GEOLOGIC MAP OF THE GENEVA QUADRANGLE, SEVIER COUNTY, ARKANSAS

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Digital compilation by Steven L. Martin and William D. Hanson
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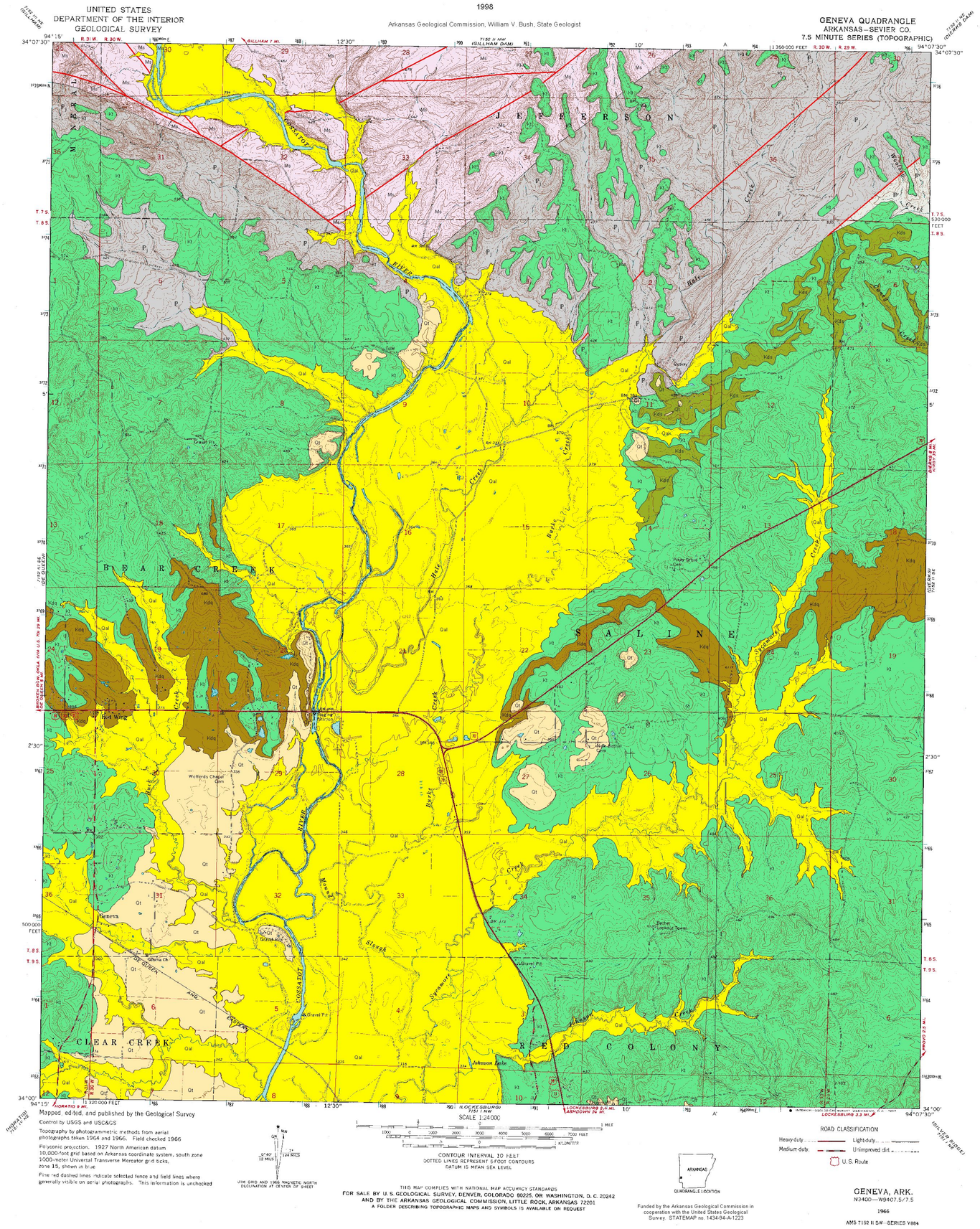
Arkansas Geological Commission, William V. Bush, State Geologist



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CORRELATION OF MAP UNITS

Qal, Qt	Quaternary	CENOZOIC
UNCONFORMITY		
Kt, Kdq, Kds	Lower Cretaceous	MESOZOIC
UNCONFORMITY		
Pjv, Pj	Pennsylvanian	PALEOZOIC
Ms	Mississippian	

DESCRIPTION OF MAP UNITS

Qal — **Alluvium (Quaternary)** - Variable size gravel overlain by unconsolidated sand, silt, and clay comprise this unit. Occurring in the floodplains of present day streams and rivers, the sediments form a rich loam and are excellent for agriculture. Gravels, primarily novaculite, originated in the Ouachita Mountain region and from local Cretaceous formations. Thickness varies from 0 to 25 feet. Mapped areas of alluvium are presently receiving sediment deposition.

