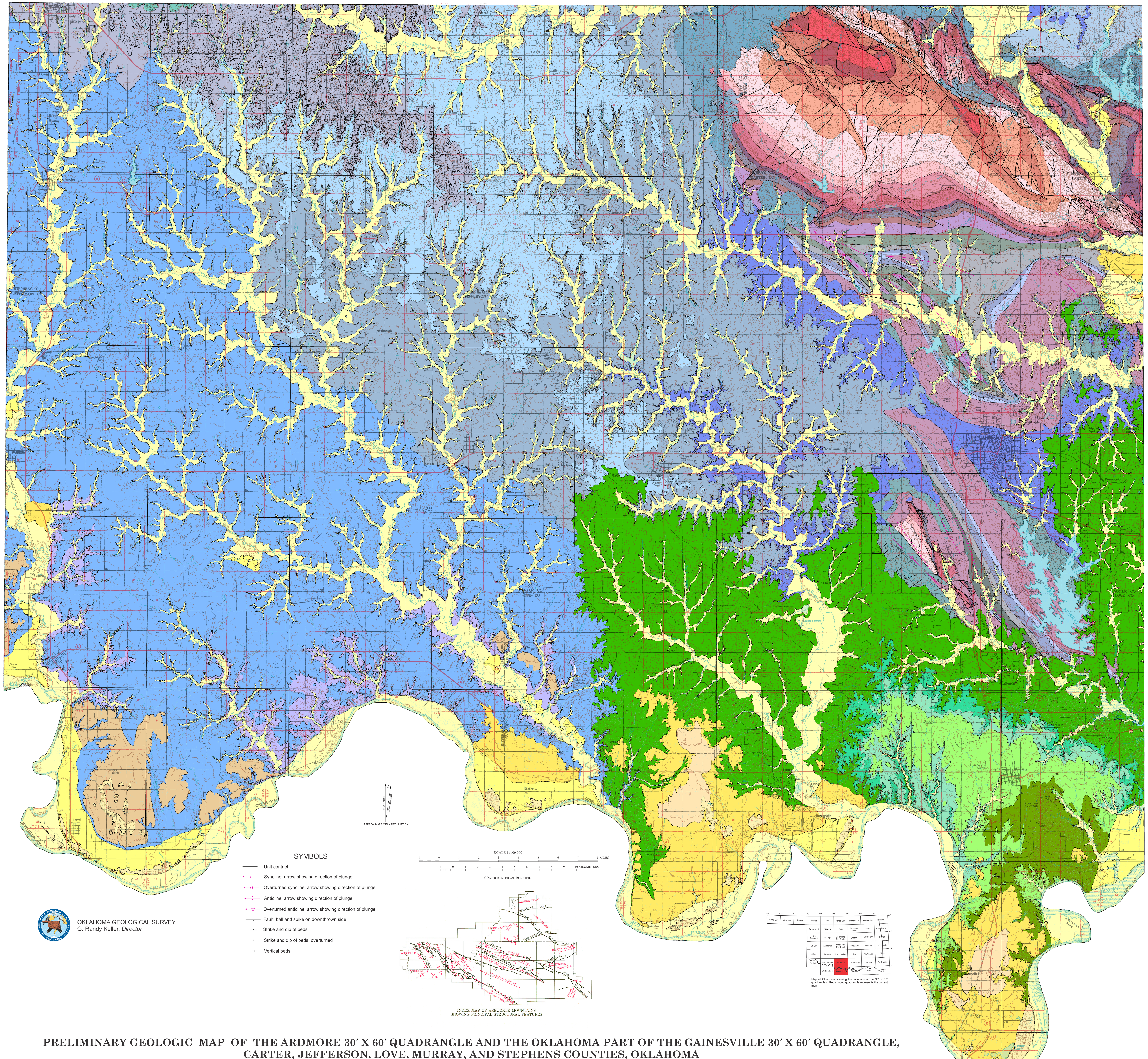


SYMBOLS

- Unit contact
- Syncline; arrow showing direction of plunge
- Overturned syncline; arrow showing direction of plunge
- Anticline; arrow showing direction of plunge
- Overturned anticline; arrow showing direction of plunge
- Fault; ball and spike on downthrown side
- Strike and dip of beds
- Strike and dip of beds, overturned
- Vertical beds

