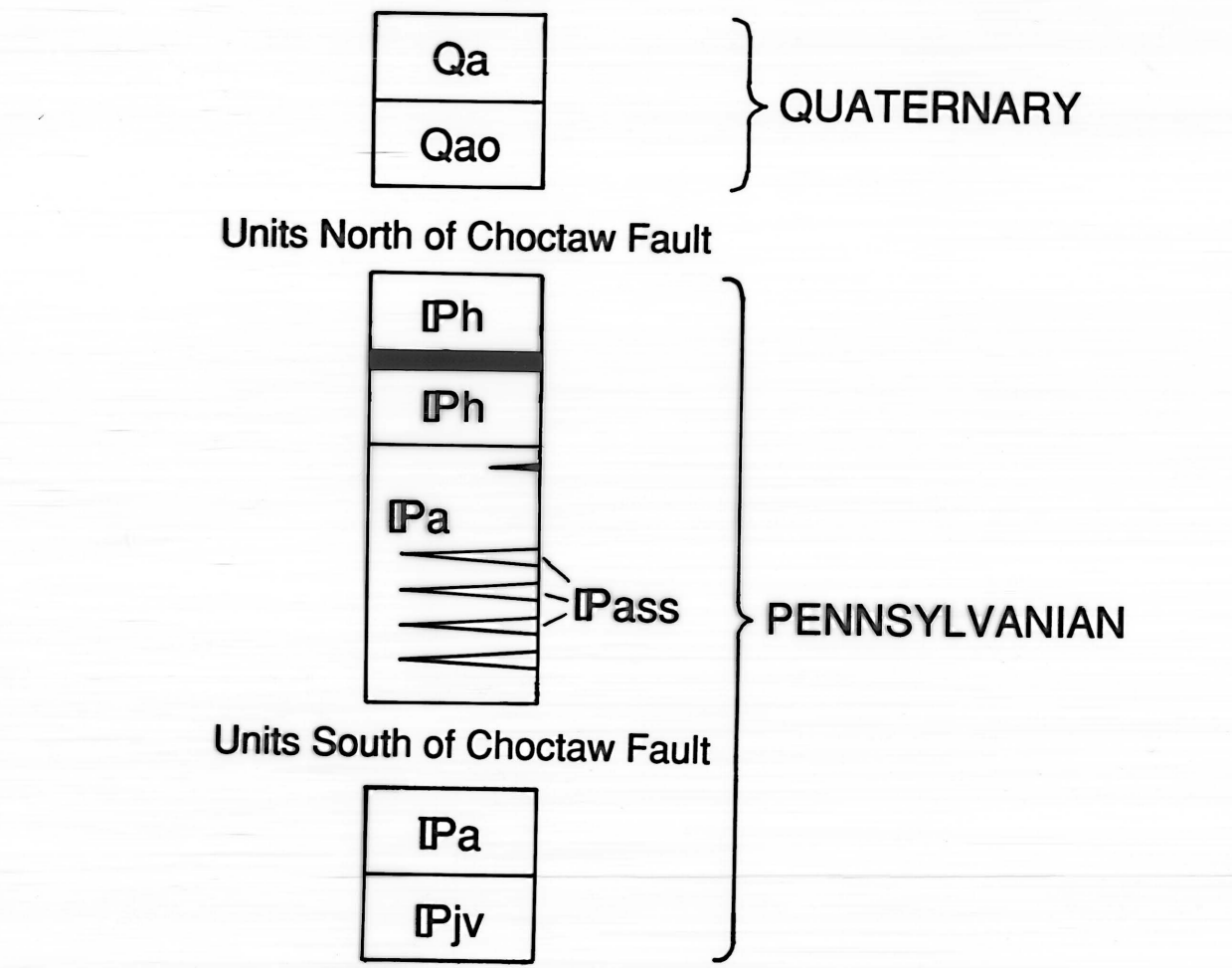


GEOLOGIC MAP OF THE HODGEN QUADRANGLE, LE FLORE COUNTY, OKLAHOMA

By
Neil H. Suneson and LeRoy A. Hemish
1993

CORRELATION OF MAP UNITS



DESCRIPTION OF MAP UNITS

- Qa ALLUVIUM (QUATERNARY)—Unconsolidated silt, sand, and gravel of present stream channels
- Qao OLDER ALLUVIUM (QUATERNARY)—Unconsolidated silt, sand, and gravel above present stream channels

