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THE IDENTIFICATION OF BONE FRAGMENTS FROM THE LEE MILL CAVE SITE

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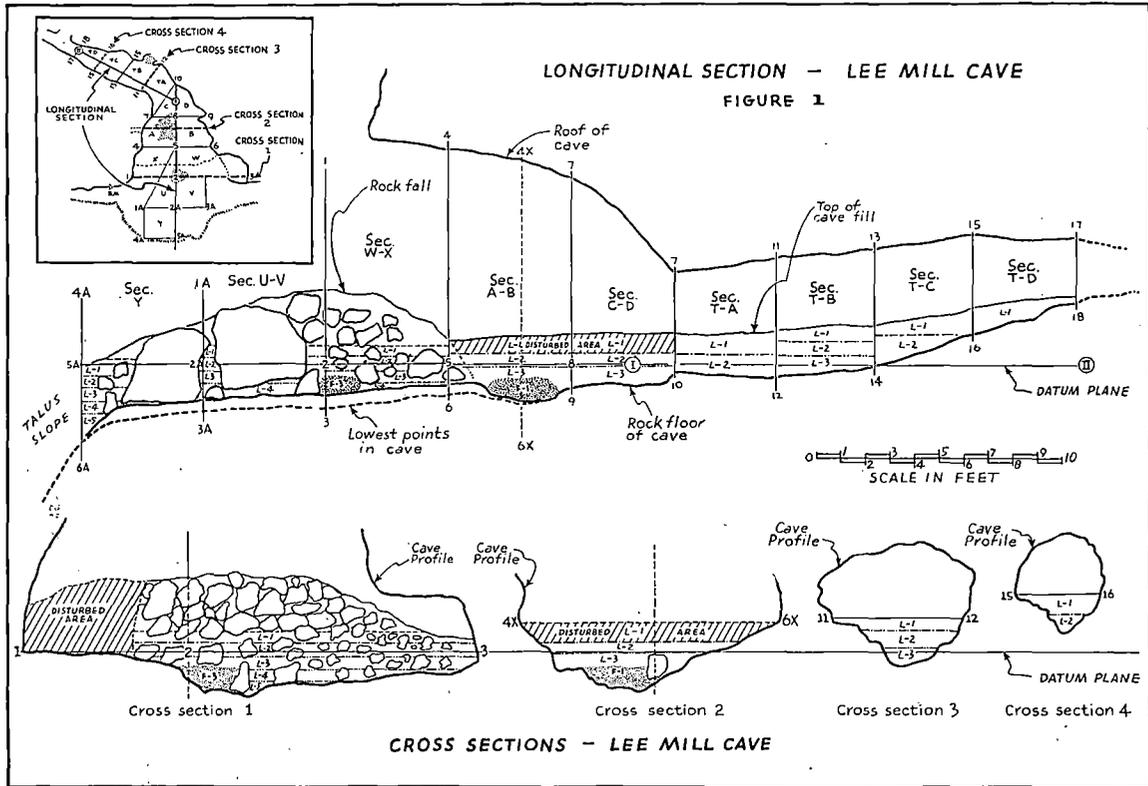
The Lee Mill Cave is located on the North bluff of the Mississippi River above Hastings and at the lower end of Spring Lake in Dakota County (Johnson, 1955). This cave is one of several small ones in the area that show signs of having been inhabited by early man. All of these shelters were formed by water creeping through fissures and eroding cavities in the limestone rock.

When the cave was discovered, there was a two or three foot high mound of earth and broken limestone at the entrance. This mound masked the view of the entrance from the river level and was undoubtedly caused by a rock fall from above. The front of the bluff has in the past and is today continually weathering away so that a steep talus slope has formed beneath the mouth of the cave. The front of the existing cave is approximately 14 feet across and the height after removal of the fill is about 11 feet. The largest part of the cave extends back about 15 feet and then a smaller tunnel opens off the southeast corner and extends back about 20 feet more. Recently, after the original excavations had been performed, a new unexplored room was found opening off the right side of the tunnel. Although this room has not been officially dug it was found to contain evidence of human habitation in the form of animal bone, charcoal and pottery.

The stratification of the pottery and lithic material within the cave reveals two identifiable cultures, with the possibility of additional short term occupations by other groups. Evidence indicates that the majority of the cultural remains were in place and not washed in with the fill. The definite fire pits with ash and charcoal in place would indicate that the wash was slow and aided in covering and preserving the remains in an orderly manner, rather than disturbing and churning them up.

The two cultures that were identified from the pottery and lithic material were: The Blue Earth Focus which is late prehistoric in the Upper Mississippi Phase; and the Southern Minnesota Woodland which is Middle Woodland (pre 1000 A.D.).