Qt — **Terrace deposits (Quaternary)** - Terrace deposits generally grade from gravel at their base to silt and clay at their top. Occurring on benches above the present day streams and rivers, the sediments form rich loamy soils. Gravels, primarily novaculite, originated in the Ouachita Mountain region and from local Cretaceous formations. Thickness varies, but is generally less than 50 feet. River terraces are topographic surfaces which mark former floor levels. Water wells generally produce from the gravels at the base of the unit. Small scale gravel-mining operations produce from the basal gravel of the unit.

Kt — **Trinity Group (Lower Cretaceous)** - The Trinity Group consists of gravel, sand, clay, limestone, gypsum, celestite, and barite. The group is exposed in a east-west trending belt dipping southward approximately 100 feet per mile. Sediments composing this unit originated to the north in the Ouachita Mountain region and were deposited following a major angular unconformity developed on an upturned and eroded Paleozoic surface in a nearshore marine environment. Members exposed are the Pike gravel, the Delight sand, the Dierks Limestone, the Holly Creek sand, the DeQueen Limestone, and the Paluxy sand.

The Paluxy sand member is composed of cross-bedded medium- to fine-grained quartz sand, minor gravel, and bedded gray, light gray, and brown clay. Sands weather to yellow to orange-red. Near the base of this member barite cementing forms sandstone, resulting in the formation of topographic highs. Thickness in the mapped area is less than 300 feet.

Kdq — The DeQueen Limestone Member is composed of interbedded gray fossiliferous limestone, gray and green calcareous clay, very fine quartz sand, and silt. Thickness of the limestone beds vary, but only rarely do they exceed 24 inches. Ripple marks, mud cracks, and worm trails are common on the upper surfaces of the limestone slabs. Clays weather to a yellowish-brown and are sticky. Orangish to white celestite occurs near the base of this member and may be up to 6 inches thick. The celestite occurs in a lens, is concordant with bedding, and may be interbedded with gray clay. Thickness of this member is from 40 to 60 feet in the mapped area. Fossils present are primarily brackish-water molluscan fauna, the most common being *Ostrea franklini*. This member corresponds to the Ferry Lake Anhydrite in the subsurface of southern Arkansas.

The Holly Creek member is composed of cross-bedded gray, fine- to very fine-grained quartz sand, gravel, and clay. Sands commonly weather red to yellow when exposed. Clays are typically gray to brown. The Ultima Thule gravel lens is a part of this member. Consisting of bedded pea-size gravel, the gravels of the Ultima Thule are composed of novaculite, sandstone, quartzite, and quartz. Minor sand and clay lenses occur within the gravel unit, while sand commonly fills the interstitial spaces around the gravel. Iron-cemented conglomerates may be present locally. Thickness of the Ultima Thule gravel in the area is 10 to 20 feet, while the thickness for the entire member is less than 250 feet.

Kds — The Dierks Limestone Lentil is composed of interbedded gray fossiliferous limestone and green calcareous clay. Upon weathering, the limestone forms thin slabs (less than 1 foot thick) and nodules. Weathered clay is sticky and yellow to gray-green in color. The thickness of the member ranges from 0 to 30 feet in the mapped area, and is not recognized west of the Cossatot River. Fossils found are brackish-water molluscan fauna with some marine influence. This lentil corresponds to the James Limestone in the subsurface in south Arkansas.

The Delight sand member is composed of cross-bedded gray fine-grained quartz sand, which is interbedded with gray clay. Locally, asphalt-impregnated sands occur as thin (less than 6 inches) lenses. Iron concretions, probably resulting from deteriorated pyrite, are present. At the surface, weathering produces yellow to red sand. On vertical slopes, bedding features may be visible. Mapped thickness of the Delight sand member in the area ranges from 0 to 140 feet.

The Pike gravel member is a bedded gravel composed of novaculite, sandstone, quartzite, and quartz. The basal few feet of the unit contains a higher percentage of cobbles and boulders, some up to 24 inches in diameter, but the average size of the gravel is 1/2 to 10 inches in diameter. Minor sand and clay lenses occur within the gravel, while sand commonly fills the interstitial spaces around the gravel. Due to its resistance to erosion the gravel forms ridges. It weathers reddish due to iron staining. Iron-cemented conglomerates may be present locally. Mapped thickness of the Pike gravel in the area ranges from 20 to 40 feet.

