

ART. XV.—*New Species of Oligocene (White River) Felidæ*; by MALCOLM RUTHERFORD THORPE.

(Contributions from the Othniel Charles Marsh Publication Fund, Peabody Museum, Yale University, New Haven, Conn.)

INTRODUCTION.

The White River (Oligocene) Felidæ material in the Marsh Collection of the Peabody Museum of Yale University consists chiefly of specimens of the genus *Hoplophoneus*, with four examples of *Dinictis* and one of *Pogonodon*, whereas the John Day Felidæ in the same collection show no specimens of *Hoplophoneus*, but several of *Nimravus*, one of *Pogonodon*, and examples of new species which will soon be described by my colleague, G. F. Eaton. This distribution is significant. The White River material, in many instances, represents a fauna whose individuals were of smaller size than the John Day representatives of allied genera. The Elothères show the same relative size, as do also the various genera of the Merycoidodontidæ. For example, the Eporeodons of the John Day include larger individuals than the White River Merycoidodonts; the same is true of the genus *Promerycochærus*.

As a result of studies of the Oligocene Felidæ, several factors have been brought out which are of interest. The genus *Pogonodon* Cope is considered by the writer to be worthy of a distinct place in the Felidæ and it should not lose its identity by having its species distributed under the various other Oligocene genera as some writers have favored doing. There are now several species referred to this genus, as follows: *P. platycopis* Cope,¹ the type of the genus; *P. brachyops* Cope;² *P. davisii* Merriam;³ a new species referred to this genus by G. F. Eaton;⁴ and *P. cismontanus* n. sp., herein described.

Some of the terms used in this paper in connection with the measurements are new to paleontology and require a word of definition. In practically all cases, the measurements are based on parts which have proved to be most resistant to destructive processes and which

¹ E. D. Cope, *Am. Nat.*, 14, 143, 1880.

² E. D. Cope, *Ibid.*, 14, 849, fig. 11, 1880.

³ J. C. Merriam, *Univ. Calif., Bull. Dept. Geology*, 5, No. 1, 53-58, 1906.

⁴ G. F. Eaton, John Day Felidæ in the Marsh Collection (in preparation).

can, therefore, be taken in the majority of specimens. These terms, some of which are foreign to paleontology, may be made clearer, as follows:

Prosthion: The most prominent part on the alveolar border between the two upper median incisors.

Basion: The mid-point on the anterior margin of the foramen magnum.

Nasion: The highest point on the internasal suture.

Bregma: The point at which the sagittal and coronal sutures meet.

Palatal length: Prosthion to posterior surfaces of the maxillary parapets, in axial projection, including the pterygoid processes of the maxillæ, if present.

Anterior palatal breadth: Between the roots of the canines (minimum).

Posterior palatal breadth: Between the innermost roots of the carnassials.

Length of the temporal fossa: Maximum measurement in an antero-posterior plane between the maxilla and the anterior margin of the glenoid fossa.

Anterior zygomatic pedicle: Situated between the inferior orbital margin and the alveolar margin beneath, and between the infra-orbital foramen and the posterior margin of the zygomatic process of the maxilla.

The measurements of the anterior zygomatic pedicle have proved of considerable value, both as absolute measurements and as ratios, in specific determinations.

The writer wishes to express his thanks to Professors Schuchert and Lull and Doctor Eaton for their kindly interest in, and friendly criticism of, this work throughout its course. The drawings of the various specimens have been made by Mr. Rudolf Weber.

DESCRIPTION OF SPECIES.

The Genus Hoplophoneus Cope.

In 1851, Leidy⁵ described a Machærodont from the White River badlands, under the name of *Machærodus primævus*. The description is very brief and is based on a mutilated cranium, very much fractured and fissured. Of this skull, the summit of the inion, the zygomata, the anterior extremities of the ossa nasi, the superior incisors, the greater portion of the corresponding canines,

⁵ J. Leidy, Proc. Acad. Nat. Sci. Phila., 5, 329.

and the symphysis of the lower jaw with the incisors and canines are broken away. The skull is not figured. The length of the skull from the occipital condyles to the incisive alveoli is $6\frac{1}{2}$ inches.

