

Deer Creek Bridge  
Carrying Township Road 406  
Over Deer Creek  
Vicinity of Geff  
Bedford Township  
Wayne County  
Illinois

HAER No. IL-126

HAER  
ILL  
96-GEFF.V,  
1-

PHOTOGRAPHS

WRITTEN HISTORICAL AND DESCRIPTIVE DATA

Historic American Engineering Record  
National Park Service  
Department of the Interior  
Denver, Colorado 80225-0287

HISTORIC AMERICAN ENGINEERING RECORD  
DEER CREEK BRIDGE  
HAER No. IL-126

HAER  
ILL  
96-GEFF.V,  
1-

I. INTRODUCTION

Present Location: Township Road 406  
over Deer Creek  
2.5 miles northeast of Geff, Illinois

USGS Quadrangle: Geff, Illinois  
Latitude 38°-28.71'; Longitude 88°-23.07'  
UTM: 16.379280.4259600

Inventory Data: Illinois Structure No. 096-3159  
E 1/2 of Sec 35, T1N, R7E  
Wayne County

Date of Construction: 1910, County Engineer's records

Owner, Custodian: Bedford Township

Present Use: Vehicular bridge to be replaced  
without preservation.

Significance: The Deer Creek bridge, a half-hip pony truss  
with verticals, 45'-0" long and built in 1910,  
is one of the earliest known Warren truss  
bridges in Illinois. It is the only truss  
bridge in the state known to have field con-  
nections made with carriage bolts.

Historian: John B. Nolan, S.E.; December 15, 1994

II. HISTORY

Located in southeastern Illinois, Wayne County was settled in the winter of 1812-1813. "The greater part of the pioneers came from Kentucky, Tennessee and other southern states. A few came from Indiana." The county was established in 1819, the first year of Illinois statehood.<sup>1</sup>

Situated near the southern edge of prairie terrain, the topography is identified as Mount Vernon Hill Country, characterized by gently rolling subdued hills and isolated prairie plains. Flat lands are used for agriculture. Watercourses provide moderately deep and wide areas for timber and pasture. An early description states that Deer Creek is a principal water source in Bedford Township affording ample drainage and plenty of stock water.<sup>2</sup>

The Deer Creek Bridge is on north-south Township Road 406, a little used road surfaced with crushed rock. A mile to the west and parallel is U.S. Route 45, connecting the towns of Cisna and Geff, to the east, one-half mile distant, is a major improved local road passing a church founded in 1840 and shown on the earliest maps. Another improved road is an additional half-mile east. With the exception of the subject bridge all parallel roads have adequate modern bridges over Deer Creek. An atlas of 1881 shows no road at this location. Present road use is limited to serving the agricultural needs of a few area residents.<sup>3</sup>

Local residents and county records have no accepted name for this bridge. For convenience, "Geff", pronounced "Jeff", is sometimes used and has been spray painted on the bridge. The town of Geff, two miles to the south, is shown on earlier maps as "Jeffersonville" or "Jeff".<sup>4</sup>

Records of the County Engineer show that the bridge was built in 1910. In 1910 the Wayne County Board of Supervisors let contracts for three bridges and received petitions for two others, all over Deer Creek. The following report is believed to refer to the "Geff" bridge:

"February 16, 1910.

"Your road and bridge Committee met with the Commissioners of Bedford Township for the purpose of letting contract for a new bridge across Deer Creek where the highway leading from Cisne to Jeffersonville crosses same and awarded the contract to Columbian Bridge Co. of Olney. The steel for a forty foot bridge at \$394 and the concrete abutments to W.E. Morgan of Jeffersonville for \$174, making a total for the bridge of \$568 commissioners to pay one-half and the County of Wayne one-half.

