Two Elephantine Teeth from the Mill Creek Drainage Area

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In a previous report (Reynolds, 3) a description was given of a mastodont tooth which was plowed up near Mud Creek in Hendricks County. The report elicited a certain measure of local interest which has resulted in attention being called to two additional teeth, both discovered some time ago, but from the same general Mill Creek drainage area. Both of these teeth were made available through the courtesy of Mr. Chauncey Phillips of Coatesville, Indiana, and the present report is for the purpose of making them a matter of record.

It was at once apparent that these two teeth were not mastodont, but of elephantine origin, since they exhibited diagnostically characteristic "ridge-plates." In the teeth of the elephant or mammoth, the crown is characterized by an antero-posterior succession of these ridge-plates, each of which is thin and compressed antero-posteriorly. Their lateral or transverse dimensions approximately determine tooth width, and in the vertical dimension the upgrowth of the ridge plates from the root largely determines crown height. Each ridge plate is a wafer-like sheet of dentine clothed on all surfaces (except basally) by a thin sheet of enamel. The ridge plates do not abut against each other directly, but are both separated and bound together by a layer of cement which also encases the outer surfaces of the tooth. In growth pattern, ridge plates appeared in antero-posterior succession in time. As the organism used the teeth in chewing the abrasive material of the diet, the upper surfaces of the teeth became worn, and such wear would be evident on anterior ridge plates before some of the posterior ones had put in appearance. As soon as the enamel coat on the tops of the ridge plates wore through, the worn portion of a tooth would present a characteristic corrugated appearance, wherein the corrugations consisted of alternate high and low bands extending transversely across the tooth chewing surface. The higher bands were ridges due to the harder enamel, while the lower bands were due to the softer dentine or cement; the sequence of these transverse corrugations would be: enamel-dentine-enamel-cement-enamel-dentine-enamel-, etc. The permanent teeth of the mammoth consisted of three molars in each quadrant of the jaws, and these, too, appeared in antero-posterior sequence. A preceding molar would be so worn down by the time its successor was full-grown that the latter would boost the former out of the jaw. This brief account has been based on the more detailed treatment given by Hay(1) and Osborn(2).

The two teeth which form the subjects of this report were of considerably different sizes and weights.

Large Tooth

This tooth, weighing 1.53 Kg (3 lbs. 6 oz.) in its present condition, was in only a fair state of preservation. Truncations at each end, and the crumbled nature of its grinding surface, both attest to loss of parts and resulting incompleteness (Fig. 1). The root of the tooth extended

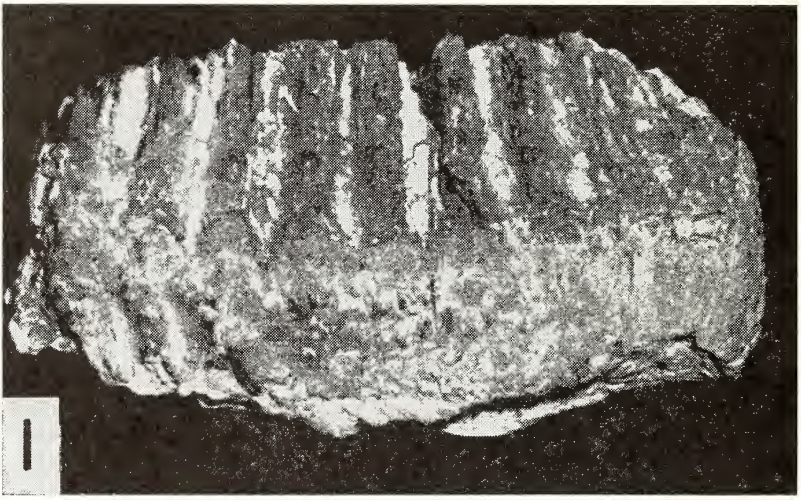

Figure 1. Large tooth in side view with crown uppermost, root below. From root-crown junction the sides of seven ridge plates are visible as darker columns between lighter layers of cement. Photograph, X 0.6 approximately.

downward only 45 mm from the root-crown junction, and the root was 180 mm in antero-posterior greatest length. From its top or grinding-surface aspect (Fig. 2), the tooth exhibited a straighter side 170 mm long and a more curved side 150 mm in antero-posterior length, both measured at mid-crown height. Crown height was determined by averaging the heights of the separate ridge plates; this mean height was 54.5 mm on the curved (convex) side, 53.6 mm on the straighter side.