In 1852, Leidy⁶ more fully described *M. primævus*. The skull is figured in his Table XII, A, figure 5, showing the left lateral view, two-fifths natural size. This is the same specimen noted in the preceding year. Leidy changed his previous figures, however, for the basal skull length, to $6\frac{1}{4}$ inches.

Again, in 1853, Leidy⁷ redescribed the original *M. primævus*, giving a very complete and detailed description. Plate XVIII of his paper shows natural size drawings of the specimen, with a lateral view of the right side of the skull with lower jaw; superior view of the right half of the same; view of the left side of lower jaw; external view of the right inferior canine; and lastly, an anterior view of the same tooth. The drawings are of the same skull figured in the previous year and referred to in 1851.

In 1869, in the "Extinct Mammalian Fauna of Dakota and Nebraska," Leidy⁸ changed the name *Machærodus* to *Drepanodon*, and stated that "The Dakota *Drepanodon* belongs to the second group [*Machærodus*, with the acute edges of the canines serrulate and the first lower premolar with a trilobate crown and double fang], or that of *Machairodus*." He examined four nearly complete skulls. Of these, one was described and figured in the 1853 paper (the type specimen), two are represented in plate IV, figures 1 and 5, as well as parts of a fourth in figures 2-4 of the same plate in the 1869 reference. The original specimen (or holotype) of *M. primævus*, and the skulls represented by figures 1 and 5 of plate IV, Leidy named *Drepanodon primævus*, while the parts of a mandible shown in figures 2-4 he referred to a new species, *D. occidentalis*.

G. I. Adams,⁹ in 1896, made a new species based upon the skull in Leidy's figure 1, terming it *Hoplophoneus robustus*. Professor Marsh had several casts made of the figure 5 skull in the 1869 reference. One of these

⁶ J. Leidy, In Owen's "Report of a geological survey of Wisconsin, Iowa, and Minnesota," etc., p. 564.

⁷ J. Leidy, *Smithson. Contrib. Knowl.*, 6, art. 7, p. 95.

⁸ J. Leidy, *Journ. Acad. Nat. Sci. Phila.*, 2d ser., 7, 54.

⁹ G. I. Adams, *Am. Nat.*, 30, 49.

casts is in the U. S. National Museum and another in the American Museum of Natural History. They have been erroneously considered as casts of the holotype of *Machærodus primævus*, whereas they are casts of the heautotype,¹⁰ which was first described eighteen years after the holotype. The basal length of the heautotype is 6 inches.

Cope,¹¹ in 1873, described *Machærodus oreodontis*, from "an incomplete mandibular ramus of the right side, containing two incisors, and the second molar, with portions of other teeth." This specimen belonged to "a saber-toothed cat of rather smaller size than the *M. primævus*." In the following year, the genus *Hoplophoneus* was established by the same author,¹² with *H. oreodontis* as the type of the genus and species. He stated that the general characters were "Dental formula of mandible: I3, C1, Pm2, M2. Superior canine greatly developed; end of mandible expanded and thickened to protect it. This is simply *Machærodus* with a tubercular molar, as in *Dinictis*."

Eleven years later (1885), Cope¹³ changed the dental formula to $1\frac{3}{3}$, $C\frac{1}{1}$, $Pm\frac{3-2}{2}$, $M\frac{1}{1}$. He also stated that there was no inferior tubercular molar and that his first diagnosis was incorrect, owing to insufficient data. He said further that "The longest known species is the *Hoplophoneus primævus*, Leidy, from the White River badlands of Dakota and Nebraska."

Dinictis Cope.

Four specimens, representing three species and possibly a fourth, were found in the White River formation.

No. 10944 Y. P. M., *D. bombifrons* Adams, was found near Terry's ranch, Nebraska, by A. S. Shelley in 1874. It consists of parts of both mandibles with nearly all the teeth except incisors. This species is synonymous with *D. fortis* Adams.

A right superior molar, No. 10951 Y. P. M., is most

¹⁰ See C. Schuchert and S. S. Buckman: The nomenclature of types in natural history, *Science*, new ser., 21, 899-900, 1905.

¹¹ E. D. Cope: Synopsis of new Vertebrata from the Tertiary of Colorado, p. 9.