/s/C.H. Keith, William Hilliard and T.M. McDaniel."<sup>5</sup>

Committee members Keith and McDaniel were paid \$31.30 and \$30.20 respectively for service on Board, mileage and Road and Bridge Committee work. The Brach Bridge, three miles west, was let on July 18, 1910 to the Columbian Company for \$394 and Mr. Morgan was allowed \$115 to build the abutments. The third bridge was let to the Springfield Bridge and Iron Company. Of the three bridges let in 1910 only the Geff bridge remains, the other two having been replaced by more modern spans.<sup>6</sup>

III. THE BRIDGE

A. The Bridge Type

The Deer Creek Bridge is a single span Pony Warren Truss with half-hip upper chords and verticals. Early metal trusses were the accepted and popular bridge type to use where maximum clearance above high water was needed.

The development of trusses of wrought iron and, later, steel in the second half of the nineteenth century contributed to the rapid expansion of railroads and eventually improved roads in the growing United States. For local road crossings of small streams low, or pony, Pratts with pinned connections provided a practical and cost effective solution. Truss members could be assembled with rivets in one of the hundreds of small fabrication shops, transported to the site by railroads and wagons and erected by a crew of local laborers under the direction of a foreman from the manufacturer's company. There were few standards, and many companies developed and patented designs which allowed them to build unique, if not better, bridges.

By the turn of the century, national quality standards were emerging and many of the early smaller bridge companies had disappeared or merged into larger companies. Ordering and erection of smaller bridges was handled by independent contractors. A Report of the Illinois Highway Commission in 1906 encouraged uniformity in design and development of experienced contractors.<sup>7</sup>

The early lightweight pony Pratts with pinned connections and outrigger braces were easy to erect but lacked strength and lateral stability. Many were washed out or failed under the increasing weight of trucks following World War I.

The Warren Truss, basically a series of isosceles triangles, and patented in Britian in 1848, is an improved version of a design patented in France in 1838. Stress analysis and design of Warren trusses may be more sophisticated than the Pratt and provide greater economy in the use of materials. Warrens with pinned connections had not been accepted in America but the type became a favorite after fixed connections replaced pins. Helped by the improvement of bolts and development of portable pneumatic riveters, the Warren gradually replaced the Pratt during the first quarter of the century and since that time has been the preferred choice for spans up to 140' where a low truss bridge is required.<sup>8</sup>

The Warren trusses of the Deer Creek bridge were erected in the transition period before field riveting was practical for bridges in isolated locations. Rivets were used in the shop for the fabrication of built-up members, but carriage bolts were used for field assembly, the spherical bolt heads appearing as rivets on the outer surfaces of members and connections. High strength bolted connections would not appear for another forty years.

The inherent strength of the fixed connections of Warren trusses is clearly illustrated in this bridge. Although the vertical posts are severely deteriorated at the upper edge of the lower chord connection plates, averaging less than twenty percent in effectiveness, there is no visible evidence of distress in the lower chord connections joining the diagonals and floor beams. The bridge is subject to occasional heavy farm machinery loading.

Design plans developed in the 1920s by the Bridge Section of the Division of Highways used fully riveted Warren Trusses for spans up to 130'. A limited number of Warren Trusses of later vintage were built in road improvement programs during the depression years. Beginning with World War II, the use of metal trusses for short spans generally gave way to reinforced concrete or multi-beam construction.<sup>9</sup>

#### B. The Builder

The fabricator of the bridge is not known.

Wayne County Road and Bridge Committee reports to the county supervisors in 1910 list three lettings of small metal trusses to the Columbian Bridge Company of Olney (Illinois). No mention of the Columbian Bridge Company, or of other bridge companies is found in histories of Olney and Richland County.<sup>5,10</sup>

The 1910 census of Olney lists three individuals as bridge builders. Further investigation presumes two as laborers and identifies Lesley W. Chesrown, a native of Ohio, as a bridge contractor in business between 1903 and 1920, and possibly longer. Mr. Chesrown evidently left the area as there is no record of his burial in the county. In 1916 he also managed the Elks Opera House.<sup>11</sup>

It can be assumed that Mr. Chesrown purchased fabricated members from a larger bridge company and erected them at the site. He would have used the products of manufacturers in Illinois, Indiana, Missouri or others more distant.

