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THE VERTEBRATE FAUNA OF THE MOUNTAIN LAKE SITE,
COTTONWOOD COUNTY, MINNESOTA

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The Mountain Lake site is located in Cottonwood County, southwestern Minnesota, within the Small Lakes Section of the Central Lowland physiographic province. The site covers the greater portion of a wooded, elevated till remnant, forming an island near the center of a now-drained lake basin. Figure 1 is an aerial photograph showing the lake basin, island-site, and surrounding area. The lake, which surrounded the site in prehistoric times, was drained during the early part of this century. Formerly, however, it was typical of the many shallow, glacially-derived lakes noted in the blue-stem prairie region of Minnesota at the time of Euro-American settlement (Nicollet, 1843).

The Science Museum of Minnesota 1976 excavations, directed by G. Joseph Hudak, revealed three stratigraphically distinct cultural components. From oldest to youngest these are: Archaic, Fox Lake (100 B.C.-A.D. 500), and Cambria (A.D. 1000-A.D. 1300). While faunal remains were recovered from all components, the majority of bones were derived from the Fox Lake levels where these were associated with a house structure and other cultural features.

Originally designed only to test the site, the 1976 excavations consisted of 48 one meter-by-one meter units excavated in arbitrary five centimeter levels to sterile deposits at a depth of approximately one meter. Initial testing revealed a buried Middle Woodland (Fox Lake) house structure. Thus, those excavation units impinging on the structure were expanded to essentially two, five meter-by-five meter, excavation units, totally exposing the house pattern and adjacent features. It is from these contiguous units that the faunal assemblage reported upon herein was obtained.

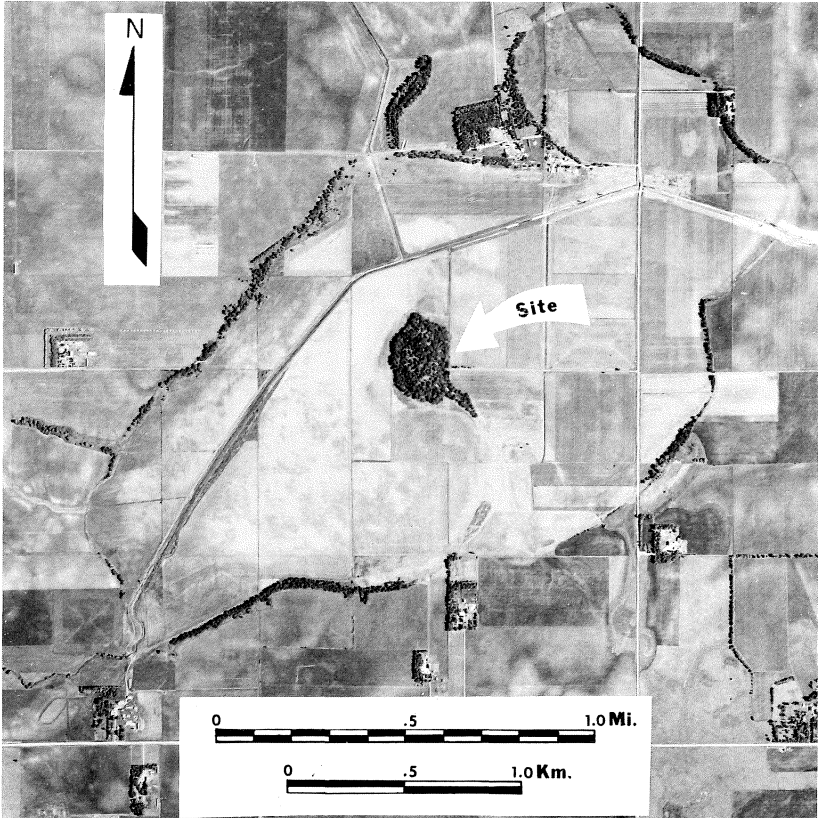


Figure 1

Aerial photograph of Mountain Lake, showing the site on the central island, the lake basin, and the deciduous forest fringe surrounding the basin.