OKLAHOMA GEOLOGICAL SURVEY
G. Randy Keller, *Director*

INDEX MAP OF ARBUCKLE MOUNTAINS
SHOWING PRINCIPAL STRUCTURAL FEATURES

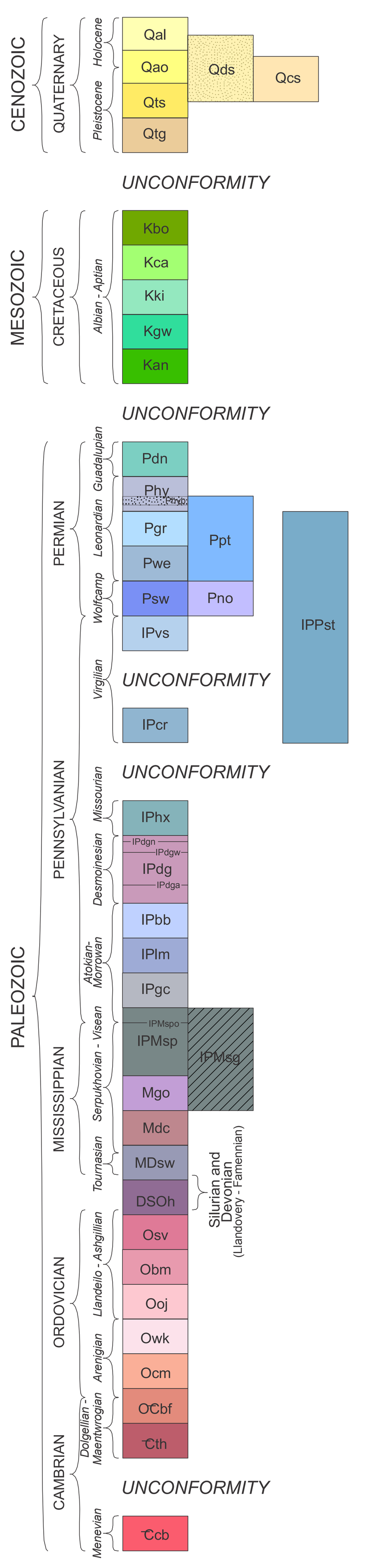
Map of Oklahoma showing the locations of the 30' X 60' quadrangles. Red shaded quadrangle represents the current map

PRELIMINARY GEOLOGIC MAP OF THE ARDMORE 30′ X 60′ QUADRANGLE AND THE OKLAHOMA PART OF THE GAINESVILLE 30′ X 60′ QUADRANGLE, CARTER, JEFFERSON, LOVE, MURRAY, AND STEPHENS COUNTIES, OKLAHOMA

Compiled by Thomas M. Stanley and Julie M. Chang

2012

CORRELATION OF UNITS



DESCRIPTION OF UNITS

Qal ALLUVIUM — Unconsolidated sand, silt, clay, and gravel in stream and river channels on modern flood plains.

Qao OLDER ALLUVIUM — Unconsolidated sand, silt, clay, and gravel in stream and river channels, mainly between 0–12 m above modern flood plains.

Qcs COVER SHEET SAND — Featureless sheet of windblown silt and sand.

Qds DUNE SAND — Unconsolidated windblown sand formed into definite dune structures and ridges.

Qts TERRACE SAND — Mostly unconsolidated sand, silt, and clay, with little to no gravel-sized material. Unit formed at several levels along former courses of present-day rivers and streams.

Qtg TERRACE GRAVEL — Unconsolidated gravel, sand, silt, and clay laid down at several levels along former courses of present-day rivers and streams.

Kbo BOKCHITO FORMATION — Mostly clay and clayshale, with some tan-colored limestones and fine-grained sandstones. Subdivided in descending order into the Pawpaw Clay at top, the Quarry Limestone, the Weno Clay and the Denton Clay at base. Only the lower 60 meters exposed in quad.

