DESCRIPTIONS OF SOME MAMMALIAN AND FISH REMAINS FROM FLORIDA OF PROBABLY PLEISTOCENE AGE.

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There are few of our States which give promise of furnishing more important contributions to our knowledge of the vertebrate animals of the Pleistocene than Florida. Already the list of species has become a long one and additions are constantly being made to it. Materials belonging to five species are described below. Two of these are believed to be hitherto unnamed.

ELEPHAS IMPERATOR Leidy.

Plate 26, fig. 1.

In 1889[1] Leidy described and figured a left ramus of the lower jaw of an elephant which had been found by Mr. J. F. LeBaron, somewhere along Peace Creek, probably not far from Arcadia, and which Leidy identified as belonging to *Elephas columbi*. Leidy's figure presents a view of the worn surface of the tooth, which he recognized as being the hindermost molar. He stated that there were twelve ridges present and that these appeared to be the complete number entering into the constitution of the tooth. Eight of these were said to occupy a space of 6.4 inches. Inasmuch as the tooth was buried in the bone nearly to its summit, the thickness of the plates was taken on the grinding surface.

This jaw is in the United States National Museum, and has the catalogue number 183. Recently the writer obtained permission to expose the lingual face of the tooth, and the result is shown on plate 26 (fig. 1). Near their bases the space occupied by four plates is about 95 mm. There can be no doubt that the jaw belonged to an individual of *Elephas imperator*. The normal number of plates in the last tooth of *E. columbi* is about 24. Had there ever been so many plates present the tooth would have had an enormous length. With 18 plates it was sufficiently large. Certainly some plates, about six, had been lost through usage.

[1] Trans. Wagner Free Inst. Sci., vol. 2, p. 23, pl. 8, fig. 2.

THINOBADISTES, new genus.

A new genus of ground sloths, most closely related to *Gnathopsis* Leidy Type, *T, segnis,* a new species described below. Based on an astragalus, in the front half of the upper surface of which there is a deep ligamentous fossa opening forward; the lower face also crossed from front to rear by a ligamentous fossa.

THINOBADISTES SEGNIS, new species.

Plate 27, figs. 1, 2.

Type specimen. An astragalus, No. 3335, of the U. S. National Museum.

Type locality.—Williston, Florida.

Type formation.—Pleistocene.

Characters.—Those of the genus.

In the United States National Museum there is a left astragalus of a large ground sloth which is recorded as having been collected by the United States Geological Survey in 1887, in Levy county, Florida. The catalogue number is 3335, and the bone is recorded a *Mylodon harlani.* It seems probable that the collector of the specimen was Mr. J. B. Hatcher; and it is quite certain that it was found at "Mixon's bone bed," near Williston, where many other fossils have been secured.

It appears that this bone had been studied by Doctor Leidy, for there is writing on it in his chirography; but he has not indicated on it any generic or specific name.

Supposing that the bone belonged to *Mylodon harlani,* the astragalus of which appears to be known only from Harlan's brief description and poor figure,[1] the writer first compared it with that of *Mylodon robustus,* as described and figured by Richard Owen.[2] It soon became evident that the Florida bone was quite different from the corresponding one of the South American species. On plate 27, figures 1, 2, are presented two views of the bone from Florida. From figure 1 it will be seen that there is on the upper face a deep fossa extending from the front of the bone to its center. A large part of this fossa is occupied by a rough surface for ligamentous attachment, the apex of which is midway between the front end of the bone and the hinder border of the articulation for the tibia. In all directions away from the fossa just mentioned the surface for articulation with the tibia is strongly convex. In *Mylodon robustus* the corresponding fossa is evidently much shorter and shallower, and the surface for the tibia is much flatter and apparently even concave posteriorly. The greatest differences are seen, however, on the lower surface of

[1] Amer. Journ. Sci., vol. 44, 1843, p. 78, pl. 1, fig. 16.