The pottery and stone artifacts have been analysed and a description will be published shortly. The present paper will deal only with the bone material. Although there was a large quantity of bone material removed from the cave, much of it was too fragmentary to allow identification. The animals listed by name in this paper are only those that could be accurately identified. The determination of the fragmentary parts could be approximated to a certain extent by noting their size and location and correlating



them with identifiable remains; but we have not made any positive statements on this basis.

In the actual analysis the raccoon, *Procyon lotor* (Linnaeus), appeared to be the most important food animal to these primitive people. Raccoon bones were scattered through almost every level dug and their number far exceeded that of any other mammal. There was a total of 757 raccoon bones that were identifiable. These bones represented almost all parts of the animal including the head, feet and tail. The bones were scattered uniformly at all levels throughout the cave except that they were absent in the very deepest level under section ABCD which was in the center of the largest part of the cave (Fig. 1). Very few if any of the bones found in the cave showed signs of rodent gnawing. Many of the bones were charred.

There was a pattern that prevailed throughout the cave in the manner in which the bones of all of the small animals had been treated. All of the long bones of the legs were broken in exactly the same places. The bones were not crushed but appeared as though they had been snapped off at particular points. In the case of the front leg, the humerus had been broken and only the distal part was present. All of the upper parts of the humerus were missing completely. The lower parts of the front leg (the radius and ulna) were broken but only the proximal parts of these bones were present. The bones of the back legs were similarly broken, but the distal parts of both the femur and tibia were found. The fibula, which is a thin bone, was missing altogether. None of the missing parts was found anywhere in the cave although numerous tarsal and carpal bones from both the front and hind feet were present.

Several skull fragments of the raccoon were found. Some of them were charred. The few fairly complete skulls were broken in the occipital region apparently to extract the brains. Most of the skulls had been broken up quite thoroughly.

Although much less abundant than the raccoon, the woodchuck, *Marmota monax* Linnaeus, was nevertheless the second most important mammal in total number of bones found. The deepest level under section ABCD was free of woodchuck bones just as it was free from raccoon bones (Fig. 1). In the front part of the cave under section WX woodchuck was found down to the deepest level. The bones were distributed quite uniformly throughout the places where they were found in the cave. There were 51 identifiable bones from this mammal.

According to archeological and ethnological reasoning the cave was assumed to be a winter shelter. But the abundance of raccoon and woodchuck, both of which hibernate during the cold weather and therefore were relatively unavailable to the hunters, would seem to rule out the probability that the cave was used only during the winter months.

The raccoon puts on a tremendous covering of fat during the fall. Whereas a good average weight for a large male during the spring and summer would be about 18 pounds this same animal during the fall just before hibernation may accumulate enough fat to weigh up to 40 pounds or more (Seton, 1909). The woodchuck also accumulates a large amount of fat prior to hibernation. If the Indians were seeking a good source of grease both of these animals would undoubtedly serve this purpose well.

Fish bones in total number (over 1,000) far exceeded any of the mammals but the majority of the fish bones (over 90%) were located in a very small area. The other fish remains (less than 10%) were scattered at various places in the cave and side tunnel. The area containing almost all of the fish bones was at the deepest point in the cave (level 3 under section ABCD) (Fig. 1). This level, it may be recalled, contained no other bones. There was a fire pit in this area but no pottery was found. These findings could indicate a pre-pottery, archaic occupation of the cave. Only Carbon-14 analysis would give us this information.

Several species of fish were represented. Among those that could be identified the sheepshead, *Aplodinotus grunniens* (Rafinesque), and catfish, *Ictalurus* sp., were the most prominent. There were 111 sheepshead otoliths which are little semi-circular bones associated with the ear and which aid in the function of balance. These distinctive bones are sometimes referred to as lucky stones. From the sheepshead there were also many pharyngeal teeth which are bony platelike structures that contain many broad circular teeth located in the back of the mouth where they serve to grind up molluscs.

All of the otoliths were of a quite uniform size. Otoliths show a pattern of growth rings much as trees do and they are a good indication of the size and growth of the sheepshead. All of the otoliths that we found came from fish that weighed between 2 and 4 pounds. This indicates that the aborigines that caught these fish used some sort of selective fishing techniques. As far as is known about the habits of the sheepshead there is no indication of any behavior pattern that would make the 2 to 4 pound size groups any easier to catch than the smaller or larger ones. As far as size, there have been reported weights to 50 or 60 pounds among sheepshead. The selective method of fishing that was practiced probably involved nets or traps.

The fish remains other than the sheepshead and catfish that could be identified were: Redhorse, *Moxostoma* sp.; sucker, *Catostomus* sp.; dogfish, *Amia calva* Linnaeus; and possibly the mooneye, *Hiodon* sp.

