

tacey C. Evans and Thomas M. Stanley, 2017-2018. I

map from USGS topographic map of the Shawn

quadrangle, dated 1985. Universal Transverse Mercator projection, 1927 North American Datum, Research

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of the U.S. Government. Cartography prepared G. Russell

SCALE 1:100 000 1 0 1 2 3 4 5 6 7 8 MILES 10 KILOMETERS CONTOUR INTERVAL 10 METERS

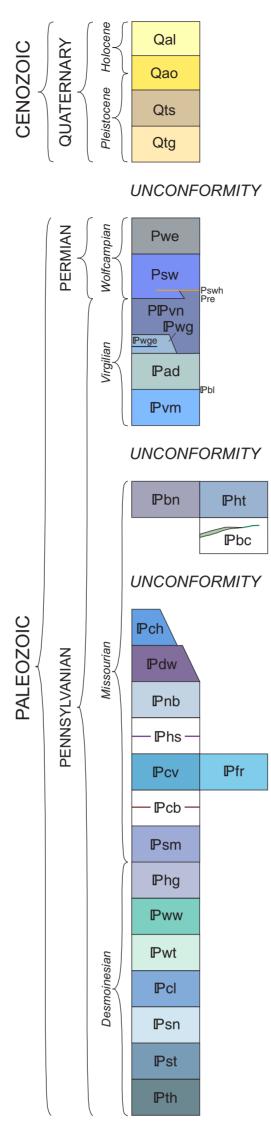
# GEOLOGIC MAP OF THE SHAWNEE 30X60-MINUTE QUADRANGLE,

HUGHES, LINCOLN, OKFUSKEE, OKMULGEE, PITTSBURG, POTTAWATOMIE, AND SEMINOLE COUNTIES, OKLAHOMA

Stacey C. Evans and Thomas M. Stanley

	Unit contact; dashed were approximate
<b>•</b>	Normal fault; dotted where concealed; bar and ball on downthrown side
	Facies contact; approximately located
×	Outcrop; geologic observation

## **CORRELATION OF UNITS**



#### DESCRIPTION OF UNITS

ALLUVIUM—Clay, silt, sand, and some gravel composed of locally derived, unconsolidated sediment deposited in channels and on flood plains of modern rivers and streams.

OLDER ALLUVIUM—Clay, silt, sand, and some gravel composed of locally derived, unconsolidated sediment located between 1.5 to 6 meters above, and adjacent to, modern flood plains and alluvial valleys.

TERRACE SAND—Mostly unconsolidated sand and silt, with little clay- or gravel-sized material. Unit formed at several levels along former courses of present-day rivers and streams.

TERRACE GRAVEL—Mostly unconsolidated gravel and sand, with minor silt- and clay-sized material; deposited well above, and at several levels along the former courses of modern rivers and streams.

WELLINGTON FORMATION—Reddish-brown weathering, thin- to sometimes medium-bedded, argillaceous, fine-grained quartz arenites, with local interbeds of brown to red mudstones. Only the basal 10-20 meters are locally exposed along the western margin of the map area.

TILLWATER FORMATION—A series of red to gray mudstones and claystones interbedded with ne-grained, lenticular quartz arenites, and very thin discontinuous beds of fine-crystalline mestones and nodular dolostones. Carbonates tend to be more common toward base of

The Stillwater Formation, as named and defined with type section by Patterson (1933), takes stratigraphic preference over nearly the same lithologic interval named as the Oscar Group by Shelton and others (1985). As per Patterson (1933), the top of the Stillwater Formation is defined as the base of the Fallis Member of the Wellington Formation. Originally, the base of the Stillwater was defined at the top of the Pennsylvanian (Gould, 1926; Patterson, 1933), which, over the years, has varied considerably. Currently, the top of the Pennsylvanian in the

Midcontinent is placed at the top of the Glenrock Limestone of the Red Eagle Formation (Pre) (Nestell and Netell, 1998). Due to the absence of the Glenrock Limestone in Oklahoma, the base of Red Eagle Formation proper constitutes the top of the Pennsylvanian in the state; consequently, the base of the Red Eagle represents the base of the Stillwater Formation in the

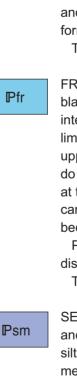
northern part of the map area. In the southern part of the map area, along State Highway 9 just east of Earlsboro, the Red Eagle Formation pinches out, at which point the base of the Stillwater Formation corresponds to the base of the Hart Limestone. The Hart Limestone (Pswh) roughly correlates to the Neva Limestone of northern Oklahoma and southern Kansas (Fay, 1997). Total thickness varies from 150 to 175 meters.

