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Geology of Arbor Day Farm Nebraska City, Nebraska

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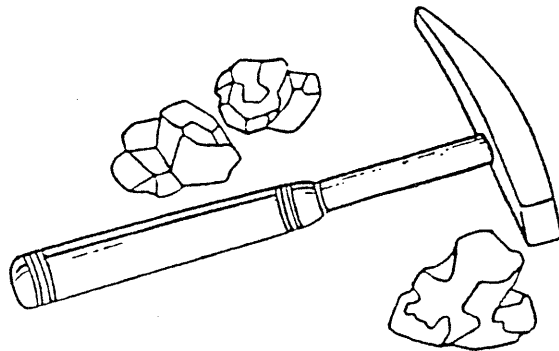
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NEBRASKA GEONOTES

GEOLOGY OF ARBOR DAY FARM NEBRASKA CITY, NEBRASKA

Raymond R. Burchett
and
Duane A. Eversoll



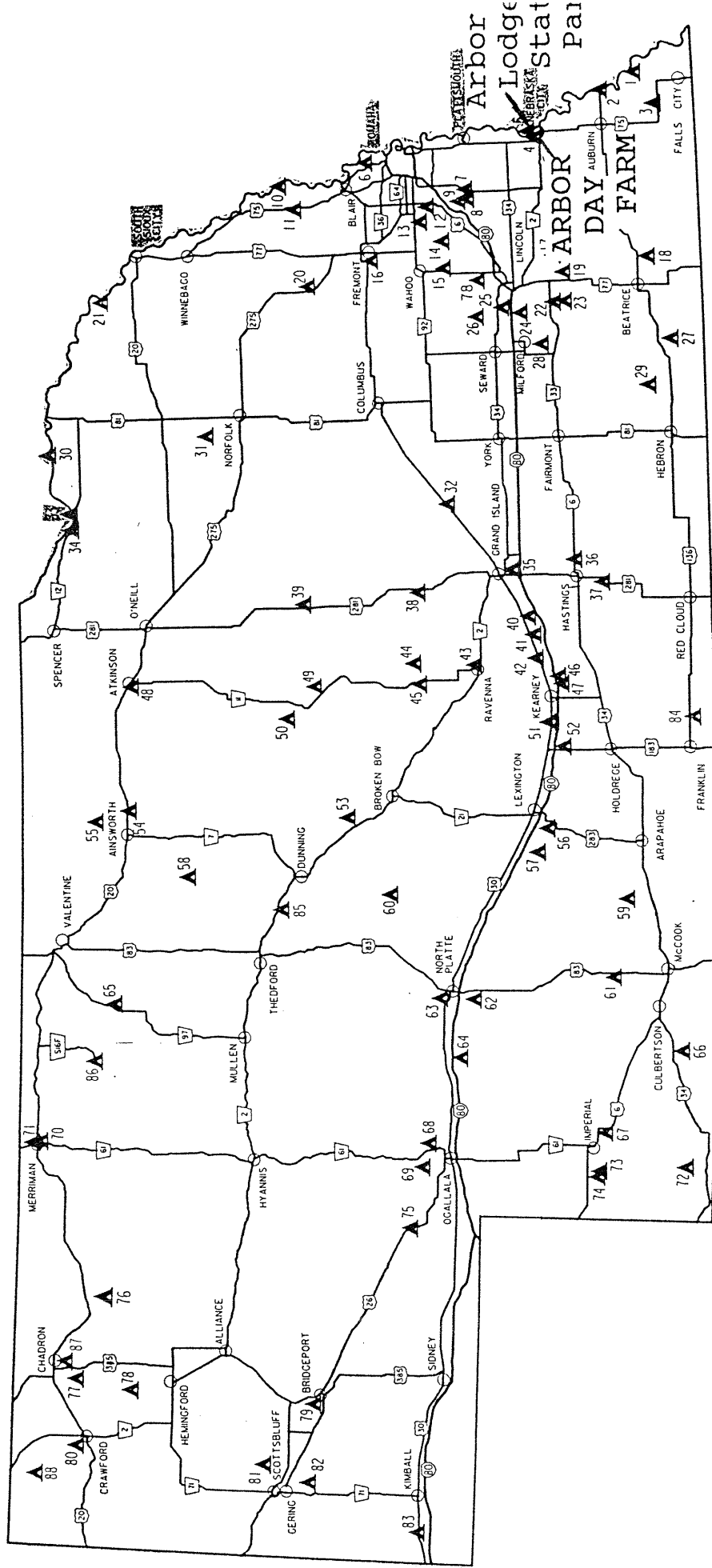
NEBRASKA GEOLOGICAL SURVEY

Conservation and Survey Division
Institute of Agriculture and Natural Resources
University of Nebraska-Lincoln



