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The Hampton Tusk

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On September 23, 1933, there was unearthed a large tusk in a gravel pit on the farm of W. S. Heuermann, section 21, Reeve Township, Franklin county, about four miles south of the town of Hampton. While loading gravel, one of the workmen, Lars C. Jensen, noticed something sticking out of the gravels that resembled a horn. Upon closer examination it was found to be a giant tusk, the largest of its kind, according to the best information available, ever found. The tusk was complete before it was broken by the workmen. The length is eleven feet, seven and one-half inches, while the circumference, at the proximal end is two feet two inches. In extricating the tusk from the gravels the tip end was broken as was a small portion, about eighten inches in length, two feet back from the tip. The following is a complete cut of the tusk as found in the pit.

The writer secured the tusk and has been able to rebuild the broken parts so that the tusk now appears as in the original form. The inner portion was very soft and friable, but was covered

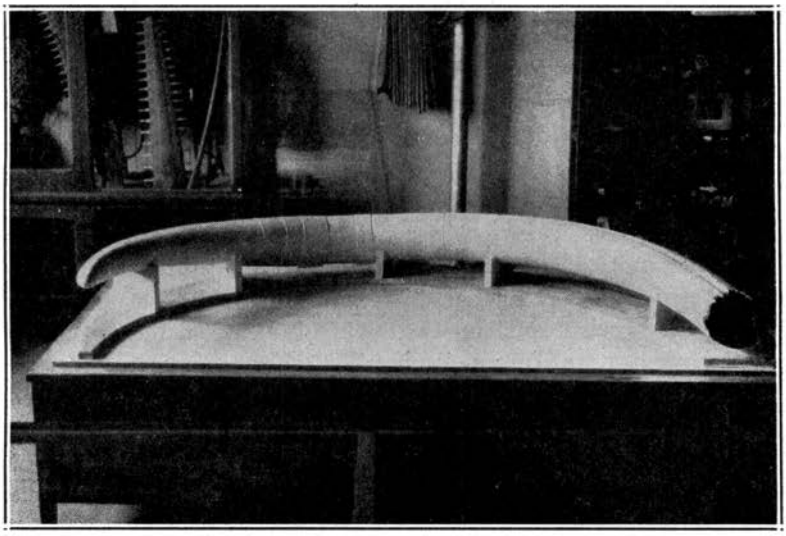

Fig. 1. The Hampton tusk.

with a hard enamel-like substance which made it possible to preserve the entire tusk.

It is not easy to determine the species, since no teeth or other bones were found associated with the tusk. After examining the specimens in the American Museum of Natural History in New York, I am quite convinced that it belongs to Mastodon americanus.

Scott reports that four species of proboscidians lived during the Pleistocene, three elephants and a mastodon. While these four species roamed over North America, they probably did not dwell in the same area nor live during the same time.

The first species, Elephas primigenius migrated over the greater part of the northern hemisphere, both in the Old and New World. It is of this species that complete carcasses have been found in the frozen gravels of Siberia, so that we have complete knowledge of body structure and general appearance. In this species the tusks varied considerably, but in general, had a tendency to spiral curvature, curving first downward and outward and then upward and inward.

The second species, Elephas columbi, was much larger than the first the tusks first curving downward and then upward and inward, their tips often crossing in the adult stage. The range of this species was much more southern than the first. In the United States, remains have been found from coast to coast, and as far south as Mexico City.

The third species, Elephas imperator, was the oldest of the four geologically and is, therefore, more characteristic of the upper Pliocene and lower Pleistocene. Its range in the United States was confined to the region west of the Mississippi river and also extended far south into Mexico. This species was the largest of them all.

The fourth species, Mastodon americanus, to which species I believe this tusk belongs, was, no doubt, a member of a different and much more ancient race, which in the Old World, became extinct before the close of the Pleistocene. In size the mastodon was more like the elephant, but was distinguished from the mammoth by the lower, more slanting forehead, the shorter and more massive trunk, and the enormously broad pelvis. The tusks were directed nearly straight forward in a parallel direction with slight convexity downward and then upward. The slant and general shape of the Hampton tusk is more nearly like the last species described.

It is not an easy matter to determine the exact geological horizon

of the burial of the tusk. In Volume XX of the Bulletin of Geological Society of America, page 341, there is a complete description of proboscidian remains which have been found in Iowa. In nearly every case, the teeth, jaw bones, leg bones and parts of tusks have been referred to the Aftonian interglacial.

The Hampton tusk is interesting since it was found in the gravels in the eastern margin of the Wisconsin terminal moraine. A careful and detailed study of the region was made by the writer in an effort to locate, if possible, the time of burial.

The tusk was found in the gravels of the second terrace of Mayne's Creek, B of Figure 2.

