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## PLEISTOCENE HISTORY AND MOLLUSCAN PALEOECOLOGY OF THE WINAMEG MASTODON SITE, FULTON COUNTY, OH<sup>1</sup>

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*Abstract.* The discovery of a mastodon skeleton in Fulton County, Ohio provided an opportunity to study the molluscan fauna and Late Wisconsinan history of this area. After the deposition of Lake Maumee sediments, a series of ponds developed in a beach ridge of Lake Maumee II, later to be filled in with sediments and vegetation. Eleven stratigraphic sections taken from a site in the village of Winameg exposed a lens-shaped deposit of shell marl capped by humus. Seventeen species of mollusks including four ctenobranchs, 10 aquatic pulmonates and 3 sphaeriids were recovered from the marl. During the early stages of the pond, *Valvata tricarinata*, *Fossaria obrussa decampi*, *Gyraulus parvus*, *Helisoma anceps*, and *Pisidium casertanum* were the dominant species. *Fossaria obrussa decampi*, *Gyraulus parvus*, *Physella gyrina*, and sphaeriids were probably the significant species in the late stages of pond succession due to the ephemeral nature of the small water body.

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In August 1978, during the excavation of a pond in the Fulton County, Ohio village of Winameg, a bulldozer operator unearthed several bones of the mastodon, *Mammot americanum*. The excavation was delayed while a team of geologists and anthropologists from Bowling Green State University and The University of Toledo combed the area for the remainder of the skeleton. In addition, I took this opportunity to study the Pleistocene stratigraphy and molluscan fauna of the site.

The Pleistocene history of northwestern Ohio is only generally known, mainly in relation to the proglacial lakes ancestral to Lake Erie. This site provided an opportunity to gather ecological and distributional data on Pleistocene mollusks of the area. Although the molluscan faunas of southern Michigan (Camp 1973, 1974) and central Ohio (Zimmerman 1960, Mowery 1961, Camp 1973) have been studied, little data is available for northwestern Ohio.

### LOCATION AND GEOLOGIC SETTING

The Winameg mastodon site is located in the NE ¼, NW ¼, Sec. 9, Pike Township in central Fulton County, Ohio in the village of Winameg (see figs. 1 and

2). The samples were collected from the margins of a partially excavated pond on the D. Murray property.

The Winameg deposit is situated on the lacustrine plain of former Lakes Maumee I and III (Goldthwait *et al* 1961, Johnson and Keller 1972). Eleven kilometers to the northwest is the slightly higher terrain marking the Defiance moraine of Late Cary age (Johnson and Keller 1972). A north-south trending Lake Maumee II beach ridge passes directly through Winameg (Forsyth 1959, Johnson and Keller 1972). Hummocky topography has developed along this ridge producing a series of small marshy depressions along the crest. The Winameg deposit was formed from the accumulation of sediments in one of these depressions.

### METHODS AND MATERIALS

Due to the pond construction, only the periphery of the deposit could be sampled. Care had to be taken to avoid areas of disturbed sediments. Eleven sections were examined around the pond site and 6 were collected stratigraphically for molluscan material (see figure 2). A pit was dug in each case and a 30 cm<sup>2</sup> column of sediment was removed. Samples were taken every 5 cm in zones of molluscan occurrence and representative samples were removed from each different stratigraphic unit until water inflow curtailed sampling.

The molluscan-rich samples were treated in dispersant and washed through 10, 20 and 40 mesh

