A Hiscock Primer

Richard S. Laub
Curator of Geology
Buffalo Museum of Science
Buffalo, New York 14211

The past draws us. Perhaps we see it as a simpler time, one less threatening than our own, since we know how things turned out. Or, we may crave the lessons it offers us from those who have already gone where circumstance may yet lead us. Or yet again, we could be drawn by the possibility of intriguing discoveries, similar to opening an old chest in our grandparents' attic.

We return to the past usually by reading about it, or listening to the accounts of those who have studied it enough to be considered residents of their selected times. But what is more immediate than actually seeing and touching objects from another age, even one so remote that we grow dizzy looking back that far?

The Hiscock Site lies in the Town of Byron, Genesee County, New York (Laub, DeRemer, Dufort & Parsons, 1988). It is western New York's own La Brea Tar Pits, one of those rare spots where geography, geology, and time have collaborated to give us a startlingly rich trove of objects that were witnesses to another time. These bones, plants and artifacts, many pre-dating the Pyramids by 5,000 years and more, contain answers to questions we haven't even learned to ask yet.

Having reached its high-water mark around 20,000 years ago, the great ice sheet that covered much of North America during the Ice Age (in which we still live) began melting back. By about 13,000-12,500 radiocarbon years ago it had receded from the latitude of northern Genesee County, New York (Calkin & Feenstra, 1985). In the process it left behind a basin in the Town of Byron, one slightly less than two acres in area. We're uncertain how this basin came to be, but it contains within it, and associated with it, topographical features with approximately the same trends as the neighboring drumlins. This suggests that the basin may reflect scoured glacial grooves, similar to those seen today on Kelley's Island in Lake Erie.

As the glacier receded, meltwater accumulated against its front, forming a large pro-glacial lake. The quiet floor of this lake was covered by fine silt and clay, the "rock flour" produced as stones incorporated in the glacier during its southward journey were ground against other stones. Some of these larger rocks were freed from the main ice sheet as bergs calved off of the glacial front and floated out onto the lake. As they melted, the gravel, pebbles and boulders they bore sank to the lake floor and became incorporated into the silt and clay. The boulder-rich ground moraine and lake sediments left in the wake of the retreating ice sheet are referred to as the Cobble Layer at the Hiscock site, and they constitute the "basement" on which the fossil- and artifact-bearing deposits lie.

Eventually, as the glacier continued to recede northward, low lands were exposed that allowed the pro-glacial lake to drain out of its temporary basin between the glacial front and higher lands to the south. The water remaining in the basin may have become considerably shallower. Currents from some unknown source winnowed away the highest levels of silt and clay, leaving the cobbles behind, concentrated in areas of the basin into a sort of armor resembling a cobblestone road (Figure 1).

Figure 1. Top of the Cobble Layer exposed in the floor of a pit at Hiscock. The tight packing of the cobbles is typical of the more marginal areas of the basin.

Then, sometime before 11,500 radiocarbon years ago, spring flow became the dominant geological agency affecting sedimentation in the basin. The sediment that now began to accumulate, termed the Fibrous Gravelly Clay (Figure 2), was apparently derived largely from re-working of the lake and ground moraine deposits that already existed in the basin. This conclusion is based on the close similarity between the earlier sediments and those deposited by the springs. There are two major differences, however, between them. The lake sediments have a bluish-grey cast, reflecting rapid burial under reducing (oxygen-poor) conditions. The later, spring-derived sediments usually have a brownish color, reflecting oxidizing conditions due to extensive exposure to the air. This would be expected if they were deposited in shallow water, and possibly churned up and re-deposited by currents. Also, while the lake sediments contain little organic material other than pollen grains, the spring-deposited sediment contains abundant fragments of conifer twigs, as well as cones of white spruce and jack pine. (More on these plant remains in a bit.)

The spring-laid sediments herald the first appearance of fossil bone in the basin. The earliest radiocarbon dates on these bones, around 11,500 years old, come from caribou antler fragments, suggesting that these animals were among the pioneer species entering the area following glacial retreat.

Far and away, however, the most abundant remains are bones and teeth of *Mammut americanum*, the American mastodon. This species, a distant cousin of the living elephants, and of the various extinct elephant species that we call “mammoths,” was common in the conifer forests that cloaked the Northeast. It was also, however, found throughout North America, from Alaska south at least to central Mexico, ranging across several vegetational zones and thus reflecting a highly adaptive nature.

