Mississippian, Meramecian)** - Silty shales with interbedded very thin to thin siltstones. The shaly zones are usually dark gray to black on fresh surface but weather a gray green color. The siltstones are dark gray to brown on fresh surface but weather a light gray to buff color. Very thin to thin bedded black siltstone occurs in the upper part of the formation. In one locality, at the base of this shale is a fossiliferous conglomerate zone containing brachiopods, crinoids, and shark teeth. This zone sits on top of a fairly persistent dark gray medium crystalline limestone (approx. 1 ft.) that has a strong petroliferous odor on a fresh surface. The Moorefield Shale forms a gentle slope supporting the Batesville plateau surface. The Moorefield Formation appears to be conformable with the Boone Formation throughout this quadrangle, however we are unsure of the position of the contact in relation to the fossiliferous conglomerate zone and the limestone, therefore, the contact could be unconformable. Approximately 20-100 ft. thick.

Mb — **Boone Formation (Lower Mississippian, Osagean and Kinderhookian)** - Coarse-grained fossiliferous and fine-grained limestones interbedded with anastomosing and bedded chert. Light to medium gray on fresh surface but usually weathers to a dark gray. The chert is white to light gray and always seems to weather a lighter color than the surrounding limestone. Springs and sinkholes are abundant. Caves occasionally develop within the Boone Formation sometimes extending through the Plattin Limestone in this area. This formation usually exhibits an undulating topography that tends to form steep hillsides separated by ravine-like drainages. Approximately 40 - 360 ft. thick.

St. Joe Limestone Member - A medium grained thin bedded crinoidal limestone containing very thin shaly limestones. Dark gray to reddish in color but sometimes with green mottles on fresh surface. Usually weathers a medium to dark gray color. Contains small round green spheres at the top of the member which are sometimes flattened and appear to be composed of green clay. This limestone is fairly persistent throughout this quadrangle and conformable with the underlying sandstone unit or the Fernvale Limestone. 0 - approx. 5 ft. The basal sandstone is a fine to medium-grained, moderately sorted, sub-rounded to rounded, iron or quartz-cemented sandstone. White to light gray and tan on fresh surface but sometimes blotchy due to iron. Weathers dark gray, tan, or black. Thin to thick bedded but most often seen as float. Contains phosphate pebbles and angular white and light gray chert fragments. This unit is fairly persistent throughout the quadrangle and is unconformable with the Lafferty Limestone or the Fernvale Limestone. The greatest thickness (approx 12 ft.) of this sandstone is near Gayler Crossing in the NE1/4, SW1/4, Sec 21, T15N, R11W. This unit yields abundant conodonts. 0 - approx. 12 ft. thick.
Chattanooga Shale (Devonian) - A clay shale that is black on fresh and weathered surface. Contains small lenticular sand bodies. The Chattanooga Shale was seen only in the SE1/4, SW1/4, Sec16, T15N, R11W and in the NE1/4, NW1/4, Sec 21, T15N, R11W. In both places the contact with the underlying Lafferty is unconformable. 0 - approx. 6 ft. thick.
Sylamore Sandstone Member - A medium-grained, moderately sorted, sub-angular to sub-rounded, friable iron-cemented sandstone. Weathers a light tan but has a salt and pepper appearance on a fresh surface. Contains abundant conodonts. 0 - approx. 1.5 ft. thick.

Sl — **Lafferty Limestone (Silurian)** - A sparsely fossiliferous finely-crystalline limestone. Medium gray with small red spots on fresh surface but weathers a light gray. Contains pyrite cubes near the upper contact. Thin to thick bedded with stylolites along bedding planes. Contains nautiloids. This unit is fairly persistent and unconformable with the Fernvale Limestone in this quadrangle. 0- approx. 20 ft. thick.
St. Clair Limestone (Silurian) - A coarse-grained fossiliferous limestone. Contains abundant trilobite fragments. Light gray to white with small round spots on fresh surface but weathers medium gray. Seen only in the SW1/4, SW1/4, Sec 30, T15N, R11W. 0- approx. 3 ft. thick.
Cason Shale (Upper Ordovician) - A clay shale with abundant black phosphate pebbles. Dark gray on fresh surface but weathers buff to light brown. Contains a reddish calcareous siltstone in the upper portion in NW1/4, NW1/4, Sec 8, T15N, R11W (approx. 10 ft. thick, Lemastus, 1979). Also seen in the NW1/4, NE1/4, Sec 21, T15N, R11W (approx. 6 ft. thick). Unconformable with the underlying Fernvale Limestone. 0- approx. 10 ft. thick.