All excavated earth was passed through one-half inch hardware cloth screens. It is important to note that the water screen and flotation methods routinely used by The Science Museum of Minnesota were not applied at Mountain Lake because of the preliminary nature of the initial test excavations. Consequently, the faunal assemblage is biased in particle size by the fact that bone pieces smaller than one-half inch were not systematically retained. It is recognized that many small but identifiable bones were undoubtedly sacrificed by this method, and future excavations will involve total recovery techniques. In all probability, the bias introduced by coarse screening had its greatest impact on the sampling of the remains of small mammals and fishes. Therefore, these vertebrates are probably under-represented in this analysis.

A total of 8,931 well preserved bones and bone fragments were recovered from 34 cubic meters of earth from Archaic, Fox Lake, and Cambria levels. Of this total, 187 bones, or 2.09 per cent, were identifiable to the specific, generic, or familial level. This number is unusually small, particularly since recovery techniques favored retention of larger, more easily identifiable, bone fragments. As will be discussed more fully below, the meager percentage of identifiable elements resulted from cultural practices by which large mammal bones (presumably *Bison bison*) were subjected to extreme fracturation, probably for extraction of bone marrow. Thus, a relatively small number of large bones were reduced to small, but still substantial, unidentifiable fragments.

All identifications were made by direct comparison with known specimens from the writer's reference skeletal collection or reference collections housed in the James Ford Bell Museum of Natural History, University of Minnesota, the Department of Anthropology, University of Minnesota, and The Science Museum of Minnesota. Scientific and common names of mammals follow Hall and Kelson (1959), while the names of birds are from the *Checklist of North American Birds* of the American Ornithologist's Union (1957). Nomenclature for amphibians and reptiles is from Smith (1961), and the scientific and common names of fishes follow Trautman (1957) and/or Scott and Crossman (1973). In the faunal lists below, taxonomic order is only maintained at the class level. Rather, as this is an anthropological study of prehistoric animal exploitation and subsistence, species are listed in order of their economic importance as estimated from potential meat yield.

The minimum number of individuals represented by the bones of each taxon was determined by considering both the maximum number of right

and left skeletal elements and the age of individuals at death. Aging techniques essentially follow those listed in Gilbert (1973), and involved examination of both dentitions and epiphyseal closure. In the case of fishes, minimum number of individuals was obtained by osteological count plus the estimated total length of fish based upon bone length-total length regression equations generated from analyses of modern samples of Minnesota fishes.

Potential meat yield was estimated using the methods of White (1953), and supplementary data from Cleland (1966), Parmalee and Shane (1970), and Parmalee, Paloumpis, and Wilson (1972). For the most part, because the number of identifiable bones from Mountain Lake is small, meat potential was calculated after White (1953). For fishes, however, length-weight regression equations were utilized, based on modern data from Minnesota lakes and streams.

A final note of caution must be reiterated at this point. Because the vertebrate faunal samples obtained from the various components at Mountain Lake were small, and were recovered from a very limited area by methods which biased the samples in particle size, any conclusions based on these data should be viewed as only tentative, subject to revision pending more systematic sampling of the Mountain Lake site.

ARCHAIC

A total of 628 bone fragments were recovered from the Archaic levels of the site. Of this number, only 17 bones, or 2.71 per cent, were identifiable to the specific or familial level. The frequency of identified species, all mammalian, is given in Table 1. This Archaic faunal assemblage is extremely small, and warrants little comment beyond the fact that those species represented, bison and canids, are typical of the prairie environment in which the Mountain Lake site is located.

TABLE 1. FREQUENCY OF IDENTIFIED VERTEBRATE SPECIES FROM THE ARCHAIC COMPONENT AT THE MOUNTAIN LAKE SITE, COTTONWOOD COUNTY, MINNESOTA.

