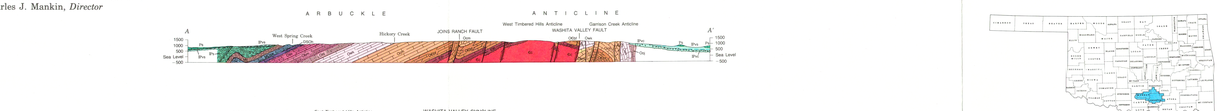
OKLAHOMA GEOLOGICAL SURVEY
Charles J. Mankin, *Director*

MAP GM 31
Geology of the Arbuckle Mountains

Geologic Map and Sections of the Arbuckle Mountains, Oklahoma

by
William E. Ham and Myron E. McKinley and others, 1954
Revised by Kenneth S. Johnson, 1990



EXPLANATION

Qal — ALLUVIUM
(Sand, silt, clay, and gravel along rivers; includes small areas of terrace deposits)

Ka — ANTLERS FORMATION
(Principally sands and sandy clays, called Paluxy Formation of Trinity Group on previous map; contains Basin Limestone Member at base in Ravia area)

Pc — STRATIFORD FORMATION
(Red shale and sandstone containing Hart Limestone Member at base in Sulphur area. Grades into limestone conglomerate and arkose towards mountains in area west of Sulphur)

Pc, IPw, IPw, Ac — VANOSS GROUP
(Consists of upper shale facies, IPw, that locally contains arkose, and lower limestone conglomerate facies, IPw; arkose, as much as 1,000 ft thick, is present in this map unit are partly equivalent to the Stratford Formation. In Sulphur area, lower Vanoss map unit may include strata equivalent to the Ada Formation)

UNITS GENERALLY PRESENT IN NORTH AND EAST

Ac — ADA FORMATION
(Shale, sandstone, and limestone conglomerate. In northern areas only)

IPdn — DESMOINESIAN SERIES
(In northern area only. Includes Hartshorne, McAlester, Savanna, Boggy, Wewoka, and Holdenville Formations, undifferentiated except Hartshorne are locally conglomeratic and collectively have been called 'Franks conglomerate' in the Franks graben)

IPat — ATOKA FORMATION
(Sandstone and dark-colored, siderite-bearing shale. Mapped separately only in east)

IPm — MAYAMUCKA FORMATION
(Limestone, dark-colored shale, and interbedded sandstone; chiefly siliceous. Mapped separately only in north and east. Includes 'Wapanucka shale' at base in Lawrence uplift)

IPs — SPRINGER FORMATION
(Dark-colored fissile shale, sandstone, and siderite in thin beds and concretions. Includes Union Valley sandstone at base. Includes Union Valley sandstone and equivalents in northern and eastern areas)

UNITS PRESENT IN MILL CREEK SYNCLINE AND SOUTHWEST

IPcl — COLLINGS RANCH CONGLOMERATE
(Limestone-boulder conglomerate in thick beds. Only present 5 miles south of Davis, in the west)

IPdf — DEESE GROUP
(In Mill Creek syncline and north part of Arbuckle anticline. Gray and red shale, limestone conglomerate, sandstone, and fossiliferous limestone)

IPdh IPsw — DORNICK HILLS GROUP and ATOKA FORMATION, undifferentiated (Dornick Hills, IPdh, to Ardmore basin in the south, is dark-colored shales and thin limestones. Atoka and Wapanucka Formations, mapped together, IPsw, in Mill Creek syncline, are thick limestones at base, overlain by shale and sandstone)

Mc — CANEY SHALE
(Dark-colored fissile shale containing septarian concretions)

MDsw — SYCAMORE LIMESTONE (Miss.), WELDEN LIMESTONE (Miss.), and WOODFORD SHALE (Miss. and Dev.)
(Woodford Shale, dark-colored fissile siliceous shale, and bedded chert. Sycamore Limestone is absent and Welden Limestone is present in east)

SDHu — HUNTON GROUP
(Consists of limestones and marblestones of the Frisco, Bois d'Arc, and Haragan Formations (Dev.); Henryhouse, Chimneyhill, and Cochrane Formations (Sil.); and Keel Formation (Ord.). Absent in pre-Woodford erosion in T. 3 S., R. 4 E.)