Kca CADDO FORMATION — Light gray, silty limestones and marls interbedded with blue-gray, silty clayshale or mudshale. Formally subdivided into the Fort Worth Limestone at top and the Duck Creek Limestone at base, with an unnamed shale between. Fossil Gryphaea common in limestones. Thickness about 46 meters.

Kki KIAMICHI FORMATION — Dark gray, calcareous clayshales and claystones, interbedded with local occurrences of nodular limestone and fine-grained, calcareous sandstone. Limestones are very fossiliferous. Thickness 9 to 10 meters.

Kgw GOODLAND LIMESTONE and WALNUT CLAY — Upper 10 meters composed of the Goodland Limestone, a medium to light gray, dense, nodular limestone with thin, dark gray clayshale partings. The Walnut Clay makes up the lower 1 meter of interval and consists of an olive brown, calcareous claystone; the Walnut Clay is poorly exposed. Thickness 6 to 9 meters

Kan ANTLERS SANDSTONE — White to light brownish yellow, medium-grained, poorly indurated sandstone. Red to maroon, arkosic conglomerates occur locally. Thickness ranges from 60 to 215 meters.

EL RENO GROUP (In part)

Pdn DUNCAN SANDSTONE — Consists predominantly of sandstone and some shale. Sandstone may be massive, thin-bedded, or cross-bedded; shale usually blocky bedded, and may be dark red, red, ochre, or maroon in color. Only the basal 2 to 5 meters of formation exposed in the quad.

Phy HENNESSY FORMATION — Overall, a reddish-brown, blocky to well laminated shale with local occurrences of red siltstones and very fine-grained sandstones. The Purcell Sandstone Member (Phyp) consists of tan to light brown colored, fine-grained sandstone and siltstone, with minor interbedded shale. Total thickness of the Hennessey Formation varies from 55-98 meters.

SUMNER GROUP

Pgr GARBER SANDSTONE — Consists predominantly of thin- to medium-bedded, reddish, fine-grained, trough-cross-bedded sandstone, with local occurrences of interbedded shale, and siltstone- and limestone-pebble conglomerate. Thickness about 40 meters.

Pwe WELLINGTON FORMATION — Consists of reddish-brown shale with interbedded very fine-grained sandstone and limestone-pebble conglomerate. Base of formation mapped at the base of the Fallis Sandstone, which is a fine-, to locally medium-grained, sandstone interval. Total thickness about 46 meters.

WICHITA GROUP

Ppt PETROLIA FORMATION — Interbedded reddish-brown, unstratified silty mudstones and lenticular, trough-cross-bedded, medium- to fine-grained sandstones; soft sediment deformation common; locally, conglomeratic beds consisting of siltstone and limestone clasts set within a medium- to coarse-grain matrix occur, particularly in the upper half of the formation. Mudstones with local occurrences of calcareous nodules and paleosol development. Base mapped at a prominent, light brown, trough-cross-bedded, fine-grained sandstone that occurs stratigraphically lower than the base of the Fallis Member of the Wellington Formation. To the north, unit grades into the Garber and Wellington Formations. Thickness varies between 70-100 meters.

Pno NOCONA FORMATION — Mostly a reddish-brown, locally gray, concretionary mudstone interbedded with thin intervals of tan to dark gray, laminated, fine- to medium-grained sandstones and siltstones. Only upper 20 meters of unit crops out in quad.

PONTOTOC GROUP

Psw STILLWATER FORMATION — Predominantly a reddish-brown concretionary mudstone with local interbeds of reddish-orange, friable, fine-grained, micaceous channel sandstones; dolomite- and siltstone-pebble conglomerates common at base of sandstone intervals. Base of formation mapped at the base of the Hart Limestone. Grades laterally into the Stratford Formation near the Arbuckle Mountains. Total thickness varies from 90-150 meters.