[2] Descr. skel. *Mylodon robustus*, 1842, pp. 117, 131, pls. 21–23.

the bone. Owen writes[1] that the anterior and inferior surface of the astragalus of *Mylodon robustus* is occupied by one extensive elongated articular surface adapted to the calcaneum, cuboides, and naviculare, and his figure shows that this is true. On the other hand, in the bone from Florida, this surface is completely divided by a deep rough furrow for ligaments. It will be noted, too, that the outlines of the two bones as seen from below are very different.

It might be supposed that the astragalus here described is that of *Megalonyx;* but this bone was described by Leidy,[2] and only a glance at Leidy's figures is needed to convince one that the Florida bone can not belong to that genus.

Owen[3] described and figured an astragalus which had been brought from South America and which he thought belonged possibly to *Megalonyx.* This was afterwards made by Leidy[4] the type of a new genus and species, *Gnathopsis oweni.* When the Florida bone is compared with Owen's figures here reproduced (pl. 27, figs. 3, 4) there are to be seen close resemblances. It might not be far out of the way to refer the astragalus from Florida to a second species of *Gnathopsis,* but a careful examination shows differences that seem to indicate a distinct but closely related genus. On the upper surface of the bone figured by Owen there was certainly no such deep fossa for a process of the tibia and for a ligament as is seen in the Florida bone. Nor was the surface for the tibia as convex as it was in the bone here described. Again, as seen from below, there was in the astragalus of *Gnathopsis* a deep and wide notch in the anterior border at the end of the ligamentous groove, as if this and the upper one joined across the border of the bone. In the Florida bone the anterior surface for articulation with the calcaneum extends nearly to the inner border of the bone; in *Gnathopsis oweni* it is much shorter. Believing that such differences in as characteristic a bone as the astragalus is among the ground sloths, indicate other important differences in the skeleton, the name *Thinobadistes* is proposed for the genus, the species to be known as *Thinobadistes segnis.* (Derivations, θὶς sand; βαδιστής, a walker; *segnis* sluggish.)

The following measurements in millimeters have been made on the astragalus here described:

Extreme length of astragalus	108
Width from summit of tuberosity for tibia to border between the fibular and the calcaneal surfaces	97
Length of surface for tibia	76
Width of surface for tibia	70
Height and length of surface for fibula	38
Length of posterior articular surface for calcaneum	69
Width of posterior articular surface for calcaneum	38

[1] Descr. skel. *Mylodon robustus,* p. 118.
[2] Smiths. Contrib. Knowl., vol. 7, art. 5, p. 40, pl. 12, figs. 7-10.
[3] Descr. skel. *Mylodon robustus,* p. 132, pl. 23, figs. 3, 4.
[4] Smiths. Contrib. Knowl., vol. 7, p. 41.

The posterior surface for the calcaneum is concave along its greater diameter; slightly convex along the shorter. The surface for the fibula is nearly plane in its upper part, but convex from front to rear in its lower half. The articular surface for the navicular is concave, but not deeply so. The surface for the cuboid is convex.

TRUCIFELIS FLORIDANUS (Leidy).

Plate 28, figs. 1–3.

In 1889[1] Leidy described a skull of a saber-tooth tiger to which he gave the name *Machairodus floridanus.* This had been secured by Mr. Joseph Willcox, in a limestone quarry at Ocala, Florida. From the same quarry had been obtained other remains which are referred to *Equus leidyi*, *Bison*, sp. indet., *Odocoileus* sp. indet., *Dasypus* sp. indet., *Sylvilagus* sp. indet., *Procamelus minor*, and *Elephas columbi*.[2] All of these indicate that the deposits belong to the Pleistocene.