June 1993





(adapted from Nebraska Department of Roads map)

NEBRASKA HIGHWAY MAP SHOWING LOCATION OF FEDERAL AND STATE PARKS

GEOLOGY OF ARBOR DAY FARM NEBRASKA CITY, NEBRASKA

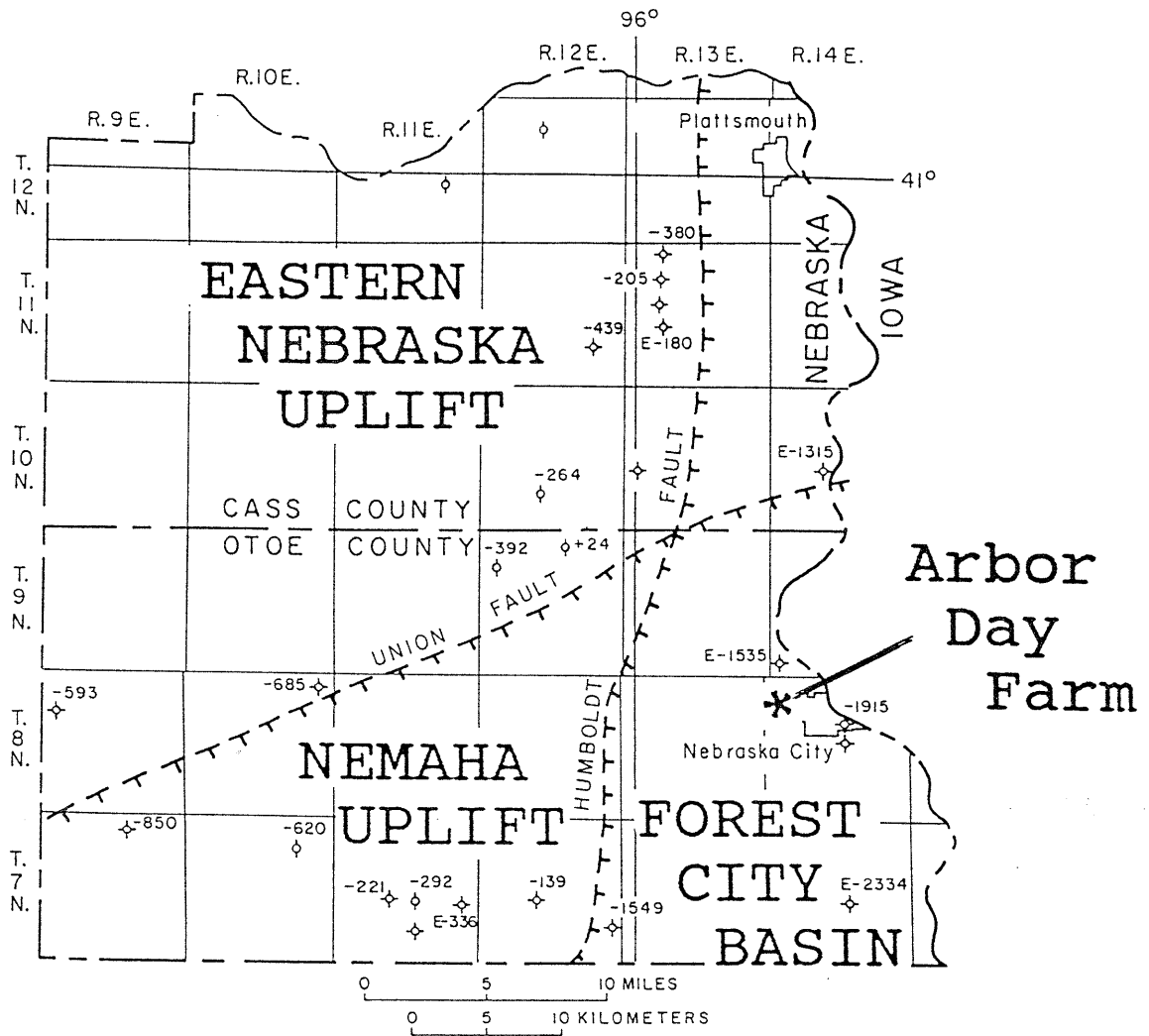
Raymond R. Burchett and Duane A. Eversoll