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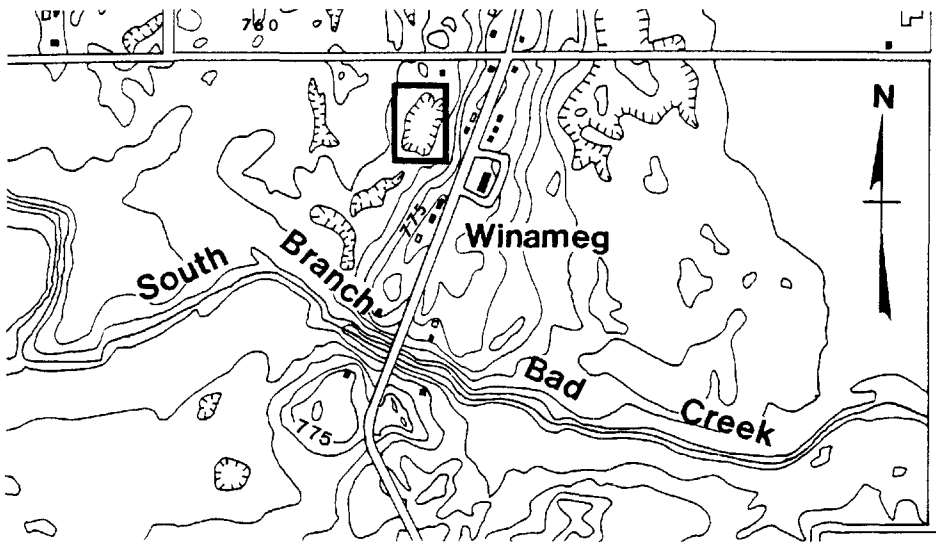


FIGURE 1. Location map of Winameg Pond Deposit, Fulton County, Ohio. K/1.75 in; contour interval 5 ft. Study area marked by black rectangle.

sieves to separate the mollusks from the finer-grained sediment. Shells (1000) were picked from each collection after the sample had been split down to a fraction estimated to contain 1,000 shells and percentage abundance was calculated for each species (table 1).

#### STRATIGRAPHIC SECTIONS

Sample pits exposed 5 stratigraphic units: from bottom to top, a sandy clay

with pebbles, a sand, a shell marl, and two upper humus layers (see figure 3).

A similar depression in the Maumee II beach ridge approximately 300 m to the south of the newly excavated pond was augered, but a high water table and thick humus section prevented a detailed interpretation of the stratigraphy. Another depression 900 m north of the Winameg site was also examined. A gray clay layer was uncovered, but it was only slightly fossiliferous. This location was also subject to a high water table and sampling proved difficult. The success of the sampling at the Winameg site has to be attributed to the presence of the deep excavation which allowed sampling to a greater depth before the water table was contacted.

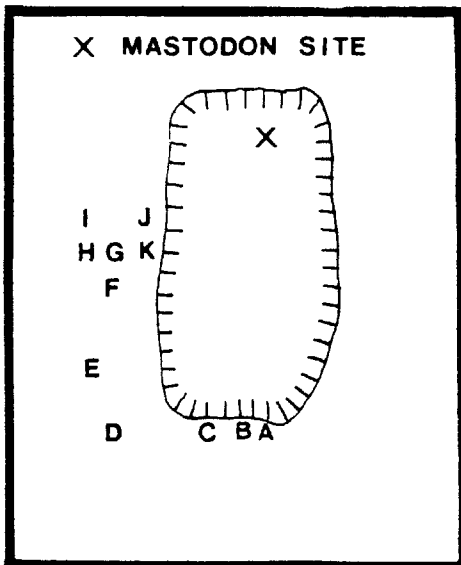


FIGURE 2. Sample sites excavated at Mastodon Site.

#### MOLLUSCAN PALEOECOLOGY

Seventeen species of mollusks were identified from the marl of unit 3 (table 1), including 4 ctenobranchs, 10 aquatic pulmonates, and 3 sphaeriids. *Amnicola lustrica*, *Valvata tricarinata*, *Fossaria obrussa decampi*, *Gyraulus parvus*, *Helisoma anceps*, and *Pisidium casertanum* are abundant throughout all sections exposing unit 3 and are considered significant indigenous species.

