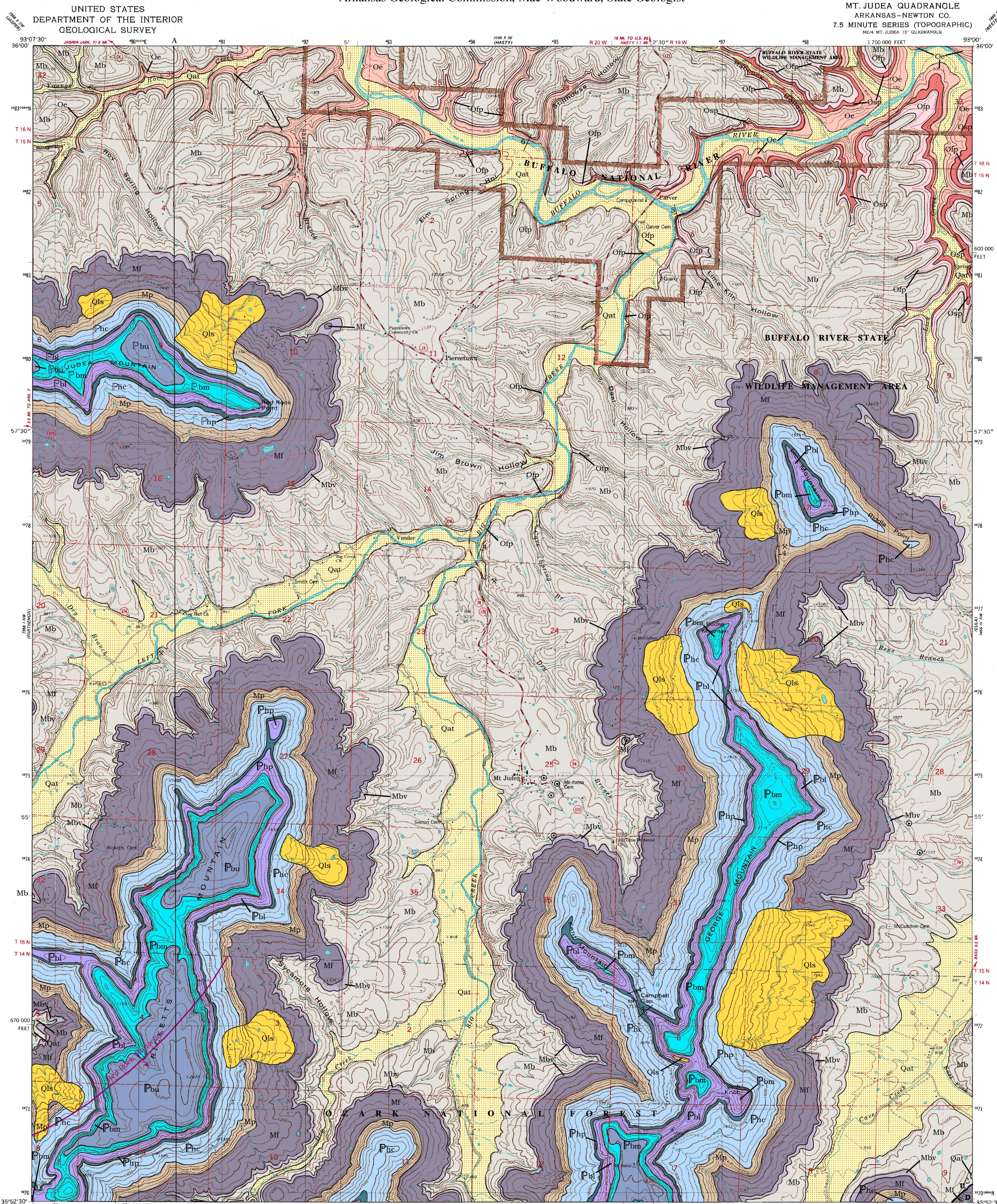


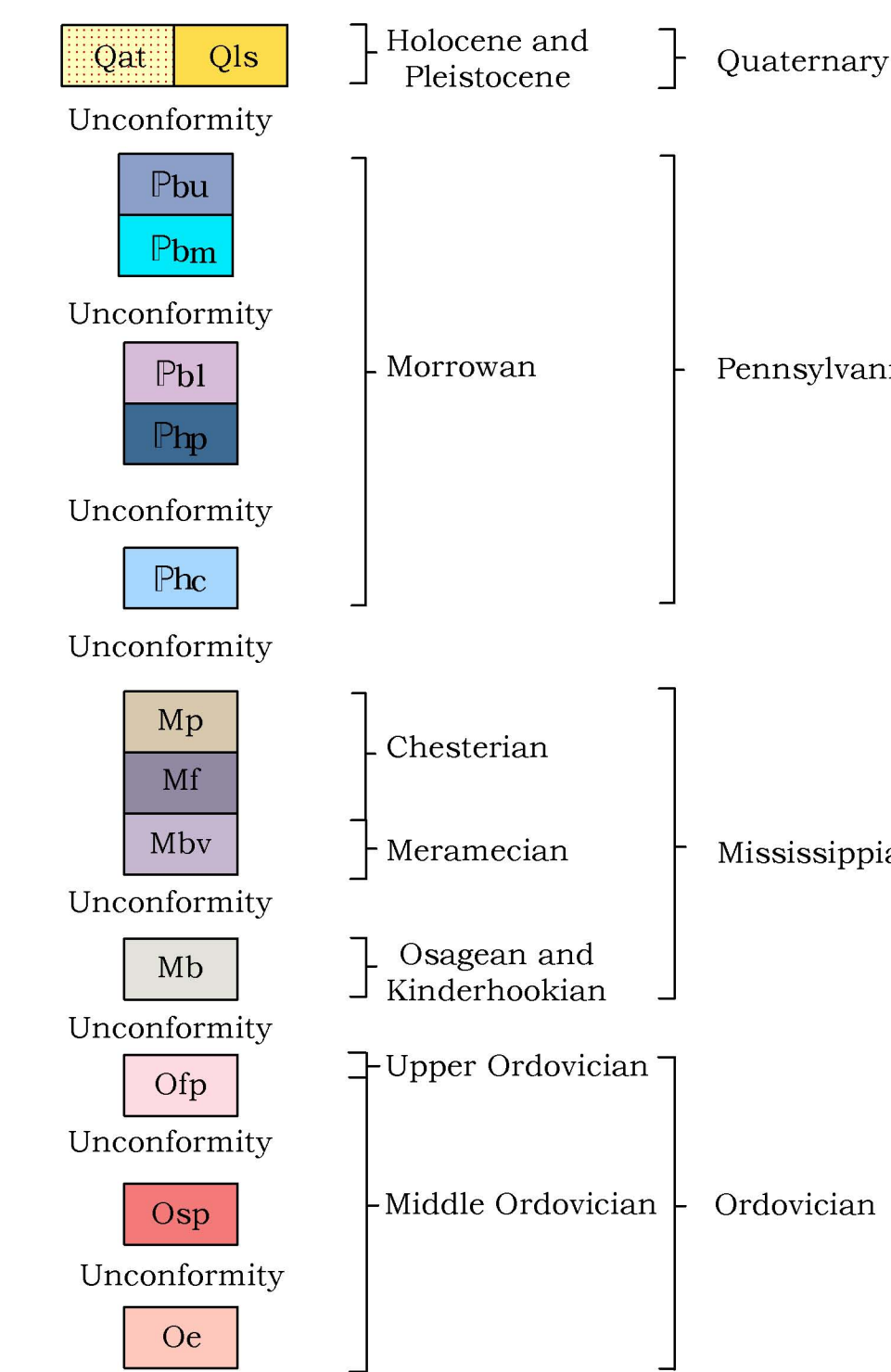
GEOLOGIC MAP OF THE MT. JUDEA QUADRANGLE, NEWTON COUNTY, ARKANSAS

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 Digital compilation by Walter K. Mayfield and Jerry W. Clark
 2003