Pvs VANOSS FORMATION — Consists mainly of reddish-brown mudshale and mudstone, and recrystallized limestones; near the Arbuckle Mountains, intercalated with calcareous and non-calcareous, arkosic sandstones, and limestone-clast conglomerates set within arkosic sandstone matrix. Grades laterally into the Stratford Formation near the Arbuckle Mountains. Only the uppermost 5 to 7 meters exposed in quad.

IPPst STRATFORD FORMATION — The formation consists predominantly of indurated, well-rounded limestone-clast conglomerate, calcareous and non-calcareous arkose and arkosic conglomerate, along with local occurrences of limestone and shale. West of Sulphur, it forms an apron around the northwest and west sides of the Arbuckle Mountains. Genetically similar to the Post Oak Formation of the Wichita Mountains. Surficial thickness from 0 to as much as 40 meters; however, in subsurface, formation probably extends well into older Pennsylvanian and Permian rocks occurring at depths of 275 meters.

IPcr COLLINGS RANCH CONGLOMERATE — Isolated patches of red to reddish-brown, limestone-boulder conglomerate preserved in fault-bounded grabens within the Arbuckle highlands proper; genetically and compositionally similar to the limestone conglomerates of the Stratford Formation. Thickness varies from 0 to about 30 meters.

IPhx HOXBAR GROUP — Consists of thick intervals of gray to tan-colored, calcareous clayshale, interbedded with thin limestone and friable, fine- to medium-grained sandstone beds. Base of unit mapped at the base of the Confederate Limestone. Thickness about 850 meters.

IPdg DEESE GROUP — A thick sequence of interbedded reddish-brown to gray mudshales and mudstones, yellow to yellow-brown, fine- to coarse-grained sandstones, chert conglomerates, and thin, fossiliferous limestone beds. Limestones mapped as: IPdgn = Natsy Limestone bed; IPdgw = Williams Limestone bed; and IPdga = Arnold Limestone bed. Total thickness about 2300 meters.

DORNICK HILLS GROUP

IPbb BIG BRANCH FORMATION — Mostly yellowish-gray to tan clayshales and mudshales, interbedded with limestone and limestone conglomerate and yellowish-brown, fine- to medium-grained sandstones. Limestones and sandstones more common in upper half of formation. Top of unit mapped at the top of the Pumpkin Creek Limestone. Thickness about 365 meters.

IPlm LAKE MURRAY FORMATION — Interbedded yellow to tan mudstones and mudshales, limestone-clast conglomerate, and thin, dark gray, sandy, whole fossil carbonate mudstones and thin grainstones, and local, discontinuous, medium-grained sandstones. Sandstones tend to be more common in upper third of formation. Thickness about 530 meters.

IPgc GOLF COURSE FORMATION — Interbedded dark gray, concretionary mudshales, light gray limestones and limestone-clast conglomerates, and tan to buff, fine-grained sandstones. Top of unit mapped at the top of the Otterville Limestone, and base mapped at the base of the Primrose Sandstone. Thickness about 600 meters.

SPRINGER GROUP

IPMsp SPRINGER FORMATION — Medium to dark gray, fissile, slightly silty, locally calcareous clayshale interbedded with two to three fine- to medium-grained, argillaceous sandstones; the most prominent being the Overbrook Sandstone (IPMspo). Base of formation mapped at the base of the Rod Club Sandstone. Total thickness is 720 meters.

Mgo GODDARD FORMATION — Similar to the Springer Formation, but with fewer and less prominent sandstone intervals; overall, a medium to light gray, noncalcareous, fissile clayshale. Thickness about 680 meters.

IPMsg SPRINGER GROUP, undifferentiated — Mapped as a single unit around the Criner Hills area.

Mdc DELAWARE CREEK SHALE — Dark gray to black, fissile, calcareous clayshale containing large septarian concretions. Formally called the Caney Shale. Thickness ranges from 50 to 230 meters.

MDsw WOODFORD SHALE — Dark gray to black, fissile, siliceous clayshale and bedded chert. Includes the Sycamore Limestone, a blueish-gray to tan colored, silty carbonate mudstone, mapped at top of interval in the Criner Hills area. Thickness between 45 and 170 meters.