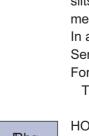
ANOSS FORMATION—Mostly multicolored mudstones and mudshales, interbedded with lenticular, fine-grained, argillaceous quartz arenites. Minor red to reddish-brown claystones occur n the middle of the unit. In the southern two-thirds of the sheet, sandstones in the lower half of the formation become very arkosic. Limestone-clast conglomerates are common and show a similar distribution as the arkoses; both lithologies, arkoses and conglomerates, become more prevalent continuing to the south. The top of the formation is placed at the base of the Red Eagle Formation. The base of the Vanoss changes due to discontinuous limestones. In the northernmost part of the map, from just south of the north line of township 10 north, and extending to the northern quad border, the base of the Vanoss Formation is placed at the top of the Grayhorse Limestone of the Wabaunsee Group. When the Grayhorse pinches out, just south of the north line of township 10 north, the base of the Vanoss is represented by the base of the Reading Limestone. Total thickness of the Vanoss Formation 150 meters.

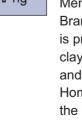
WABAUNSEE GROUP—Overall, the general lithologic character of the group consists of limestones, interbedded with calcareous, argillaceous, and arenaceous shales. The group is only found in the northern-most part of the sheet, where it is composed of elements of the Wood Siding Formation (Grayhorse Limestone at top), Root and Willard Shales, and the Emporia Formation (consisting of the upper Elmont Limestone (Pwge), middle Havenville Shale, and basal Reading Limestone) at base. All carbonate units and beds consist of light gray, carbonate mudstone to fine-crystalline limestone textures. Most likely, shales of the Wabaunsee interfinger with shale elements of the Vanoss Formation as the various carbonates of the Wabaunsee pinch out to the south.

Total thickness of the Wabaunsee Group varies between 0 and 40 meters.

ADA FORMATION—Interbedded, brown to gray weathering shales and lenticular, fine-grained uartz arenites with local cross-bedding. Chert-pebble conglomerates at the base of some andstone beds common throughout map area. The Beil Limestone (Pbl) defines the base of the Ada formation, and is a prominent, 2.2 to 4 meters thick, thin-bedded carbonate mudstone. Total thickness of the Ada Formation varies between 12 to 60 meters.









VAMOOSA FORMATION—Consists of locally calcareous, gray-green, blue-green, and maroon weathering shale, with yellowish brown siltstones, fine- to coarse-grained sandstones, and local, thin limestones. Chert-pebble conglomerates common in the lower half of formation; the prominent (10 meter thick) Boley Conglomerate occurs at the base of the formation throughout the map area. Total thickness varies between 45 and 60 meters; thinning to the south.

BARNSDALL FORMATION—In the far northern part of quad, the unit is comprised of an upper reddish-brown to blue-gray weathering mudstone and a basal light brown to red weathering, thinbedded, moderately indurated, argillaceous, fine-grained quartz arenite, called the Okesa Member. The Okesa pinches out at some point just south of the North Canadian River, while the upper shales of the Barnsdall interfinger to the south with shale elements of the Hilltop Formation (see Figure 1 below). Total thickness of formation varies between 0 to 25 meters.

CHANUTE FORMATION—Poorly exposed. Appears to be a gravish-orange to pale yellowishbrown weathering, very silty claystone; shale tends to be more sandy toward base of unit, becoming more of a mudstone rather than claystone. Locally, a thin-bedded, fine- to very finegrained quartz arenite may occur at the top and base of formation, but were unobserved in this quad. The unit pinches out at, or just south, of the North Canadian River, Thickness varies from 0 to 8 meters.

EWEY FORMATION—Composed of an upper grayish-brown to reddish-brown weathering, calcareous clayshale, and a lower, reddish-brown to yellowish-brown weathering, indurated to moderately indurated, calcareous, fine-grained quartz arenite. Unit most likely removed by pre-Barnsdall erosion south of the North Canadian River. Thickness of the Dewey from 0 to 20 meters.

HILLTOP FORMATION—Black to dark gray, well-laminated, slightly silty clayshales. Upper third of formation shows an increase in coarse clastic material where clayshale lithology becomes interbedded with siltstone and very fine-grained sandstone intervals.

Where the underlying Belle City Limestone pinches out, the Hilltop interfingers with shales of the upper part of the Barnsdall Formation (see Figure 1 below). It may be that the Hilltop should be abandoned altogether in favor of Barnsdall nomenclature given that the Barnsdall takes stratigraphic preference and is lithologically similar to the Hilltop Formation. However, more work is needed to solve this stratigraphic problem. The total thickness of the Hilltop Formation varies from 0 to ~25 meters.