UNITS PRESENT NORTH OF CHOCTAW FAULT

- Ph HARTSHORNE FORMATION (PENNSYLVANIAN)—Grayish-orange (10YR7/4) to moderate-reddish-orange (10YR6/6) to very light gray (N8) very fine to fine-grained, ripple-marked, cross-bedded, thin-bedded to massive, bioturbated sandstone, containing abundant upright Calamites; interstratified with silty, medium-gray (N5) to grayish-black (N2) shale containing siderite nodules. Includes the Lower Hartshorne coal (Phh) about 50 ft (15 m) above base. Surface-mined area in northeast part of quadrangle designated PhhM. Top of formation eroded. Remaining thickness: 100-120 ft (30-35 m)
- Pa ATOKA FORMATION (PENNSYLVANIAN)—Predominantly poorly exposed, olive-gray (5Y3/2) to grayish-olive (10Y4/2), slightly silty, noncalcareous shale (Pa) containing siderite nodules. Includes numerous, continuous to discontinuous, ridge-forming moderate-yellowish-brown (10YR5/4) to dark-yellowish-orange (10YR6/6), very fine grained, silty, micaceous sandstones (Pass) containing plant fragments, sole markings, and trace fossils. Includes grayish-black (N2), fissile shale beds, and two unnamed coal beds in upper part. Sandstone units variable in thickness, generally thinly parallel-bedded with interstratified siltstones and shales, commonly ripple-marked; contacts usually gradational. Approximately 7,500 ft (2300 m) exposed north of Chocktaw fault