Scientific Name	Common Name	No. of Bones	Per Cent	Approx. No. of Individ.	Per Cent	Total Lbs. Usable Meat	Per Cent Total Meat
<i>Bison bison</i>	Bison	15	88.24	1	33.33	750.0	94.94
<i>Canis lupus</i>	Wolf	1	5.88	1	33.33	25.0	3.17
Canidae	Canid	1	5.88	1	33.33	15.0	1.90
Total Mammal		17	100.00	3	100.00	790.0	100.01

FOX LAKE

The Middle Woodland Fox Lake faunal assemblage consists of 4,389 bones and bone fragments. Of these, 108, or 2.46 per cent were identifiable to the specific, generic, or familial level. In addition, most bone fragments were identifiable to class on the basis of bone structure. Table 2 gives the frequency of identified and unidentified bones by class; the frequency of identified vertebrate species is presented in Table 3.

Of the over 4,300 pieces of bone recovered from this component, approximately 3,800 bones, or 88 per cent, were associated with the house pattern which covered much of the area exposed by excavation. Moreover, the bulk of these bones was concentrated on the north one-half of the house floor and in a one meter wide arc immediately outside of the north and east walls of the structure. Therefore, it is highly probable that the bone refuse associated with the house structure represents only a limited range of activities carried out over a relatively short period of time by the occupants of this structure. In all probability, conclusions based on these data apply only to the group using the structure, and not necessarily to activities carried on over the site as a whole.

As noted above, the percentage of identifiable bones is small, particularly when compared with frequencies of identified bones in faunal assemblages from other archaeological sites in the Midwest (see Shane and Barber, 1976). This feature of the Fox Lake assemblage is due to the very fragmented nature of the bone, which prompted a closer examination of the fragments and how they were broken.

TABLE 2. FREQUENCY OF IDENTIFIED AND UNIDENTIFIED BONES BY CLASS FROM THE FOX LAKE COMPONENT AT THE MOUNTAIN LAKE SITE, COTTONWOOD COUNTY, MINNESOTA.

Class	Identified Bones	Per Cent	Unidentified Bones	Per Cent	Total	Per Cent
Mammal	84	1.91	4,264	97.15	4,348	99.07
Bird	5	0.11	13	0.30	18	0.41
Reptile	1	0.02	1	0.02	2	0.05
Amphibian	7	0.16	—	—	7	0.16
Fish	11	0.25	3	0.07	14	0.32
Totals	108	2.46	4,281	97.54	4,389	100.01

The majority of fragments show thick (8.0-12.0 mm) cortical bone with curved exterior surfaces, indicating the pieces were derived from the long bones of large mammals. Since bison and deer are both represented in the assemblage, it is presumed that many of the bone fragments came from long bones of these species. However, elk (*Cervus canadensis*) also formerly occurred in the southwestern Minnesota prairie (Shane, 1977), and may have been a source of some fragments.

Two distinctive fracture patterns are recurrent. The first can be described as transverse fracture, caused by direct percussion with a chopper-like tool. The second pattern can be characterized as "twist fracture," resulting from the application of torsion over the length of a long bone. Both of these fracture patterns have been described and experimentally reproduced by Sadek-Kooros (1972), who fractured sheep long bones by first cracking them with controlled blows, and then opening the bones by twisting. This process may be used either to obtain bone for tool manufacture, or to expose marrow for consumption. Regardless of how the bones may have been used ultimately, the evidence clearly indicates that the high degree of bone fragmentation at Mountain Lake during Middle Woodland times was the result of cultural practices rather than some nonhuman agency.

TABLE 3. FREQUENCY OF IDENTIFIED VERTEBRATE SPECIES FROM THE FOX LAKE COMPONENT AT THE MOUNTAIN LAKE SITE, COTTONWOOD COUNTY, MINNESOTA.