Exposed earth materials on Arbor Day Farm consist generally of soil or of alluvium (silt, sand, and gravel). These materials overlie deposits of loess (wind-deposited silt) or till (a glacial deposit consisting of clay, silt, and sand, gravel). All of these materials are of Quaternary age and are less than 1.7 million years old. These unconsolidated materials mantle consolidated bedrock that consists, in descending order, of sedimentary rocks of Permian, Pennsylvanian, Mississippian, Devonian, Silurian, Ordovician, and Cambrian age. The rocks of Permian, and Pennsylvanian age crop out along the creeks and valley sides on the farm and consist primarily of shales, thin limestone layers, sandstones, and thin beds of coal. All of these rock layers were deposited in shallow seas more than 290 million years ago.

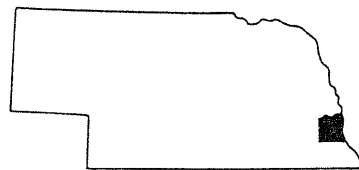
The basement or oldest sedimentary deposits in the area are referred to as "red clastics" and are of Precambrian age.

Arbor Day Farm lies within the structural feature known as the Forest City Basin. Although the younger bedrock formations appear to be relatively flat-lying they actually have a gentle dip of approximately 10 to 20 feet per mile to the southeast.

No mineral operations are currently active in the Nebraska City area, but some mineral production has occurred in the past. This has consisted of the surface mining of shale for brick or lightweight aggregate manufacture, and of sand and gravel for construction or road surfacing, also the mining of coal for local use. Several oil and gas tests have been drilled in the area but the operators reported no shows of either resource. Present sources of water include shallow wells producing from the sand and gravel deposits of Quaternary age. At the present time no significant metallic mineral resources are known to exist in the area.



- Zone of faulting or steep dip
- Deep drill hole
- Stratigraphic test
- Datum is mean sea level
- 850 Precambrian elevation determined by drilling
- E-850 Precambrian elevation estimated