From the skull described by Leidy all the teeth were missing; but there were present the alveoli for the upper incisors, the great canine, the third premolar, and the carnassial. This skull was figured in a later paper.[3]

In the Eighth Annual Report of the Florida Geological Survey, on plate 29, figure 8, Dr. E. H. Sellards figured an upper carnassial premolar which had been found at Vero, Florida, in the stratum known in the literature of that locality as No. 2. This he referred (p. 152) to *Smilodon.* Recently, through the kindness of Doctor Sellards, the writer has been permitted to examine the tooth in question. By comparing the figure of this tooth here presented (pl. 28, figs. 1, 2) with that of Leidy's *Trucifelis fatalis*[4] it will be seen that there is between them a close resemblance. It will be necessary first of all to determine whether or not the Vero tooth belongs to *T. fatalis.* The following measurements enable us to make comparisons, those of *T. fatalis* being computed from Leidy's description[5]. In the second column under each tooth is given the ratio of each dimension to the length of the tooth.

Dimensions of upper carnassials.

	Trucifelis fatalis type.		Vero tooth.	
	1	2	1	2
Length of crown	32.8	100	40	100
Width at inner buttress	15.6	41	17	42.5
Height of principal cusp	18.7	57	26	65
Height of anterior lobe	14.6	44.5	19	47.5
Height of front of rear lobe	13.5	41	19	47.5

[1] Proc. Acad. Nat. Sci. Phila., p. 29.
[2] Sellards, 8th Ann. Rep. Fla. Geol. Surv., p. 103.
[3] Trans. Wagner Free Inst. Sci., vol. 2, pl. 3, fig. 1.
[4] Ext. Mamm. Fauna Dak., Neb., pl. 28, figs. 10, 11.
[5] Idem, p. 367.

It will be seen at once that the Vero tooth was probably that of a larger species than *T. fatalis* and that the crown is everywhere higher in proportion to its length. As may be seen from comparing the figures of the two teeth, the width of the principal cusp at its base is one-half of its height, while that of *T. fatalis* is relatively considerably wider. The two teeth agree in having the protocone absent and in having the anterior lobe divided into two parts. It appears certain that the Vero tooth does not belong to *T. fatalis*. The latter was found at Sour Lake, in Hardin County, Texas.

Through the courtesy of Mr. John G. Rothermel, director of the Wagner Free Institute, the writer has been able to examine the upper jaw of Leidy's type of *Machairodus floridanus*. The carnassial possessed in front two roots, of which the inner was somewhat reduced in size and pushed backward, as in the Vero tooth, to nearly opposite the interval between the anterior outer root and the great hinder root. It is quite certain that the anterior lobe of the tooth was much larger than it is in the lion and the tiger. The alveolus has a length of 37 mm.; that part for the hinder root is 24 mm. long. The tooth was therefore only slightly larger than the Vero tooth; and there appears to be no reason why the latter can not be with much certainty referred to Leidy's species.

In the deposit at Vero which furnished the carnassial Doctor Sellards found a part of a great canine tooth which belonged to some one of the Machairodontinae. The fragment (pl. 28, fig. 3) is 67 mm. long. Probably nearly 25 mm. of the distal extemity is gone. The upper end does not reach the base of the crown. In the Ocala skull the socket for the canine measures 40 mm. in length fore and aft and its width is 20 mm. At its upper end the fragment from Vero has a width for and aft of 30 mm. and a thickness of 13 mm. If the front and rear borders of this tooth are continued until the distance between them is 40 mm. and the distal extemity is restored, a tooth is indicated whose crown was about 110 mm. long. Both borders are acute, more especially the hinder one, which is knife-like. The anterior edge is smooth, but the hinder one is obsoletely crenulated. The tooth is quite different from that of Barnum Brown's *Smilodontopsis conardi*.[1] In the latter the base of the fragment has the same fore and aft diameter as does the Vero tooth. At a distance of 55 mm. from this, toward the tip, the fore and aft diameter is 19 mm.; in the Vero specimen, only 16 mm. In *Smilodontopsis conardi* both edges are crenulated. In Cope's *Smilodon gracilis* [2] the powerful canine maintains well its breadth as the tip is approached; and both edges are free from denticles (Cope). For comparison there is figured here (pl. 28, fig. 4) a right canine tooth evidently belonging to *Dinobastis*