#### C. The Structure Description

##### Primary Data:

One span, pony Warren truss with verticals and half hips.<sup>12</sup>

Design loading, Unknown.

Allowable steel unit stress, presumed A-7, 16,000 psi.

Truss length 45'-0", three (3) panels 15'-0".

Total bridge length: about 45'.

Distance center to center of trusses 14'-6".

Height between upper and lower chord centers 6'-0".

Clear roadway width 13'-6" between timber edgings.

Trusses are symmetrical about the center of the second panel.

Upper chords, U0.5-U2.5, and half-hip end posts, L0-U0.5, U2.5-L3:  
 Built-up members, two channels, 5"x 6.7 lb., with 10"x1/4" top cover plates full length; rivets evenly and neatly spaced at 6". three batten plates, 4"x1/4", on bottom in each panel.  
 Fabricated upper chords include U0.5 end connection plates; fabricated end posts include L0 connection plates. Bent 1/4" scab plates over hip joints.

Lower chords, two angles:

L0-L1, L2-L3                    2"x2"x1/4"; four bolts on ends.  
 L1-L2                            2-1/2"x3"x1/4"; five bolts on ends.

Diagonals, two angles:

U0.5-L1, L2-U2.5            2-1/2"x3"x1/4"; lug angles at ends for two bolts, five bolts total.  
 L1-U1.5, U1.5-L2            2"x2"x1/4"; three bolts on ends.  
 Fabricated with three spacer angles on each pair.

All vertical posts: four angles:

U1-L1, U2-L2                    2"x2"x3/16"; one bolt in each angle through upper chord channels; five 2"x1/4" plate spacers; Fabricated posts include L1 and L2 connection plates, shop riveted.

Floor beams, rolled beams:

L1 and L2                        12"x 31.8 lbs. 1/4" connection plates on web ends, 8 rivets, bolts to vertical posts.

Stringers:

Seven rolled beams, 6"x3", channel at each edge; supported on tops of floor beams. Western channel in mid-span has been pushed by driftwood to side of first stringer.

Bottom lateral cross-bracing:

Rods, 3/4" rd., extending through webs of floor beams; nuts bear on floating angles held in position by vertical stop angles riveted to floor beam webs.

Bearings:

Bearings are buried under debris and driftwood.  
 The southwest bearing appears to be a single plate approximately 14"x1'6"x3/4". Deteriorated truss ends at all abutment bearings have been reinforced, usually with vertical plates welded to the flanges of the sloping end posts. The lower edges of these plates bear on the abutment.

Connection plates, gussets, all locations - 3/16"

Connectors:

Shop - rivets 5/8" dia.; field - carriage bolts 5/8" dia. with square nuts, no washers.

Timber Deck:

Transverse: 3"x12"; treads: 2"x12", three per wheel track.

Railing:

Two channels 3-1/2"x 1.4 lbs.; 1'-7" and 3'-1-1/2" above deck.  
Damaged, loose and bent.

Substructure:

Closed abutments with integral wings at about 45 degrees. Face walls 18'-0" long and 14" thick; wings 12'-0"x12" thick.

To the face of the south abutment an additional 16" wall has been added, apparently at the time of the original construction, to support the southeast bearing. The northwest bearing extends about fifteen inches past the back edge of the north abutment and the bridge appears to be supported on vertical plates welded to the end post and resting on the abutment wall. There is some sag in the panel 3 diagonals. There is no access beneath the bridge or to the east side. Truss ends are largely covered with debris, driftwood and vegetation. The bridge is on a slight grade descending to the north. Additional investigation is required to explain the bearing position anomaly.

D. Present Condition and Modification

Above the deck the bridge trusses are rusty but fairly clean. All lower chord connections are severely deteriorated and beyond restoration by conventional maintenance practice. Vertical scab plates have been added at the truss ends. The timber deck is in sound condition. The bridge is posted for 7-ton loading.

E. Ownership and Future

The Deer Creek Bridge is owned and maintained by Bedford township. Due to the narrow roadway and critical load carrying capacity, a replacement of this structure is scheduled for the immediate future.