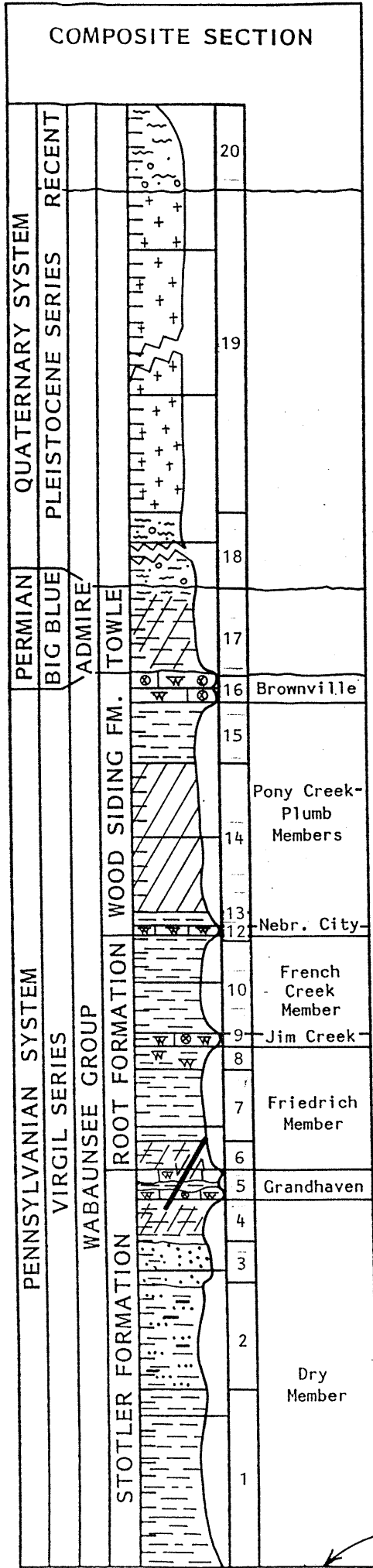


ELEVATION MAP ON TOP OF THE OLDEST,
OR PRECAMBRIAN, ROCKS

| System | Series | Group | Thickness, Ft. | General Characteristics | Geologic Age in Million Years |
|------------------------------|---------------|---------------|----------------|------------------------------------------------------|-------------------------------|
| Quaternary | Recent | | 0 to 100 | Alluvium (silt, sand and gravel) | 1.7 |
| | Pleistocene | | | Loess and Glacial Till (clay, silt, sand and gravel) | |
| Tertiary | | | Absent | | 66 |
| Cretaceous | | | Absent | | 138 |
| Jurassic | | | Absent | | 205 |
| Triassic | | | Absent | | 240 |
| Permian | Big Blue | Admire (only) | 0 to 50 | Shale and thin limestone | 290 |
| Pennsylvanian | Virgil | Wabaunsee | 500+ | Shale, limestone, and coal | 330 |
| | | Shawnee | | Limestone and shale | |
| | | Douglas | | Shale and limestone | |
| | Missouri | Lansing | 250+ | Limestone and shale | |
| | | Kansas City | | Limestone and shale | |
| | Des Moines | Marmation | 275+ | Shale, limestone, and coal | |
| | | Cherokee | | Shale, sandstone, and coal | |
| | Mississippian | | | 400+ | |
| Devonian | | | 375+ | Dolomite and limestone | 410 |
| Silurian | | | 250+ | Cherty dolomite | 435 |
| Middle and Upper Ordovician | | | 600+ | Dolomite, Shale, and sandstone | 570 |
| Lower Ordovician Cambrian | | | 0 to 100 | Dolomite and sandstone | |
| Precambrian | | | | Sedimentary rocks "Red clastics" | |

Generalized chart of the geology on Arbor Day Farm. Only the shaded rock units are exposed at the land surface.

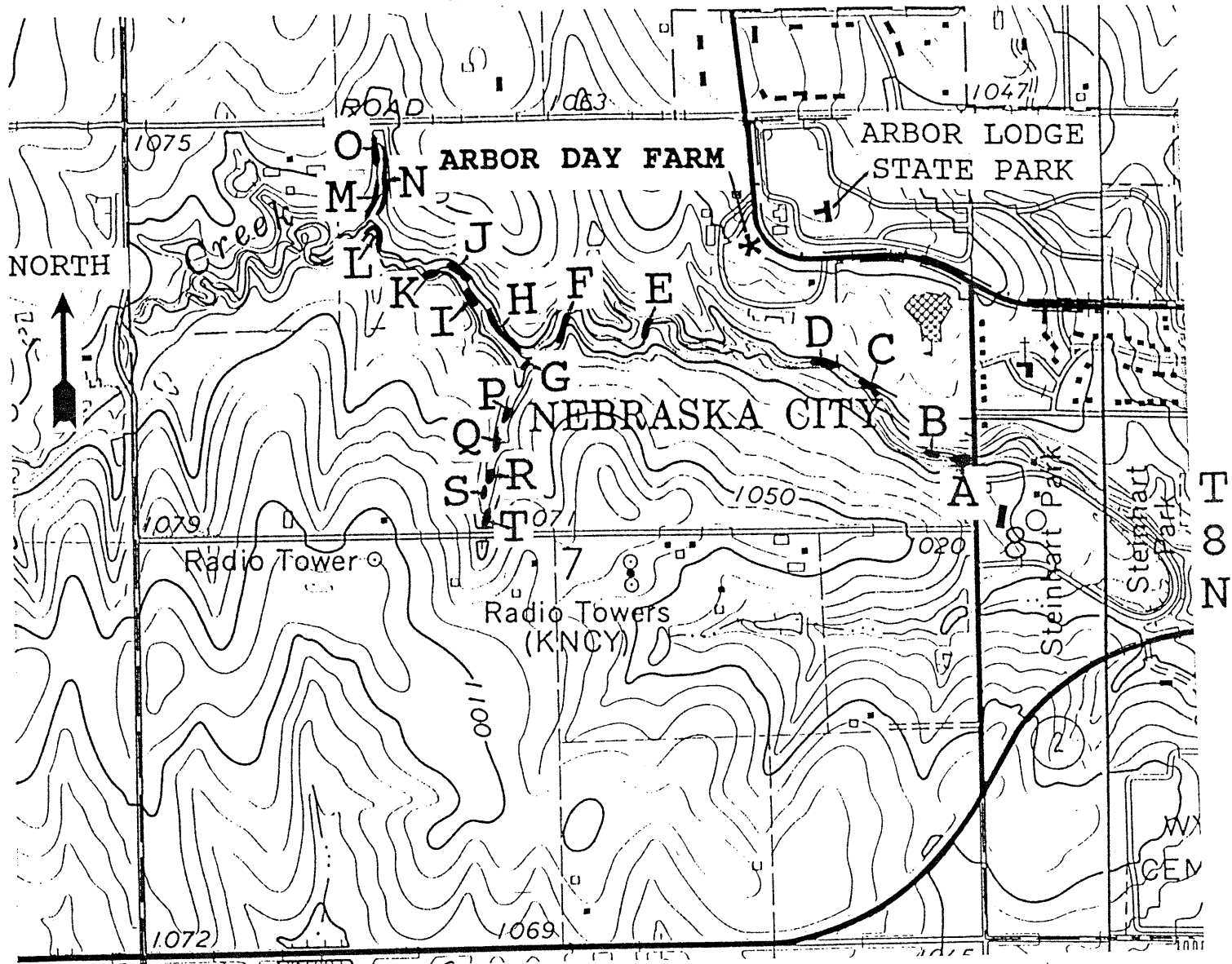
GEOLOGIC SECTION OF OUTCROPS ON ARBOR DAY FARM



