

TERRACES, MEANDER LOOPS, AND ARCHAEOLOGY  
IN THE AMERICAN BOTTOMS, ILLINOIS

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ABSTRACT--Utilizing association of dated archaeological artifacts and sites, plus the principles of superimposition, a dated chronology has been established for the first terrace, the floodplain surface, and 24 extinct river channel segments in the American Bottoms portion of the central Mississippi River valley. These data suggest that the last deposition on the first terrace (Festus) occurred after 10,000 radiocarbon years ago but prior to 9000 B.P., that the surface of the present floodplain was formed after 5000 B.P. but some years prior to 2800 B.P., and that some of the river channel remnants (meander loops) ceased to exist as viable portions of the river well prior to 2800 B.P.

In situations where chronologies of geological events have been established, archaeologists have often utilized these chronologies to establish sequences of cultural events, primarily by the association of cultural artifacts or sites with particular geological features. Although less frequently used, the opposite edge of the sword is equally sharp; when the cultural chronology is well established, geological features can be dated by their association with diagnostic cultural remains. This paper is an attempt to determine, by association of archaeological remains, the age of formation of the surface of the floodplain, the first terrace above the floodplain, and a number of extinct river channel remnants (meander loops) within the American Bottoms.

LOCATION AND DESCRIPTION

The American Bottoms is a wide expanse of valley floor along the Mississippi River in Illinois, roughly opposite St. Louis, Missouri, and opposite and mostly downstream from the mouth of the Missouri River. Summarizing from previous descriptions of the physical characteristics of this area (Penneman 1911; Branom 1941; Bergstrom and Walker 1956), the greatest width east-west is approximately eleven miles and occurs just north of the Madison-St. Clair county line. The valley narrows abruptly on the north near

Alton, Illinois, and on the south near Dubo, Illinois, a distance of approximately 25 miles.

The bulk of this bottomland area is floodplain; i.e., it was, prior to modern leveeing projects, subject to overflow from the Mississippi River, and it varies from ca. 415 feet above mean sea level at the northern end of the Bottoms to ca. 405 feet above sea level at the southern end. Most of this floodplain area is scarred by a number of extinct river channels which exhibit various degrees of filling. Prior to modern drainage, approximately one-sixth of the total area of the American Bottoms consisted of lakes and swamps of a permanent enough nature to be worthless as agricultural land (Branom 1941: 91), and all of these lakes and swamps apparently laid within the channel remnants.

At the northern end of the Bottoms, a sandy terrace of Pleistocene age rises ca. 30 feet above the floodplain (ca. 445 feet above sea level). This feature, which is informally referred to as the "Wood River Terrace" by Bergstrom and Walker (1956: 30-31) and most archaeologists working in the area (e.g., Munson 1971), has been formally designated as a portion of the Festus Terrace of the central Mississippi River valley by Robertson (1938), and the Festus Terrace correlates exactly with the terrace system in the vicinity of the mouth of the Illinois Valley which Rubey (1952) refers to as the Deer Plain Terrace.

#### METHODS OF DATING

Archaeological sites must post-date the formation of the surface upon which they rest. Therefore, a terrace or the surface of a floodplain will be older than the oldest archaeological assemblage found upon it. A corollary assumption is that if a human population exists in a general area, any new surface will be "colonized," at least to some extent, soon after it becomes available for habitation. A potential source of confusion which exists here, however, is that individual artifacts might be fabricated and lost or discarded at an earlier date and then transported by the same agency (in this case water action) which was responsible for the formation of the terrace or floodplain. However, such specimens would be expected to show evidence of "rolling" and since none of the artifacts dealt with in this study show such evidence this possibility can be ignored.

The sequence of formation of meander loops, from a straight segment of river, to a wide and expanding loop, to cut-off and creation of an "oxbow" lake, is well understood (Leopold and Langbein 1966; Lathrao 1966: Fig. 2). Given this sequence, the position of dated archaeological sites in relationship to oxbow lakes can be used to establish the dates before which the meander loops were cut off (i.e. ceased to function as viable portions of the river). If an archaeological site is found immediately adjacent the inside (convex) bank of a meander segment, it is certain that the site was established after, or at most only a few years prior to, the date when this segment was cut off; if the site had

been established prior to the migration of the meander, it would have been destroyed; if it had been established after the meander had passed, but well prior to the cut-off, the bank would have migrated away from the site. Sites found on the surface immediately adjacent the outside (concave) edge of a meander segment also must have been established after or only a few years prior to the date of cut-off; sites established along the concave bank of a viable meander would have soon been eroded away, or, in a situation where a meander migrated up to a site which pre-dated it and then stopped, the site would be buried beneath the alluvium of the natural levee.

