

GEOLOGIC MAP OF THE CHAPEL HILL QUADRANGLE, SEVIER COUNTY, ARKANSAS

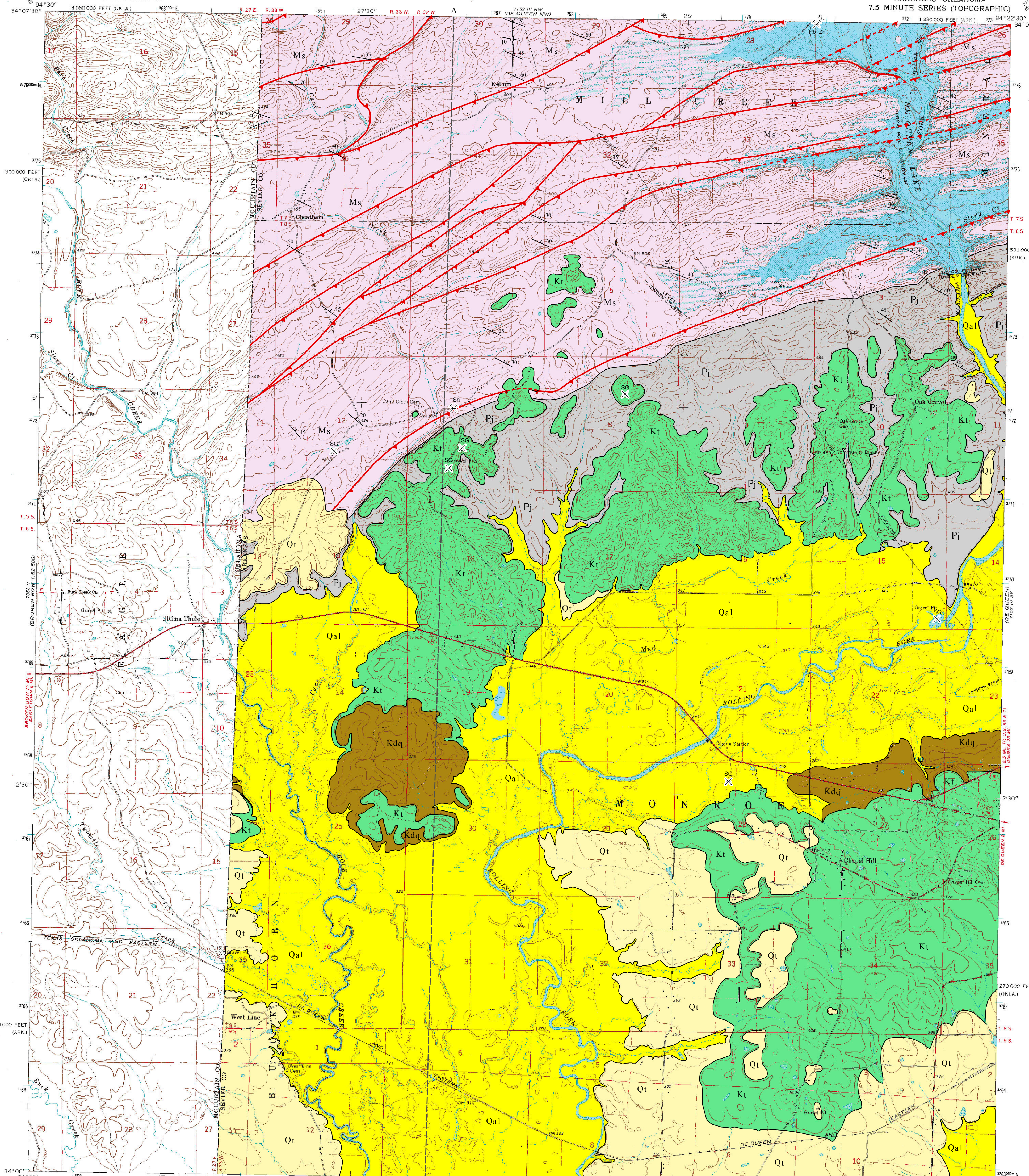
GEOLOGIC QUADRANGLE MAP
CHAPEL HILL QUADRANGLE, ARKANSAS
GM-AR-00149

Geology by W.D. Handson, B.F. Clardy, B.R. Haley, and C.G. Stone
Digital compilation by William D. Hanson and Jennifer R. Perkins
1999