¹² E. D. Cope, *Ann. Rept., U. S. Geol. and Geog. Surv. Terr.*, for 1873, p. 509.

¹³ E. D. Cope: *Rept. U. S. Geol. Surv. Terr.*, 3, Tertiary Vertebrata, Book 1, p. 992.

closely allied to *D. paucidens* Riggs, and corresponds to the measurements and form of the same molar in the type specimen of this species. It was found near Pine Bluffs, Colorado, by E. Devendorf in 1874.

A skull and right mandible, No. 10048 Y. P. M., are identified with *D. squalidens* (Cope) and were found at White River, Nebraska. Another specimen, No. 12116 Y. P. M., is provisionally identified with this species. It consists of a very poorly preserved skull and both mandibles, with teeth well preserved. Its nearest ally is *D. squalidens*, although, while a young individual, it is much smaller and may represent a new species. In view of the obliteration of nearly all skull characters except length, however, it is referred to *D. squalidens*, pending the finding of additional material.

Hoplophoneus primævus (Leidy).

Cat. No. 10051, Y. P. M., White River (Oligocene), Casey, South Dakota.

This specimen, collected by H. C. Clifford in 1891, is slightly smaller in nearly all dimensions than the type, and as the bones are thin and the mandibles long and slim, it is reasonable to suppose that it may represent a female, but from the material at hand it is impossible to make any positive statements in regard to sex differences.

An interesting feature in the specimen is the lack of a coronoid process on the right ramus. The base of the ascending ramus, above the masseteric fossa, is about 2 mm. thicker than on the left ramus, and, instead of a coronoid, there is a lateral osseous growth of over 4 mm., to which was probably attached a part of the masseter muscle. The right condyle is also a little smaller than the left. The animal undoubtedly lived a considerable length of time without the coronoid, the lack of which apparently had no special influence on its life habits, even though it seems to indicate either a pathologic or a traumatic condition.

Hoplophoneus marshi, sp. nov.

(Figs. 1 A and B.)

Holotype, Cat. No. 10049, Y. P. M., White River (Oligocene), Nebraska.

The type of this species, collected by H. C. Clifford and A. S. Shelley, consists of a skull only. It is that of a submature animal, and while some fracturing has oc-

curred, yet very little distortion has taken place. The incisors and both molars are missing, but their alveoli are distinctly visible. The right P³ is lacking. The

FIG. 1; A, B.

