

CORRELATION OF MAP UNITS

Qa	}	QUATERNARY
Qao		
Pa	}	PENNSYLVANIAN
Pjv		
Pjf		
Ms		
		MISSISSIPPIAN

DESCRIPTION OF UNITS

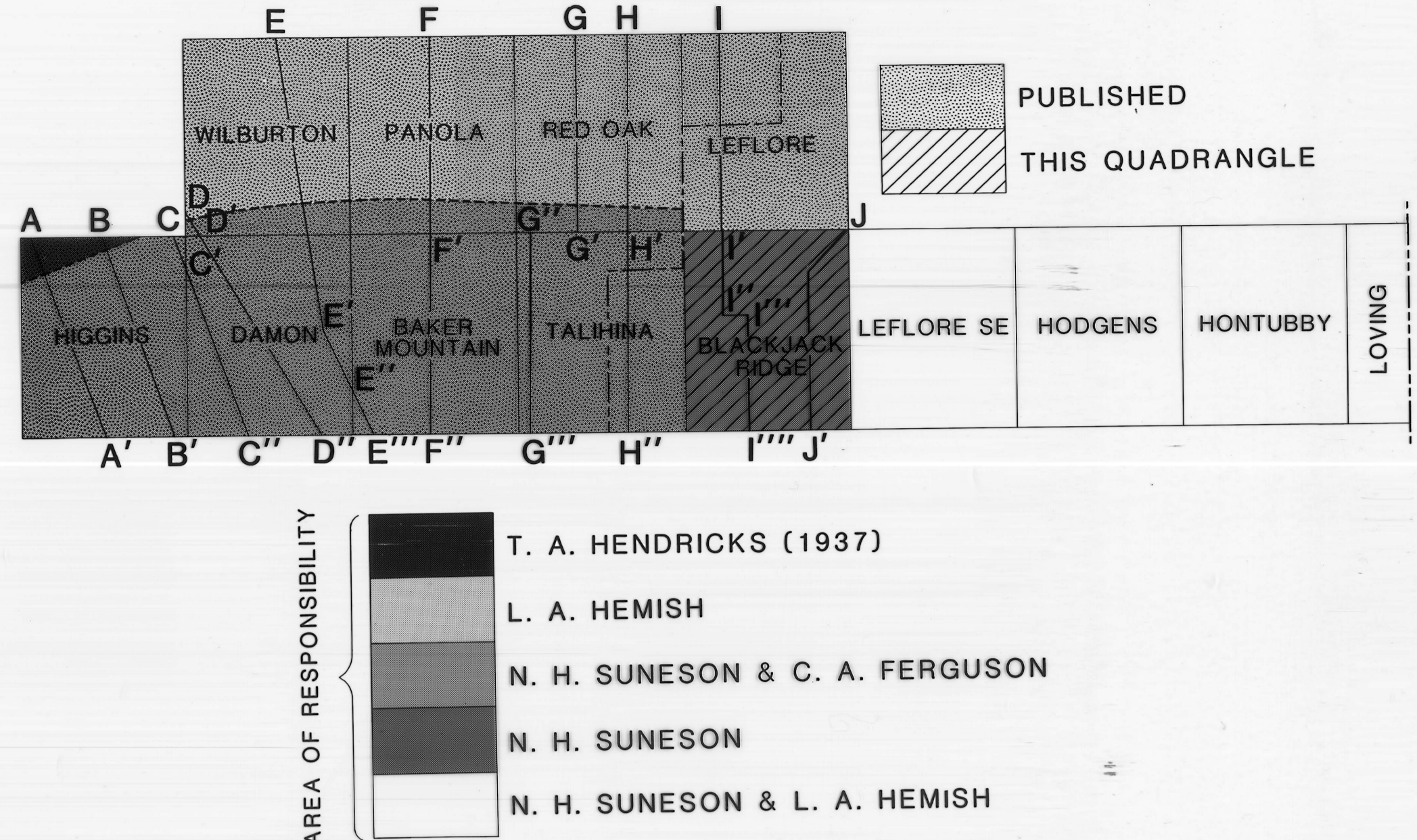
- Qa ALLUVIUM (QUATERNARY)—Unconsolidated silt, sand, and gravel of present stream channels
- Qao OLDER ALLUVIUM (QUATERNARY)—Unconsolidated silt, sand, and gravel above present stream channels
- Pa ATOKA FORMATION (PENNSYLVANIAN)—Predominantly poorly exposed, olive-gray (5Y3/2) to olive-black (5Y2/1), slightly silty, noncalcareous, poorly laminated shale and mudstone. Stratification in some beds contorted. Some beds have sheared appearance, and shale fragments have well-developed "shear". Locally fissile, weathers to "flaky" appearance. Contains rare sandstone and siderite pods or concretions elongate parallel to bedding. Some beds exhibit "pencil" structure. Contains many thin beds of laminated siltstone and very fine-grained sandstone and rare beds of dark-colored siliceous siltstone. Also contains less common, moderately well exposed sandstone beds as much as about 20 m thick. Sandstone typically is light-olive-gray (5Y5/2), yellowish-gray (5Y7/2), to medium-light-gray (N5). Mostly very fine-grained to moderately fine-grained and silty, poorly to moderately sorted, and noncalcareous. In southern thrust sheets, the basal 1500 m (4900 ft) appears to be locally medium-grained or bimodal with medium-sized grains supported in a fine-grained matrix. 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; quartz rarely less than 75% or greater than 95%. Individual beds mostly vary from several centimeters to several meters thick and average about 60 cm. Amalgamated beds common, forming resistant ridges and dip slopes easily identifiable on aerial photographs; these marker beds are mapped. Thicker beds are generally unstratified (corresponding to Ta of Bouma sequence) grading upwards to parallel-laminated (Tb); some beds exhibit low-angle, moderate- to long-wavelength, undulatory stratification similar to incipient dish-and-pillar or slump structures. Thinner beds commonly are ripple cross-laminated (Tc). Dish-and-pillar structures common. Sole marks (flute, groove, and load casts, trace fossils) at base of sandstone beds locally common. (Sole marks more common than in Jackfork Group sandstones.) Some beds have planar or slightly undulatory bases. Tops of sandstone beds typically grade upwards to