Location: Measured along South Table Creek and its tributaries
 N 1/2 Sec. 7 T. 8N R. 14E Co. OTOE
Company: Nebraska Geological Survey Farm ARBOR DAY FARM
Elev.: +964 Estimated base unit #1 TD
Described by: R.R. Burchett & D.A. Eversoll **Date:** 11/17/92

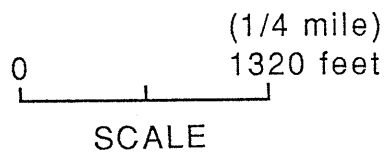
| Bed | Description | Thk. |
|-----|-----------------------------------------------------------------------------------------------|---------|
| 20 | Alluvium, silt, sand and gravel | 0 - 25' |
| 19 | Loess, yellowish brown, very silty | 0 - 75' |
| 18 | Glacial Till, bluish gray to brown, clayey, silty; contains sand and gravel | 0 - 10' |
| 17 | Shale, greenish gray mottled with red | 6.0 |
| 16 | Limestone, pale yellowish gray, contains crinoids and brachiopods | 2.0 |
| 15 | Shale, greenish gray | 4.0 |
| 14 | Shale, red | 10.0 |
| 13 | Shale, greenish gray | 1.0 |
| 12 | Limestone, dark gray, shaly; contains abundant brachiopods | 0.5 |
| 11 | Coal, black | 0.5 |
| 10 | Shale, bluish gray | 6.5 |
| 9 | Limestone, bluish gray, slabby; contains abundant brachiopods, crinoids, and bryozoans | 0.8 |
| 8 | Shale, gray; contains brachiopods | 1.5 |
| 7 | Shale, light gray | 5.0 |
| 6 | Shale, greenish gray mottled red in part | 2.0 |
| 5 | Limestone, cream, 2 beds with interbedded green gray shale; contains brachiopods and crinoids | 2.0 |
| 4 | Shale, greenish gray with red mottling | 3.0 |
| 3 | Sandstone, buff | 3.0 |
| 2 | Shale, olive to buff, sandy; contains coal | 7.0 |
| 1 | Shale, light gray weathers olive | 12.0 |