### THE ARCHAEOLOGICAL CHRONOLOGY

The sequence of prehistoric cultural periods or phases in the Midwestern United States has been well-established by stratigraphic excavations and by several hundred radiocarbon age determinations. These periods and their age-ranges as extrapolated from radiocarbon determinations are, from latest to earliest, as follows:

<u>Period</u>	<u>Age B.P.</u>
Late Mississippian	400- 700
Early Mississippian	700- 1000
Final Late Woodland	900- 1100
Initial Late Woodland	1100- 1600
Middle Woodland	1600- 2200
Early Woodland	2200- 2800
Late Archaic	2800- 5000
Middle Archaic	5000- 8000
Early Archaic	8000-10,000
Clovis	10,000-12,000

Sites, or at least unrolled artifacts, of all these periods except Clovis have been discovered at various locations within the American Bottoms during archaeological surveys by myself (Munson 1971), by Harn (1971), and by others as recorded in the files of the Illinois Archaeological Survey.

### AGE OF THE FESTUS TERRACE

On geological grounds, there has been some confusion as to the exact temporal position of the Festus Terrace. Robertson (1938: 236), who originally defined it, simply referred to it as a Wisconsinan feature. Subsequently Rubey (1952: 96), who refers to the feature as the Deer Plain Terrace, argued for a post-Kankakee Torrent alignment (i.e., post-ca. 14,000-15,000 B.P.). More recently Leighton (1957: 1037) argued that this terrace could be traced to the Bigstone Moraine in Minnesota, which he interpreted as a Valderan feature. Wright (1957: 1038), however, correlated the Bigstone Moraine with the Mankato Advance, and it is apparently on this basis that Willman and Frye (1970: 116) assign the terrace to a late Woodfordian, pre-Two Creeks position (i.e., pre-ca. 12,500 B.P.).

Whatever the temporal placement of the Bigstone Moraine and its relationship to the lowest terrace of the Mississippi Valley, the archaeological evidence strongly suggests an early Valderan, rather than a late Woodfordian, alignment for at least the final deposition upon the Festus Terrace. Although Clovis points are fairly commonly recovered from elevations higher than the surface of this terrace in the vicinity of the American Bottoms and the mouth of the Illinois Valley, none are known to have come from its surface or lower elevations, thus suggesting that the surface was not present (or at least was not inhabitable by man) until after 10,000 years ago. Projectile points diagnostic of the Early Archaic Period, specifically the types Dalton-Meserve and St. Charles, do however occur in some quantity upon the surface of this terrace both within the American Bottoms and in the lower Illinois Valley. St. Charles points are at best only loosely dated within the ca. 8000-10,000 B.P. time-range (or perhaps slightly later), but it seems definite that Dalton-Meserve points were not used after about 8500 years ago and it is likely that their use does not post-date ca. 9000 B.P. The archaeological data thus suggest that the terrace was still being formed at 10,000 B.P., but that formation had ceased by 9000 B.P., a date approximately mid-way in the assigned time-range for the Valderan Substage.

#### AGE OF THE FLOODPLAIN

The present floodplain is the surface of the recently classified Cahokia Alluvium Formation (Willman and Frye 1970: 75). Neither Clovis nor Early Archaic materials have been recovered from this surface and only one site of the Middle Archaic Period (South Roxana, Ms-66) has been discovered at a floodplain elevation. Significantly, however, this site is located upon the flank of the Festus Terrace rather than upon the floodplain proper, and consequently is perhaps not relevant to the dating of the present floodplain. It is only during the Late Archaic Period that sites become general upon the floodplain surface.

Additional archaeological support for a post-Middle Archaic age for this surface comes from recent dredging activity in the west-central portion of the Bottoms in which unrolled artifacts assignable to the Late Archaic Period (and presumably dating to the early portion of this period) were recovered at a depth in excess of 25 feet below the present floodplain. Furthermore, Willman and Frye (1970: 37) report that in this general vicinity an upright tree trunk was discovered at a depth of 50 feet below the present floodplain surface which yielded a radiocarbon age of 6600 B.P.

Available data therefore suggest that at 6600 B.P. at least portions of the floodplain surface were some 50 feet lower than modern levels, and that by some time after the beginning of the Late Archaic Period (ca. 5000 B.P.) some portions were still in excess of 25 feet lower than present, but that floodplain formation, with the exception of natural levees and point bars associated

with river channels, had ceased some time prior to 2800 B.P. This in turn suggests that floodplain formation in this portion of the Mississippi Valley is comparable in age to formation in the lower Mississippi Valley (from Cairo, Illinois to the mouth) where geological evidence suggests a final "wave of alluviation by braided streams . . . 4,000-5,000 years ago (Saucier 1968: 74-75).