Arkansas Geological Commission, Mac Woodward, State Geologist



Correlation of Map Units



Description of Map Units

- Qls** **Landslide deposits (Quaternary)** - Blocks of sandstone derived from the Morrowan units. Along roads, the landslides are mostly in shale units either in the Fayetteville Shale or Cane Hill Member of the Hale Formation.
- Qat** **Alluvium and terrace deposits (Quaternary)** - Unconsolidated clay, silt, sand and gravel including deposits on one or more terrace levels.
- Pbu** **Blond Formation (Lower Pennsylvanian, Morrowan)** - In this quadrangle, the individual members within the Blond Formation cannot be recognized because its limestone units (Brentwood and Kessler Limestones) are either missing or have become shaly and sandy. There are no other "marker zones" to divide the section into the recognizable members known from the type section in northwest Arkansas. Therefore the Blond Formation is divided informally into lower and upper parts (Hudson et al., 2001) separated by the "middle Blond sandstone" (Zachry and Haley, 1975). Approximately 160-400 ft. thick.
 - Upper part** - Consists of interbedded thin ripple-bedded to thick micaceous sandstones and shales above the "middle Blond sandstone". The sandstones consist of fine to coarse-grained sub-angular to sub-rounded quartz. They are light brown to gray on fresh surface but weather dark gray. The shales are dark-gray to black on fresh and weathered surfaces. This interval contains many trace fossils, load features, and ball and pillow structures. Approximately 200-240 ft. thick.
 - Middle Blond sandstone** - A thin to massive, medium to coarse-grained, cross-bedded quartz or iron-cemented sandstone with sub-angular to sub-rounded quartz grains. Reddish, gray, or light tan on fresh surface but weathers brown to orange-brown due to iron content. The cross-bedded packages can be up to three feet thick and occasionally "overturned". Contains abundant lycopod fossils and rounded quartz pebbles. This sandstone forms a prominent bluff throughout this quadrangle and separates the upper from the lower part of the Blond Formation. A pebble clast conglomerate is present at the base of this sandstone. The "middle Blond sandstone" is unconformable with the lower part of the Blond Formation. Approximately 80-160 ft. thick.
 - Lower part** - Mostly seen below the "middle Blond sandstone" are interbedded very thin to thin ripple-bedded micaceous sandstones and shales that are fine to medium grained, however, a very thin to thick bedded fossiliferous sandy fine-grained limestone is present beneath the "middle Blond sandstone" in a few locations. This limestone is gray on fresh surface but weathers light-brown with a rounded profile. Throughout the lower part is black fissile clay shales to silty shales interbedded with thin to thick-bedded fossiliferous carbonate to sandy carbonate layers. The carbonate layers vary from red to gray on fresh and weathered surface and can be mottled. Sometimes the fossiliferous sandy layers look "rotten" due to decalcification. The sand grains are medium and sub-angular to sub-rounded. The carbonate layers are distinctive from the Cane Hill in that it is not silty and does not contain box work fragments. Trace fossils are abundant. A one foot thick conglomerate containing black pebble clasts, fossil fragments, and clay clasts is present at the base of the Cane Hill at one locality. The Cane Hill Member is unconformable with the Pitkin Limestone. Approximately 120 - 240 ft. thick.
- Pbl** **Hale Formation (Lower Pennsylvanian, Morrowan)** - The Hale Formation consists of two Members; the Prairie Grove Member and the Cane Hill Member. Approximately 160 - 320 ft. thick.
