U.S. DEPARTMENT OF THE INTERIOR
U.S. GEOLOGICAL SURVEY

PRELIMINARY GEOLOGIC MAP OF THE ASHLAND NW QUADRANGLE AND PARTS OF THE ENGLEWOOD, PROFITT LAKE, AND MOUNT HELEN QUADRANGLES, CLARK COUNTY, KANSAS

By

GEORGE M. FAIRER[1], AND MORRIS W. GREEN[1]

Open-File Report 94-655

[1] Denver, Colorado

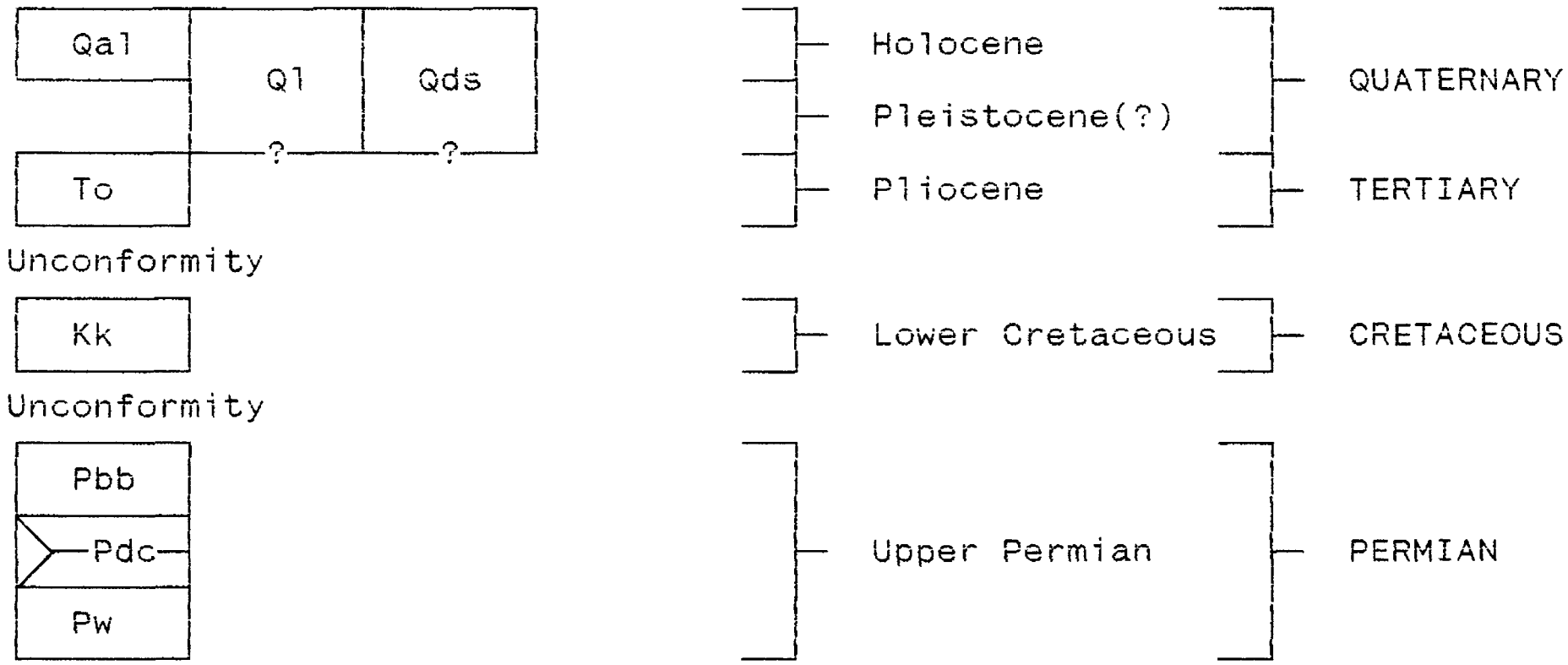
1994

U.S. Geological Survey Open-File Report 94-655

Preliminary geologic map of the Ashland NW quadrangle and parts of the Englewood, Profitt Lake, and Mount Helen quadrangles, Clark County, Kansas