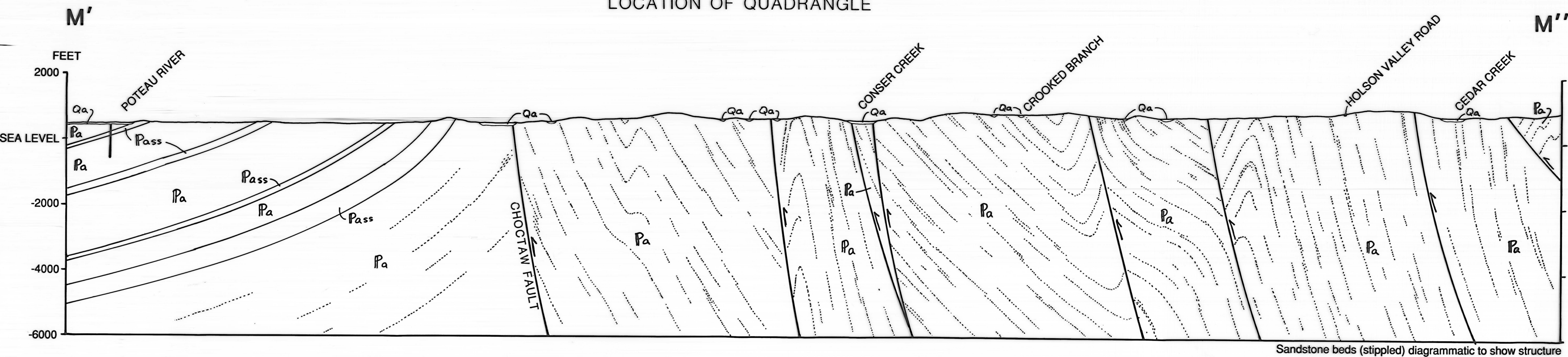
UNITS PRESENT SOUTH OF CHOCTAW FAULT

- Pa ATOKA FORMATION (PENNSYLVANIAN)—Predominantly poorly exposed, olive-black (5Y2/1) to olive-gray (5Y3/2), slightly silty, noncalcareous, fissile shale and poorly laminated mudstone. Locally, shale fragments have well-developed "sheen". Contains rare sandstone phacoids and siderite pods or concretions. "Pencil structure" common. Contains many thin beds of laminated siltstone and very fine-grained sandstone and very rare beds of dark-colored siliceous siltstone.
- Also contains less common, better-exposed sandstone beds as much as about 15 ft (5m) thick. Sandstone typically is light-olive-gray (5Y5/2), medium gray (N5), to olive-gray (5Y4/1) or yellowish-gray (5Y7/2). Mostly fine-grained to very fine-grained and silty, poorly to moderately sorted, and noncalcareous. Individual beds vary from ungraded to graded, showing very slight increase in grain-size upwards; locally, sandstone beds grade upwards to siltstone and/or mudstone. Based on hand-specimen examination, sandstones generally composed of about 95% quartz, 2-5% feldspar and rock fragments, and conspicuous white mica parallel to laminations. Most sandstone beds range from several cm to 2m thick; amalgamated beds are uncommon. Beds locally show development of complete, incomplete, and truncated Bouma sequences, including (from base to top) unstratified beds (Ta), parallel stratified beds (Tb), and cross-laminated beds (Tc). Plane-parallel very fine-grained sandstone and/or siltstone (Td) locally overlies Tc. Undulatory stratification and/or wavy bedding similar to incipient dish-and-pillar or slump structures is common. Tops of some sandstone beds wavy or irregular due to dewatering or slumping. Dish-and-pillar structures common. Base of sandstone beds vary from planar to those containing sole marks (flute, groove, and load casts; trace fossils). Unfossiliferous except for local concentrations of carbonized plant debris on bedding planes. Porosity typically is very low. Sandstone beds typically weather to platy or blocky appearance; joints are common. In many places, individual beds are composed of a lower part that is massive and an upper part that is platy.
- Maximum exposed thickness south of Chocktaw fault approximately 11,000 ft (3400m); top not exposed
- Pjv JOHNS VALLEY FORMATION (PENNSYLVANIAN)—(Description based on exposures in LeFlore SE 7.5' quadrangle to west) Predominantly poorly exposed, olive-gray (5Y3/2), noncalcareous, poorly laminated, slightly silty shale and mudstone. Some beds fissile, weather to "flaky" appearance when dry and "gummy" consistency when wet. Other beds contorted, appear pervasively sheared. Contains thin beds of noncalcareous laminated siltstone and thin- to medium-bedded sandstone. Siderite concretions and phosphatic nodules (as large as 1 in. (3 cm) in diameter) locally common.