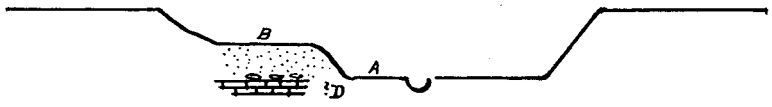

Fig. 2. Terraces along Mayne's Creek

This valley has its source just outside the western margin of the Wisconsin terminal moraine and extends first north east, then for two or two and one-half miles heads about due east until near the eastern border of the Wisconsin terminal moraine, when it again turns east-north east crossing the rather level Iowan moraine plain until it joins the west fork of the Cedar River in Butler county.

The valley in which the pit is located is rather broad and deep for a young valley in the Wisconsin drift plain. The wall to the north is steeper and sharper than the southern wall. From a careful study made of the valley, it appears to the writer that the valley is not post Wisconsin, but is pre-Wisconsin in age. There are few valleys in the Wisconsin, and where present they are very youthful. Another evidence of a pre-glacial valley, is the terraces that are found in this vicinity to the south of Mayne's creek. A study of figure 2, shows two terraces, the lower terrace A, is about 5 feet above the present stream's bed, and in very high waters is flooded. The second terrace, B of figure 2, is 16 feet above the level of the first terrace. This upper terrace extends up and down the valley for considerable distance and varies in width from one-fourth to one-half mile. It is in this terrace that the gravels occur.

A careful study of the gravels was made in an effort to determine, if possible, their relative age. From a study of Figure 3, it can be seen that the gravels are well assorted and distinctly cross-bedded. Often lenses of coarse gravel will pinch out into lenses of finer gravel or even sand. In many places the angle of rest in the lenses is as great as 25 to 30 degrees. In places large bowlders are

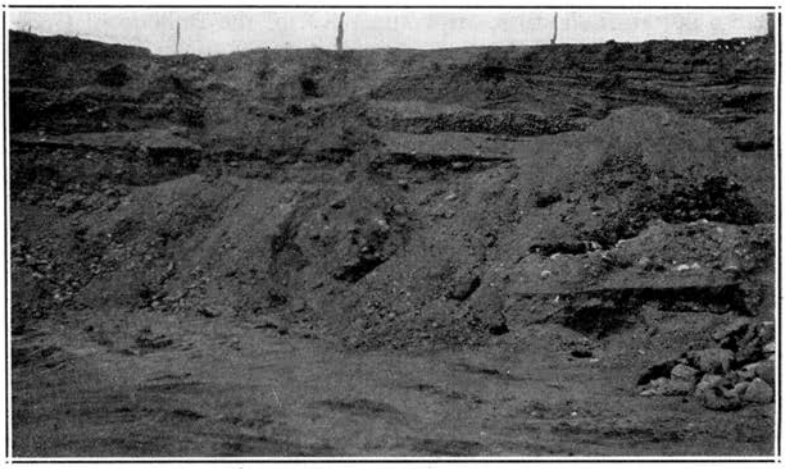

Fig. 3. Section of the Heuermann pit showing the stratification and cross-bedding of the gravels.

present, suggesting very strong currents at the time of their deposition. Much of the gravel is so coarse that it has to be run through a screener before being used for road material. The structure is evidence that there must have been a large volume of water during the time of deposition and thus very strong currents. The fine sand lenses with the cross-bedding is suggestive of more sluggish water conditions, while the lenses of coarser material indicates possibly a larger volume of water with swifter currents and eddies.

A detailed study of the gravels from the top to the bottom of the pit was made. Ten horizons were selected and samples of the gravel taken. Sixty pebbles from each horizon were taken at random and tested for solubility with the following results:—

Horizons	Percentage of soluble pebbles
1—Gravels beneath surface stripping	40
2—2 ft. below (1)	28
3—1 " " (2)	40
4—2 " " (3)	23
5—1 " " (4)	36
6—2 " " (5)	Fine sand with high lime content
7—1 " " (6)	46
8—2 " " (7)	35
9—1 " " (8)	36
10—2 " " (9)	47

From the above data it will be seen that an average of 36 percent of the pebbles were soluble. A sample of the material, without

a pebble count, from each of the above horizons was subjected to the acid test and was found to contain a high calcium content. This would suggest that the gravels are rather young in age, as old gravels so near the surface would have been leached of all of their lime content.

In places the gravels are highly iron-stained, especially is this true near the surface and basal portion of the pit. Iron concretions with clay centers are very abundant in the basal portions of the deposit, as well as an abundance of highly weathered bowlders of dolerite, pyroxenite, and granites. While the granites of lighter color are plentiful, the darker igneous bowlders predominate. It seems reasonable to conclude from the above evidence that the materials mixed with the gravels in the basal portion of the pit are of greater age than the gravel deposit itself.

The gravel, with the exception of the northern part of the pit, has been deposited on solid bed rock which is, in all probability, Kinderhook of Mississippian age. According to Dr. Lowell R. Laudon's work on the Mississippian of Iowa, this outcrop is the Mayne's creek member of the Hampton (Choteau). The limestone is highly dolomitic, is of a yellowish-brown color, and is thinly bedded and much weathered. The following is a chemical analysis of the limestone made in the Chemical laboratory at Iowa State Teachers College:—

Sample 1 was taken from the bed rock on which tusk was found.
Sample 2 is a piece of limestone taken from gravels above tusk.
Sample 3 is a limestone pebble taken from upper part of pit.