BELLE CITY LIMESTONE—In the southern part of the map area, the Belle City Limestone is represented by an upper thick (1 to 3 meters thick), planar, thin-bedded limestone and a basal thin (< 0.5 meters thick) limestone, separated by a dark gray, calcareous clayshale interval averaging about 4.5 meters thick. The limestones are hard and textually skeletal wackestones to

fossiliferous carbonate mudstones. To the north, the Belle City thins to about 0.5 meters thick, on average, and rapidly grades into a bluish–gray, fine-crystalline limestone before eventually pinching out approximately 4 km southwest of Cromwell, Oklahoma.

Total thickness varies from 0 to a maximum of 10 meters.

NELLIE BLY FORMATION—Consists mostly of clayshale and mudstone interbedded with some Pnb prominent sandstones, none of which can be easily separated into mappable units due to their indefinite upper and lower contacts. Sandstones typically indurated to moderately indurated, thinto medium-bedded, fine-grained quartz arenites that vary in thickness between 6 and 25 meters. Thickness of shale intervals at least half to a quarter of that observed for the sandstone intervals. Base of formation normally mapped at the top of the underlying Hogshooter Limestone, except south of the Hogshooter pinch-out (occurring about 3 km north of Okemah), where it is mapped at the base of the first prominent sandstone interval. Total thickness of formation ~60 meters.

HOGSHOOTER FORMATION—Unit a distinct light reddish-gray weathering color that consists of Phs a single 0.5 to 1.5 meter thick carbonate mudstone along northern boundary of sheet. Locally, the carbonate mudstone grades into a very sandy carbonate mudstone to limey sandstone in the south. Unit pinches out about 3 km north of Okemah, Oklahoma. Thickness of formation 0 to 1.5 meters.

> COFFEYVILLE FORMATION—Gray to light brown weathering, well-laminated to fissile, slightly silty clayshale, interbedded with thinner intervals of brown to yellow-brown weathering, indurated, fine- to very fine-grained, slightly silty quartz arenites; however, sandstones become thinner, more friable, and less distinct to the south as the overall formation may grade and interfinger with the more shale-rich Francis Formation. Shale intervals are said to be locally fossiliferous (Ries, 1954; Tanner, 1956), although none were observed by present geologists.

> Lithologically and stratigraphically, the Coffeyville Formation is nearly identical to the Francis Formation of Morgan (1924), both being predominantly fossiliferous shales (though the Francis tends to contain a higher shale content lithologically and a greater abundance of fossils) positioned between the prominent formations of the Seminole Formation below and the Nellie Bly above. Given that the name Coffeyville takes nomenclature preference over the Francis, it may be best to invalidate the Francis Formation altogether. However, more work needs to be done to adequately resolve the stratigraphic validity of either formation. As such, and for the purposes of this map, south of the Checkerboard Limestone pinch-out (about 1 km north of Okemah), the Coffeyville stratigraphic interval is labeled Francis Formation. Total thickness of unit 50 meters.

CHECKERBOARD LIMESTONE—Medium gray when fresh, but weathers to a distinct dark Pcb yellowish-orange color. Texturally, it is a massive carbonate mudstone along the northern border of the sheet, but quickly breaks up into a series of thin (0.5 to 2 cm thick) carbonate mudstone and fine-crystalline limestone flags interbedded with thin intervals of calcareous clayshale. The formation pinches out at a location about 1 km north of Okemah, Oklahoma. Thickness 0 to 1.5 meters.

FRANCIS FORMATION—Unit similar to the Coffeyville Formation, and consists predominantly of black to dark gray, very fossiliferous, medium- to coarse-grained, slightly silty clayshales interbedded with light brown, moderately indurated, quartz arenites and local occurrences of limestone- and chert-clast conglomerates. Sandstones tend to be more common in the middle to upper third of the formation. Limestone may occur locally in the upper part of formation, but they do not appear to extend laterally. A more prominent limestone, the DeNay Limestone bed, occurs at the base of the formation. Texturally, it is a distinct yellowish orange weathering, fossiliferous carbonate mudstone containing abundant crinoid stems. As far as can be determined, the DeNay bed disappears north of the middle of township 7 north.

Pending more work, the Francis may be invalidated in favor of Coffeyville terminology (see discussion under the Coffeyville Formation, above). Thickness of unit ~50 meters.

SEMINOLE FORMATION—Consists of a lower sandstone interval, called the Tulsa Sandstone, and an upper suite of interbedded, laminated, concretionary, silty clayshales, mudshales, and siltstones. The Tulsa Sandstone is an approximately 20 meters thick, yellowish-brown, fine- to medium-grained (locally coarse-grained) quartz arenite that is frequently conglomeratic in texture. In areas where either the Checkerboard or DeNay Limestones are absent, the top of the Seminole is mapped at the base of the first prominent sandstone found at the base of the Francis Formation.

Thickness of the Seminole Formation ~27 meters.