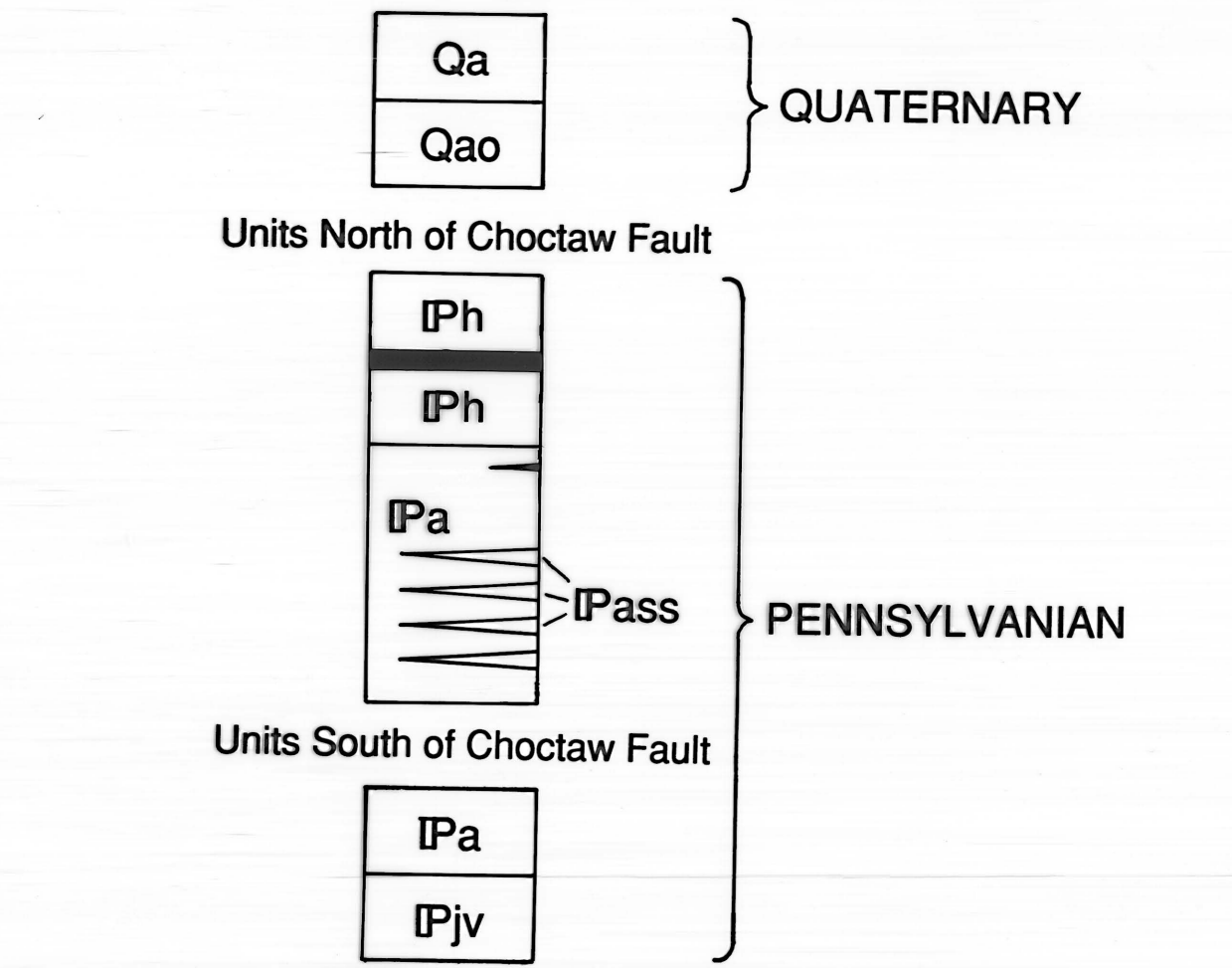
Sandstones mostly light-olive-gray (5Y5/2) to yellowish-gray (5Y7/2), silty, and very fine-grained to fine-grained to locally medium-grained. Sandstone beds unstratified (corresponding to Ta of Bouma sequence) to parallel-laminated (Tb) or, more rarely, ripple cross-laminated (Tc). Based on hand specimen examination, composed of about 3%, but locally as much as 10%, feldspar and rock fragments, conspicuous white mica parallel to laminations, and the remainder quartz. Calcite cement rare. Some sandstone beds contain fragments of crinoids(?). Sole marks, dish-and-pillar structures, and contorted or wavy bedding typical of some beds.

Beds containing "exotic" rock types absent in this quadrangle.

Exposed only in extreme southwest corner of quadrangle. Maximum exposed thickness approximately 1100 ft (340 m)