siltstone; ripples or irregular tops caused by dewatering or slumping less common. Unfossiliferous except for local concentrations of plant debris on bedding planes throughout the formation and brachiopod(?) and crinoid(?) fragments in rare beds in the lower part of the formation, particularly in the eastern part of the quadrangle. Porosity typically is very low except where medium-grained, fossiliferous, and/or moderately sorted. Sandstone beds typically weather to platy or blocky appearance; rarely vuggy. Maximum exposed thickness approximately 2100 m (7000 ft); top not exposed
- Pjv JOHNS VALLEY FORMATION (PENNSYLVANIAN)—Predominantly poorly exposed, olive-black (5Y2/1), noncalcareous, poorly laminated, slightly silty shale and mudstone. Some beds fissile, weather to "flaky" appearance. Other beds contorted, appear pervasively sheared. Contains thin beds of noncalcareous laminated siltstone and thin- to medium-bedded sandstone and rare beds of dark-colored, hard, platy, slightly calcareous siltstone. Siderite concretions and phosphate nodules (as large as 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. Locally medium-grained, bimodal with medium-sized grains supported in a fine-grained matrix, or very coarse-grained, granule sandstone, granule conglomerate, and chert breccia beds rare. 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. Some sandstone beds contain fragments of bryozoans(?), crinoids(?), and gastropods(?). Sole marks, dish-and-pillar structures, and contorted or wavy bedding typical of some beds. Sandstone marker beds visible on aerial photographs are mapped. Shale locally contains angular to rounded pebbles, cobbles, and boulders (as large as 5-m diameter) of chert, dolomite, and a wide variety of limestone rock types (micrites, bioclastic grainstones and packstones, limestone breccias and conglomerates). Other rock types within the shale include large masses of platy to very fissile, hard, grayish-black (N2) shale with calcareous concretions and phosphatic(?) nodules. Limestone clasts have been correlated with lower and middle Paleozoic limestone units exposed to the north and west; chert clasts may be Woodford Formation (Devonian); and many black shale masses may correlate with the Caney Formation (Mississippian). Maximum exposed thickness approximately 900 m (2900 ft); varies widely due to structural thinning and thickening