By George M. Fairer and Morris W. Green

CORRELATION OF MAP UNITS



DESCRIPTION OF MAP UNITS

Qal — **Alluvium (Holocene)**--Unconsolidated gravel, sand, silt, and clay within and adjacent to major stream channels and flood plains. Locally includes dune sand, slopewash, colluvium, and terrace deposits; locally intertongues with loess (Ql) and eolian sand (Qds) deposits

Ql — **Loess deposits (Holocene and Pleistocene?)**--Eolian deposits of nonstratified silt and minor amounts of sand (5-15 percent) and clay; deposits are porous and calcareous; commonly contain nodules, carbonate-filled root casts, fossil plants, and fossil animals. Cementation and the cohesiveness of sediment particles cause loess deposits to form characteristic near-vertical scarps in dissected deposits; locally includes slopewash and colluvium; mantles bedrock and other associated surficial deposits; locally forms dunes. Thickness 0-40 ft

Qds — **Eolian dune sand (Holocene and Pleistocene?)**--Eolian deposits of stratified and nonstratified fine to very fine sand and minor amounts of silt and clay in irregularly shaped eolian dunes which may be locally altered and reworked in ephemeral ponds and on flood plains by fluvial processes; deposits are porous and locally calcareous; commonly contain nodules, sand concretions, and carbonate-filled root casts. Locally intertongues with slopewash, alluvium, and colluvium; mantles bedrock and associated loess deposits (Ql) and occurs dominantly in proximity to major streams and tributary drainages; locally includes deposits of sandy loess. Thickness 0-60 ft

To	**Ogallala Formation (Pliocene)**--Composed of arkosic, conglomeratic sandstone, calcareous siltstone, eolian sandstone, and calcrete. Conglomeratic sandstone occurs as fluvial channel fill, is trough crossbedded, and contains granules, pebbles, and cobbles of chert, feldspar, and rock fragments, including granite and quartzite. Larger clasts are black, red, reddish brown, pink, and yellowish brown and are supported in a matrix of medium- to fine-grained sandstone; matrix colors are light brown, pinkish gray, yellowish brown, and buff. Sandstone is grayish brown and consists of sand cemented with calcium carbonate. Siltstone is white to grayish brown and consists mainly of loess cemented with calcium carbonate. Calcrete is white to grayish brown and consists of well-indurated beds of calcium carbonate containing a significant portion of loess. Locally, calcrete has been replaced by opaline silica. Calcrete generally forms an erosion-resistant caprock in the northern part of the map area where the formation underlies alluvium and wind-blown deposits. Deposition of the formation apparently occurred under arid fluvial, and eolian conditions. Formation ranges from 0 to 60 ft in thickness. The formation crops out on the periphery of Big Basin located in sec. 25, T. 32 S., R. 25 W. and an accompanying depression about half a mile to the east in sec. 30, T. 32 S., R. 24 W. known as "Little Basin". These depressions apparently formed from collapse of strata in the subsurface because of the dissolution of gypsum/anhydrite once present in Permian rocks at depth. At Little Basin the formation is offset around the collapse feature by a ring fault. At Big Basin a ring fault along the northern, eastern, and southern periphery of the depression is probable but is not shown since a fault was not observed. On the western periphery of Big Basin the beds apparently were folded into the depression rather than tilted by faulting
Kk	**Kiowa Formation (Lower Cretaceous)**--Dark-gray to black gypsiferous shale; locally contains thin beds of light- to medium-gray coquinoidal limestone and light-yellowish-brown calcareous sandstone. Commonly includes thin beds and lenses of selenite and limestone with cone-in-cone concretionary structure. Shale contains finely disseminated flecks of coaly carbonaceous plant matter in the silt and clay fractions of the formation sediment. Deposition of the formation apparently occurred a considerable distance offshore in a shallow epeiric sea or marine embayment. Formation is unconformable with formations above and below. Formation ranges from 0 to about 60 ft in thickness