Although the carriage bolt assembly is structurally noteworthy, the bridge has little value for salvage or preservation.

IV. ENDNOTES

<sup>1</sup>Paul F. Campbell, Illustrated and Descriptive Sketch Book of Wayne County, Illinois. (Fairfield: Press Print, 1903).

<sup>2</sup>History of Wayne and Clay Counties, Illinois. (Chicago: Globe Publishing Co., 1884. (Reprint: Evansville, Indiana: Unigraph, Inc., 1969), 233ff.

<sup>3</sup>A Standard Atlas of Wayne County, Illinois, 1881. (Evansville, Indiana: reproduced by Unigraph, Inc, 1977); Standard Atlas of Wayne County, Illinois (Chicago: George A. Ogle and Co., 1910); Land Atlas and Plat Book, Wayne County, Illinois. (Rockford, Illinois: Rockford Map Publishers, Inc., 1987).

<sup>4</sup>Conversations: Gary W. Maxwell, County Highway Engineer, Fairfield, November 28, 1994; Albert Grove, resident, Rt. #1, Geff, 62842, December 1, 1994.

<sup>5</sup>Proceedings of the Wayne County Board of Supervisor's Meeting, Wayne County Record. (Fairfield, Illinois: March 31, 1910), 1.

<sup>6</sup>Ibid; \_\_\_\_\_, January 8, 1910, 1; July 21, 1910, 4; September 29, 1910, 1.

<sup>7</sup>Victor C. Darnell, Directory of American Bridge Building Companies, 1840-1890. (Washington, D.C.: Society for Industrial Archaeology, 1984), Introduction, 13; \_\_\_\_\_ Illinois Highway Commission Report. (Springfield: State of Illinois, 1906), 55ff.

<sup>8</sup>Milo S. Ketchum, C.E. Structural Engineers Handbook. (Chicago: McGraw-Hill, 1924), 140, 676ff; James L. Cooper, Iron Monuments to Distant Posterity, Indiana's Metal Bridges, 1870-1930. (DePauw University and others, 1987), 84ff; David Plowden, Bridges: The Spans of North America. (New York: Viking Press, 1974), 185; Eric DeLony, The Golden Age of the Iron Bridge, American Heritage of Invention and Technology. (New York: Forbes, American Heritage Division, Fall 1994), 11.

<sup>9</sup>Illinois Department of Transportation, Historic Bridge Preservation List. (Springfield: Bureau of Location and Environment, 1992), 3102M.PWff.

<sup>10</sup>Richland County History Committee, Olney/Richland County Sesquicentennial History, 1841-1991. (Rich Hill, Missouri: Ball Books); Bert Michels, History of Olney. (Olney: Taylor Print Shop, undated [after 1961]); \_\_\_\_\_ Richland County Centennial History. (Olney: 1941).

<sup>11</sup>C.W. and C.F. McLaughlin, Official Directory of the City of Olney. (Olney: Lile Printing Co., 1903); \_\_\_\_\_ Olney City Directory. (Olney: The Olney Times, 1916); Richland County Genealogical and Historical Society. Transcribed Federal Census Schedules (1900, 1910, 1920): (Olney: 1994 etc.).

<sup>12</sup>Field inspection by the author, December 1, 1994.

V.