DSOh HUNTON GROUP — Consists of light gray, fossiliferous, carbonate mudstones to grainstones, yellow to buff colored carbonate marlstones, and thin intervals of dark gray, fissile clayshale. Comprised of the Frisco, Bois d'Arc, and Haragan Formations (Dev.); Henryhouse, Clarita, and Cochrane Formations (Sil.); and the Keel Formation (Ord.). Thickness about 90 meters.

Osv SYLVAN SHALE (U. Ord.) and VIOLA GROUP (U. and M. Ord.) — Sylvan Shale is a yellow to dark greenish gray, siliceous, fissile clayshale; minor interbeds of fine-grained sandstone and siltstone may occur in upper part of shale. The Viola Group composed of an upper fossiliferous limestone (wackestone to packstone in texture), called the Welling Limestone; and a lower, interbedded, cherty, unfossiliferous carbonate mudstone and fossiliferous wackestones to packstones, called the Viola Springs Formation. Total thickness of interval ranges from 125 to 375 meters.

SIMPSON GROUP

Obm BROMIDE, TULIP CREEK, and McLISH FORMATIONS — The Bromide is predominantly a tan to yellowish-gray, very fossiliferous, whole fossil, carbonate mudstone to packstone, with occasional gray clayshale and very fine-grained sandstone interbeds; clastic material more common in upper half of unit. The Tulip Creek consists of a lower, reddish-brown, weakly indurated, medium-grained sandstone; and an upper, olive-green, mudstone to claystone with thin interbeds of limestone. The McLish is similar to the Tulip Creek, with a lower light gray, friable, fine-grained sandstone and an upper greenish gray clayshale with limestone interbeds. Thickness of total interval ranges from 230 to 425 meters.

Ooj OIL CREEK and JOINS FORMATIONS — The Oil Creek consists of a lower white to very light gray, friable to weakly indurated, featureless, fine- to medium-grained sandstone; and an upper interbedded olive-green clayshale and thin-bedded, fossiliferous limestone. The Joins Formation consists of alternating light to medium gray, thin-bedded, fossiliferous limestones with thin intervals of greenish-gray to dark gray clayshale. Interval thickness varies from 180 to 335 meters.

ARBUCKLE GROUP

Owk WEST SPRING CREEK and KINDBLADE FORMATIONS — The West Spring Creek Formation is a medium gray carbonate mudstone and intraclastic limestone. Base of the formation locally contains an appreciable amount of quartz sand detritus. The Kindblade is a medium gray carbonate mudstone and intraclastic limestone, similar to the overlying West Spring Creek. However, the Kindblade is usually more locally dolomitized and contains less quartz detritus than overlying West Spring Creek. Base of the Kindblade is poorly bedded due to abundant algal boundstones. Interval thickness ranges between 570 to 915 meters.

Ocm COOL CREEK and McKENZIE HILL FORMATIONS — The Cool Creek Formation is a variable mixture of medium gray carbonate mudstones, intraclastic limestones, algal stromatolitic boundstones, oolitic limestones, and pure quartz sandstones; a prominent quartz sandstone called the Thatcher Creek Member occurs at the base of the unit. The McKenzie Hill is an interbedded medium gray carbonate mudstone and intraclastic limestone; chert beds and nodules are common in the upper half, with minor amounts of glauconite in lower half of formation. Basal contact with Signal Mountain Formation ambiguous at best. Total interval thickness varies between 450 and 700 meters.

OЄbf BUTTERLY DOLOMITE (Ord.), SIGNAL MOUNTAIN FORMATION (Ord. and Camb.), and FORT SILL LIMESTONE (Camb.) — Butterly Dolomite is a tan to pink colored, usually fine-crystalline dolostone; becomes coarsely crystalline to the eastern part of the quad. The Signal Hill is dark gray, distinctly thin-bedded at base, but becoming thicker bedded toward top; it is highly fossiliferous and composed of interbedded carbonate mudstones, wackestones, grainstones, and intraclastic limestones. Fort Sill Formation is a light gray, thick-bedded to massive carbonate mudstone; thin-bedded, dolomitic siltstones common in middle third of formation, while algal boundstones are common in upper third. A conspicuous coarsely crystalline dolomite interval (the Bally Dolomite) locally occurs near top of the Fort Sill. Total interval thickness from 175 to 490 meters.