 - Prairie Grove Member** - A fine to coarse-grained quartz sandstone with varying amounts of carbonate, crinoidal fragments and quartz pebbles. Reddish-brown to brown or mottled on a fresh surface but weathers dark reddish-brown. Bedding varies from thin to massive and exhibits a rounded weathering profile. This unit is a prominent bluff former that often contains cross-beds and a pitted surface that is referred to as honeycomb weathering. The base of the Prairie Grove Member contains a fossiliferous quartz pebble conglomerate that contains clasts of shale, siltstone, and sandstone as large as almost one foot in diameter. One green feldspar fragment was found from this interval. The Prairie Grove Member is unconformable with the Cane Hill Member. Approximately 40 - 60 ft. thick.
 - Cane Hill Member** - A gray to black fissile clay to silty shale containing iron nodules and small limonitic box work fragments. Varies from black to dark-gray on fresh surface to light-gray and light-orange-brown on weathered surface. Thin-bedded ripple marked siltstones and sandstones are present above the clay shale. Trace fossils are abundant. A one foot thick conglomerate containing black pebble clasts, fossil fragments, and clay clasts is present at the base of the Cane Hill at one locality. The Cane Hill Member is unconformable with the Pitkin Limestone. Approximately 120 - 240 ft. thick.
- Pbc** **Pitkin Limestone (Upper Mississippian, Chesterian)** - A fine to coarsely crystalline often fossiliferous limestone containing crinoidal fragments, archimedes, bryozoans, gastropods, coral (rugose and colonial) and oolites. Varies from light-gray to dark-gray on fresh surface but usually weathers light or medium-gray. Medium to massive bedded. Oolites have a petroliferous odor on freshly broken surfaces. A black shale occurs at the top of the Pitkin just beneath the Cane Hill Member of the Hale Formation at a few localities. It is distinctive from the Cane Hill in that it is not silty and does not contain box work fragments. No fossils were found from this shale interval. The Pitkin Limestone is conformable with the Fayetteville Shale. Approximately 160 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. The micritic beds in the upper portion of this unit form resistant and sometimes steep ledges. Septarian concretions are present near the base of the shale. Thin sandstone dikes oriented at an angle to bedding are exposed near a small spring along county road 249 near the center of Sec. 8, T15N, R19W. The Fayetteville Shale is conformable with the underlying Batesville Sandstone. Approximately 200 - 280 ft. thick.
- Mbv** **Batesville Formation (Upper Mississippian, Meramecian)** - A very 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. Minor amounts of sandstone are present in this quadrangle. This interval is mostly made up of the Hindsville Limestone Member. The Batesville Sandstone is unconformable with the Boone Formation. Approximately 5 - 20 ft. thick.
 - Hindsville Limestone Member** - A thin-bedded, fine to coarsely crystalline limestone. Light to dark-gray on fresh surface but generally weathers light-gray or brown. Usually has a strong petroliferous odor on freshly broken surface. The limestones are fossiliferous and/or oolitic, contain pyrite and are sometimes interbedded with thin layers of clay shale and thin beds of siltstone to fine-grained sandstone. A breccia containing angular chert and limestone fragments is present at the base of this interval in some localities.