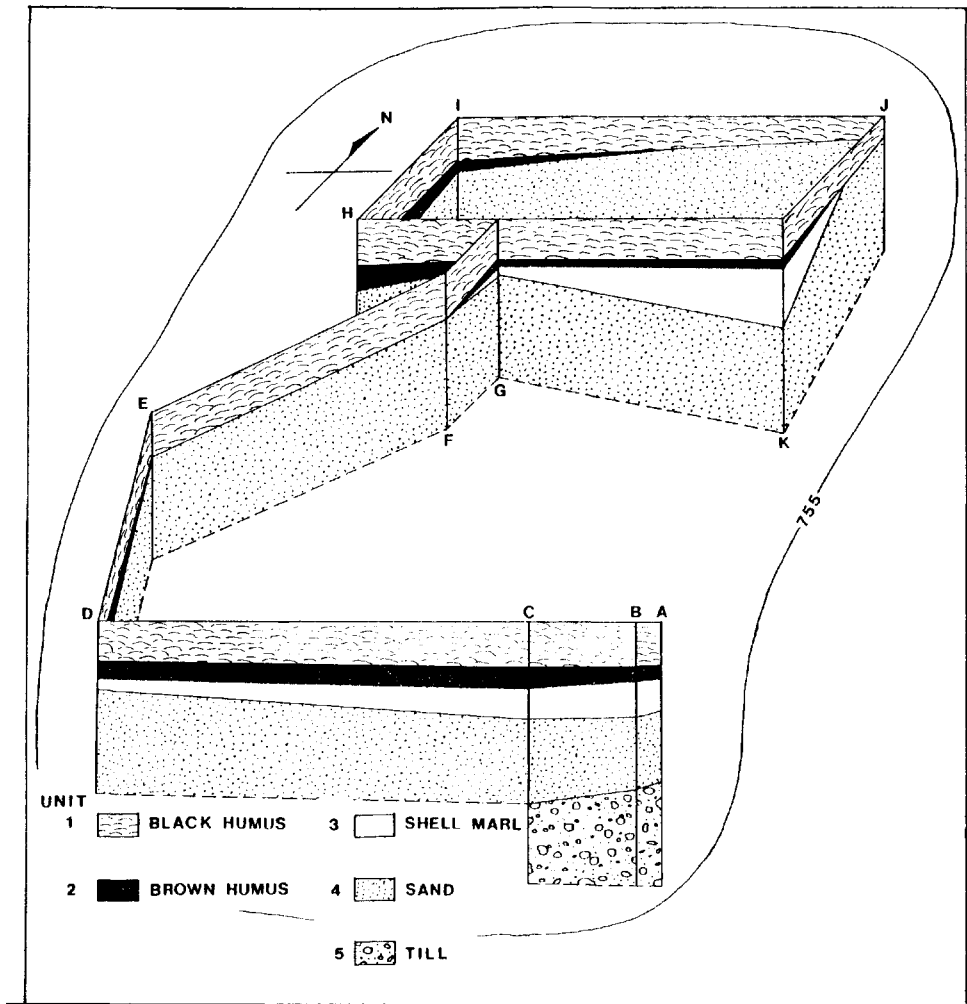


FIGURE 3. Panel diagram of Winameg Pond Deposit, Fulton County, Ohio. Scale is 10m/in; vertical scale is 10X.

These are species that were living in large numbers in the immediate vicinity of the sections or in the case of *Helisoma anceps*, possessed a large shell that occupies a notable volume of the sample.

The remaining species are considered indigenous, but varied in abundance during the deposition of unit 3 marl. *Helisoma campanulatum* is significant in sections C, G and K; *Physella gyrina* in section C; *Musculium lacustre* in sections A, C and K; and *Sphaerium occidentale* in sections A, C and G.

The occurrence of *Acella haldemani* is notable because of its paucity in Ohio Pleis-

tocene deposits. It has been recorded for only Franklin and Logan counties (Aukerman 1960, Zimmerman 1960, Cornejo 1961). The delicate nature of its shell, its non-aggressiveness and extreme sensitivity to changes in aquatic habitats probably account for its absence.

**HISTORY OF THE WINAMEG DEPOSIT**

Several water-well records for the area show a pebbly blue clay below an average depth of 48.0 m (Ohio Division of Water). This clay is interpreted to be Cary till deposited while ice was at the various recessional moraines south of the Winameg area. The

TABLE 1  
 Percentage Abundance of Pleistocene Molluscan Species in the Winameg Pond Deposit  
 (Unit 3) Section K.