Scientific Name	Common Name	No. of Bones	Per Cent	Approx. No. of Individs.	Per Cent	Total Lbs. Usable Meat	Per Cent Total Meat
<i>Bison bison</i>	Bison	50	46.30	3	8.82	2,250.0	90.60
<i>Odocoileus virginianus</i>	White-tailed Deer	2	1.85	1	2.94	100.0	4.03
<i>Canis lupus</i>	Wolf	3	2.78	2	5.88	50.0	2.01
<i>Castor canadensis</i>	Beaver	2	1.85	1	2.94	31.5	1.27
<i>Procyon lotor</i>	Raccoon	3	2.78	1	2.94	17.5	0.71
<i>Urocyon cinereoargenteus</i>	Gray Fox	1	0.93	1	2.94	4.5	0.18
<i>Ondatra zibethica</i>	Muskrat	4	3.70	2	5.88	4.2	0.17
<i>Geomys bursarius</i>	Plains Pocket Gopher	12	11.11	3	8.82	—	—
<i>Citellus tridecemlineatus</i>	13-lined Ground Squirrel	1	0.93	1	2.94	—	—
<i>Microtus</i> sp.	Vole	1	0.93	1	2.94	—	—
Rodentia	Small Rodent	2	1.85	1	2.94	—	—
<i>Homo sapiens</i>	Human	3	2.78	1	2.94	—	—
Total Mammal		84	77.78	18	52.94	2,457.7	98.97
<i>Chen</i> sp.	Snow/Blue Goose	1	0.93	1	2.94	4.0	0.16
<i>Mergus</i> sp.	Merganser	1	0.93	1	2.94	2.1	0.09
<i>Buteo regalis</i>	Rough-legged Hawk	1	0.93	1	2.94	2.0	0.08
<i>Anas platyrhynchos</i> or <i>A. rubripes</i>	Mallard or Black Duck	1	0.93	1	2.94	1.8	0.07
<i>Aythya</i> sp.	Duck	1	0.93	1	2.94	1.0	0.04
Total Bird		5	4.63	5	14.71	10.9	0.44
<i>Trionyx</i> sp.	Softshell Turtle	1	0.93	1	2.94	10.0	0.40
Total Turtle		1	0.93	1	2.94	10.0	0.40
<i>Rana</i> sp.	Frog	6	5.61	2	5.88	—	—
<i>Bufo</i> sp.	Toad	1	0.93	1	2.94	—	—
Total Amphibian		7	6.48	3	8.82	—	—
<i>Ictalurus</i> sp.	Bullhead	2	1.85	1	2.94	0.4	0.02
<i>Ictalurus natalis</i>	Yellow Bullhead	1	0.93	1	2.94	0.3	0.01
<i>Ictalurus nebulosus</i>	Brown Bullhead	5	4.63	3	8.82	1.6	0.06
<i>Esox lucius</i>	Northern Pike	2	1.85	1	2.94	2.1	0.09
<i>Perca flavescens</i>	Yellow Perch	1	0.93	1	2.94	0.4	0.02
Total Fish		11	10.19	7	20.59	4.8	0.19
GRAND TOTALS		108	100.00	34	100.00	2,483.4	100.00

PALAEOECOLOGY

There is excellent palaeoecological evidence that at least four major resource zones formerly existed near the Mountain Lake site, and that these zones were differentially exploited by Fox Lake people. Elsewhere (Shane, 1977), based on modern vegetational and faunal surveys, faunal data from several prehistoric sites, and a post-glacial pollen record from Pickeral Lake in northeastern South Dakota (Watts and Bright, 1968), I have documented the existence of prairie, deciduous woodland, marshy fen, and aquatic resource zones within prairie-lake ecosystems in southwestern Minnesota. Furthermore, these resource zones were stable at least over the past 3,000 years, until they were partially disrupted by modern Euro-American agricultural activities.

At Mountain Lake the aquatic zone included the deeper waters of the lake surrounding the site. Typical vertebrates were fishes, turtles, waterfowl, and semi-aquatic mammals such as beaver, muskrat, and otter. Modern lake survey data from the Minnesota Department of Natural Resources, Division of Fisheries, show that fish populations in shallow prairie lakes are dominated by bullheads (*Ictalurus* spp.) and yellow perch, with these two groups accounting for 50-90 per cent of all fishes. Evidence of Fox Lake exploitation of this zone includes bullheads, perch, and pike, as well as soft-shell turtle, ducks, merganser, goose, beaver, and muskrat.