Ose — SYLVAN SHALE (Upper Ord.) and VIOLA GROUP (Middle and Upper Ord.)
(Sylvan is green fissile shale. Viola Group comprises limestones of the Welling Formation (above) and Viola Springs Formation (below). Welling (previously Fernvale Limestone) is coarse-grained and fossiliferous; Viola Springs is cherty, fine- to medium-grained)

Obm — BROMIDE, TULIP CREEK, and McLISH FORMATIONS
(Alternating sandstone, green shale, and limestone. Tulip Creek not recognized in east)

Obj — OIL CREEK FORMATION
(Basal pure sandstone overlain by limestone and shale)

JOINS FORMATION
(Thin-bedded limestones absent by erosion eastward)

Owk Ow Ok — WEST SPRING CREEK and KINDBLADE FORMATIONS
(Principally limestones in west and dolomites in east, contains thin sandstones which generally are more numerous and thicker eastward. Differentiated into Ow and Ok in Hunton anticline only)

Ocm — COOL CREEK and McKENZIE HILL FORMATIONS
(Cherty and sandy limestone in west, grading into dolomite and thin sandstones eastward)

OrSM — BUTTERLY DOLOMITE (Ord.), SIGNAL MOUNTAIN FORMATION (Ord. and Cam.), ROYER DOLOMITE (Camb.), and FORT SILL LIMESTONE (Camb.)
(Dolomites are facies equivalents of limestones; Signal Mountain limestone disappears through dolomitization in central and eastern areas)

Crh — TIMBERED HILLS GROUP
(Reagan Sandstone at base overlain by Honey Creek Formation, which is limestone in west and dolomite or sandy dolomite in east)

Rc — COLBERT RHYOLITE
(Pink porphyritic rhyolite, locally flow-banded; equivalent to Carlton Rhyolite in Wichita Mountains)

pCu pCGr pCm pCgr pCqd — TISHOMINGO GRANITE, TROY GRANITE, GRANODIORITE, and GRANITIC GNEISS
(Tishomingo, pCu, is medium- to coarse-grained pink granite containing large feldspar phenocrysts; it intrudes all other rocks in the area. Troy granite is a fine-grained pink granite that intrudes granodiorite. Unnamed granodiorite, pCgr, is medium-grained gray hornblende-biotite granodiorite to tonalite. Unnamed granitic gneiss, pCqd, is medium- to fine-grained granitic rock with pervasive metamorphic textures. Camptonite and Precambrian dikes (not mapped) cut all granitic rocks and locally are numerous)

Contact; dashed where inferred, dotted where concealed

Fault; dashed where inferred, dotted where concealed
D, Downthrown side; U, Upthrown side

Fault; arrows show relative movement (on map and cross sections)

Thrust fault; sawtooth on upper plate

Relative movement on strike-slip fault shown in cross sections. A, away from observer; T, toward observer

Strike and dip of beds

Horizontal beds

Vertical beds

Overturned beds

Areas of brecciated rock showing chaotic structure

Mine, pit, or quarry

1 McKee Products quarry (rhyolite)
2 Material Producers quarry (limestone)
3 Dolese Brothers, Davis quarry (limestone)
4 Sooner Rock and Sand quarry (limestone)
5 Dwight Payne pit (sand)
6 Primrose Construction pit (sand)
7 Dolese Brothers, Reynold quarry, inactive (limestone)
8 Dolese Brothers, Davis
9 Dougherty district, inactive (asphalt)
10 Dolese Brothers, Big Canyon quarry (limestone)
11 Sulphur district, inactive (asphalt)
12 Buckhorn pit, inactive (asphalt)
13 Oklahoma Glass Sand pits, inactive (silica sand)
14 Mill Creek Mining pit (iron ore)
15 Mill Creek Mining pit (sand)
16 U.S. Silica pits (silica sand)
17 Century Granite quarry, inactive
18 Meridian Aggregates quarry (granite)
19 Boadle I. Anderson quarry (granite)
20 Dolese Brothers quarry (dolomite)
21 Schmidt Quarry, Fort Johnson
22 Capitol quarry at Ten Acre Rock, inactive (granite)
23 Rose pit (gravel)
24 Unimin pits (silica sand)
25 West Basic Industries, Lawrence quarry (cement, limestone, shale)
26 Cement pit (shale)
27 Canary pit (shale)
28 Jennings Stone quarry (limestone)
29 Daraco quarry (limestone)
30 Cook Stone quarry (limestone)
31 quarry, inactive (limestone)
32 Bir Cole quarry (limestone)
33 Dolese Brothers, Ardmore (limestone)
34 Dolese Brothers, Bromide quarry (limestone)
35 Woods pits (shale)
36 Lattimore Materials quarry (limestone)
37 Dolese Brothers, Coleman quarry (limestone)