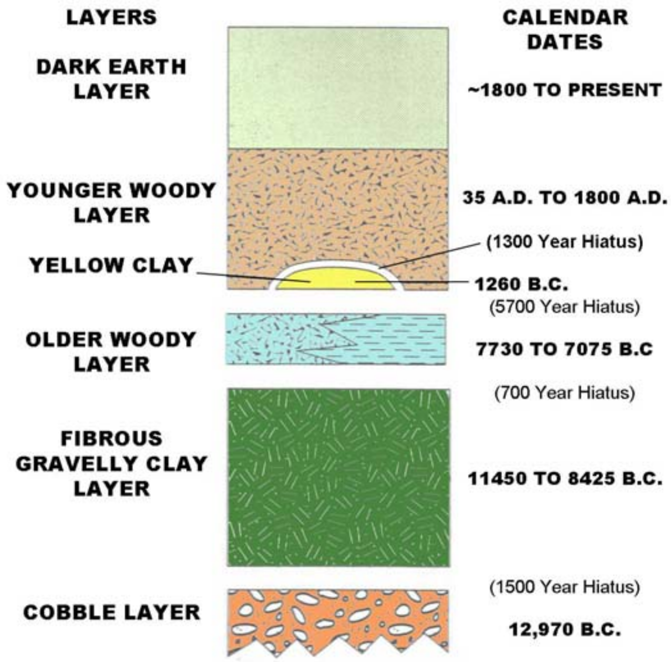

Figure 2. Stratigraphic column for the Hiscock Site. Gaps represent an absence of deposits for a given time interval.

Hiscock has so far yielded the remains of at least 15 mastodons, and quite possibly several times that number. These include adult males and females, as well as juveniles. More than a hundred mastodon teeth have been found, but not one from a mammoth. We know that mammoth lived in western New York at about this time, but for some reason they avoided, or were excluded from, the Hiscock Site.

Does this great accumulation of mastodon remains reflect a mass-death event? The evidence indicates that it does not. University of Michigan paleontologist Daniel Fisher refined a technique that has allowed him to analyze the growth increments of several tusks. These increments are like conical drinking cups inserted within one another, the last one forming the wall of the pulp cavity at the end that fit into the skull. The spacing of these increments changed with the seasons, and the final ones inside the pulp cavity tell the season of death. Of the tusks examined, representing six individuals, the deaths had occurred in the early winter, late winter, two near the winter-spring boundary, mid-spring, and summer. This suggests that the assemblage of bones accumulated through occasional deaths spread across an expanse of time. Radiocarbon dates taken directly from mastodon remains range from 11,033±40 to 10,430±60 rcyBP radiocarbon years before present), a tusk and tooth, respectively.

This second date is rather young for mastodon, for which ages post-dating 10,800 years are unusual. There is, however, evidence suggesting that this species may have survived even longer in the Great Lakes area. The layer containing mastodon bones is suffused with short segments of conifer twigs. In the early 1990's we did a study that included comparison of these twigs with the contents of elephant droppings (Laub, Dufort & Christensen, 1994). The physical condition and size-frequency distribution matched closely, suggesting that the twigs were disaggregated droppings from living mastodons, and gastrointestinal content from dead ones. Subsequent observations strongly support this view (e.g., Griggs & Kromer, 2008). Remarkably, while dates on some of these twigs fall within the same range as the mastodon bones and ivory, two twigs gave even younger dates: 9475±95 and 9205±50 rcyBP, a hint that a population of mastodon may have endured in the lower Great Lakes beyond the extirpation of the species from most other regions.

Other fossil remains enrich our picture of the late Ice Age fauna here. Herds of caribou ranged through the area. The stag-moose, *Cervalces*, an extinct elk-like animal the size of a moose, similarly came to the basin. A single tooth is the sole record in New York State of the long-nosed peccary, *Mylohyus*, a species that was far more common in the south-eastern states. *Castoroides*, a beaver nearly the size of a black bear, left a giant incisor tooth at the site. The foot bone of a hare, anything but impressive visually, represents the first fossil remains of a lagomorph from Ice Age New York.