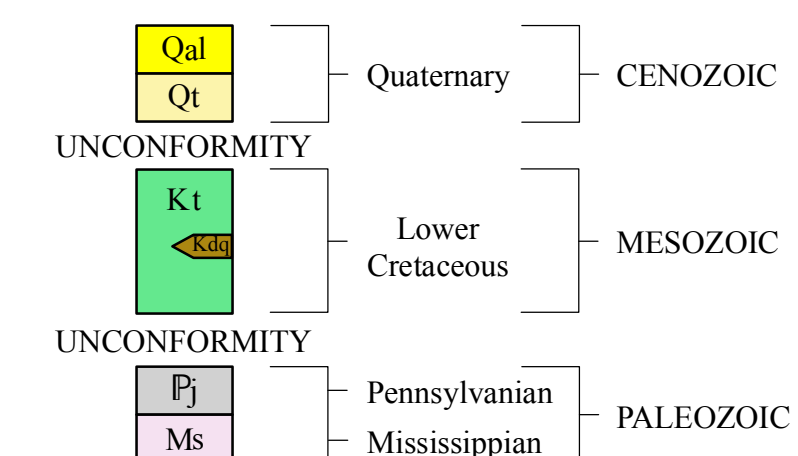
Arkansas Geological Commission, William V. Bush, State Geologist

UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY

CHAPEL HILL QUADRANGLE
ARKANSAS-OKLAHOMA
7.5 MINUTE SERIES (TOPOGRAPHIC)



Correlation of Map Units



Description of Map Units

- Qal Alluvium (Quaternary)** - Variably sized gravel overlain by unconsolidated sand, silt, and clay comprises this unit. This unit occurs in the floodplains of 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. Areas of alluvium are presently receiving sediment deposition.
- Qt Terrace Deposits (Quaternary)** - Terrace deposits generally grade from basal gravel to silt and clay at the top. Gravels, primarily novaculite, originated in the Ouachita Mountain region and from local Cretaceous formations. Thicknesses vary, but are generally less than 50 feet. Terraces are topographic features which are former floodplains of the river. The sediments form a rich loamy soil. The basal gravel is sometimes utilized for water well production and gravel mining operations.
- Kt Trinity Group (Lower Cretaceous)** - The Trinity Group consists of gravel, sand, clay, gypsum, celestine, and barite. The group is exposed in an east-west trending belt and dips southward approximately 100 feet per mile. Sediments comprising this unit originated to the north in the Ouachita Mountain region and were deposited following a major unconformity on an uplifted and eroded Paleozoic surface in a near-shore marine environment. Members of the Trinity Group exposed are the Pike Gravel, 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 from yellow to orange-red in color. The thickness of the unit in the quadrangle is approximately 350 feet. Near the base of the Paluxy Sand Member, sandstones with barite cement form topographic highs. The DeQueen Limestone Member is composed of interbedded gray fossiliferous limestone, gray and green calcareous clay, very fine quartz sand, and silt. The thickness of the limestone beds vary, but rarely exceed 36 inches. Ripple marks, mud cracks, and worm trails are common on the upper surface of the limestone slabs. Clays weather yellow-brown in color and are sticky. The thickness of the member is approximately 75 feet in the quadrangle. Fossils present are primarily brackish-water molluscan fauna, the most common being the *Ostrea franklini*. This member corresponds in part 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 yellow to red in color. Clays are typically gray to brown in color. The Ultima Thule gravel lens is a part of this member. The Ultima Thule consists of bedded pea-size gravel composed of novaculite, sandstone, quartzite, and quartz. Minor sand and clay lenses occur within the gravel unit, while sand generally fills the interstitial spaces around the gravel. In-cemented conglomerates may be present locally. The thickness of the Ultima Thule in the mapped area is 10 feet. The thickness for the entire member in the quadrangle is approximately 250 feet. The Ultima Thule gravel is difficult to distinguish from the Pike Gravel Member, as they are likely to merge near the Arkansas-Oklahoma border. The Pike Gravel Member is a bedded gravel composed of novaculite, sandstone, quartzite, and quartz. The basal 1 to 2 feet of the unit contains a higher percentage of cobbles and boulders, some up to 24 inches in diameter. The average size of the gravel is 1/2 to 10 inches in diameter. Minor sand and clay intervals are within the gravel, while sand commonly fills the interstitial spaces around the gravel. Reddish staining, due to weathering of iron bearing minerals, is present on the gravels. Iron-oxide-cemented conglomerates may be present locally. The thickness of the Pike Gravel in the quadrangle ranges from 0 to 30 feet. Near the Arkansas-Oklahoma border the Ultima Thule gravel likely merges with this member, and it is difficult to distinguish one unit from the other.
- Ms 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. Shales weather reddish to tanish-gray in color. The sandstone weathers white to reddish-brown in color. Some granule-conglomerate intervals occur in massive quartzose sands in both the upper and lower portions of the formation. Thin intervals of black siliceous shales with some pinkish siderite laminae are sometimes present. Occasional debris flows containing clasts of shale, sandstone, and siderite occur and are 5 to 15 feet thick. Some slurred silty sandstones contain fossil plant remains. Sedimentary features and trace fossils indicative of deep marine turbidite deposition occur throughout the unit. In the Athens Plateau, the Jackfork Sandstone has a total thickness of about 7,000 to 7,500 feet. In the quadrangle about 800 feet of the uppermost Jackfork Sandstone and thick conformable sequences of younger Pennsylvanian strata are absent due to overlap by Lower Cretaceous strata. The formation is conformable with the underlying Stanley Shale. A major unconformity exists in some locations where the Pike Gravel Member of the Trinity Group (Lower Cretaceous) overlies the formation.
- Ms Stanley Shale (Mississippian)** - The Stanley Shale is predominantly composed 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 and siliceous shale layers are present throughout the formation. Weathering of the shale often imparts an olive-gray clayey 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 6,500 feet of the upper part of the formation is present in the quadrangle. The thickness of the Stanley Shale in the southern Athens Plateau is 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 antimony and copper mineralization within some of the milky quartz veins. The Stanley is conformable with the underlying Arkansas Novaculite in the Cossatot Mountains north of the mapped area, and the overlying Jackfork Sandstone. Locally, a major unconformity exists between the Stanley Shale and the Pike Gravel Member of the Trinity Group (Lower Cretaceous).