The marshy fen zone covered the wet margins of the lake, and was characterized vegetationally by cattail (*Typha* spp.), as well as some grasses and sedges. Beaver and muskrat nested in this zone, while waterfowl would also have been present.

Still evident today at Mountain Lake is the deciduous woodland zone, forming a discontinuous fringe around the lake shore, no more than 100 meters wide, covering the upland edge, shoreline slopes, and the slopes of ravines draining into the lake. Typical vegetation includes oaks, cottonwood, elm, box elder, ash, basswood, maple, willow, hackberry, hornbeam, wild plum, current, and hawthorn. Many of these plants provided mast and browse for a variety of vertebrate species such as deer, raccoon, woodchuck, cottontail, sharp-tailed grouse, and bobwhite quail. Other species preferring this zone include wolf, coyote, striped skunk, gray fox, and weasel. From the Fox Lake faunal assemblage, exploitation of this zone is indicated by white-tailed deer, raccoon, and gray fox.

The most extensive resource zone was the blue-stem prairie covering the rolling uplands above the lake. Characterized vegetationally by a dense cover of grasses, many herbs, and some shrubs, this zone supported bison, elk, wolf, coyote, badger, spotted skunk, jackrabbit, Franklin and 13-lined ground squirrels, plains pocket gopher, and prairie vole. Some additional prairie vertebrates include Swainson's hawk, rough-legged hawks, prairie chicken, and sandhill crane. Evidence for Fox Lake utilization of the prairie is represented by numerous bison remains and the occurrence of rough-legged hawk in the faunal assemblage. The occurrence of 12 bones of plains pocket gopher, representing at least three individuals, is intriguing, in as much as this animal would not be expected on a wooded island. Therefore, it seems possible that even this small rodent may have been utilized.

While all four resource zones were exploited by the Fox Lake occupants of Mountain Lake, the prairie zone was probably the most important in terms of faunal exploitation. Over 90 per cent of all meat represented by the faunal remains was provided by prairie species, with bison supplying the vast majority of consumable meat. However, although this analysis emphasizes the significance of the prairie zone and the hunting of the large gramivorous bison, it should be noted that the woodland and marshy fen zones possess considerable resource potential in terms of edible plant foods. Therefore, it is imperative that flotation techniques for the recovery of plant remains be employed during further excavations at Mountain Lake. If the botanical evidence were forthcoming, the local vegetational setting of the site could be more fully documented, and some of the ecological relationships between plants and Fox Lake people could be investigated.

ETHNOZOOLOGY

The small size of the identifiable fraction of the Fox Lake faunal assemblage precludes any firm statements regarding such important questions as subsistence patterning, seasonality of occupations, procurement techniques and scheduling, selectivity, and other aspects of Fox Lake animal exploitation. Furthermore, the lack of any reliable quantitative data on the composition and dynamics of animal populations within the prehistoric biotic communities associated with prairie-lake ecosystems places additional constraints on the interpretations presented below.

Subsistence

As shown in Table 2, over 98 per cent of potential meat was provided by mammals, with bison yielding approximately 90 per cent of all meat consumed. Clearly, bison was the single most important animal in the Fox Lake food economy, undoubtedly supplying hides, sinew, and bone as well as meat.

Although probably only available in limited numbers from the woodland surrounding the lake, white-tailed deer, because of its size, contributed significantly to the economy in terms of meat, hides, and bone. Judging from the numbers taken, wolf and muskrat may have been most important among the smaller mammals. Muskrat, a common resident of prairie lakes and sloughs, would have provided pelts in addition to meat, and probably was available in some quantity.

Among other animals, birds yielded 0.44 per cent of the total meat, turtles 0.40 per cent, and fishes 0.19 per cent. Although fish would appear to have been least important at this island-site, it should be recalled that these animals are almost certainly under-represented because of the recovery techniques employed in excavation. Indeed, at another Fox Lake component at the Pedersen site on Lake Benton (Shane, 1977), where flotation was used, fishes ranked second only to mammals in terms of meat provided.