Pjv — **Johns Valley Shale (Pennsylvanian)** - The Johns Valley Shale is composed predominantly of intervals of grayish black shale and thin to thick, silty, fine- to medium-grained, light gray sandstone. Upon weathering, the shale is typically clayey and has a grayish tan color, while the sandstone often becomes friable and has a light to dark brown color. Minor quantities of thin black chert and lenticular, fossiliferous, calcareous, silty sandstone are present. Siderite concretions occur in some shale-dominated units. Current markings and trace fossils indicate this is a deep marine turbidite deposit. About 450 to 500 feet of the lower Johns Valley Shale is present in the mapped area, a complete thickness in the southern Athens plateau is about 2,500 feet. The Johns Valley Shale is typically conformable with the underlying Jackfork Sandstone, but here it is juxtaposed by faulting. A sharp angular unconformity separates the formation from the overlying Pike gravel member of the Trinity Group.

Pj — **Jackfork Sandstone (Pennsylvanian)** - The Jackfork Sandstone contains many alternating layers of grayish black shale and silty to quartzose, fine- to medium-grained, light gray sandstone. Weathering of the shale results in a reddish to tannish gray color. The sandstone weathers white to reddish brown. Some granule-conglomerate intervals occur in massive quartzose sandstones in both the upper and lower portions of the formation. Minor thin sequences of black siliceous shale and chert are present. An occasional debris flow from 5 to 15 feet thick contains clasts of shale, sandstone, and siderite. Some slurried silty sandstones contain coalified plant remains. Sedimentary features and trace fossils indicative of deep marine turbidite deposition occurs throughout the 7,000 to 7,500 feet of the unit. The formation is conformable with both the underlying Stanley Shale and the overlying Johns Valley Shale. In places where the Pike gravel member of the Trinity Group overlies the formation, a major angular unconformity exists.

Ms — **Stanley Shale (Mississippian)** - The Stanley Shale is comprised dominantly of sequences of gray black shale and thin to occasionally thick, silty, feldspathic, fine- to medium-grained, light gray to gray sandstone. Thin intervals of black chert, siliceous volcanic ash or tuff layers are present at the top and at places lower in the formation. Weathering of the shale often imparts an olive "chloritic" appearance, while the sandstone becomes olive brown in color and rather friable. Small silty calcareous cone-in-cone structures, and siderite concretions occur in some shales. About 3,500 feet of the middle and upper Stanley is present in the quadrangle. The Stanley has a complete thickness in the southern Athens plateau of about 11,000 to 12,500 feet. Deep-marine turbidity-current deposits occur throughout the formation. Complex structural deformation generated by the Late Paleozoic Ouachita orogeny formed several major thrust faults in the Stanley strata. Hydrothermal fluids migrated during the late stages of this tectonic event resulting in the deposition of antimony and copper mineralization within some of the milky quartz veins. The Stanley is conformable with the underlying Arkansas Novaculite (Cossatot Mountains north of the mapped area) and the overlying Jackfork Sandstone. Locally, a major angular unconformity exists between the Stanley Shale and the Pike gravel member of the Trinity Group.

SYMBOLS

- Strike and dip (70)
- Gravel and/or sand pits
- Contact
- Thrust fault (dotted where concealed)

REFERENCES

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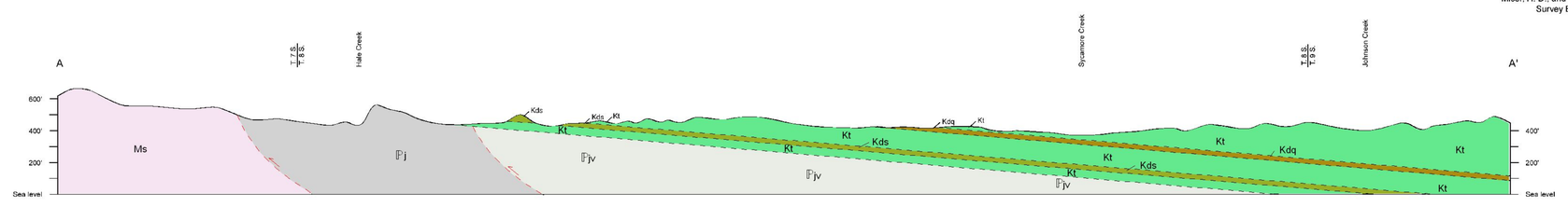

GEOLOGIC CROSS SECTION A-A'
(Quaternary deposits not shown)
Vertical exaggeration X5