BIBLIOGRAPHYA. Books

- Campbell, Paul F. (Bowling Green, Kentucky, Compiler and Publisher). Illustrated and Descriptive Sketch Book of Wayne County, Illinois. Fairfield: Press Print, 1903. (Brief history of county areas.)
- Cooper, James L. Iron Monuments to Distant Posterity, Indiana's Metal Bridges, 1870-1930. DePauw University and others, 1987. (Includes extensive discussions and photographs of many early bridge types.)
- Darnell, Victor C. Directory of American Bridge Building Companies, 1840 - 1900. Washington, D.C.: Society for Industrial Archaeology, 1984. (An authoritative source book published by a branch of the Smithsonian Institution.)
- Ketchum, Milo S., C.E. Structural Engineers' Handbook. Chicago: McGraw-Hill, 1924. (An early classic on bridge design practices, originally published in 1908.)
- McLaughlin, C.W. and C.F. Official Directory of the City of Olney. Olney: Lile Printing Company, 1903. (Olney Central College Library.)
- Michels, Bert. History of Olney. Olney: Taylor Print Shop, undated (after 1961). (Searching for Columbian Bridge Co.)
- Plowden, David. Bridges: The Spans of North America. New York: Viking Press, 1974. (An overview and illustrated history of the advancement and romance of bridge building in the United States.)
- Schuberth, Christopher J. A View of the Past: An Introduction to Illinois Geology. Springfield: Illinois State Museum, 1986. (Topography of area.)
- History of Wayne and Clay Counties, Illinois. Chicago: Globe Publishing Co., 1884; (Reprint: Evansville: Unigraph, Inc., 1977.) (Early county history.)
- Olney City Directory. Olney: The Olney Times, 1916. (Olney Central College Library.)
- Olney/Richland County Sesquicentennial History, 1841-1991. Rich Hill, Missouri: Ball Books, 1991. (Searching for Columbian Bridge Co.)
- Richland County Centennial History. Olney: 1941.

B. Magazines

- Delony, Eric. The Golden Age of the Iron Bridge. American Heritage of Invention and Technology. New York: Forbes, American Heritage Division, Fall 1994. (Early bridge history.)

C. Maps

A Standard Atlas of Wayne County, Illinois. Philadelphia:  
D.J. Lake and Co., 1881; Reproduced: Evansville, Indiana:  
Unigraph, Inc., 1977.

Standard Atlas of Wayne County, Illinois, Including a Plat Book.  
Chicago: Geo. A. Ogle and Co., 1910.

Land Atlas and Plat Book, Wayne County, Illinois. Rockford, Illi-  
nois: Rockford Map Publishers, Inc., 1987.

D. Reports

Richland County Genealogical and Historical Society, Transcribed  
Federal Census Schedules, 1900, 1910, 1920. Olney: 1944 etc.  
(Alphabetical listing of county residents and occupations,  
Olney Central College, Library).

Historic Bridge Preservation List, Illinois Department of Transpor-  
tation. Springfield: Bureau of Location and Environment,  
1992.

E. Newspapers

Proceedings of the Wayne County Board of Supervisor's Meetings,  
Wayne County Record. Fairfield: January 8, 1910; March 31,  
1910; July 21, 1910; September 29, 1910. (Microfilm at State  
Historical Library, Springfield.)

F. Conversations

Doan, Jan, Richland County historian  
Olney Central College Library  
Olney, Illinois  
Telephone 618/869-2425

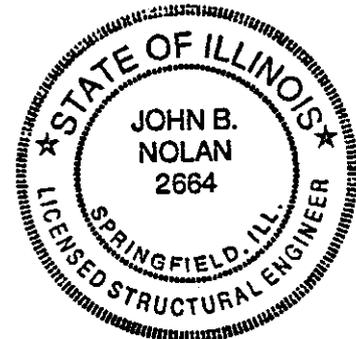
Grove, Albert, local resident  
Rt. #1; Geff, Illinois 62842  
December 1, 1994

Maxwell, Gary W., Wayne County Engineer  
Rt. #3, Highway 15 East  
Fairfield, Illinois 62837  
Telephone 618/847-7343. November 28, 1994

-----  
Report prepared by:

John B. Nolan, S.E.  
66 Circle Drive  
Springfield, IL 62703-4805  
Telephone 217/529-1550

15 December 1994.



GEFF QUADRANGLE  
ILLINOIS-WAYNE CO.  
7.5 MINUTE SERIES (TOP)