Species	Collection Number						
	1	2	3	4	5	6	7
<i>Ammicola limosa</i>	0.1	0.3	—	—	—	—	—
<i>A. lustrica</i>	1.8	1.3	0.8	0.9	1.7	1.1	1.7
<i>Valvata sincera</i>	—	—	0.2	—	0.1	—	0.2
<i>V. tricarinata</i>	14.7	15.8	14.0	14.0	16.2	15.2	13.8
<i>Acella baldemani</i>	—	—	—	—	0.1	—	—
<i>Ferrissia parallela</i>	—	0.1	—	0.1	0.1	0.1	0.2
<i>Fossaria obrussa decampi</i>	20.3	22.0	20.0	17.5	19.3	19.8	18.6
<i>Gyraulus parvus</i>	14.7	13.5	14.9	14.0	11.4	14.0	15.3
<i>Helisoma anceps</i>	1.9	1.5	1.3	1.9	2.0	1.5	2.0
<i>H. campanulatum</i>	0.8	0.5	0.4	0.4	0.9	1.0	0.8
<i>H. trivolvis</i>	—	—	—	—	0.1	—	—
<i>Physella gyrina</i>	—	0.1	0.1	0.1	0.1	0.1	0.3
<i>Promenetus exacuosus</i>	—	0.1	—	—	—	—	—
<i>Pseudosuccinea columella</i>	0.2	—	—	—	—	—	—
<i>Musculium lacustre</i>	0.8	0.3	0.2	1.0	0.1	0.2	1.0
<i>Pisidium casertanum</i>	44.7	44.3	47.9	50.2	47.4	47.1	46.2
<i>Sphaerium occidentale</i>	0.2	0.2	0.4	—	0.5	—	—
	Estimated No./Collection						
	16,000	16,000	16,000	16,000	16,000	30,000	8,000

Winameg area was covered by the Cary ice sheet until approximately 15,500 years B.P. (Zumberge 1960, Kelly and Farrand 1967). The ice retreated from the Fort Wayne moraine at this time freeing the Winameg area of an ice cover, but inundating the area under the waters of Lake Maumee I (800 A.T.) (Kelly and Farrand 1967). Cary ice then readvanced to the Defiance moraine just west of Winameg, subjecting the region to another period of ice cover.

To the west, Lake Maumee II (760 A.T.) formed. A final high stand of the proglacial lake, Lake Maumee III (780 A.T.) covered Winameg as Cary ice retreated into northern Michigan and Ontario (Kelly and Farrand 1967). Lake Maumee I and III sediments are represented in area well logs as 45 m of blue clay overlain by 3.9 m of sand. The blue clay seems to be reworked till and the sand is probably due to the erosion of earlier meltwater deposits.

Only the upper units of this sequence were exposed during my investigation. Section A exposed a pebbly sandy clay (unit 5) at a depth of 1.3 m that extended deeper by at least 4 m. An oxidized sand (unit 4)

covered this clay and extended to within 0.7 m of the surface. Units 4 and 5 are considered to represent deposits from proglacial Lake Maumee.

Conditions were not favorable for large populations of mollusks during the deposition of lower unit 4 and unit 5. The samples are unfossiliferous, but this does not necessarily mean that mollusks were absent. Re-working of the sand by wave action may have destroyed mollusk shells and later percolation of groundwater through the permeable sand may have leached out remaining shells. Due to the presence of ice on the northeast side of Lake Maumee, the water must have approached Arctic temperature and probably contained icebergs. Few species of freshwater mollusks can survive and reproduce in such cool water temperatures and so it was probably some time before mollusks became inhabitants of early Lake Maumee.

The level of Lake Maumee III gradually lowered due to the continued recession of the ice sheet, exposing the Winameg area by about 14,000 B.P. (Kelly and Farrand 1967). Although several later proglacial lakes inundated eastern Fulton County, the

Winameg site was unaffected. Sediments of upper unit 4 yielded a few mollusk fragments suggesting that some species had finally reached the lake. The presence of a few wood fragments in upper unit 4 support the existence of vegetation near the shoreline by this time. Wood samples have been submitted for radiometric dating, but results have not yet been received.