- Mb** **Boone Formation (Lower Mississippian, Osagean and Kinderhookian)** - Coarse-grained fossiliferous and fine-grained limestones interbedded with sandstone and bedded chert. Light to medium-gray on fresh surface but usually weathers dark-gray. The chert varies in color from light-gray to dark-gray. Springs and sinkholes are abundant. In this area the Boone Formation exhibits an undulating topography that tends to form steep hillsides separated by ravine-like drainages. Approximately 120 - 400 ft. thick.
 - Short Creek Oolite** - A thin to massive cross-bedded, oolitic crinoidal biosparite or oolitic biomicrite. White to gray on fresh and weathered surface. Can be easily recognized by a chalky appearance and in some places a concave weathering profile. Some intervals are durable due to calcite cement while other intervals are friable. Around 35 ft. of this unit is quarried at Mt. Judea Quarry and mixed with cherty limestone for road aggregate. The oolite is present along Hwy 74 in the town of Mt. Judea and along Hwy 74 on the eastern edge of the map. The oolite occurs approximately 10-15 feet below the base of the Batesville Formation in Mt. Judea Quarry. Approximately 5-35 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 mottling on fresh surface. Usually weathers medium to dark-gray. Sometimes contains phosphate nodules near the lower contact. The St. Joe Limestone is present along the Buffalo River and Big Creek and their drainages south to Vandy in the central portion of the quadrangle. Approximately 10-30 ft. thick.
 - Basal sandstone** - 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 staining. Weathers tan to white. Thin to thick bedded but most often seen as float. Contains phosphate pebbles and angular white and light gray chert fragments. This unit yields abundant conodonts. The basal sandstone is unconformable with the Ferraville Limestone. 0-approximately 3 ft. thick.
- Osp** **Ferraville Limestone (Upper Ordovician)** - A medium to coarsely crystalline crinoidal limestone. Medium to thick to massive bedded. White to light-gray with a pink to reddish tint or mottling on fresh surface but weathers dark-gray. Contains nautiloids, barrel-shaped crinoids, and brachiopods that are accentuated on a weathered surface. Often contains pyrite. Sometimes cross-bedded when beds are massive. On a weathered slope the Ferraville Limestone occurs as rounded masses that are usually friable. The Ferraville is unconformable with the Plattin Limestone. 0- approx. 25 ft. thick.
- Oe** **Plattin Limestone (Middle Ordovician)** - A thin to thick-bedded micritic limestone that sometimes displays a sugary texture. Light gray to dark gray on fresh surface and weathers white to dark-gray. A dolomitic interval is present at the top of the formation. The Plattin Limestone is unconformable with the St. Peter Sandstone or Everton Formation in this quadrangle. 0- approx. 80 ft. thick.
- Osp** **St. Peter Sandstone (Middle Ordovician)** - A thin to thick bedded very fine to fine-grained sandstone. White to green on fresh surface but weathers light-gray-green to brown. Green shale clasts are present and sometimes weather to give the sandstone a green color. Contains a calcite cement but when leached leaves sandstone friable. The quartz grains are rounded. Green siltstones and shales are interbedded with the sandstone. Contains vertical trace fossils referred to as Scollifos by Adams et al. (1904), that weather to resemble icicles in cross-section view. The St. Peter Sandstone is unconformable with the Everton Formation. Approximately 0-40 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 light-gray. Approximately 40 - 140 ft. thick exposed at surface.