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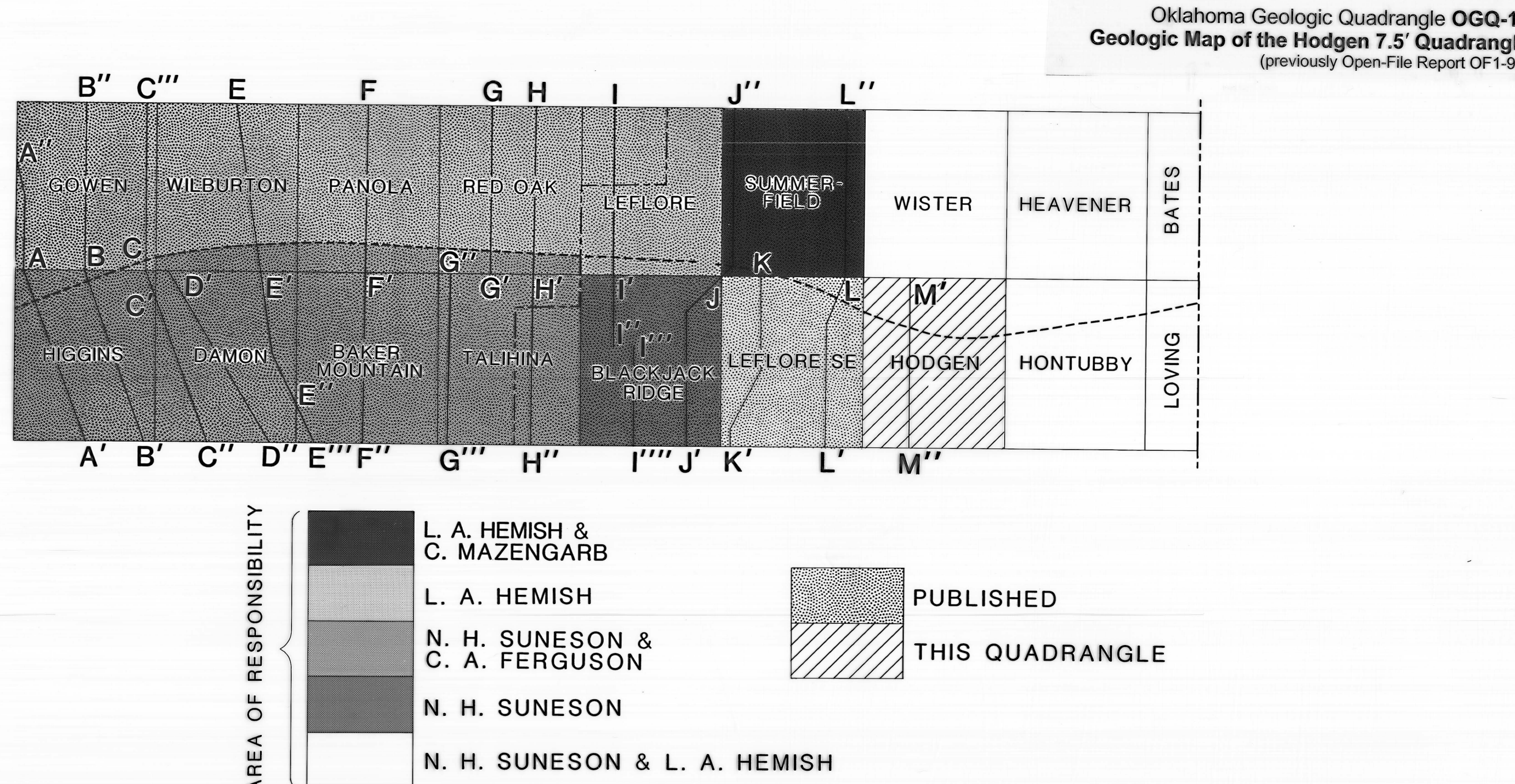
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