Sample number	Mixture Percentage	Siliceous matter Percentage	Silica Percentage	Iron Aluminum Oxides Percentage	Iron Oxide Percentage	Calcium Carbonate Percentage	Mg. Co. Percentage	Mn. Percentage
1	0.12	0.32	0.	1.14	0.	50.06	48.17	0.
2	0.45	21.95	15.73	3.67	1.32	47.15	30.26	2.33
3	0.23	1.92	1.52	2.50	1.34	64.31	31.43	0.

The north side of the pit shows no limestone present at the base of the gravels, the limestone being replaced with clay mixed with sand and gravel, "D" of figure 2. During wet weather water stands in this portion of the pit. A checking up of this portion of the pit shows that it is at about the same depth as the level of Mayne's creek. The playing out of the bed rock (C), figure 2, suggests that possibly the edge of the limestone outcrop here is the edge of the old pre-Wisconsin valley wall.

The tusk was found about 14 feet beneath the top surface of

the gravels and about 2 feet above solid bed rock. Figure 4 shows the exact location of the tusk when found, its position being between the two men holding shovels.

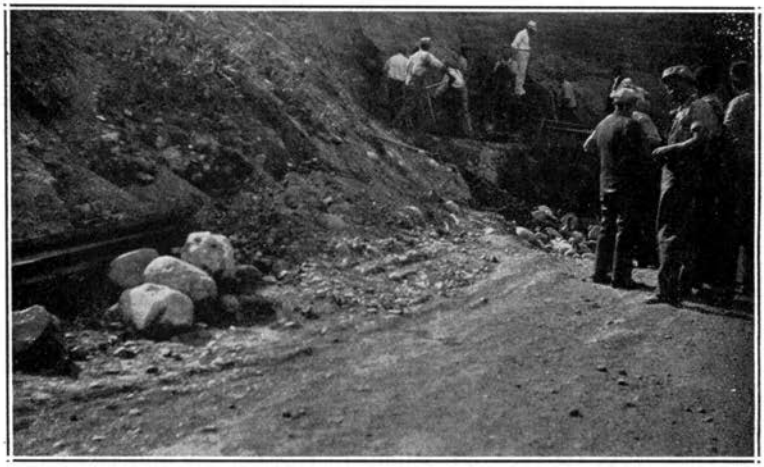

Fig. 4. Showing the position of the tusk in the gravels.

It was buried in an inclined position with the tip part of the tusk about three feet higher than the proximal end. The upper end was covered with very fine cross-bedded sand, while the lower end was buried in coarse gravel with some sand. This inclined position might suggest a carriage of the tusk by the strong currents of water some distance from the original place of deposition and its final lodging place on the edge of a sand bar. *What is the age of burial?*

The position of the tusk in the gravels, together with the fact that no other bones or remains of the animal have been found, suggests that either the animal must have died where the tusk was found, and the other parts of the skeleton drifted away, or the tusk was carried from some other place where the animal died, by the strong water currents. If the animal had mired down, it would seem that other parts of the skeleton should have been found.

If the ledge on which the gravels are found is a pre-Wisconsin valley, its age may be post-Nebraskan, post-Kansan or post-Iowan. Since no Illinoian drift is found in this part of the state, it might be assumed that the valley in which the tusk was buried might be either Aftonian or Yarmouth. If all of the drift sheets were present in the locality, we should find Nebraskan, Kansan, Iowan and Wisconsin. There is no evidence of the first three, so far as the writer was able to determine. This does not mean, however,

that these drift sheets were not present at one time. They may have been deposited in the form of interglacial gravels and then eroded away before the coming of the Wisconsin, or the older materials may have been so mixed with the younger drift so that it is not easy to separate them. The highly weathered and oxidized material found in the basal portion of the pit suggests that older glacial debris must have been present in the valley. Thus is can be seen that it is not an easy matter to tell the exact age of the older gravels since they may be either Aftonian or Yarmouth. The writer is inclined to think that the tusk was buried in a post-Nebraskan or post-Kansan valley and covered with older gravels at the base, and with much younger gravels at the top, possibly of Wisconsin age as evidenced by their freshness and high lime content.

Estimates of the minimum duration of the Pleistocene have been made in Iowa by Dr. G. F. Kay and others. The chief criterion used was the relative depths of leaching of calicum carbonate in similar materials which throughout their time of weathering were similarly located as regards topographic position and climatic conditions. From such a study it has been estimated that the minimum time involved from the retreat of the Late Wisconsin ice-sheet until now is 25,000 years. Using 25,000 for post-Wisconsin in Iowa, gives post-Iowan time 55,000; Sangamon time 120,000 years; Yarmouth time 300,000 years, and Aftonian time 200,000 years. Thus the combined duration of Aftonian, Yarmouth, and Sangamon interglacial ages, and of post-Iowan total about 675,000 years. If the tusk is of Aftonian time it is possible to estimate somewhere near the time of burial.

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