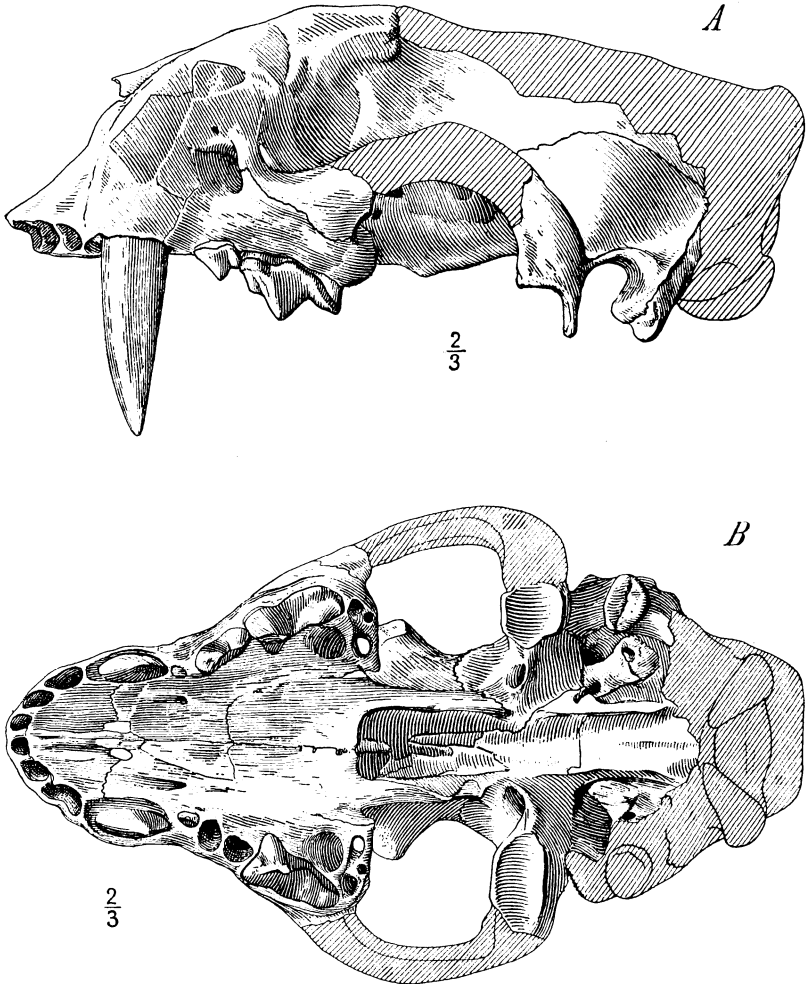


FIG. 1.—*Hoplophoneus marshi*, n. sp. (A) Left lateral view and (B) inferior view of skull. Two-thirds natural size.

condyles have been restored, as well as portions of the zygomata, occiput, and parietal bones. All of the teeth now present belong to the permanent dentition.

The skull resembles that of *H. primævus* Leidy in some characters and that of *H. oreodontis* Cope in others, but it has several distinctive features of specific value, the most prominent of which are the very large incisor alveoli, the long sharp-pointed palate, the peculiar shape of the canines, and the very large molar alveoli.

The basal length of the skull is 147 mm., which is next to that of the smallest species of the genus, but the incisors, measured at the alveoli, are proportionately much larger, their dimensions being as follows:

	antero-posterior	transverse
I ¹	7 mm.	4.5 mm.
I ²	7 mm.	4.75 mm.
I ³	8 mm.	5.5 mm.

Anterior to the orbits, the face is flat, but in front of the infraorbital foramen the maxillary is strongly convex, due to the alveolus of the canine. The infraorbital foramina are large and subangular. The diastema between I³ and the canine is proportionally a little longer than in *H. primævus* Leidy. The palate is nearly 20 per cent longer than in *H. oreodontis* Cope. The premaxillary border is very convex anterior to the line of the canines. It is, in fact, so pointed that it is unlike any other species of *Hoplophoneus*. The canines are decidedly laterally compressed. The maximum diameter at the alveolus is 14.5 mm., and the transverse diameter is 5.4 mm.; or the maximum diameter is nearly three times the transverse, whereas the other species generally show a relation of about twice the maximum over the transverse. The posterior cutting edge or axis of the canine is at right angles to the plane of the palate.

Cope, in describing *H. oreodontis*, stated that there was no indication of the existence of a second premolar, but one is present on the left side of this specimen, although there is none on the right. This P² had insufficient space to develop between the canine and P³ and hence its position is inward from the true line of the teeth. The diastema between the canine and P³ on the left side is nearly equal to that between the canine and the I³. The posterior edge of the paracone of P³ is denticulate. The total length of the tooth row is 54 mm., which makes it appear near to *H. oreodontis* in size, but this is due to

the very small diastema between the canine and P.³ Both molars are missing, but their alveoli are each 14.5 mm. in length and 6 mm. wide. These molars had two stout roots in a transverse line, and a third, very small, centrally located posterior to the transverse. *H. oreodontis* Cope is from the Upper Oligocene (John Day), while *H. marshi* is of White River age, probably from the *Oreodon* zone of Middle Oligocene.

Measurements.

	mm.
Prosthion to basion	137
Prosthion to nasion	66
Prosthion to bregma*	109
Basion to bregma*	65
Bizygomatic diameter*	94
Postorbital constriction	31
Bimastoid diameter	64
Palatal length	72.5
Posterior palatal breadth	33
Inferior orbital margin to alveolar margin	16
Infraorbital foramen to posterior margin of zygomatic process	24
Length of tooth row, P ³ to M ¹ , inc.	36
Diastema, C to P ³	4
Diastema, I ³ to C.	3
Crown of P ³ , length of base	12
Crown of P ³ , maximum width	5.5
Crown of P ⁴ , length of base	20
Crown of P ⁴ , maximum width	11

* Approximate.

Hoplophoneus latidens, sp. nov.

(Figs. 2 A-C; 3).

Holotype, Cat. No. 10050, Y. P. M., White River (Oligocene), near Pine Bluffs, Colorado.