[1] Mem. Amer. Mus. Nat. Hist., vol. 9, p. 190, pl. 19.
[2] Journ. Acad. Nat. Sci. Phila., vol. 11, pl. 20, fig. 1.

serus Cope. It was found in a cave in the northern part of Bexar County, Texas. The tooth belongs to the Scientific Society of San Antonio. It was a far smaller tooth than that of figure 3.

From the close resemblance existing between the carnassial found at Vero and here referred to Leidy's *Machairodus floridanus* and that of *Trucifelis fatalis* found at Natchez, it is certain that both belong to the same genus. For this genus the writer accepts at present the name *Trucifelis*. We shall have, therefore, the two species, *Trucifelis atrox* and *T. floridanus*.

FELIS VERONIS, new species.

Plate 28, figs. 5–7.

When the author was at Vero, in October, 1917, he found along the drainage canal, a short distance above the railroad bridge, in the bed of sand known as No. 2, an upper left fourth premolar of a large tiger-like animal. Views of this tooth are here presented (pl. 28, figs. 5–7). On comparing it with the corresponding teeth of the tiger and of the jaguar (*F. paraguensis*, No. 4128 U. S. Nat. Mus.), and with those of the machairodonts, it can not be doubted that its possessor belonged to a species of *Felis*. In order to facilitate comparison the following measurements are presented, being those of the specimen in question, the same tooth of *Felis tigris*, and of the large South American jaguar, *Felis paraguensis* Hollister.

Measurements of carnassials of Felis.

	Felis from Vero.	*Felis tigris* 218321.	*Felis paraguensis* type.
Length of the crown	33.0	32.5	28.8
Width of crown at protocone	17.8	15.5	15.2
Width of crown between the main and the hinder cusps	12.5	10.0	10.2
Height of anterior lobe	10.0	11.0	11.0
Height of main cusp	16.0	15.0	16.0
Height of rear hinder lobe	7.0	6.0	6.0
Width of the main cusp	11.5	11.0	10.6

Various differences between the fossil tooth and that of the tiger appear other than those shown in the table of measurements. The protocone of the Vero tooth is considerably less reduced than in the tiger, its height and anteroposterior diameter being greater by one-third. Immediately behind the protocone the width of the tooth is reduced more suddenly than in the tiger; the preanterior tubercle is much more prominent than that in the tiger; and the buttress which descends from the principal cone to the protocone is sharp, instead of rounded. In the jaguar the preanterior tubercle is missing and the protocone is relatively more reduced than in the fossil. The height of the main cusp is relatively greater than in either the recent tiger or the fossil one. Naturally, the fossil is very distinct from the jaguar because of its greater size.

From Natchez, Mississippi, Leidy described *Felis atrox*[1] which was based on a lower jaw with teeth. Inasmuch as the lower carnassial is 31.2 mm. long, while that of the existing tiger above-mentioned is only 23 mm., it is evident that *F. atrox* had upper carnassials which were about 44 mm. long. It was therefore a much larger animal than the Vero cat. *Felis augustus*,[2] besides belonging to the Arikaree of the Tertiary, differs in various ways from the Vero specimen. *Felis hillianus* Cope belongs to the Blanco Pliocene and is based on a canine tooth and some foot bones; so that it can not be compared with the animal here described. *Felis imperialis*, of the Pleistocene of California, had a second molar about 25.5 mm. long and was, therefore, a larger animal than that from Vero. According to Cope[3] the upper carnassial of *Felis inexpectata* has a length of 24 mm., being thus considerably smaller than that of the Vero animal.

Inasmuch as this large felid found at Vero appears to have been hitherto unknown, it is proposed to introduce it under the name *Felis veronis*.