HOLDENVILLE GROUP—May contain some lithostratigraphic elements of the Lost Branch and Phg Memorial Formations of the Tulsa Metro Area, most notable the Nuyaka Creek Shale of the Lost Branch, and the Dawson coal of the Memorial Formation. In the Shawnee sheet, the Holdenville is primarily a grayish-green to yellow-brown weathering, locally fossiliferous, slightly silty claystone to clayshale, interbedded with thin intervals of fine- to very fine-grained quartz arenite and thin beds of whole fossil carbonate mudstone. Two prominent limestones, the Sasakwa and Homer Limestone beds, have been reported ~10 meters below the top, and ~30 meters above the base of the formation, respectively (Tanner, 1956). Thickness about 55 meters.

WEWOKA FORMATION—Consists of alternating intervals of shale and sandstone, though shale is by far the more dominant lithology.

Sandstones tend to be weakly indurated, yellowish-brown to reddish-brown weathering, finegrained, argillaceous quartz arenites. A prominent sandstone interval forming distinct cuestas and escarpments (compared to the flat featureless planes formed on the Holdenville) occurs at the top of the formation, and is correlatable to the Jenks Sandstone of the Tulsa Metro Area. Shales are poorly exposed, but where observed are slightly calcareous clayshales and mudshales that are, locally fossiliferous. Total thickness ~175 meters.

WETUMKA SHALE—Poorly exposed in quad, mainly a gravish-yellow to yellow-brown Pwt weathering, slightly silty, fossiliferous clayshale; very thin beds of friable, argillaceous quartz arenite occur locally in the middle and base of unit. Total thickness no more than 35 meters.

CALVIN SANDSTONE—Brownish-gray to medium gray, moderately indurated to indurated, thick-



SENORA FORMATION—Lower two-thirds of formation a light to moderate brown weathering Psn sandstone interbedded with thin shale intervals. Sandstones are typically thin to medium bedded, fine- to occasionally medium-grained, argillaceous, quartz arenites. Shales occur in thin (less than 20 cm thick) intervals within sandstones, and are consistently light gray to maroon mudstones.

laterally with the sandstones.

Upper third of formation predominantly a brownish-red to maroon mudstone with local interbeds of fine- to very fine-grained quartz arenite. Sandstones tend to be more common in the upper half of this interval. Total thickness of formation 105 meters.

o thin-bedded, argillaceous quartz arenites, interbedded with thin intervals (varying from 1 to 3

neters thick) of micaceous mudstone and very silty claystone. Sandstones at top of formation

tend to be thicker bedded and more indurated than those found lower in the formation. Shales tend to be more common in the lower half to two-thirds of the formation, where they intertongue

Total thickness varies between 65 and 70 meters; thinning slightly to the south.

STUART SHALE—Unit a reddish-brown to brown weathering, laminated, slightly silty clayshale, Pst with local, thin interbeds of argillaceous, fine-grained quartz arenite. Thickness ~20 meters.

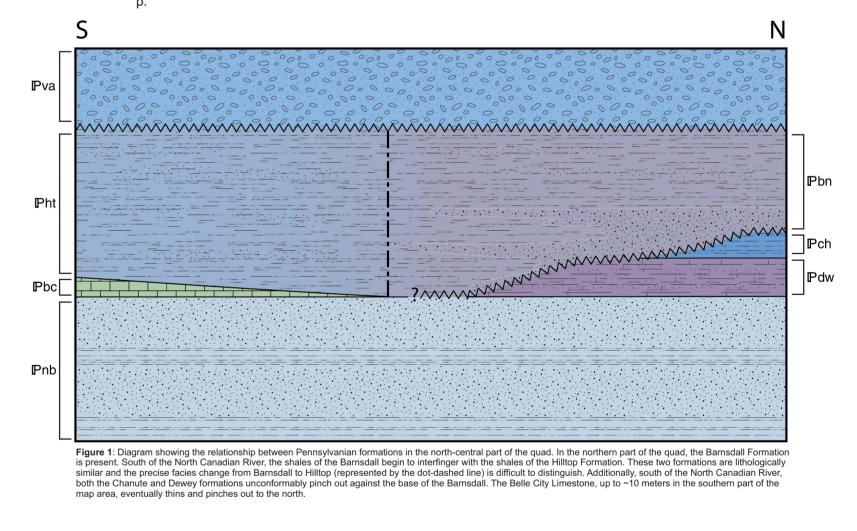
HURMAN SANDSTONE—Mostly a moderate brown, fine- to medium-grained, locally coarsegrained, slightly argillaceous quartz arenite. Sandstone thin to medium-bedded, cross-bedding and soft sediment deformation common in upper part of formation. Chert conglomerates are also common at base of most sandstone beds. Laminated shale interbeds, consisting of mudstone, occur but are not common.

Only the uppermost 10 meters is exposed in the southeast corner of the map area.

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