Cartography by Masoud Safavi
Cartography Manager, T. Wayne Furr

SCALE 1:100 000
2 1 0 2 4 6 MILES
2 1 0 2 4 6 KILOMETERS

This map is redrafted, at reduced scale and with minor revisions, from an earlier published map (W. E. Ham, M. E. McKinley, and others, 1954, Geologic map and sections of the Arbuckle Mountains, Oklahoma: Oklahoma Geological Survey, scale 1:72,000). Stratigraphic nomenclature has been updated from the earlier map and is largely consistent with terminology adopted in the COSUNA project (C. J. Mankin, coordinator, 1987, Correlation of stratigraphic units of North America—Texas-Oklahoma tectonic region correlation chart: American Association of Petroleum Geologists). Data for the present map are from sources through 1987. Map reduction, adjustments, revisions, stratigraphic nomenclature, and new mine, pit, and quarry data have been done by K. S. Johnson. F. K. Sutherland provided information on Late Mississippian through Middle Pennsylvanian nomenclature; R. E. Denison provided mapping and subdivision of Precambrian units; R. O. Fay provided information on Virgilian nomenclature and on thrusting along major faults.

On the earlier map, virtually all faults were shown as vertical faults in the cross sections, because there were no subsurface borehole data to verify the dip of the fault plane. Subsequent work in the Arbuckle Mountains, especially by Denison in the Tishomingo anticline, shows that some faults are thrusts (Denison, 1982, Geologic cross section from the Arbuckle Mountains to the Muenster arch southern Oklahoma and Texas: Geological Society of American Map and Chart Series MC-28B, W. O. Brown, 1984, Washita Valley fault system—a new look at an old fault, in Mid-Continent tectonics: Oklahoma City Geological Society, and Mid-Continent regional meeting: Oklahoma City Geological Society, p. 68–80; these faults are now shown as thrusts on this map and cross sections, but other faults are left as shown on the original map.

Base from U.S. Geological Survey 30- × 60-minute quadrangle map series; Ada, 1975; Ardmore, 1986; Pauls Valley, 1986; and Tishomingo, 1985.

1 Myron E. McKinley
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3 Robert J. Dunham, M.S. thesis, University of Oklahoma, 1951
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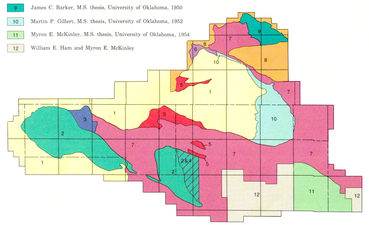
5 Charles E. Decker and William E. Ham, Okla. Geol. Survey Bull. 65, 1945
6 William E. Ham, Okla. Geol. Survey Bull. 60, 1945
7 William E. Ham
8 George D. Morgan, Bur. Geol. Bull. 2, 1924
9 James C. Barker, M.S. thesis, University of Oklahoma, 1950
10 Martin P. Gillert, M.S. thesis, University of Oklahoma, 1952
11 Myron E. McKinley, M.S. thesis, University of Oklahoma, 1954
12 William E. Ham and Myron E. McKinley



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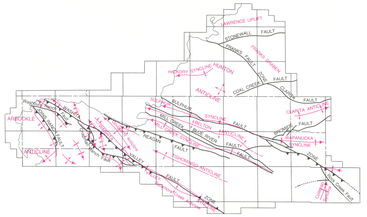

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SHOWING PRINCIPAL STRUCTURAL FEATURES