A major surprise was the California condor (Steadman & Miller, 1987), the largest land bird in North America today. This species, which until recently teetered on the verge of extinction, previously had a fossil record limited to areas of the United States and northern Mexico with subtropical and warm-temperate climates. The Hiscock discovery shows that this was actually a pretty tough bird, adaptable to peri-glacial conditions, and this has caused ornithologists to reconsider the reason for its dramatic range reduction.

Ice Age people at Hiscock

One of the many fascinating things about the Hiscock Site is the presence of human artifacts associated with the Ice Age animal remains. These were left by some of the earliest people to inhabit our region, people whose everyday experiences included animals now long extinct, and sights and conditions quite different from those we know today. At this time, the glacial front lay about 150 miles north of present Toronto, and these people, whom scientists refer to as "Paleoindians," doubtless had either seen this wonder, or at least carried memories of it in their folklore.

We have found six of their signature fluted points, bifaced spearheads that bore a channel on either side for hafting onto a shaft (Ellis, Tomenchuk & Holland, 2003). It's interesting, however, that none of these finished its life as a projectile point. All had been modified, sometimes after breakage in use, into alternative tools, primarily knives and scrapers (Figure 3). Beyond these there are pieces of bone, tusk and antler that had been formed into simple tools (Tomenchuk, 2003)(Figure 4). They were probably made quickly, at the moment of need, rather like us sharpening a stick found in the woods and using it to skewer and cook a hot dog. Bone tools are absent or, at best, rare at other Paleoindian sites. Hiscock has so far yielded 17 of them. There are, however, probably many more, as only a small portion of the Ice Age collection has been examined for them.

The pattern of lost or discarded artifacts suggests that their owners didn't live for extended periods at the site. Rather, they appear to have belonged to small parties dispatched from the main habitation area, remaining at the basin only long enough to carry out specific tasks. Analysis of the tools suggests that butchery and hide-working were among these tasks.

Figure 3. A Paleoindian fluted point. While this may have originally served as a projectile point, it was subsequently modified into a “gutting knife,” a tool for removing the hide from prey animals.

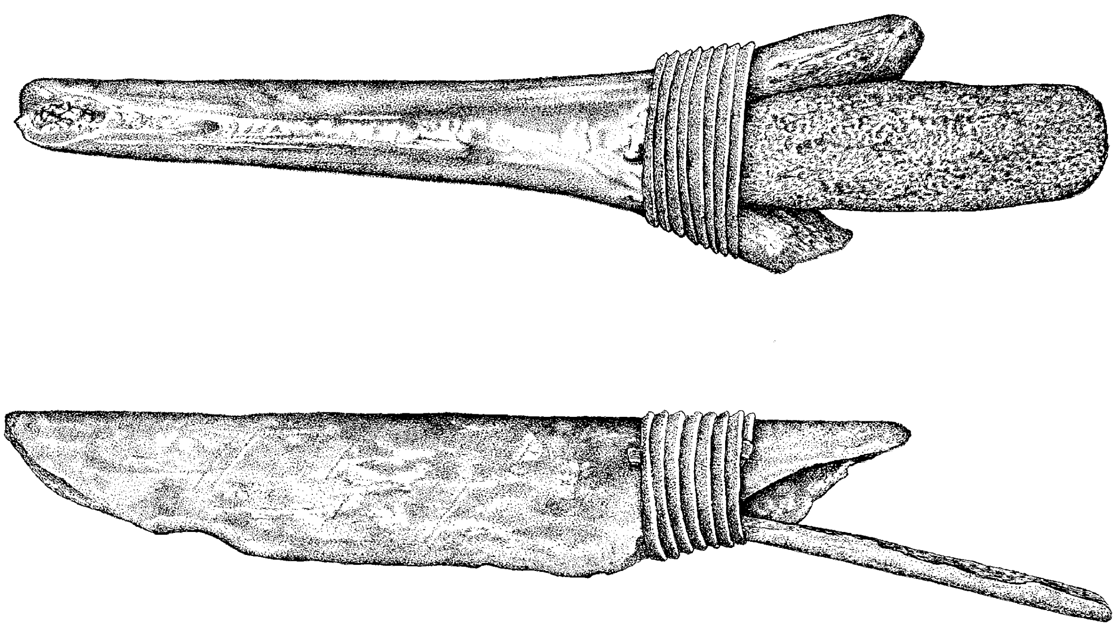

Figure 4. A hypothetical Paleoindian hide scraper. This is a composite of two mastodon bone fragments from a rib and a vertebra, found at the Hiscock Site.