#### AGES OF THE VARIOUS MEANDER LOOPS

Segments of 24 extinct meanders are apparent within the floodplain of the American Bottoms (Fig. 1). In several instances it can be demonstrated that two or more of these meanders were parts of a single extinct channel; examples are the Spring Lake and Jones Park meanders, the Choutou Slough-Gabaret Slough-Horseshoe Lake channel, and at a later period the Choutou Slough-Gabaret Slough-Dead Creek channel. It might be possible to correlate other segments, but such correlations are much less convincing. Consequently, except for the above mentioned channel reconstructions, consideration will be given only to single meander loop segments.

Although archaeological sites have not been discovered in association with every one of these channel segments, there are, nevertheless, numerous sites in key positions, and these, combined with the relative chronologies derived from superimpositions of various channel segments, allow one to reconstruct a fairly tight chronology of channel changes.

The last channel change to have occurred in the American Bottoms, as determined by the superimposition of channel segments, was the cut-off of Cahokia Slough by the modern channel of the Mississippi. Historical data can be brought to bear here since the French mission at the village of Cahokia was established in 1699 (Fortier 1908) and this village lies immediately adjacent the outside margin of Cahokia Slough, which was described as an "arm" of the river (rather than the channel) in 1699. Cahokia Slough is superimposed upon the older Choutou Slough-Gabaret Slough-Dead Creek channel, which in turn is superimposed upon the Horseshoe Lake meander. The methodology employed here has already been applied to the Horseshoe Lake meander by Bareis (1964: 89), who argued that lateral movement of this feature had ceased prior to the end-date of the Final Late Woodland and Early Mississippian periods (ca. 900-1000 B.P.). This was determined on the basis of the positions of the Powell mound group and village site (Ms-2-2) and the Mollenbrocks mound and village (Ms-37), which lie immediately adjacent the outside margin of this meander.

The Edelhardt Lake meander, which pre-dates the Horseshoe Lake meander, must have a cut-off date prior to 2200 B.P. since the Early Woodland Miller Lake site (Ms-34) is located on a point bar remnant adjacent the inside margin. Cut-off of the McDonough Lake meander, which is superimposed upon by the Edelhardt Lake meander, pre-dates 2800 B.P. on the basis of the position of the Late Archaic McDonough Lake site (Ms-46) adjacent its outside margin. The Spring Lake-Jones Park channel segment is also

- B Bullfrog Station
- Ca Cahokia Slough
- Ch Chouteau Slough
- Cr Crooked Lake
- D Dead Creek
- E Edelhardt Lake
- F Fish Lake
- Ga Gabaret Slough
- GM Grand Marais
- Go Goose Lake
- Gr Grassy Lake
- H Horseshoe Lake
- J Jones Park
- Mc McDonough Lake
- M Mapiewood Park
- N Nameoki
- O Oldenburg
- Po Pontoon Beach
- Pr Prairie Lake
- R Rock Road
- Sa St. Thomas
- Sc Schmidts Lake
- Sm Smith Lake
- Sp Spring Lake
- St Stallings

-  Bluff
-  Festus Terrace

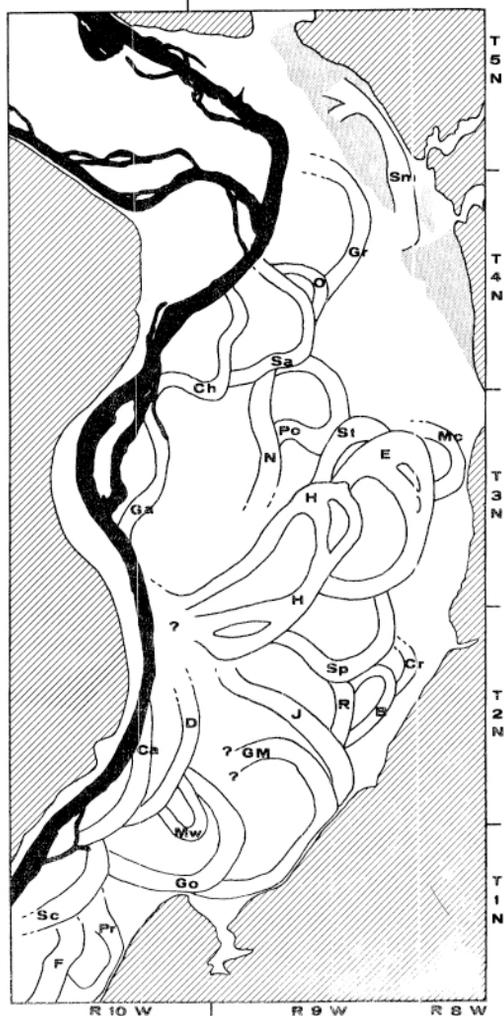
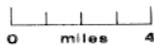


Fig. 1: Terraces and meander loops of the American Bottoms

superimposed upon by the Edelhardt Lake meander and also has a cut-off date prior to 2800 B.P., as determined by the Late Archaic Bullfrog Station site (Ms-45) located adjacent the outside margin of the Spring Lake meander.