JACKFORK GROUP (PENNSYLVANIAN)—Predominantly well-exposed, light-gray (N7), dark-gray (N3), to pinkish-gray (5YR8/1), mostly fine-grained, quartzose, noncalcareous sandstone. More rarely medium-grained, bimodal, or coarse-grained; pebble-conglomerate beds rare. Less common shale and siltstone beds rarely exposed. Sandstone slightly porous, especially where more coarse-grained. Based on hand-specimen examination, generally composed predominantly of quartz; feldspar and rock fragments rarely exceed 5% of rock. Mica mostly rare to absent; very small grains of dark mineral locally conspicuous. Beds typically amalgamated and unstratified (corresponding to Ta of Bouma sequence) grading upwards to parallel-stratified (Tb); more rarely ripple cross-laminated (Tc). Sandstone beds as thick as 10 m, generally 1-2 m. Some beds identifiable on aerial photographs are mapped individually. Base of sandstone beds locally contain sole marks (flute, groove, and load casts, trace fossils), which are much less common than in Atoka Formation. Channels rare. Tops of sandstone beds rarely ripple-marked or irregular. Rarely fossiliferous; locally contains traces of organic debris parallel to bedding planes and molds and impressions of brachiopods(?) and crinoids(?). Very rarely contains traces of solid hydrocarbons filling pore spaces and as fracture coatings. Weathers blocky to platy. Shale and mudstone mostly dark-gray (N3) to light-olive-gray (5Y5/2), fissile to papery, silty, and interbedded with thin siltstone and very fine-grained sandstone beds and discontinuous sandstone lenses. Inclusions in the shale include rounded sandstone masses and siderite concretions. Weathering characteristics vary from hard and "chippy" to soft and "gummy". "Pencil" structure locally well-developed. Unit also contains rare beds of very dark-colored siliceous shale and siltstone. Maximum exposed thickness approximately 1800 m (5900 ft); base not exposed

