

FIGURE 6.—Geological section showing relative thickness of lower aquifer unit.

Thickness

Thickness of the lower aquifer unit in the Western Interior Plains aquifer system is depicted in geologic section B-B' (fig. 6) and on the accompanying thickness map (fig. 7). The thickness of the lower aquifer unit ranges from a few feet near the edges of the Nemaha Anticline, the Cambridge Arch, and the Central Kansas Uplift, where the aquifer unit has been removed by erosion, to about 2,500 feet thick near the southwest corner of the State in Morton County (fig. 7). The areas of greatest thickness in central and eastern Kansas along the Kansas-Nebraska State line do not coincide with the deepest parts of the Salina and Forest City Basins in Kansas, but do reflect the effect of the North Kansas Basin (fig. 5), which is a pre-Mississippian structural feature that existed during deposition of part of the lower aquifer unit (Merriam, 1963). The Ellis Arch, which is another pre-Mississippian structural feature (fig. 5), also was present during deposition of part of the lower aquifer unit (Merriam, 1963). Evidence of this arch generally has been masked throughout much of the area of the arch by later development of the Cambridge Arch and Central Kansas Uplift. However, the broad areas where the lower aquifer unit is rather thin west of the Cambridge Arch in northwestern Kansas may be a remnant of the Ellis Arch (compare figs. 5 and 7).

The general thickening of the lower aquifer unit in the Western Interior Plains aquifer system along the Kansas-Oklahoma State line is due to the presence of the Southwestern Kansas Basin (fig. 5) and its extension into the panhandle in southern Oklahoma and Arkansas during the period of deposition (Charnock, 1959). The lower aquifer unit does not thicken as much in southeastern Kansas as it does toward the west, probably because of the effect of the Ozark Uplift, which was present during deposition of the lower aquifer unit (Merriam, 1963). The irregular nature of the thickness lines (fig. 7) is due, in part, to the rugged nature of the Precambrian surface on which sediments of the lower aquifer unit were deposited, especially good examples of this can be seen in Morton, Stevens, Hodgeman, Chase, and Montgomery Counties and elsewhere where the lower aquifer unit abruptly thins over structurally high areas on the Precambrian surface.

Well Yields

Where the water quality is suitable for use, the shallower part of the lower aquifer unit is used as a source of water in Bourbon, Cherokee, Crawford, and Labette Counties. In these counties, well yields in the lower aquifer unit generally range from 30 to 150 gallons per minute but may exceed 500 gallons per minute (Stevens and others, 1963). Elsewhere in Kansas, the unit is used as a source of water but is used extensively for disposal of oil-field brines.

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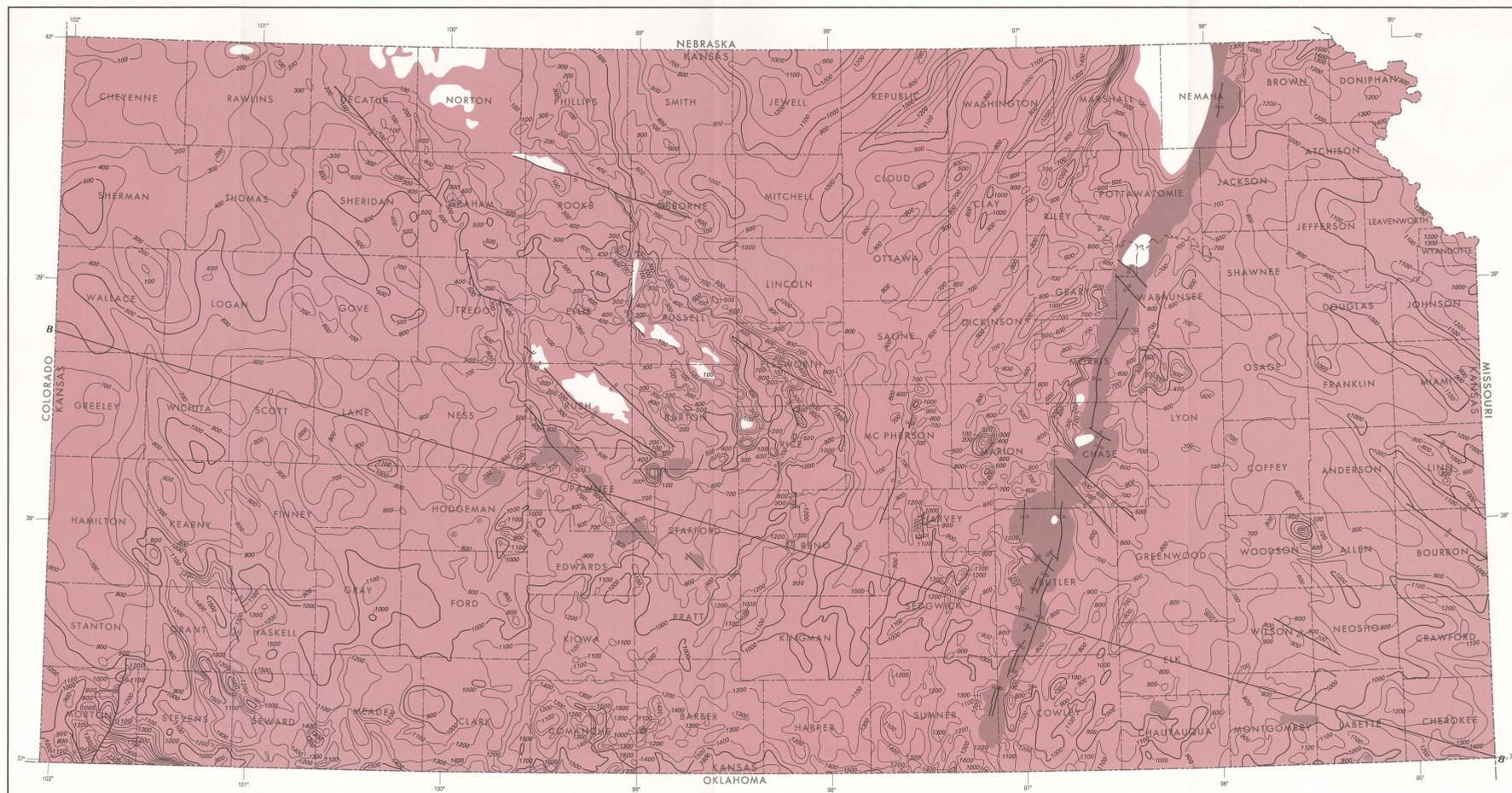


FIGURE 7.—Geohydrologic map showing thickness of lower aquifer unit.

EXPLANATION

- AREA OF LOWER AQUIFER UNIT
- AREA WHERE LOWER AQUIFER UNIT IS ABSENT
- AREA OF ABRUPTLY CHANGING THICKNESS
- 100 — LINE OF EQUAL THICKNESS OF LOWER AQUIFER UNIT—Interval 100 feet
- FAULT—U, upthrown side; D, downthrown side
- B—B' TRACE OF SECTION

GEOHYDROLOGIC SYSTEMS IN KANSAS—PHYSICAL FRAMEWORK OF THE LOWER AQUIFER UNIT IN THE WESTERN INTERIOR PLAINS AQUIFER SYSTEM

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