In the northern portion of the Bottoms, the St. Thomas meander segment has been determined to have a pre-1600 B.P. cut-off date on the basis of two Middle Woodland sites located immediately adjacent its outside bank: Sunny Acres (Ms-43) and West mound (Ms-76). The Grassy Lake meander, which is superimposed upon by the Oldenberg meander, which in turn is superimposed upon by the St. Thomas segment, may represent a relatively very ancient channel; the Middle Archaic South Roxana site (Ms-66) is located immediately adjacent its outside margin, suggesting a cut-off prior to 5000 B.P. However, as previously noted, this site is upon the flank of the Festus Terrace, and consequently it is possible that it does not relate to this meander.

In the southern portion of the Bottoms a cut-off date prior to 1100 B.P. is suggested for the Goose Lake meander since the Initial Late Woodland Julien site (S-63) is located immediately adjacent its inside bank. Goose Lake in turn is superimposed upon the Grand Marais meander, which had to have been cut-off prior to 1600 B.P. since two sites with Middle Woodland components, Lalumier (S-54) and Lohmann (S-75), are found immediately adjacent its inside bank. The Fish Lake meander, the southernmost channel segment under consideration here, has been determined to have a pre-2800 B.P. cut-off on the basis of the Late Archaic component of the Divers site (Mo-28), which is located immediately adjacent its outside margin.

Utilizing the minimal date of cut-off for these ten channel segments, plus the relative chronology derived from the superimposition of segments, some estimate can be made for the minimal date of cut-off of most of the remaining meander segments within the American Bottoms. In the following listing, meanders with minimal cut-off dates as determined by associated archaeological sites will be followed by those "dates"; e.g., if the cut-off of Meander X pre-dates the end of the Middle Woodland Period it will be indicated as "pre-1600 B.P." If Meander X is superimposed upon Meander Y, then the cut-off of Meander Y, even in absence of known associated archaeological sites as old or older than the Middle Woodland Period, must pre-date 1600 B.P. by at least whatever length of time was necessary for Meander X to form and subsequently be cut-off. This necessarily greater age for Meander Y will be indicated by a plus sign following the minimal date assigned to Meander X (i.e. pre-1600+ B.P.), and if Meander Y in turn is superimposed on the still older Meander Z, which also lacks known associated archaeological sites, its "date" would be indicated as pre-1600++ B.P. Utilizing these designations, the chronology of cut-off for the channel segments, from latest to earliest, is as follows:

<u>Meander Segment</u>	<u>Cut-Off (B.P.)</u>
Cahokia Slough	pre-275
Choutou-Gabaret-Dead Cr.	pre-275+
Horseshoe Lake	pre-900
Goose Lake	pre-1100
St. Thomas	pre-1600
Grand Marais	pre-1600
Oldenberg	pre-1600+
Nameoki	pre-1600+
Edelhardt Lake	pre-2200
Stallings	pre-2200+
Pontoon Beach	pre-2200++
McDonough Lake	pre-2800
Spring Lake-Jones Park	pre-2800
Fish Lake	pre-2800
Rock Road	pre-2800+
Prairie Lake	pre-2800+
Bullfrog Station	pre-2800++
Crooked Lake	pre-2800+++
Grassy Lake	pre-5000 ?

The Schmidts Lake and Maplewood Park meanders are omitted from the above listing since it has not been possible to determine their temporal positions relative to each other or relative to the Horseshoe Lake meander. Both, however, postdate the Goose Lake meander and both pre-date either Cahokia Slough or Dead Creek. The Smith Lake meander is also omitted from this listing since it is a feature associated with Festus Terrace rather than the floodplain.

A final comment concerns two instances where there exist sequences of seven superimposed channels or channel remnants, the youngest being the present channel and the oldest pre-dating 2800 B.P.: 1) present channel to Jones Park, and 2) present channel to McDonough Lake. Assuming that the Jones Park and McDonough Lake meanders were cut off only shortly prior to 2800 B.P., this would indicate an average of 350 years or more between channel changes.

#### SUMMARY

Archaeological data indicate that final deposition of the Festus Terrace post-dates the end of the Clovis Period (ca. 10,000 B.P.), but that formation had ceased before the end-date of the Dalton point utilization (ca. 9000-8500 B.P.). The same methodology suggests that the surface of the floodplain, at least in general, post-dates the end of the Middle Archaic Period (ca. 5000 B.P.), but that the surface was in existence some years prior to the end of the Late Archaic Period (ca. 2800 B.P.). The 24 meander loop remnants found within the floodplain of the American Bottoms represent segments of at least nine former river channels, and the relationships of archaeological sites to these channels indicate minimal cut-off dates extending back, in some cases, to well prior to 2800 B.P.

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