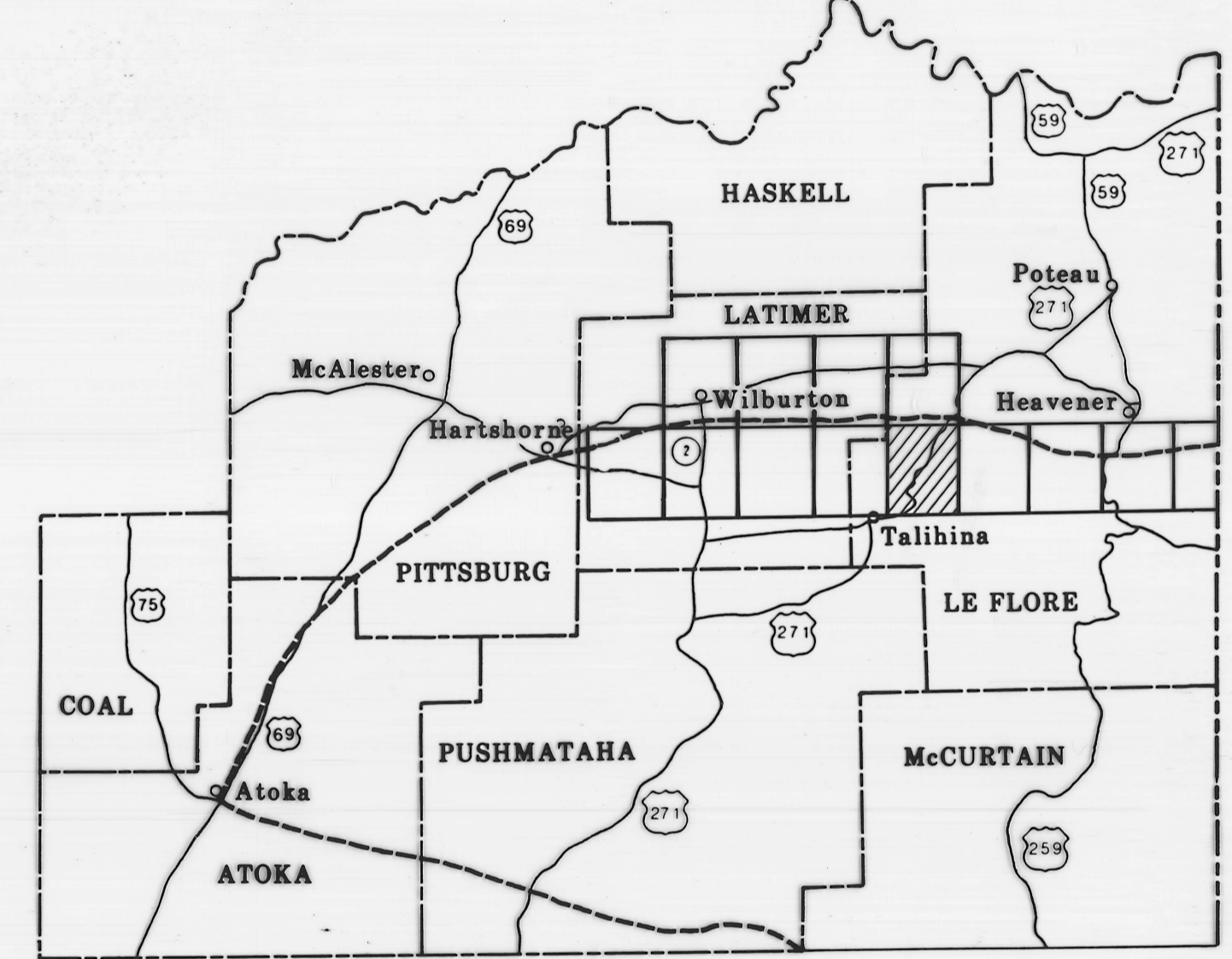
STANLEY GROUP (MISSISSIPPIAN)—Predominantly poorly exposed, light-olive-gray (5Y5/2) to olive-gray (5Y4/1), fissile, noncalcareous shale and thin siltstones. Interbedded sandstone less common. Shale typically contains discoidal siltstone and sandstone masses and rare limonite concretions. Shale commonly appears chevron and/or contorted; "pencil" structure common. Shale weathers to "flaky" appearance. Siltstones rarely show cone-in-cone structure. Includes uncommon dark-colored, hard, fractured, siliceous shale beds. Sandstone beds average about 50 cm thick, varying from 5 cm to amalgamated beds as much as 10 m thick. Sandstone typically is light-olive-gray (5Y5/2) to dark-gray (N3), fine-grained, unstratified (corresponding to Ta of Bouma sequence) to parallel-stratified (Tb), rarely cross-stratified (Tc) or wavy-bedded, and calcareous or noncalcareous. Sole marks (flute, groove, and load casts, trace fossils) uncommon. Sandstones vary from fine-grained to medium-grained and bimodal; all are silty and contain abundant mud in the matrix. Sorting is generally very poor. Some individual beds show slight normal grading; others contain medium-sized, rounded, frosted quartz or chert grains supported in a fine-grained matrix. Based on hand specimen examination, feldspar and rock fragments constitute as much as 25% of the sandstone. Organic material and plant debris is disseminated throughout the sandstone and locally concentrated on bedding planes. Rolled sandstone masses and sandstone and locally abundant. Porosity typically very low. Widely exposed only in southwestern part of quadrangle. Maximum exposed thickness approximately 1500 m (4900 ft); top and base not exposed