Єth TIMBERED HILLS GROUP — In descending order, consists of the Honey Creek Formation, a medium gray, cross-bedded, skeletal grainstone; locally, a 12 meter thick interval of calcareous, quartz-rich sandstone occurs in middle of formation. The basal unit of the Timbered Hills is the Reagan Sandstone, a tan to brown, coarse-grained, cross-bedded, glauconitic sandstone. Group thickness varies from 45 to 213 meters.

Єcb COLBERT PORPHYRY — A reddish-brown, flow banded, rhyolite porphyry; dated at 525 m.y. Thickness at least 2300 meters.

MAP REFERENCES

Ardmore Geological Society, 1966, Pennsylvanian of the Ardmore Basin, southern Oklahoma: Ardmore Geological Society Field Conference Guidebook, 50 p.

Bullard, F.M., 1925, Geology of Love County: Oklahoma Geological Survey Bulletin 33, 77 p.

Cromwell, D.W., 1974, The stratigraphy and environment of deposition of the lower Dornick Hills Group (lower Pennsylvanian), Ardmore Basin, Oklahoma: University of Oklahoma unpublished M.S. thesis, 138 p.

Dionisio, L.C., Jr., 1975, Structural analysis and mapping of the eastern Caddo Anticline, Ardmore Basin, Oklahoma: University of Oklahoma unpublished M.S. thesis, 83 p.

Duchin, R.C., Moran, S.S., Andrews, G.W., Lenox, W.E., Boyle, W.V. Boyle, McCormack, R.K., Duffy, G.E., Storm, P.V., Smith, R.R., Warfield, R.L. Warfield, Forster, R.W., Stearns, D.W., and Wendt, R.L., 1955, Geologic map of southern Ardmore basin, Carter County, Oklahoma: Shell Oil Company unpublished map.

Fay, R.O., Oklahoma Geological Survey, unpublished mapping

Frederickson, E.A., 1957, Geologic map of the Criner Hills area, Oklahoma: Oklahoma Geological Survey Map GM-4, scale about 1 inch to 1/3 mile.

Ghazal, R.L., 1975, Structural analysis and mapping of the western part of the Caddo Anticline, Carter County, Oklahoma: University of Oklahoma unpublished M.S. thesis, 61 p.

Hart, D.L., Jr., 1974, Reconnaissance of the water resources of the Ardmore and Sherman quadrangles, southern Oklahoma: Oklahoma Geological Survey Hydrologic Atlas, HA-3, scale 1:250,000, 4 sheets.

Johnson, K.S., 1990, Geologic map and sections of the Arbuckle Mountains, Oklahoma: Oklahoma Geological Survey Circular 91, plate 1, scale 1:100,000; revision of Ham, W.E., et al., 1954: Oklahoma Geological Survey Map GM-31, scale 1:100,000.

Maley, M.P., 1986, Depositional history of the upper Morrowan (Pennsylvanian) strata of the Ardmore Basin, Oklahoma: University of Oklahoma unpublished M.S. thesis, 206 p.

McGee, D.T., 1985, Lithostratigraphy and depositional history of the upper Dornick Hills Group (early Desmoinesian, Pennsylvanian) of the Ardmore Basin, Oklahoma: University of Oklahoma unpublished M.S. thesis, 348 p.

Miser, H.D., et al., 1954, Geologic map of Oklahoma: U.S. Geological Survey and Oklahoma Geological Survey, scale 1:500,000, 1 sheet.

Russom, V.W., 1943, Surface structure map, Overbrook Anticline, T4-6S, R1-3E, Carter & Love Counties, Oklahoma: Sinclair Prairie Oil Company unpublished map, scale 4 inches to 1 mile.