The type of this species, found in 1874 by E. Defendorf, consists of a nearly complete skull, atlas and axis. Both second premolars are missing and the canines have been restored. The left molar has been somewhat laterally compressed.

In some characteristics this specimen is closer to *H. robustus* than to the other species of *Hoplophoneus*, although there are close resemblances to *H. primævus* Leidy, and in several distinct features it differs from

FIG. 2; A.

A

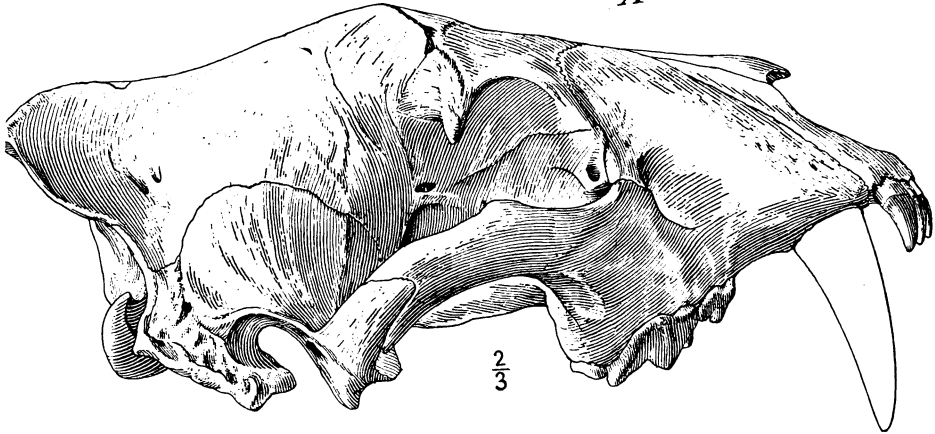
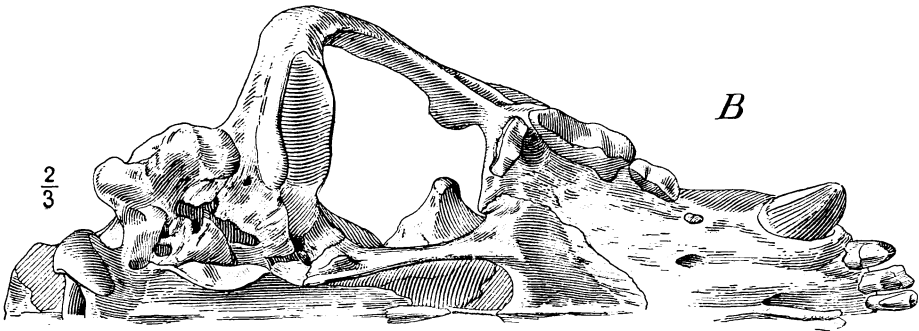


FIG. 2; B, C.

B



C

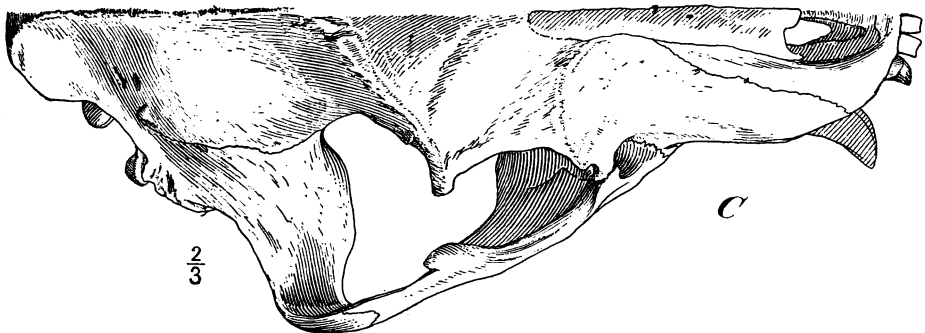


FIG. 2.—*Hoplophoneus latidens*, n. sp. Holotype. (A) Right lateral view of skull, (B) right half inferior view and (C) right half superior view. All two-thirds natural size.

both. Its basal length is about intermediate between the two species above mentioned, while the prosthion-nasion dimension is but 3.5 mm. above that of *H. primævus*. The prosthion-bregma dimension is only 2.5 mm. below that of *H. robustus*. The cranial region is lower than in *H. robustus* by 13 mm., and lower than in *H. primævus* by 6 mm., which gives the skull a markedly different configuration. The bizygomatic diameter is greater than that of *H. robustus* by 6 mm., although the breadth of the anterior nares is less. Again, the diameter of the postorbital processes of the frontals is greater than in *H. robustus* by 6 mm., but the bimas-toid diameter is less by 1.5 mm. The palatal length is

FIG. 3.