As to the number of ridge plates on this tooth, evidence existed for ten such plates, eight of which were clear and well-defined (Fig. 1). These ranged from 7.7 to 11.2 mm in antero-posterior thickness, averaging 8.8 mm. The dentine cores of these plates varied from 3.7 to 6.3 mm in thickness, with a mean of 4.7 mm, while the covering coats of enamel were 2.2 mm in mean thickness. Intervening between the ridge plates were the layers of cement (Fig. 2) which averaged 7.6 mm in thickness, varying from 2.3 mm to 8.8 mm.

Tooth width may be adjudged by the transverse measurements of the ridge plates, measurements which varied from 73 mm to 90 mm, averaging 86 mm. This does not reflect the true original tooth width, however, for mammoth teeth characteristically had an outer coating or encasement of cement (1, 2). In the some 15,000 years since the Pleistocene or post-Pleistocene demise of this tooth's owner, this outer encasement of cement has leached, dissolved, or crumbled away. This has rendered clearly visible the sides of the ridge plates as rounded edges, and also made clearly evident the root-crown junction (Fig. 1).

On the basis of the location from which this tooth was taken, it is reasonable to assume that it came from a specimen of *Parelephas jeffersonii*, which had a widespread occurrence throughout the middle United States (2). A descriptive statistic utilized by both Osborn (2)

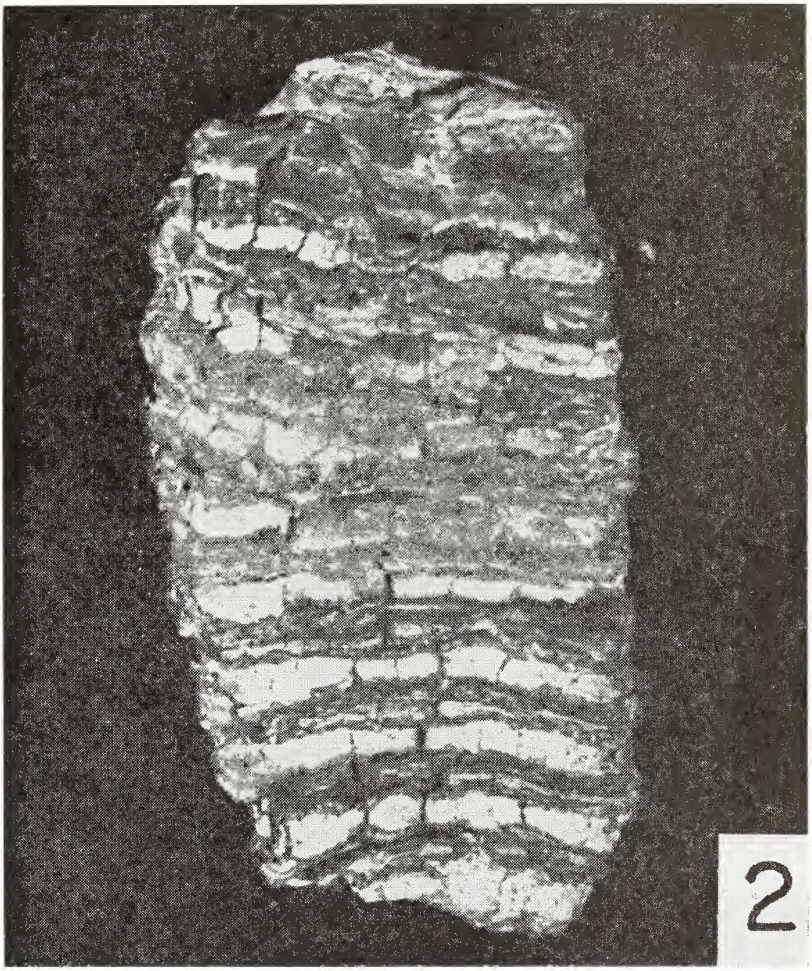

Figure 2. Large tooth, view of grinding surface. Note lighter transverse bands of cement alternating with ridge plates. Ridge plates exhibit thin light streaks of dentine sandwiched between darker enamel sheets. Photograph, X 0.65 approximately.

and Hay (1) for mammoth teeth was the number of ridge plates occurring within 100 mm of linear length. When applied to this tooth, there were 7 ridge plates in 100 mm on the grinding surface. On the straighter side of the tooth, 100 mm encompassed 6½ plates near the summit, 6 plates at mid-crown height, and 5½ plates at the base of the crown. These values indicate a tendency toward increased compression of the ridge plates as they grow upward, a relationship noted by Osborn (2).