Around 9,000 to 10,000 radiocarbon years ago, the spring activity diminished considerably, and the water in the basin became more stagnant. The forest, no longer held back by browsing mastodons, closed in around the basin. Initially, conifers, particularly white pine, spruce and tamarack, dominated these forests. Later, probably sometime around 7,000 radiocarbon years ago, the nature of the forest changed, and broadleaf trees such as beech, ash and elm became dominant.

The sediment that accumulated in the basin was now peat, soil containing a high percentage of incompletely decayed plant material. The oldest component, a fine-grained peat called the Older Woody Layer, dates to somewhere between 8,000 and 9,000 rcyBP. The Younger Woody Layer, consisting of coarser peat, dates from 1,000 or 2,000 rcyBP until about 200 years ago. Between these two horizons occurs the Yellow Clay, a burn layer reflecting a forest fire that raged through the basin 3,000 years ago. Clearly there are sizable chunks of chronology missing from the post-Ice Age record. Here, however, is where the soft nature of the soil is a blessing, because objects from the missing periods were often preserved by being intruded into the existing older layers. For example, we found a log of ash (*Fraxinus*) that had jammed vertically, deep into the Ice Age layers. Probably a branch that fell from a large tree, it dated to 4500 rcyBP, thus telling us something about the missing years at Hiscock.

A typical forest fauna of mammals, birds (the richest fossil avifauna in the Northeast) reptiles and amphibians lived in this forest, leaving an extraordinarily abundant array of bones in the post-Ice Age peat. It is rarely possible to attach a specific age to these remains, other than that they post-date the Ice Age, belonging to the last 10,000 years. There are, however, a few specimens for which radiocarbon dating has given us more precise ages. Two elk bones have yielded dates of 8620±50 and 6220±85 rcyBP, and a deer bone dated to 7880±90 rcyBP. Passenger pigeon, black bear, and beaver remains found in the 8000 to 9000 rcyBP peat of the "Older Woody Layer" may belong to that period. On the younger end of the scale, a southern flying squirrel bone yielded an age of 445±25 rcyBP.

Early European settlers of the Northeast reported vast flocks of passenger pigeons that sometimes took several days to fly by. Whether these accounts are exaggerations or not, Hiscock does have something to say about this issue. Bones of passenger pigeons are extraordinarily abundant, more so than those of the other 34 post-Pleistocene bird species combined. Remains of deer and elk, successors to the Pleistocene "megafauna," are also numerous.

Following is a list of species that inhabited the virgin forest of the Holocene, as attested by the presence of their bones in the Woody Layer:

Mammals:

Insectivores:
- short-tailed shrew (*Blarina brevicauda*)
- star-nosed mole (*Condylura cristata*)
- hairy-tailed mole (*Parascalops breweri*)

Carnivores (meat-eaters):
- raccoon (*Procyon lotor*)
- short-tailed weasel (*Mustela erminea*)
- mink (*Mustela vison*)

fisher (*Martes pennanti*)
black bear (*Ursus americanus*)

Artiodactyls (cloven-hooved mammals):
elk (*Cervus elaphus*)
white-tailed deer (*Odocoileus virginianus*)

Rodents:
southern flying squirrel (*Glaucomys volans*)
northern flying squirrel (*Glaucomys sabrinus*)
woodchuck (*Marmota monax*)
gray squirrel / fox squirrel (*Sciurus carolinensis / niger*)
eastern chipmunk (*Tamias striatus*)
red squirrel (*Tamiasciurus hudsonicus*)
American beaver (*Castor canadensis*)
white-footed mouse / deer mouse (*Peromyscus leucopus / maniculatus*)
meadow vole (*Microtus pennsylvanicus*)
muskrat (*Ondatra zibethicus*)
southern bog lemming (*Synaptomys cooperi*)
porcupine (*Erethizon dorsatum*)