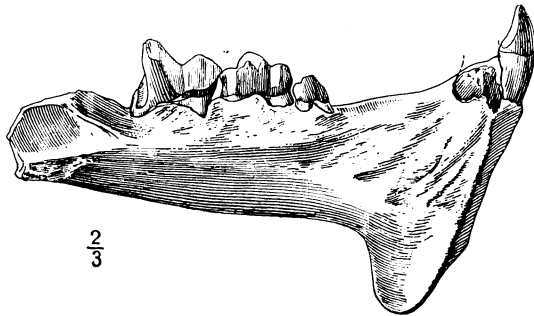


FIG. 3.—*Hoplophoneus latidens*, n. sp. Paratype. Right ramus, two-thirds natural size.

12.5 mm. less than that of *H. robustus*. One important feature is the difference in shape of the anterior zygomatic pedicle. The measurement from the inferior orbital margin to the alveolar margin is 24 mm., in *H. robustus* it is 18 mm., while the distance from the infra-orbital foramen to the posterior margin of the zygomatic process of the maxilla is 28 mm. and in *H. robustus*, 32.5 mm. The conventional index of these measurements for this specimen is 117, for *H. robustus*, 162.5, and for *H. primævus*, 143. The superior canine is slightly greater in its maximum diameter at the parapet. The postorbital constriction is less than that of *H. primævus* by 3 mm.

Summing up the broad differences of the skull, it is found that this specimen, in comparison with *H. robustus*, is shorter and broader, has a much lower parietal region, and the diameter of the postorbital constriction is less than that of even *H. primævus*, while that of the bimas-toid is about equal to that of *H. primævus* and much less

than in *H. robustus*. Considerable importance should be attached to the proportions of the anterior zygomatic pedicle.

The atlas and axis of this specimen are worthy of description. The maximum diameter between the external margins of the transverse processes of the atlas is 78.5 mm.; the measurement from the margin of the anterior articular surfaces to the posterior tip of the transverse process is 47 mm. and the maximum diameter across the anterior articular surfaces is 44 mm. The maximum height is 25 mm. and the thickness of the dorsal arch is 8 mm. The ventral tubercle is not as sharp as in the Canidæ, but is gently rounded. The dorsal arch is massive and domed so that no distinct spine is noticeable, thus differing from the modern Felidæ. The alar notches are very shallow, and the transverse processes are stout and massive on their inner posterior margin.

The axis has a very long spine, its length being 66.5 mm., whereas the length of the centrum proper is 33 mm. The odontoid process is stout and heavy. It is 12 mm. long and its transverse diameter is the same at its junction with the centrum while its vertical diameter is 7.25 mm. The width across the posterior articular surfaces is 24 mm., and across the anterior articular surfaces 34 mm. The vertebrarterial foramen is nearly vertically oval, its maximum diameter being 5.5 mm. and its horizontal diameter 2 mm. The transverse processes are long and slender.

No mandibular rami were found with specimen No. 10050, but a right ramus, together with parts of both superior molar series and contiguous portions of the palate, are here referred to this species. These remains bear the number 10949. The ramus possesses the third and fourth premolars and the first molar in good condition. The third incisor is nearly perfect, but the canine is broken off. The left superior second, third, and fourth premolars and the base of M^1 , together with a small contiguous portion of the palatine and maxillary bones, are present. The right P^4 , the posterior half of P^3 , and the base of M^1 are present, also with a small portion of the palatine and maxillary bones. The P^2 is single-rooted in No. 10949, whereas in No. 10050 it is very difficult to determine, as both second premolars are missing and their alveoli are quite indistinct. It is unwise, however, in specific determinations, to place too much stress upon

the presence or absence of a second root in the second premolar. In both of these specimens, the superior second premolar is on the point of disappearance. The superior molars of both are three-rooted. The superior carnassial in specimen No. 10949 has a distinct, though small, anterior cusp, developed from the cingulum, in which it is prophetic of *Machærodus*.