From the study of topographic quadrangles of the Winameg area, it appears that hummocky topography developed in the former lacustrine sands of Lake Maumee through stream and wind action. Low lying depressions became small lakes such as occur in the hinterlands of modern beaches and the Winameg deposit accumulated in such a lake.

Winameg Pond originally had a substrate of reworked sands of former Lake Maumee. During this initial stage of the pond, mollusks were introduced by any number of many dispersal methods (see Rees 1965), and began to flourish in the shallow quiet water. Shells accumulated on the bottom forming the shell marl of unit 3, which was found in 6 of the studied sections. It was thickest, 41 cm, in section K and pinched out to the north, west and south. Data on the thickness of unit 3 was lacking to the east of section K because of the excavation of the present day pond. Sections exposed in the south wall of the newly excavated pit showed a lens-shaped deposit of shell marl which was thickest (25 cm) at section B and pinched out to the east and west.

The shell marl appears to have been thicker in the area that had already been excavated. This had been the lowest part of the marshy area that was being made a pond and thus probably was underlain by a thicker marl deposit located near the center of early Winameg Pond. It was also within this part of the pond where a mastodon either fell through the ice or became trapped in the muck and marl. Since most of the bones had been bulldozed up and the water table was high, the actual location could not be accurately determined. From the humic and marly sediments and molluscan

material removed from the bones, it seems reasonable that the skeleton was entombed mainly in the unit 3 marl with parts of it projecting up into the unit 2 humus.

The mollusks recovered from the unit 3 marl are typical of those of a small shallow pond (LaRocque 1966). The sections taken represent areas that were never covered by much more than a meter of water. Sediments representing the deeper central part of the pond were unavailable for study. Among the first species to enter the pond were *Pisidium casertanum*, *Valvata tricarinata*, *Fossaria obrussa decampi*, *Gyraulus parvus* and *Helisoma anceps*. These are present in significant numbers in the lower part of the shell marl (table 1). They were common inhabitants of small lakes of this area during the Pleistocene as indicated by their abundance in many other similar lacustrine deposits (LaRocque 1966, 1968; Camp 1973). Sphaeriids, in general, are pioneering species of small lakes for they are tolerant of many different aquatic habitats and are easily dispersed by insects, birds, other small animals, and/or wind (Rees 1965, LaRocque 1967). Ecologic requirements of the above four species are very broad, but they suggest a shallow, quiet water environment with abundant plant growth, especially filamentous algae (Harman and Berg 1971).

The presence of *Acella baldemani* strongly supports quiet water conditions and abundant aquatic vegetation (Morrison 1932). This lymnaeid is not common in the Winameg sections, but this is to be expected since even in areas of optimum conditions it is present only in limited numbers.

During most of the existence of Winameg Pond, the surrounding terrain must not have had a large population of terrestrial gastropods for they are absent in the sections. It was sandy terrain and probably did not provide favorable woodland habitats for terrestrial snails. Runoff, which may transport land snails into the shallows of a lake, may have been very low because of infiltration into the permeable sands. Terrestrial pulmonates should be-

come more common in the later stage of pond succession, but this stage is represented by the unfossiliferous humus of units 1 and 2. Fossils present at one time are presumed to have been destroyed through leaching.

*Fossaria obrussa*, *Gyraulus parvus*, *Physella gyrina* and sphaeriids would probably have been the significant species in the last stages of Winameg Pond (Kenk 1949). The larger pulmonates such as *Helisoma* and the ctenobranchs would not be able to tolerate the periodic dessication. Unionid bivalves apparently were never present in the pond. They are often typical of the early sandy bottom phase of marl lakes, but usually occur in lakes of larger size with connecting streams (Camp 1974). Winameg Pond gradually became a marshy depression and retained that condition until 1978 when it was against transformed into a pond.

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