The incompleteness of this tooth practically obviates any accurate identification with reference to exact jaw and jaw position. With a width of approximately 86 mm, it could conceivably be either a second

or third molar, both of which fall within the range of 60 to 90 mm in reported width (1, 2). Reported lengths for third molars have been 228 to 355 mm, for second molars 165 to 300 mm, and these measurements might render reasonable the classification of this tooth as a second molar since its length in its present state places it in the 150 to 180 mm range. Any attempt to allocate the tooth further to right or left side or to upper or lower jaw would be largely speculative because of insufficient evidence.

Small Tooth

This smaller tooth, weighing 0.5 Kg, was relatively more complete than the larger one described above. The grinding surface was ovoid in shape, and had a transverse dimension (greatest width) of 68.2 mm. Viewed from the side, the tooth was approximately triangular in shape

Figure 3. Small tooth in side view. Note progressive decrease in height of ridge plates from right to left. Photograph, X 0.65 approximately.

due to the taper from grinding surface to tip of the root (Fig. 3). The greatest antero-posterior dimension occurred at the grinding surface which had a length of 112.6 mm. On one end of the grinding surface, interpreted here as the anterior end, there occurred a plate 40 mm in

length which exhibited no ridge plates; this has been interpreted as being due to wear, since faint indications of ridge plate bases could be detected on one side of the tooth in a position underlying this plate. In height, the shortest ridge plate occurred next to this ridge-free plate. The seven quite visible ridge plates of the tooth were of progressively greater heights (Fig. 3), the highest being 42.0 mm, and occurring at what is presumed to be the posterior end of the crown. Some breakage at this end of the crown had not obliterated evidence for two more ridge plates. From crown to tip of the root, over-all height of the tooth was 126.0 mm. The mean antero-posterior thickness for the seven well-defined ridge plates was 6.0 mm, with dentine cores averaging 2.2 mm in thickness and the covering coats of enamel had a mean thickness of 1.86 mm. The cement layers between ridge plates averaged 4.03 mm in thickness.

It was assumed that this tooth also came from a specimen of *Parelephas jeffersonii*, which is the same animal described by Hay (1) as the "Hairy Mammoth," *Elephas primigenius* (2). On the basis of its general size and a few other characteristics, it is probably a third milk molar, based on criteria given by Hay (1). Since its grinding surface is convex from front to back, it most likely came from the upper jaw.

Discussion

The two teeth just described are not of recent discovery; both have been in the possession of the finders for approximately two decades. Personal visits to the discovery sites with the finders of the teeth were not feasible, but the teeth were accompanied by collection-site information. The larger tooth was discovered north of Stilesville, Indiana, by Mr. Clarence Stubblefield, at a spot near a fork of Mill Creek. Such a fork occurs somewhat less than 1.5 miles north of Stilesville where Crittenden Creek flows into Mill Creek. This stream junction lies approximately at latitude 39°39′14″ north, longitude 86°37′48″ west, and occurs in Section 15, Township 14 North, Range 2 West, in Hendricks County, Indiana. The smaller tooth was discovered by Mr. Daniel Stone "a mile south and a mile east of Stilesville." This description would place the site at approximately latitude 39°37′20″ north, longitude 86°36′49″ west, which would be in Section 27, Township 14 North, Range 2 West; the site would occur very near the east edge of the section, and about mid-section in the north-south direction.

From the large tooth discovery site near the Crittenden-Mill Creek junction, the small tooth discovery site is about 2.3 miles distant in a straight line (5, 6), and lies south-southeast (actual azimuth 157°) from it. A Mastodon tooth described earlier (3) was found at a site which occurred 0.5 mile south and 2.5 miles east of the small tooth discovery site. Both mammoth tooth discovery sites bear an interesting relation to a glacial lake, Lake Eminence, which was formed back (north) of the Early Wisconsin (Shelbyville) moraine, according to Thornbury (4). Lake Eminence extended north into the present Hendricks County in two finger-like extensions, one of which projected almost to the present site of Stilesville. The smaller tooth came from a location very close to the eastern boundary of this extension of the lake, while the larger

tooth came from a spot about 1.5 miles north of the northern Lake Eminence boundary.

Summary

Two teeth discovered approximately two decades ago in Hendricks County, Indiana, were identified as elephantine on the basis of their ridge-plate structure, and allocated to *Parelephas jeffersonii* on the basis of the discovery sites near Stilesville. Both teeth were described in quantified terms, and the approximate sites of discovery discussed briefly in relation to their proximity to Lake Eminence of the late Wisconsin glacial epoch.

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