Measurements.

	Holotype (10050) mm.	Paratype (10949) mm.
Prosthion to basion	154	
Prosthion to nasion	78.5	
Basion to nasion	99	
Prosthion to bregma	126.5	
Basion to bregma	71	
Bizygomatic diameter	116	
Diameter of postorbital constriction	31	
Bimastoid diameter, max.	70.5	
Palatal length	79	
Posterior palatal breadth	47	
Inferior orbital margin to alveolar margin (min.)	24	
Infraorbital foramen to posterior margin of zygomatic process of maxilla.....	28	28
Depth of mandibular symphysis (est.)		40
Depth of mandible posterior to P ₄		21.5
Depth of mandibular flange		49
Length of tooth row, C to M ¹ , inclusive	67.5	
Length of tooth row, P ³ to M ¹ , inclusive	36	37
Diastema, C to P ³	16	
Diastema, I ³ to C	3	
Superior canine, maximum diameter at al- veolus	17.5	
Superior canine, transverse diameter at al- veolus	10	
Crown of P ³ , length of base	11	11
Crown of P ³ , maximum width	5	5
Crown of P ⁴ , length of base	21	21.5
Crown of P ⁴ , maximum width	10	11
Length of tooth row, P ₂ to M ₁ , inc.		39
Diastema, inferior canine to P ³		25.5
Crown of P ₄ , length of base		14
Crown of P ₄ , maximum width		6.5
Crown of M ₁ , length of base		17
Crown of M ₁ , maximum width		8.5
Inferior canine, maximum diameter at al- veolus		7
Inferior canine, transverse diameter at al- veolus		5

FIG. 4; A.

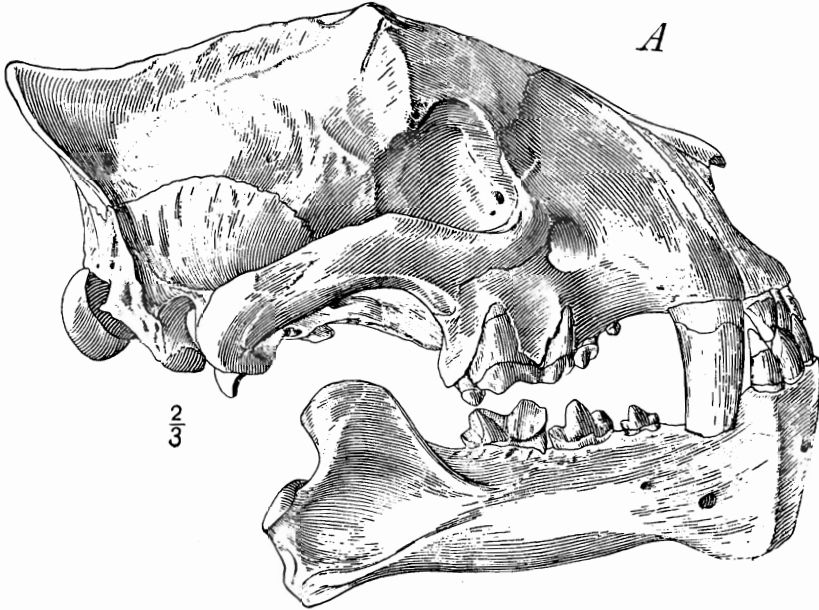


FIG. 4; B, C.