Lagomorphs (rabbit-like mammals):
snowshoe hare (*Lepus americanus*)
eastern cottontail (*Silvilagus floridanus*)

Birds:
Birds-of-prey and scavengers:
Cooper's hawk (*Accipiter cooperii*)
red-shouldered hawk (*Buteo lineatus*)
red-tailed hawk (*Buteo jamaicensis*)
barred owl (*Strix varia*)
great horned owl (*Bubo virginianus*)
common raven (*Corvus corax*)
turkey vulture (*Cathartes aura*)

Non-passerine grain eaters:
ruffed grouse (*Bonasa umbellus*)
wild turkey (*Meleagris gallopavo*)
greater prairie chicken (*Tympanuchus cupido*)
passenger pigeon (*Ectopistes migratorius*)

Non-passerine insect-eaters:
yellow-shafted flicker (*Colaptes auratus*)
yellow-bellied sapsucker (*Sphyrapicus varius*)
downy woodpecker (*Picoides pubescens*)
yellow-billed cuckoo / black-billed cuckoo (*Coccyzus americanus / erythrophthalmus*)

Passerine omnivores:
blue jay (*Cyanocitta cristata*)
gray catbird (*Dumetella carolinense*)

American robin (*Turdus migratorius*)
northern oriole (*Icterus galbula*)
common grackle (*Quiscalus quiscula*)

Aquatic omnivores:
Virginia rail / sora (*Rallus limicola / Porzana carolina*)
common moorhen (*Gallinula chloropus*)
American coot (*Fulica americana*)
solitary sandpiper (*Tringa solitaria*)
mallard / black duck (*Anas platyrhinchos / rubripes*)
wood duck (*Aix sponsa*)
Canada goose (*Branta canadensis*)
American wigeon (*Anas americana*)
gadwall (*Anas strepera*)
pintail (*Anas acuta*)
shoveler (*Anas clypeata*)
green-winged teal (*Anas crecca*)
blue-winged teal (*Anas discors*)
dabbling ducks (*Anas* sp.)
redhead (*Aythya americana*)

Reptiles and Amphibians:
common snapping turtle (*Chelydra serpentina*)
spotted turtle (*Clemmys guttata*)
wood turtle (*Clemmys insculpta*)
painted turtle (*Chrysemys picta*)
snakes
frogs
toads

One of the most surprising and intriguing discoveries at Hiscock is the remains of a dog. More than 70 bones, bone fragments, and teeth were found scattered over 50 square meters, with an outlying specimen about 8 meters from the main cluster. These fossils, analyzed by Toronto zooarchaeologist Stephen Cox Thomas, appear to come from a single animal that was butchered and at least partly eaten, and that may have then been interred (Thomas, 2003). The bones date to 5110±150 rcyBP, which equates to slightly less than 6,000 calendar years old.

The presence of a dog infers the presence of humans, and indeed Holocene stone artifacts have been unearthed here. Seven projectile points range in age from Early Archaic to Late Woodland. It is noteworthy that the basin contains considerably more late Pleistocene (Paleoindian) artifacts, spanning several hundred years, than post-Pleistocene (Archaic and Woodland) artifacts, spanning nearly 10,000 years. This suggests that the basin was perceived and used by Holocene people differently from their late Pleistocene predecessors.

American settlement of the area began around 1810. The forest was gradually cut down and the land cleared for agriculture. The Dark Earth layer, which caps the stratigraphic sequence at Hiscock, appears to reflect this final period, and its thickness compared with that of the underlying Woody Layer, indicates that the rate of slope erosion increased by at least a factor of 20 when the tree cover was removed and plowing began. Large pieces of wood are no longer abundant in the peat, and items of "European" origin begin to appear. These include glazed ceramic sherds, glass, pieces of brick, coal, nails, bullets, wooden and leather objects, buttons, fragments of smoking pipes, remains of sheep and horse, and a cobble-filled drainage ditch. The nature of these materials indicates that they were deposited here over a broad period of time, rather than in a single event. We are in the process of trying to understand the source from which they came, and what they have to tell us about the people who left them, their activities, and how their lives changed over the past 200 years.