Ofk — **Fernvale Limestone (Upper Ordovician)** - A medium to coarsely crystalline crinoidal limestone. Medium, thick, or massive bedded. White to light gray with a pink to reddish tint or mottles on fresh surface. Weathers a dark gray. Contains nautiloids and barrel crinoids that are accentuated on a weathered surface. Sometimes cross-bedded when beds are massive. On a weathered slope the Fernvale occurs as rounded masses that are usually friable. The contact with the underlying Kimmswick is usually a bedding plane contact (sometimes solutionally enlarged) or a 'welded contact' (Craig et. al. 1988) that is probably unconformable. 0- approx. 30 ft. thick.
Kimmswick Limestone (Middle Ordovician) - A medium crystalline limestone. Light gray on fresh surface but weathers dark gray. Tends to weather to rounded masses much like the Fernvale, however, it is very hard and not friable. Its rounded appearance easily distinguishes it from the blocky Plattin Limestone on a weathered slope. This limestone is fairly persistent throughout the quadrangle. The contact with the underlying Plattin Limestone is usually a solutionally enlarged bedding plane or a "welded contact" (Craig et. al. 1988) that is probably unconformable. 0- approx. 10 ft. thick.


Sandstone pipe in the St. Peter Sandstone in bluff shelter picnic area.

Opj — **Plattin Limestone (Middle Ordovician)** - A micritic limestone that sometimes displays a sugary texture. Light gray to dark gray on fresh surface and weathers dark gray. Very thin to thick bedded and a persistent blocky ledge former throughout this quadrangle. Stromatolites were seen near the lower and upper contacts. Springs and caves develop in this limestone. The contact with the Joachim Dolomite is conformable and when the Joachim is missing the Plattin rests unconformably upon the St. Peter Sandstone. Approximately 20-180 ft. thick.
Joachim Dolomite (Middle Ordovician) - A fine-grained to finely crystalline dolostone containing sand in the lower portion near the contact with the St. Peter Sandstone. Light to medium gray on fresh surface (sometimes mottled) and weathers dark gray to tan. Calcite-filled voids (1/10 inch to 1/4 inch) are abundant. Also contains mud cracks, lamellae, and rip-up clasts. The Joachim is thickest on the eastern boundary of this quadrangle along Hwy 14 (approx 90 ft. thick, Rives, 1977). Conformable with the St. Peter Sandstone. 0 - approx. 90 ft. thick.

Osp — **St. Peter Sandstone (Middle Ordovician)** - A fine to medium-grained, angular to rounded, well sorted, calcite-cemented sandstone. Usually case hardened but friable when broken. Light tan to white on fresh surface but weathers gray to dark tan. Thick to massive bedded and commonly displays a concave or convex rounded ledge. Commonly forms "balds" or glades but can also forms bluffs along creeks. Cylindrical columns of sandstone referred to as "sandstone pipes" (Purdue and Miser, 1916; Hawley and Hart, 1933) were seen at various localities in this quadrangle. These sandstone pipes vary in size from 1 inch in diameter to 6 feet in diameter. Sometimes just the upper surface is exposed; however, vertical sections were seen in bluff faces. Unconformable with the underlying Everton Formation. Approximately 20 - 300 ft. thick.

Oe — **Everton Formation (Middle Ordovician)** -Very fine to fine-grained crystalline to sandy and limy dolostones that are thin to massive bedded. Thin to medium beds of fine to medium-grained quartz sandstone are common and similar to the overlying St. Peter Sandstone. Medium to dark gray on fresh surface but usually weathers a lighter gray. Dolostones are sometimes mottled and contain stromatolites, mudcracks, and calcite-filled voids (up to 1 inch in diameter). Strong petroliferous odor in freshly broken calcite-filled void interval. 0 - approx. 80 ft. thick.

Symbols

- Contact
- Quarry
- Gravel Pit
- Strike and Dip (6)
- Fault - dashed where inferred or concealed. U - upthrown D - downthrown
- Sandstone pipes
- Monocline

Stratigraphic Column

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