Pbb

Big Basin Formation (Upper Permian)--Dark-reddish-brown argillaceous siltstone mottled greenish gray and white; locally dolomitic and montmorillonitic; contains thin beds of silty shale, silty very fine grained sandstone, and gypsum/anhydrite. Where dolomitic, siltstone is well indurated and has hackly fracture; weathered montmorillonitic layers form crusty surfaces; presence of montmorillonite in the unit probably marks the advent of volcanically derived sediment in Permian rocks in this region. Deposition of sediment in this formation apparently occurred as suspended sediment settling and chemical precipitation from sea water in a restricted marine embayment under arid climatic conditions. Formation ranges from 0 to about 100 ft in thickness

Pdc

Day Creek Dolomite (Upper Permian)--Light-gray, pink, and white, dense, very fine grained crystalline dolomite; locally contains chert nodules and disseminated chert grains. Deposition apparently occurred by chemical precipitation from sea water in a restricted marine embayment under arid conditions. Day Creek crops out extensively in NE¼ of map area where it forms a thin, resistant bed capping the Whitehorse Formation. Conformable with underlying Whitehorse Formation. Formation is as much as 2 ft thick

Pw

Whitehorse Formation (Upper Permian)--Reddish-orange nonstratified, argillaceous siltstone; locally includes some thin beds of very fine grained, locally crossbedded, silty sandstone and thin beds of dolomite; contains beds of gypsum and anhydrite in subsurface, Unit is locally bleached white along bedding planes, is moderately friable, and contains sandy calcareous concretions that resemble musket balls. Silt and sand are well sorted, well rounded, and consist mostly of iron oxide-stained quartz but also some dark accessory minerals. Upper part of unit is locally impregnated with secondary calcium carbonate. Sediment deposition apparently occurred subaqueously from the settling of suspended sediment in relatively shallow marine waters of a restricted embayment. The character of the detrital fraction of Whitehorse rocks suggests that detrital sediment was transported into the embayment primarily as loess winnowed by eolian activity from dune fields adjacent to the embayment; apparently subaqueous currents acted locally to form low-angle crossbedded units. Beds are characteristically wavy because of deformation caused by dissolution of gypsum and anhydrite. Base of formation not exposed in map area. Exposed thickness about 250 ft