References

Adams, G.I., Purdue, A.H., Burchard E.F., and Ulrich E.O., 1904, Zinc and Lead Deposits of northern Arkansas with a section on the determination and correlation of formations; U.S. Geological Survey Professional Paper 100-24, 118 p.

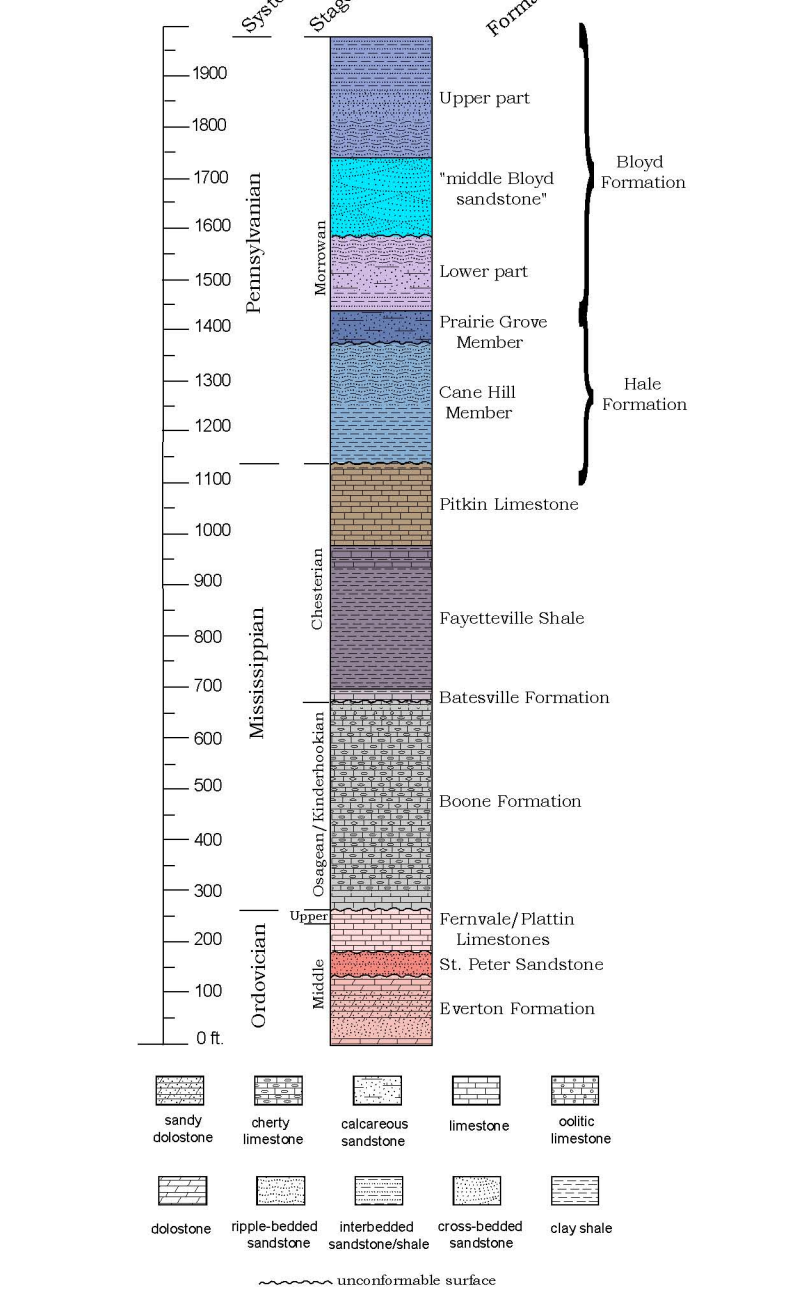
Glick, E.E., 1976, Geologic map of the Mt. Judea Quadrangle, 15-minute series; Arkansas Geological Commission Geologic Worksheet, 1 sheet.