Water level of South Table Creek



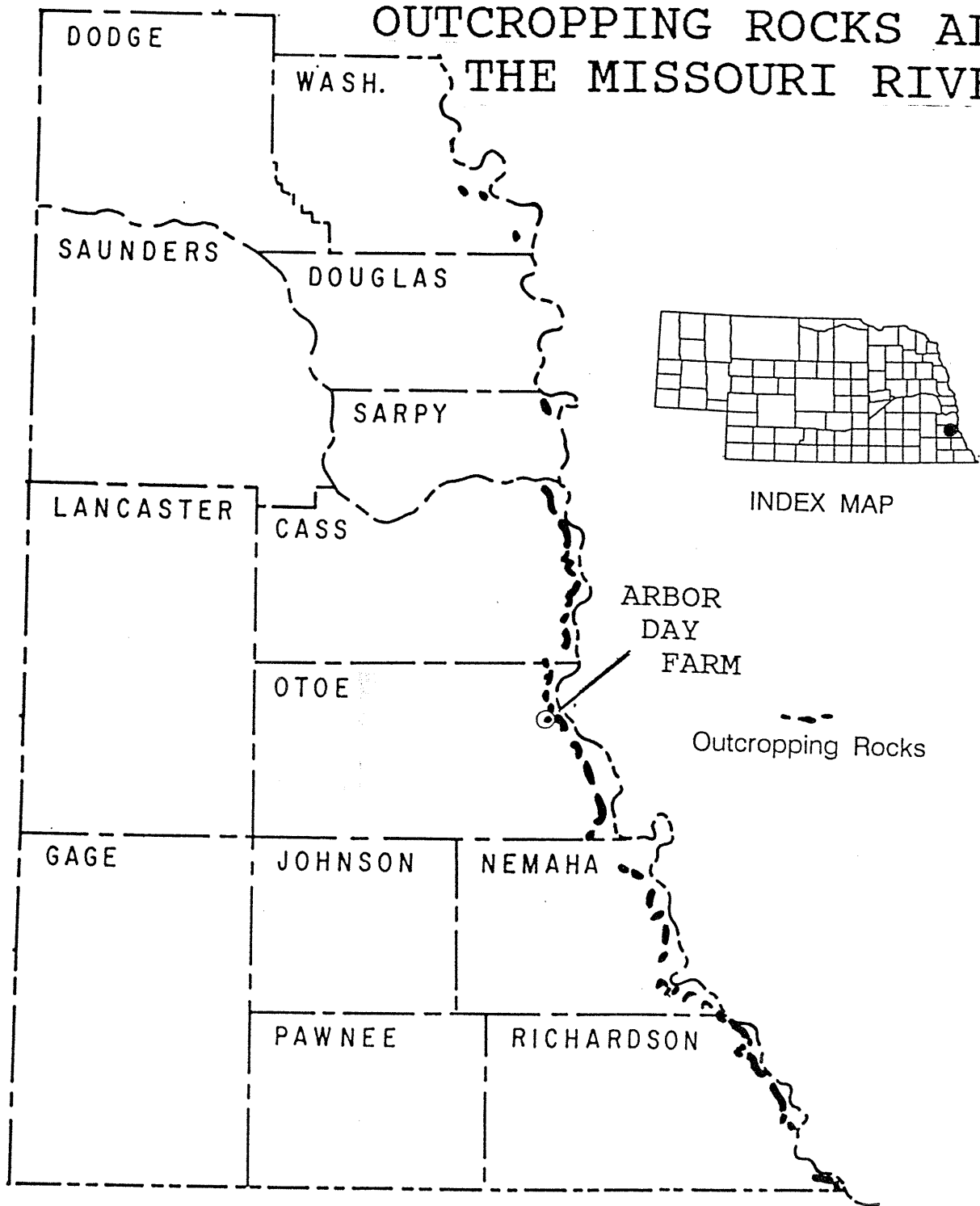
NOTES ON OUTCROPS SHOWN ON THE LOCATION MAP

- A. Shale, sandstone, and coal
- B. Shale
- C. Shale
- D. Shale "Bridge Overlook Outcrop"
- E. Limestone "Lower Ledgerrock Falls"
- F. Limestone "Upper Ledgerrock Falls"
- G. Shale
- H. Limestone and shale
- I. Shale and thin limestone "Rock Rapids and Pools" (NOTICE THE SMALL FAULT)
- J. Shale and thin limestone
- K. Shale and thin limestone
- L. Limestone and shale "The Falls"
- M. Shale
- N. Shale
- O. Shale and coal
- P. Limestone and shale
- Q. Shale
- R. Limestone and coal
- S. Shale
- T. Limestone and shale



LOCATION MAP OF BEDROCK OUTCROPS ON ARBOR DAY FARM

LOCATION MAP OF OUTCROPPING ROCKS ALONG THE MISSOURI RIVER



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