SYMBOLS

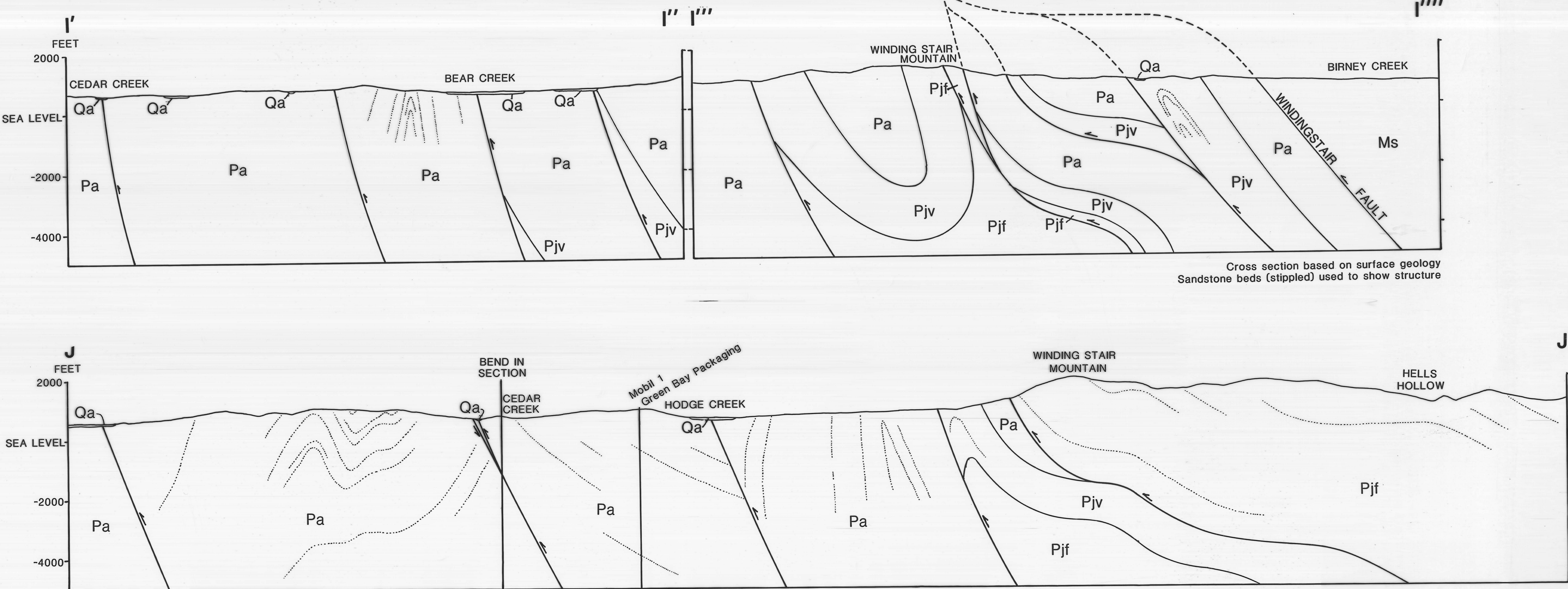
- CONTACT—Dashed where approximately located
- MARKER BED
- THrust FAULT—Sawtooth on upper plate; dashed where approximately located; dotted where concealed; queried where questionable
- FAULT—Arrows show relative horizontal movement; dashed where approximately located; dotted where concealed; queried 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; queried where questionable
- OVERTURNED SYNCLINE—Showing troughline; dashed where approximately located; dotted where concealed
- MINOR ANTICLINE—Showing direction and amount of plunge
- MINOR SYNCLINE—Showing direction and amount of plunge
- MINOR Z-FOLD—Showing direction and amount of plunge
- MINOR S-FOLD—Showing direction and amount of plunge
- LIMESTONE OR DOLOMITE COBBLE OR BOULDER IN JOHNS VALLEY FORMATION
- CHERT COBBLE OR BOULDER IN JOHNS VALLEY FORMATION
- STRIKE AND DIP OF BEDS
- Leader to location of measurement
- Strike and dip of beds, facing direction unknown
- Vertical beds, facing direction unknown
- Strike and dip of beds, upright
- Vertical beds, ball indicates top of beds
- Strike and dip of beds, overturned
- GAS WELLS (Spudded before January 1, 1991)
- Drilling



INDEX TO QUADRANGLES, CROSS SECTIONS, AND AREA OF RESPONSIBILITY



LOCATION OF QUADRANGLE



Cross section based on surface geology
Sandstone beds (stippled) used to show structure

Cross section based on surface geology
Sandstone beds (stippled) used to show structure

GEOLOGIC MAP OF BLACKJACK RIDGE QUADRANGLE, LE FLORE COUNTY, OKLAHOMA

By
Neil H. Suneson
1991

Geology by N. H. Suneson
assisted by L. A. Hemish
1989

BLACKJACK RIDGE, OKLA.
N3445—W9452.5/7.5
1966
AMS 7053 IV SW—SERIES Y883

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