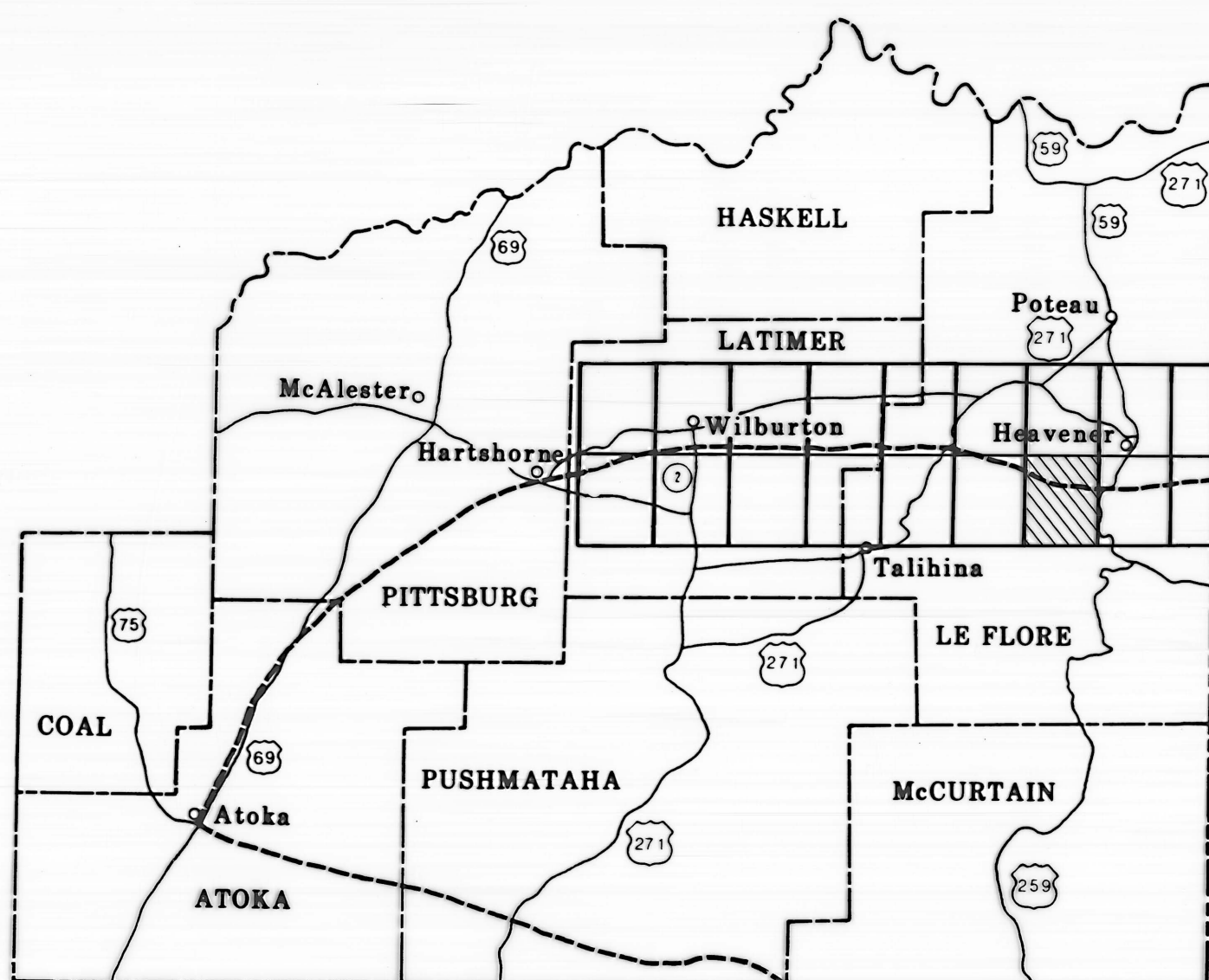
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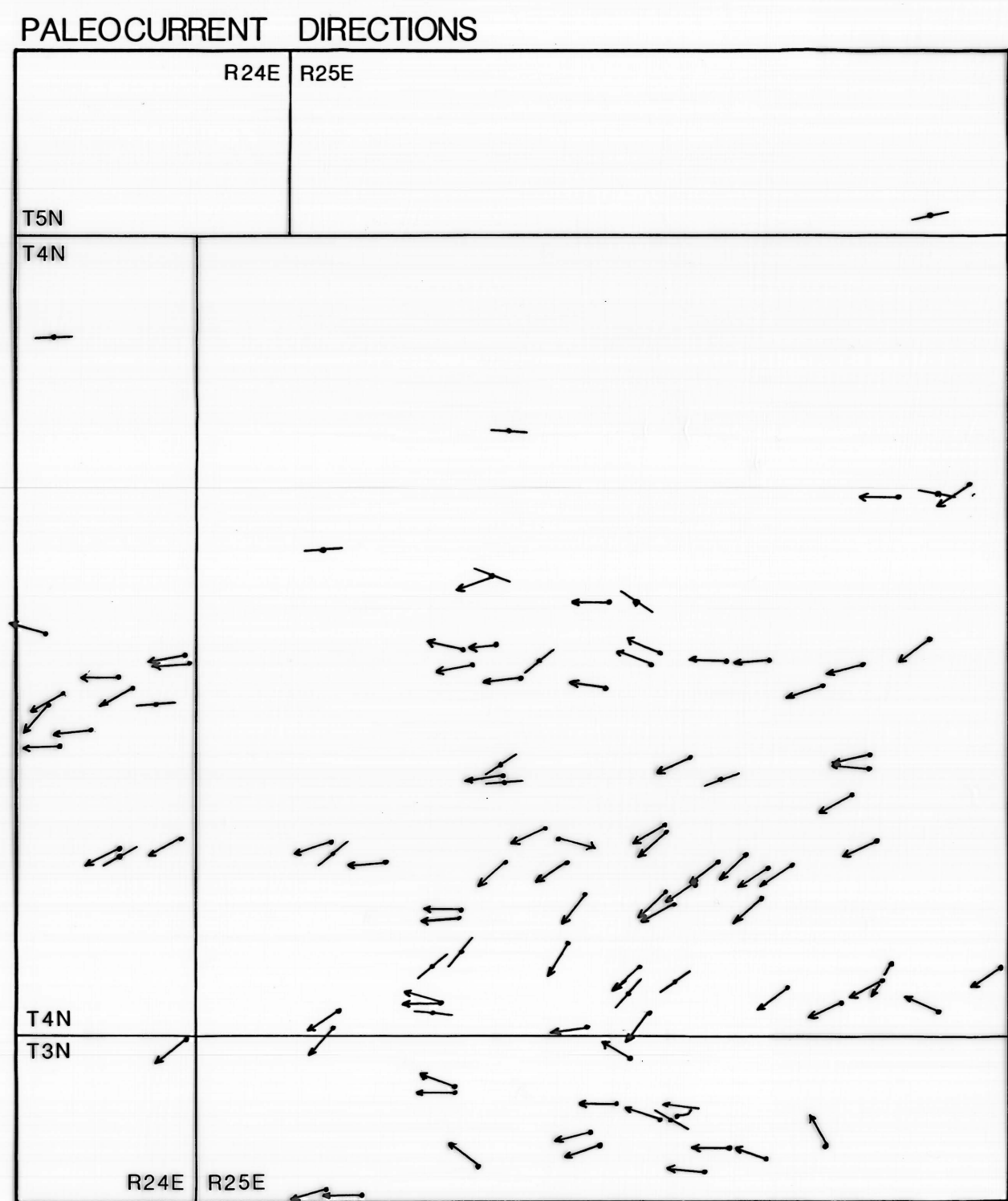