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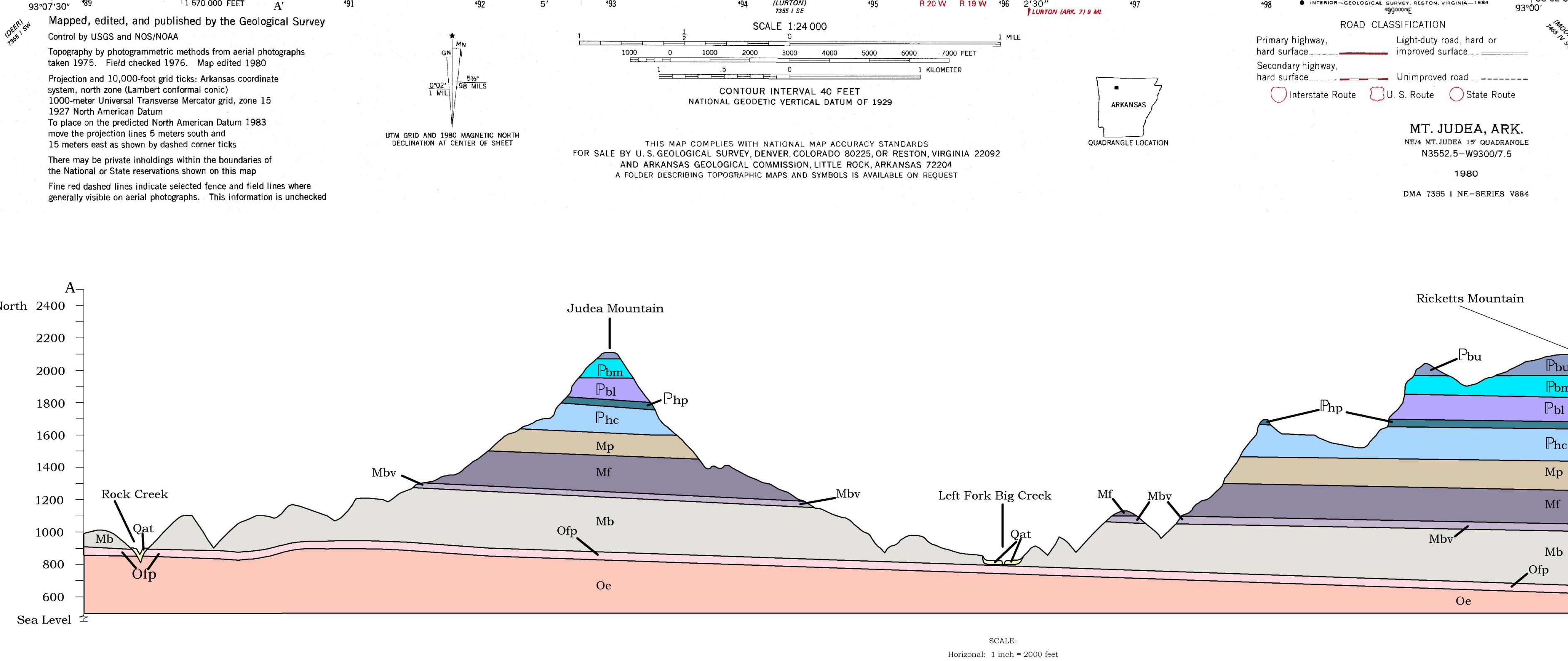
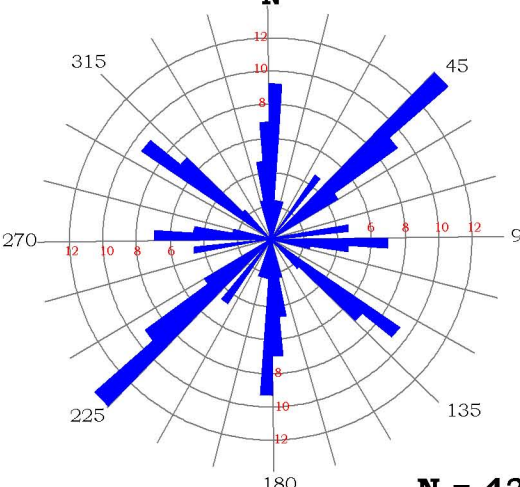
Symbols

- Contact
- Oolite outcrop
- Quarry
- Monocline
- Strike and dip
- Fault
- U - upthrown
- D - downthrown

Stratigraphic Column



Joint Frequency



Maped, edited, and published by the Geological Survey
 Control by USGS and NGS/NOAA
 Topography by photogrammetric methods from aerial photographs taken 1975. Field checked 1976. Map edited 1980
 Projection and 10,000 foot grid ticks: Arkansas coordinate system, north zone (Lambert conformal conic)
 1000-meter Universal Transverse Mercator grid, zone 15
 1927 North American Datum
 To place on the predicted North American Datum 1983 move the projection lines 5 meters south and 15 meters east as shown by dashed corner ticks
 There may be private landings within the boundaries of the National or State reservations shown on this map
 Fine red dashed lines indicate selected fence and field lines where generally visible on aerial photographs. This information is uncheckd

SCALE: 1:24,000
 Horizontal: 1 inch = 2000 feet
 Vertical: 1 inch = 500 feet (Exaggeration: 4x)

MT. JUDEA, ARK.
 NEW MT. JUDEA 7.5-MINUTE QUADRANGLE
 N3552.5-W35007.5
 1980
 DMA 2356 1 NR-BERRIER 584