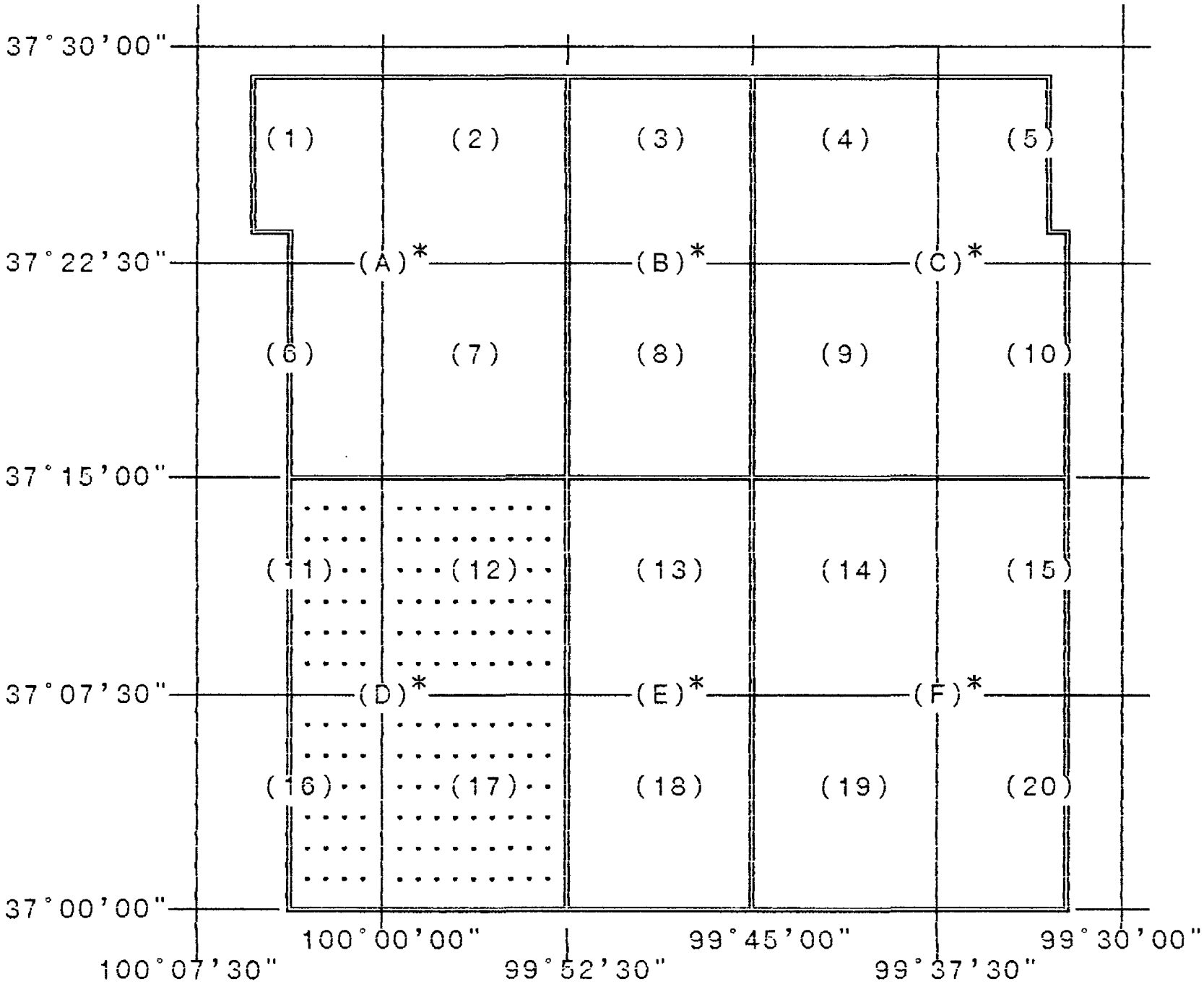
CONTACT

NORMAL FAULT--Bar and ball on downthrown side

STRIKE AND DIP OF BEDS

5

Inclined



Index map of Clark County showing the location of 7.5' quadrangles (1-20), this geologic map report (D), and other published geologic maps (A-C, E, and F) covering the county. *, map report listed by letter in References Cited

7.5' quadrangles:

(1) Minneola
(2) Bloom
(3) Simmons Creek
(4) Mount Jesus NW
(5) Turkey Creek
(6) Fowler SE
(7) Bloom SW
(8) Bloom SE
(9) Mount Jesus
(10) Lexington
(11) Profitt Lake
(12) Ashland NW
(13) Ashland
(14) Sitka
(15) Sugarloaf
(16) Mount Helen
(17) Englewood
(18) Ashland SE
(19) Sitka SW
(20) Trout Creek

References Cited

(A) Fairer, George M. and Green, Morris W., 1992, Preliminary geologic map of the Bloom SW quadrangle and parts of the Bloom, Minneola, and Fowler SE quadrangles, Clark County, Kansas: U.S. Geological Survey Open-file Report 92-698, 1 pl., 10 p., scale 1:24,000.

(E) Fairer, George M. and Green, Morris W., 1994, Preliminary geologic map of the Ashland quadrangle and part of the Ashland SE quadrangle, Clark County, Kansas: U.S. Geological Survey Open-file Report 94-657, 1 pl., 6 p., scale 1:24,000.

(B) Green, Morris W. and Fairer, George M., 1992, Preliminary geologic map of the Bloom SE quadrangle and part of the Simmons Creek quadrangle, Clark County, Kansas: U.S. Geological Survey Open-file Report 92-697, 1 pl., 7 p., scale 1:24,000.

(C) Green, Morris W. and Fairer, George M., 1994, Preliminary geologic map of the Mount Jesus quadrangle and parts of the Mount Jesus NW, Lexington, and Turkey Creek quadrangles, Clark County, Kansas: U.S. Geological Survey Open-file Report 94-656, 1 pl., 8 p., scale 1:24,000.

(F) Green, Morris W. and Fairer, George M., 1994, Preliminary geologic map of the Sitka quadrangle and parts of the Sitka SW, Sugarloaf, and Trout Creek quadrangles, Clark County, Kansas: U.S. Geological Survey Open-file Report 94-658, 1 pl., 7 p., scale 1:24,000.