Hiscock has made valuable contributions to our understanding of the past 13,000 years of this region's history. A partial list of these would include (1) the presence of the California condor, (2) one of the richest troves of Paleoindian bone artifacts known, (3) an Ice Age stone bead, (4) early evidence of the diet of mastodons, (5) one of the oldest pieces of evidence of textile-making east of the Mississippi River (minimally 7,900 rcyBP, and possibly older), (6) the presence of mammal species not previously reported from the New York Pleistocene, and (7) evidence of a previously unknown severe drought in the late 1400's AD that lasted for at least 15 years.

Hiscock is also an excellent example of how complex stratigraphic relationships can be, and how easily this can lead to erroneous interpretations. I have offered examples of this (Laub, 1998), and the cardinal lesson that it teaches: No matter how firm one's conclusions may seem, there is value in continuing to gather data, re-evaluating it, and keeping an open mind to alternative interpretations.

Acknowledgments

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The site has been excavated annually since 1983 by hundreds of volunteers, ranging in age from 13 to over 80. The dedication of these people, who labor and endure through blistering heat, storms, and 12-hour days, is a perpetual source of wonder and inspiration to me. Without them, there never would have been a Hiscock excavation project, nor the volume of new knowledge that project has yielded. And my life would have been much the poorer without the privilege of knowing and working with them.

References Cited

Calkin, Parker E. and Bern H. Feenstra 1985. Evolution of the Erie-Basin Great Lakes, p. 149-170. *In* Paul F. Karrow and Parker E. Calkin (editors), Quaternary Evolution of the Great Lakes. Geological Association of Canada.

Ellis, Christopher J., John Tomenchuk and John D. Holland 2003. Typology, use and sourcing of the late Pleistocene lithic artifacts from the Hiscock Site, p. 221-237. *In* Richard S. Laub (editor), The Hiscock Site: Late Pleistocene and Holocene Paleoecology and Archaeology of Western New York. Bulletin of the Buffalo Society of Natural Sciences 37.

Griggs, Carol B. and Bernd Kromer, 2008, Wood macrofossils and dendrochronology of three mastodon sites in upstate New York, p. 49-61. *In* Warren D. Allmon and Peter L. Nester (editors), Mastodon Paleobiology, Taphonomy, and Paleoenvironment in the Late Pleistocene of

New York State: Studies on the Hyde Park, Chemung, and North Java Sites. Palaeontographica Americana 61.

Laub, Richard S. 1998. Misleading stratigraphic relationships at the Hiscock Site (late Quaternary, western New York State), p. 193-202. *In* Ernst E. Both (editor), Contributions to the Natural Sciences and Anthropology: A Festschrift in Honor of George F. Goodyear. Bulletin of the Buffalo Society of Natural Sciences 36.

Laub, Richard S., Mary F. DeRemer, Catherine A. Dufort and William L. Parsons 1988. The Hiscock Site: a Rich Late Quaternary Locality in Western New York State, p. 67-81. *In* Richard S. Laub, Norton G. Miller and David W. Steadman (editors), Late Pleistocene and Early Holocene Paleoecology and Archeology of the Eastern Great Lakes Region. Bulletin of the Buffalo Society of Natural Sciences 33.

Laub, Richard S., Catherine A. Dufort and Donna J. Christensen 1994. Possible mastodon gastrointestinal and fecal contents from the late Pleistocene of the Hiscock Site, western New York State, p. 135-148. *In* Ed Landing (editor), Studies in Stratigraphy and Paleontology in Honor of Donald W. Fisher. New York State Museum Bulletin 481.

Steadman, David W. and Norton G. Miller 1987. California condor associated with spruce-jack pine woodland in the late Pleistocene of New York. Quaternary Research 28: 415-426.

Thomas, Stephen C. 2003. Mid-Holocene dog remains from the Hiscock Site, p. 133-148. *In* Richard S. Laub (editor), The Hiscock Site: Late Pleistocene and Holocene Paleoecology and Archaeology of Western New York. Bulletin of the Buffalo Society of Natural Sciences 37.

Tomenchuk, John 2003. Analysis of Pleistocene bone artifacts from the Hiscock Site, p. 238-260. *In* Richard S. Laub (editor), The Hiscock Site: Late Pleistocene and Holocene Paleoecology and Archaeology of Western New York. Bulletin of the Buffalo Society of Natural Sciences 37.