Symbols

- Contact
- Thrust fault
- Thrust fault - Inferred or concealed
- | Strike and dip
- ✕ Mine or Quarry, abandoned
- ✕ Pit, abandoned
- ✕ Pit, active

Mineral Commodities

- Pb Lead
- SG Sand & Gravel
- Sh Shale
- Zn Zinc

References

- Bush, W. V., and Clardy, B. F., 1971, Geologic Map of the Chapel Hill Quadrangle, Sevier County, Arkansas: Arkansas Geological Commission Open-File Report, scale 1:24,000.
- Dane, C. H., 1929, Upper Cretaceous Formations of Southwestern Arkansas: Arkansas Geological Survey Bulletin 1,215 p.
- Haley, B.R., and Stone, C.G., 1994, Geology of the Chapel Hill Quadrangle, Sevier County, Arkansas: Arkansas Geological Commission Open-File Report, scale 1:24,000.
- Miser, H. D., and Purdue, A. H., 1929, Geology of the DeQueen and Caddo Gap Quadrangles, Arkansas: United States Geological Survey Bulletin 808, 195 p.

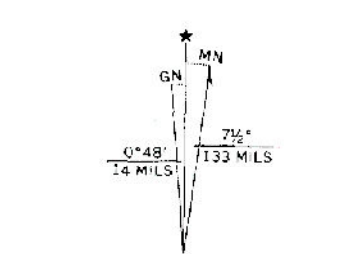
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Maped, edited, and published by the Geological Survey
Control by USGS and USO&GS
Topography by photogrammetric methods from aerial
photographs taken 1964 - Field checked 1965
Polyconic projection, 1927 North American datum
10,000-foot grids based on Arkansas coordinate system, south zone
and Oklahoma coordinate system, south zone
1000-meter Universal Transverse Mercator grid ticks,
zone 15, shown in blue
Blue hatching indicates area to be submerged by De Queen Reservoir
Area covered by dashed light-blue pattern
is subject to controlled inundation
Fine red dashed lines indicate railroad fence and field lines where
generally visible on aerial photographs. This information is unchecked



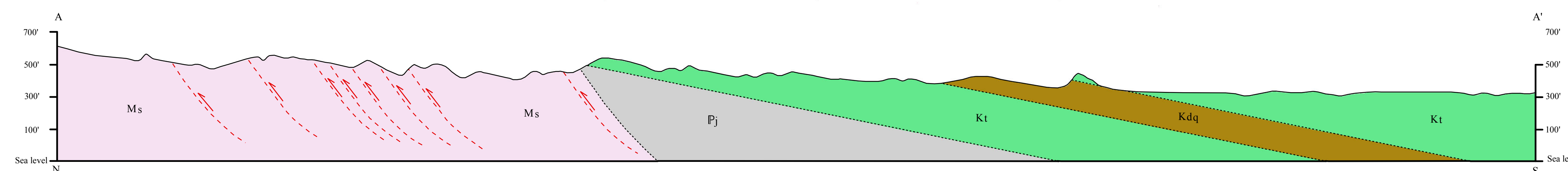
SCALE 1:24,000
1" = 2 MILES

CONTOUR INTERVAL 20 FEET
DOTTED LINES REPRESENT 10-FOOT CONTOURS
NATIONAL GEOGRAPHIC VERTICAL DATUM OF 1985

THIS MAP COMPLETES WITH NATIONAL MAP ACCURACY STANDARDS
FOR SALE BY U.S. GEOLOGICAL SURVEY, DENVER, COLORADO 80225, OR RESTON, VIRGINIA 20192
AND ARKANSAS GEOLOGICAL COMMISSION 1111E ROCK, ARKANSAS 72204
A FOLDER DESCRIBING TOPOGRAPHIC MAPS AND SYMBOLS IS AVAILABLE ON REQUEST

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CHAPEL HILL, ARK.-OKLA.
N3400-W9422.5-7.5
1965
AMS 7152 III SW-SERIES Y864



GEOLOGIC CROSS SECTION A-A'
(Quaternary deposits not shown)
Horizontal scale 1:24,000
Vertical scale X5