Seasonality

The seasonality of archaeological components can be determined within months or weeks from the observation and analysis of the age at death of young, large, herbivores such as bison, deer, or elk (Smith, 1975; Shane and Barber, 1975, 1976). Unfortunately, the 50 bison bones in the Fox Lake assemblage did not include dentitions from which age at death could be estimated, precluding application of this method. However, there is some evidence that Fox Lake occupation occurred at least during the spring, summer, or fall. Fish were almost certainly taken when the lake was ice-free, while turtles would have been unavailable during the winter period. Although merganser could have been available throughout the year, the ducks and goose were probably absent in winter, and were more likely to have been killed during the fall or spring migration periods.

While indicators of warm season occupancy are present, direct evidence from the faunal assemblage for winter occupation is equivocal. There is, perhaps, a more compelling argument that the site was not occupied throughout the year. If it is assumed that the faunal remains recovered from the habitation structure represent animals used by the occupants of the structure, then it can be shown that this meat, even if heavily supplemented by vegetal foods, probably could not have supported one nuclear family of five to seven persons throughout one year. Assuming an average caloric value of 1,000 kcal./pound of meat, the total caloric production from the house faunal assemblage would approximate 2,100,000 kcal. If it is further assumed that the daily caloric requirement for a hunter/gatherer in warm weather is 3,000 kcal./day (Odum, 1973), and that the requirement for cold weather is 4,500 kcal./day (Feit, 1973), then assuming 220 "warm" days/year and 145 "cold" days/year, the total caloric requirement for one adult approximates 1,312,500 kcal./year.

Subsisting on meat alone, the potential calories derived from the faunal assemblage would barely support two adults for 365 days (2,100,000 kcal. < 2,625,000 kcal.). Only if some 5,000,000 to 7,000,000 kcal. were obtained from plant foods, could a group of five to seven adults and children survive at Mountain Lake for an entire year.

When seasonal variation in availability of plants and animals is considered, perennial occupation appears more unlikely. Even with some storage of foods, high, cold-weather caloric requirements would surely have outstripped reduced resources in winter. Moreover, some of the wild plant foods traditionally stored against winter food reduction by Indians in the eastern United States, particularly hickory nuts, walnuts, and butter-nuts (Yarnell, 1964), are rare or absent in prairie-like ecosystems.

I realize the above argument is open to several criticisms; sampling is inadequate, refuse could have been disposed of off-site, and there is no accurate measurement of the potential of plant foods. Nonetheless, I believe the weight of the evidence justifies a hypothesis of seasonal warm period occupation by Fox Lake people at Mountain Lake.

Hunting

Because of the small size of the faunal sample, the only information on Fox Lake hunting methods was obtained from an analysis of bison remains. A tabulation of skeletal elements was made, comparing observed

with expected frequencies of bones, based on the minimum number of individuals represented. Only limb and pedel elements approached expected frequencies, implying differential distribution of bison bones over space. Presumably bison were killed along the lake shore or elsewhere in the prairie, where meat, hides, and limbs were stripped from the carcasses, to be transported back to the site for further processing.

Dentitions and teeth from which the age of bison could be determined did not occur in sufficient quantity to allow any reliable estimate of the age frequency distribution for this species. Therefore, it was impossible to make any judgement as to whether selective or non-selective techniques may have been employed in taking these animals. In light of the obvious importance of bison in Fox Lake subsistence-settlement patterning, it would be useful to seek out and investigate a Fox Lake bison procurement station from which a number of animals might be studied.

Summary

Approximately 4,400 pieces of bone were recovered from within and near a Fox Lake habitation structure. Of the total number, 108 bones were identifiable, representing eleven species of mammals, five bird species, one turtle, two amphibian species, and at least four species of fishes. While gopher, vole, and amphibian remains may have been incidental to the human occupations, most other bones undoubtedly represent animals killed and carried onto the site by Fox Lake hunters.