TRICHECHUS ANTIQUUS Leidy?

Plate 26, figs. 2, 3.

In the collection of the National Museum is a part of the lower jaw of a manatee (Cat. No. 2522) which is labeled as having been found with the other fossils of the Alachua clays, in Levy County. However, the writer finds no reference to this genus in any of the lists of materials collected in the Alachua clays; the fossil has an appearance different from most of the other fossils of those clays; and there is attached to it an oyster shell, showing that it had lain in salt water. Doctor Sellards informs the writer that he has never seen any marine fossils that have been found in the Alachua clays. It is hence probable that the bone was found somewhere else in Florida. Leidy reported[4] fragments of ribs of supposed *Trichechus antiquus* from Peace creek, and Sellards[5] included *T. manatus* among the fossils found in Withlacoochee river. No mention is found of the discovery of a lower jaw at any place.

The jaw in question appears to be well fossilized and it is heavy; so that it evidently belongs to either the Pleistocene or to some late Tertiary deposit.

The jaw lacks both ascending rami and all of the teeth. It evidently belonged to a species of *Trichechus*, but not to *T. manatus*. The individual possessing it appears to have had a size somewhat less than that of a manatee whose basilar length is 356 mm. The

[1] Trans. Amer. Philos. Soc., vol. 10, 1853, p. 319, pl. 34.
[2] Leidy, Ext. Vert. Fauna, etc., pl. 7.
[3] Journ. Acad. Nat. Sci. Phila., vol. 11, p. 248.
[4] Trans. Wagner Inst., vol. 2, p. 27.
[5] 8th Ann. Rep. Fla. Geol. Surv., p. 104.

distance from the front of the symphysis to the rise of the ascending ramus was close to 180 mm; in the jaw of the existing manatee with which it is compared this dimension is 195 mm. The length of the symphysis is relatively the same as in the manatee. Its greatest height is 68 mm.; in the manatee, 83 mm. In the latter animal the upper half of the hinder face of the symphysis forms a concavity; this does not exist in the fossil jaw. The surface which in life was occupied by the horny plate is relatively much shorter than in the manatee, being only 60 mm. long; in the manatee, 80 mm. In the manatee the inner face of the horizontal ramus is flat or even concave; this does not seem to have been the case in the fossil jaw. The height of the jaw was evidently less than in the existing manatee, being apparently only 48 mm. at the middle of the length; whereas in the only slightly larger manatee jaw the height is 60 mm. The inferior dental canal is considerably larger than in the manatee, its diameter being 17 mm. Moreover, its outer face is open backward to about the position of the third or fourth tooth.

Judging from what remains of the sockets of the teeth the latter had a length somewhat greater than in the existing manatee. Three of these sockets occupy a line 45 mm. long; in the manatee used for comparison, 41 mm. The lower teeth appear to have been wider than those of the manatee, but of this one can not be certain.

Leidy described an upper tooth of a manatee which bears the name *Trichechus antiquus*, and which was found at Charleston, South Carolina. The fore and aft diameter of the tooth was about 20 mm.; that of the existing manatee is about 12.5 mm. *T. antiquus* was evidently a much larger animal. Its lower teeth must have had a length of about 24 mm. Evidently the jaw supposed to have been found at Williston belonged to a considerably smaller individual, perhaps to a smaller species, than the one which furnished Leidy's type. In the various species belonging to the genus *Trichechus* there is a continuous succession of teeth which are produced at the rear of the jaw and which move forward. These increase in both length and width as the animal grows. Hence the tooth described by Leidy may have belonged to a very large specimen of the same species as that to which the jaw belonged which is above described. For that reason the jaw is referred provisionally to *Trichechus antiquus;* but it may, with equal probability, have belonged to an undescribed species.

ATRACTOSTEUS LAPIDOSUS, new species.

Plate 26, fig. 4; plate 28, fig. 8.