INDEX TO QUADRANGLES, CROSS SECTIONS, AND AREA OF RESPONSIBILITY

- SYMBOLS**
- CONTACT—Dashed where approximately located
- COAL BOUNDARY—Approximate outcrop boundary of coal bed (named on map); triangle indicates exposure of coal
- THRUST FAULT—Sawtooth on upper plate; dashed where approximately located; dotted where concealed; queried where questionable. Arrows show relative horizontal movement where slip may be oblique.
- FAULT—Arrows show relative horizontal movement; dashed where approximately located; dotted where concealed; queried where questionable
- ANTICLINE—Showing crestline, arrow shows direction of plunge; dashed where approximately located; dotted where concealed
- SYNCLINE—Showing troughline, arrow shows direction of plunge; dashed where approximately located; dotted where concealed; queried where questionable
- OVERTURNED ANTICLINE—Showing crestline; dashed where approximately located; dotted where concealed
- OVERTURNED SYNCLINE—Showing troughline; dashed where approximately located; dotted where concealed
- MINOR ANTICLINE—Showing direction and amount of plunge; dip of axial surface
- INACCESSIBLE TUNNEL, ADIT, OR SLOPE
- MINED-OUT AREA
- STRIKE AND DIP OF BEDS
- Leader to location of measurement
- Strike and dip of beds, facing direction unknown
- Strike and dip of beds - approximate
- Vertical beds, facing direction unknown
- Strike and dip of beds, upright
- Vertical beds, ball indicates top of beds
- Strike and dip of beds, overturned
- OIL AND GAS WELLS
- Dry hole, abandoned



LOCATION OF QUADRANGLE



Sandstone beds (stippled) diagrammatic to show structure