Fox Lake people exploited at least four resource zones in the immediate vicinity of their encampment, taking bison from the prairie as a major source of meat, hides, and bone. Fish supplemented a diet rich in protein from terrestrial mammals. The site was occupied at least during the warm period of the year; winter occupancy appears unlikely. In a first-approximation hypothetical model of Fox Lake settlement, it is suggested that the Mountain Lake site represents a warm season base camp for hunting and gathering activities in the surrounding region. Seasonal (warm period) base camps imply winter sites, and these are predicted to occur in more favorable, potentially rich, resource zones associated with deciduous woodlands along major streams, e.g., the Minnesota River and its tributaries or the tributaries of the Des Moines River.

CAMBRIA

The faunal assemblage from the Cambria component at Mountain Lake consists of 3,914 bones and bone fragments. Of these, 62 pieces of bone, or 1.58 per cent, were identifiable to the specific, generic, or familial level. The frequency of identified and unidentified bones by class is given in Table 4. Table 5 shows the frequency of identified species, the minimum number of individuals of each taxon, and the pounds of meat provided by economic species.

The Cambria faunal remains were evenly distributed over the excavated area, showing only a slight tendency toward greater concentration in the northwest quadrant of the excavation. No concentrations of bone in features were present.

Like the older Fox Lake faunal remains, the Cambria assemblage includes many bone fragments from large mammals exhibiting transverse fracture and twist fracture patterns. Thus, it appears that both cultural groups treated the bones of large mammals in much the same manner, fracturing them to obtain marrow for food or bone for tool manufacture.

TABLE 4. FREQUENCY OF IDENTIFIED AND UNIDENTIFIED BONES BY CLASS FROM THE CAMBRIA COMPONENT AT THE MOUNTAIN LAKE SITE, COTTONWOOD COUNTY, MINNESOTA.

Class	Identified Bones	Per Cent	Unidentified Bones	Per Cent	Total	Per Cent
Mammal	53	1.35	3,836	98.01	3,889	99.36
Bird	3	0.08	10	0.26	13	0.33
Reptile	—	—	1	0.03	1	0.03
Fish	6	0.15	5	0.13	11	0.28
Totals	62	1.58	3,852	98.42	3,914	100.00

PALAEOECOLOGY

Both the palynological evidence from Pickeral Lake (Watts and Bright, 1968) and the ecological indicators in the Cambria faunal assemblage in-

dicates that the four resource zones exploited by Fox Lake people were available and utilized by the Cambria occupants of the Mountain Lake site during the first two to three centuries of the second millennium A.D. The aquatic zone is indicated by bullhead, pike, merganser, and otter. Muskrats imply the marshy fen habitat, and striped skunk, cottontail, and sharp-tailed grouse are indicative of exploitation of the deciduous woodland fringe bordering the lake. Finally, bison, wolf, badger, jackrabbit, and plains pocket gopher are prairie indicators, illustrating utilization of the prairie fauna.

TABLE 5. FREQUENCY OF IDENTIFIED VERTEBRATE SPECIES FROM THE CAMBRIA COMPONENT AT THE MOUNTAIN LAKE SITE, COTTONWOOD COUNTY, MINNESOTA.

Scientific Name	Common Name	No. of Bones	Per Cent	Approx. No. of Individ.	Per Cent	Total Lbs. Usable Meat	Per Cent Total Meat
<i>Bison bison</i>	Bison	33	53.23	2	10.0	1,500.0	94.28
<i>Canis lupus</i>	Wolf	2	3.23	1	5.0	25.0	1.57
Canidae	Canid	1	1.61	1	5.0	15.0	0.94
<i>Lutra canadensis</i>	River Otter	2	3.23	1	5.0	12.0	0.75
<i>Taxidea taxus</i>	Badger	1	1.61	1	5.0	10.0	0.63
<i>Mephitis mephitis</i>	Striped Skunk	1	1.61	1	5.0	5.6	0.35
<i>Lepus townsendi</i>	Jackrabbit	1	1.61	1	5.0	4.9	0.31
<i>Sylvilagus floridanus</i>	Cottontail	4	6.45	2	10.0	4.2	0.26
<i>Ondatra zibethica</i>	Muskrat	3	4.84	2	10.0	4.2	0.26
<i>Geomys bursarius</i>	Plains Pocket Gopher	2	3.23	1	5.0	—	—
<i>Homo sapiens</i>	Human	3	4.84	1	5.0	—	—
Total Mammal		53	85.48	14	70.0	1,580.9	99.37
<i>Mergus sp.</i>	Merganser	1	1.61	1	5.0	2.1	0.13
<i>Buteo sp.</i>	Hawk	1	1.61	1	5.0	2.0	0.13
<i>Pedioecetes phasianellus</i>	Sharp-tailed Grouse	1	1.61	1	5.0	1.5	0.09
Total Bird		3	4.84	3	15.0	5.6	0.35
<i>Esox lucius</i>	Northern Pike	5	8.07	2	10.0	4.1	0.26
<i>Ictalurus sp.</i>	Bullhead	1	1.61	1	5.0	0.4	0.03
Total Fish		6	9.68	3	15.0	4.5	0.28
GRAND TOTALS		62	100.00	20	100.0	1,591.00	100.00