In the United States National Museum are a right opercular bone and some scales of a fresh-water gar which are labeled as having been found by L. C. Johnson, in 1885, in the "Mixon bone bed," in

Levy County, Florida. This place is near the present town of Williston. These gar remains are doubtless those mentioned by Leidy in 1896.[1] An examination of these shows that they belonged to a fish closely related to that known as alligator gar, usually called *Lepisosteus tristoechus*. However, this gar appears to the writer to be generically distinct from the long-snouted gar and hence to be called *Atractosteus* Rafinesque. The fossil materials from Williston are referred to this genus and may be known as *Atractosteus lapidosus*. The opercular bone is made the special type of this species. It can hardly be doubted that the scales belonged to the same individual fish. In case the opercular bone had the same length, proportioned to the remainder of the body, as in a specimen of *A tristoechus* the total length of the fish was close to 27 inches.

The opercular is represented of the natural size by figure 4 of plate 26. The height near the front border is 26.5 mm.; the length is 24 mm. The corresponding dimensions of this bone in a specimen of the existing alligator gar are 54 mm. and 54 mm. This bone also is shown, reduced to the same size for comparison (pl. 26, fig. 5). It belonged to the left side of the head. The fossil bone is entire, except that a small fragment is missing, the loss of which has produced the notch in the lower border. It will be seen that there are some differences in the shape of the two bones. The greatest difference is found, however, in the character of the sculpture. That of the fossil differs in consisting of more regular, more continuous, and more sharply defined ridges descending from the upper angle of the bone. The ridges of the existing fish consist of a sort of network of low ridges, especially on the front half of the bone. Also the ridges of the front half are directed downward or downward and backward, while in the fossil they turn somewhat forward in their descent. In the existing fish the ridges of the front half are more widely separated than those in the hinder part; in the fossil they are narrower and more closely packed.

Ten of the scales are here represented of the size of nature (pl. 28, fig. 8). It will be seen that some of them have the upper hinder border toothed, while others have this border smooth. In these respects they resemble the scales of the existing alligator gar (pl. 28, fig. 9) except that there appear to be fewer of the teeth. Both *Lepisosteus osseus* and *L. platystomus* have the borders of all the scales smooth; at least the writer has not found toothed scales in either of these species.

[1] Trans. Wagner Free Inst. Sci., vol. 4, page x.

EXPLANATION OF PLATES.

PLATE 26.

FIG. 1. *Elephas imperator*. Hindermost left lower molar. $\times \frac{3}{8}$.
2. 3. *Trichechus antiquus?* Lower jaw. $\times \frac{1}{2}$.
2. View of left side.
3. View from above.
4. *Atractosteus lapidosus*. Right opercular bone; outer surface. $\times$ 1.
5. *Atractosteus tristoechus*. Left opercular bone; outer surface. Reduced.

PLATE 27.

FIGS. 1. 2. *Thinobadistes segnis*. Left astragalus. $\times \frac{3}{4}$.
1. View of upper face.
2. View of lower face.
3. 4. *Gnathopsis oweni*. Left astragalus. $\times \frac{1}{3}$.
3. View of upper face.
4. View of lower face.
a, external; *b*, internal, portion of tibial articular surface; *c*, articular surface for navicular; *d*, articular surface for cuboid; *e*, anterior; *f*, posterior surface for calcaneum; *g*, articular surface for fibula.

PLATE 28.

FIGS. 1–3. *Trucifelis floridanus*. Teeth. $\times$ 1.
1. Left upper carnassial. Inner view.
2. Same tooth. Outer view.
3. Fragment of upper canine.
4. *Dinobastis serus*. Right canine. $\times$ 1.
5–7. *Felis veronis*. Left upper carnassial. $\times$ 1.
5. Outer view.
6. Inner view.
7. View of cutting border.
8. *Atractosteus lapidosus*. Scales. $\times$ 1.
9. *Atractosteus tristoechus*. Scales. $\times$ 1.