Deer and elk were the only representatives of large animals found. There were 7 fragments of each identified from both old and young animals. Two of the deer fragments were from fawn

and one or two of the elk fragments were also from very young animals. There were no fragments of bone that could be identified as belonging to the bison although the Spring Lake area today lies very close to a prairie fringe (Upham, 1884). There were no remains that could be identified as bear. There was a large number (over 100) of very large bones that could not be identified because of their fragmentary nature. Many of these were charred. They were all split in pieces apparently to obtain the marrow. On the basis of what we have already identified these fragmentary bones were probably the leg bones from elk or deer.

Molluscs were present at various levels in the cave. There were quite a few pockets of two species of our common land snails, *Anguispira alternata* (Say), and *Polygira profunda* (Say), at the surface levels as well as down deep. Clams were also used as food and possibly baked because several of the shells were charred from fire. Clam shells were not found at the deepest level but were mainly concentrated at the 3rd and 4th levels of section W (Fig. 1).

The bones of several other animals also occurred at scattered places but none was abundant. Fragments of turtle shell were found in the top two levels of section ABCD and through almost all of the levels down to level 5 in section W. One fragment was also found in section Y at level 2 (Fig. 1).

The rabbit, which we usually consider as a good, easily obtained source of meat for the hunter and trapper, was very scarce in the bone collection from the cave. There were only 2 lower jaws from the cottontail, *Sylvilagus floridanus* (Allen), present in level 1 of section W and a fragment of the skull from level 2 of section B in the cave tunnel (Fig. 1).

Fragments of the beaver, *Castor canadensis* Kuhl, were found in section ABCD at level 1; section Y and tunnel section B at level 2; section U at level 3; and section W at level 5 (Fig. 1). In each of these cases the fragments were only single pieces. Although scarce, the beaver was found at almost all depths in the cave.

Bones from cats (either bobcat or lynx) were found in three places near the surface: Section ABCD at level 1, tunnel section B at level 1, and section Y at level 2 (Fig. 1).

The porcupine, *Erethizon dorsatum* Linnaeus, of which there is no modern record in Minnesota south of Sherburne county, was identified from level 1 of section ABCD (Fig. 1).

Remains of the muskrat, *Ondatra zibethica* (Linnaeus), were found at six different places in the cave. They were found in level 1 of section ABCD, level 2 and 3 of section W, level 2 of tunnel section B and level 3 and 4 of section U. (Fig. 1).

Other animals identified from scattered locations in the cave were: Mississippi valley pocket gopher, *Geomys bursarius* (Shaw); striped ground squirrel, *Citellus tridecemlineatus* Mitchell; eastern chipmunk, *Tamias striatus* Linnaeus; big brown bat, *Eptesicus*

fuscus (Beauvois); deer mouse, *Peromyscus* sp.; and the red squirrel, *Tamiasciurus hudsonicus* Erxleben.

Human remains were found chiefly in the form of teeth but there was also a fragment of a human lower jaw and a portion of a scapula. The incisors showed the typical shovel back shape of the Mongoloid or Indian. The human fragments were found from level 1 to level 5 but all of the finds were out in the main large room and not back in the tunnel. There were no pottery finds back in the tunnel either and this would indicate that the tunnel was used chiefly by the Indians to throw debris left over from their meals, because of the quantity of bone material found there.

Bird bones were very scarce. There was one partial skull that was tentatively identified as belonging to a Grebe.

The principle article of plant remains uncovered was the butternut, *Juglans cinerea* L. There were several large deposits of shells of butternuts in side pockets in the cave proper. They were all split open just to one side of the center and the smaller half was missing. Very few of the shells showed any indication of being gnawed by rodents and in those that did the gnawing seemed secondary. In one of the side pockets where there were 109 butternut shells we also found a piece of pottery and a few bone fragments. In searching the surrounding area today many black walnut trees can be found but no butternut trees.

There were a few other plant parts found in the cave but they are probably of no significance in this study. There were a few basswood seeds, one or two black walnuts (although there is an extensive grove of black walnuts in the area at the present time), one or two acorns and one or two ash seeds.

SUMMARY

This paper has been a small part of a much more extensive study in the way of life of the early prehistoric people inhabiting the Spring Lake area. At the present time extensive investigations are being carried on at very old stratified open village sites that lie in close proximity to the cave site. Field work as well as evaluation of factual information is being undertaken by various workers trained in the fields of Archeology, Anthropology, Sociology, Geology, Botany and Zoology. Their combined interpretations will be included from time to time in site reports published by the St. Paul Science Museum in its Spring Lake Archeology series. The reports will cover the identification and description of various types of stone artifacts and pottery as well as discussions on the primitive and modern ecological relationships.

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