ETHNOZOOLOGY

Even more so than in the earlier analysis of the Fox Lake assemblage, conclusions based upon the 62 identifiable elements from the Cambria component must be considered tentative. Not only is the sample apparently from a sheet midden, unassociated with any specific activity loci, but also there is no evidence that the remains represent a single occupation.

As shown in Table 5, the 62 identifiable bones represent nine species of mammals (excluding *Homo*), three bird species, and two species of fishes. Mammals provided over 99 per cent of all meat represented, with bison alone, because of its great size, yielding 94 per cent of all meat. The seven other mammals present would have provided useful pelts as well as meat. Fish yielded 0.29 per cent of all meat; but, again, they are probably under-represented in the sample.

Evidence from which seasonality can be inferred is meager. With the exception of the fishes, which were probably caught when the lake was ice-free, all other species would have been available throughout the year.

Cambria culture is known from the type site and other large agricultural villages on the Minnesota River (Wilford, 1945; Knudson, 1967), and Cambria subsistence has been reviewed by Watrall (1974). While living on the Minnesota, Cambria villagers practiced corn agriculture and harvested a variety of local mammals, including bison, elk, and especially deer (Watrall, 1974). Therefore, what is known of Cambria subsistence-settlement patterning would suggest that components like Mountain Lake are seasonal encampments established to exploit prairie-lake resources which may have been returned to the permanent villages. One could speculate, from the number of fur-bearing animals present in the assemblage (9 of 20 individuals), that the Cambria occupation was established to exploit this resource. If this were the case, the preferred season for taking fur-bearers is spring (February to May), when the pelts are in prime condition. It is interesting to note that divisions of the historic Eastern Dakota living on the Minnesota River made spring forays into the plains to trap muskrats on the prairie lakes (Woolworth, 1977), thus perhaps perpetuating a pattern practiced earlier in Cambria times.

CONCLUSIONS

Excavations by The Science Museum of Minnesota at the Mountain Lake site yielded a total of 8,931 pieces of bone; these were recovered from Archaic, Fox Lake, and Cambria components. While the Archaic faunal assemblage was too small for any meaningful analysis, the Fox Lake and Cambria components provided significant data on the palaeoecology of the site, subsistence, seasonality of occupation, patterns of animal exploitation, and settlement patterning.

Fox Lake and Cambria hunters exploited a variety of resource zones, of which the prairie zone was probably the most important because of bison, which provided the bulk of meat consumed by both groups. Probably second in importance was the lake surrounding the site, which was the source for fishes, waterfowl, and aquatic mammals taken by the hunters.

Both the Fox Lake and Cambria components probably represent seasonal spring, summer, or fall base camps for local hunting and gathering activities. Since warm weather base camps imply winter settlements elsewhere, for Fox Lake a settlement pattern is suggested in which winter settlements would be located in deciduous woodlands along major streams such as the Minnesota River and its tributaries. Although Fox Lake components have only been reported from prairie lakes, the model developed here predicts their occurrence on the larger streams traversing the open prairie. The Cambria component almost certainly represents a seasonal, possibly spring, base camp established from one or more of the large Cambria agricultural villages on the Minnesota.

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