61 III SE  
-R(PISE)

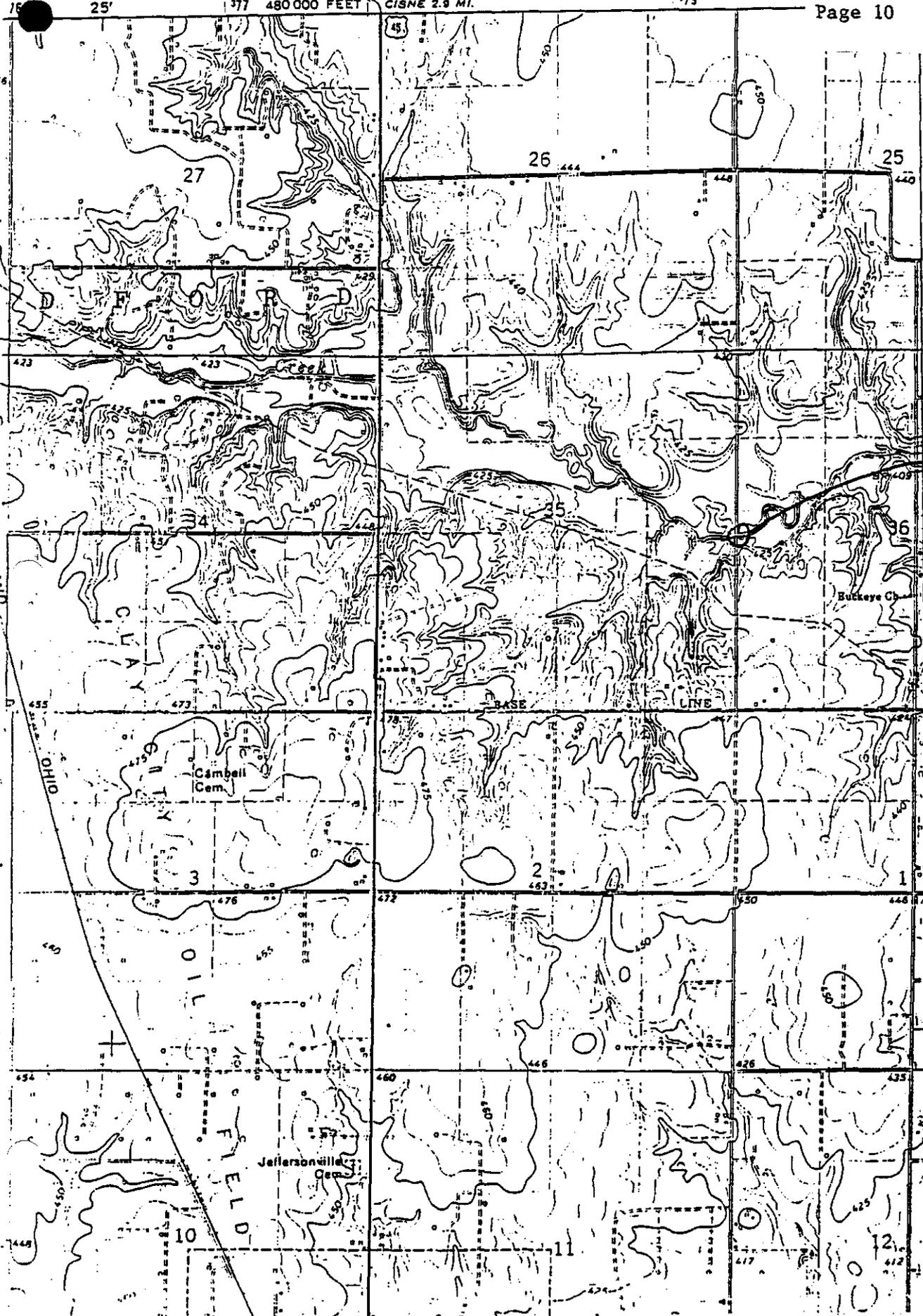
NW/4 FAIRFIELD 15' QUADRA

Deer Creek Bridge

HAER No. IL-126

Page 10

FLORA 16 MI.  
CISNE 2.9 MI.



096-  
3159

660 000  
FEET

T. I. N.

T. I. S.

27' 30"

4257