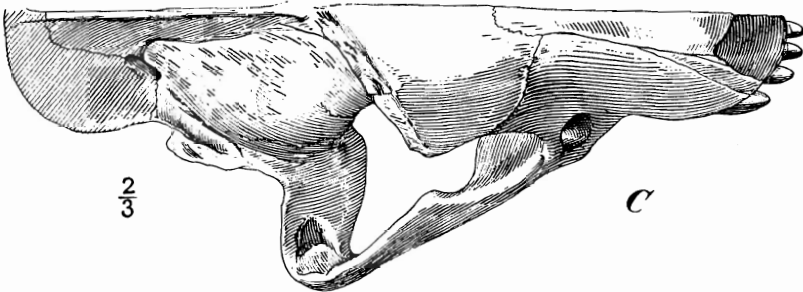
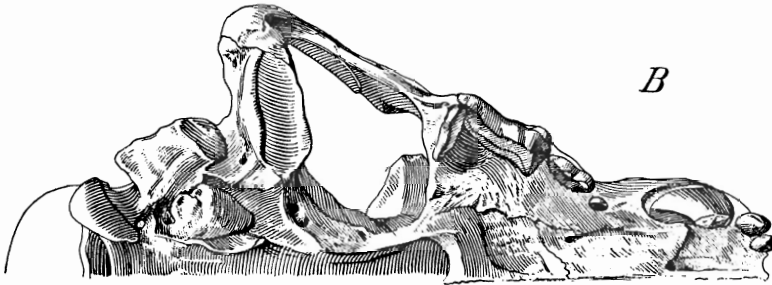


FIG. 4.—*Hoplophoneus molossus*, n. sp. (A) Right lateral view of skull and jaw; (B) right half, inferior view and (C) right half, superior view. All two-thirds natural size.

Hoplophoneus molossus, sp. nov.

(Figs. 4 A-C).

Holotype, Cat. No. 10052, Y. P. M. White River (Oligocene), White River, Nebraska.

This species is based on an almost complete skull, both mandibular rami, atlas, axis, third cervical, eleventh, twelfth, and thirteenth dorsals, and the first lumbar. Fragments, probably of the sixth, twelfth, and thirteenth ribs, were found with the specimen, which was collected in 1875 by H. C. Clifford. The specimen is an adult and has suffered a small amount of distortion, but not enough to interfere with the general outline and characters of the skull. Both canines are broken off about midway of their length.

This species is most closely allied to *H. primævus*. The basal length is approximately 10 mm. shorter, while the prosthion-nasion dimension is also less by 10 mm. than in *H. primævus*, but the breadth of the anterior nares is greater by 4.5 mm. and the interorbital breadth is less by 5 mm., thus showing a different facial aspect. The postorbital constriction differs by 8 mm., *H. primævus* having the greater diameter. The bimastoid diameter is 10 mm. less in this specimen. The ratio of the anterior zygomatic pedicle in *H. primævus* is 143, but in this species it is 109. The depth of the ramus of this species, posterior to P₄, is greater by nearly 3 mm. The maximum diameter of the superior canine at the alveolus is 3.5 mm. greater, while the length of the base of the crown of P⁴ is 1.5 greater, and the distance between P₃ and M₁, inclusive, is 3 mm. greater than in *H. primævus*.

One very obvious difference between this species and the nearest to which it bears resemblance is the heavy, massive bones which make up all parts of the specimen. The cranial capacity is small and the very small diameter of the postorbital constriction is very noticeable, as well as the important relations existing between the pedicle dimensions. The face is broad, and the cranium narrow, while the reverse is true of *H. primævus*.

The atlas and axis will be briefly described. The atlas resembles that of *Felis* and yet is primitive in some characters. There are no alar notches and the dorsal arch has a distinct spine, which is massive and rounded, rather than oblong-shaped. The maximum diameter be-

tween the external margins of the transverse processes is 71 mm.; the measurement from the margin of the anterior articular surfaces to the posterior tip of the transverse process is 45 mm., and the maximum diameter across the anterior articular surfaces is 43 mm. The maximum vertical diameter is 33 mm. and the thickness of the dorsal arch is 9 mm., including the small spine. This skull is much smaller than that of No. 10050 and yet the atlas exhibits some dimensions even greater. The massive character is maintained throughout the skeleton in so far as it is present.

The axis is nearly complete except for the posterior tip of the spine, which has been restored. The maximum length is 50 mm. and the length of the centrum is 28 mm., exclusive of the odontoid process. The odontoid is 9.5 mm. long and 9 mm. wide in transverse diameter at its junction with the centrum, while its vertical diameter is 6.5 mm. The width across the posterior articular surfaces is 22.5 mm. and across the anterior articular surfaces, 31 mm. The vertebrarterial canal is triangular, with the right angle nearest the centrum.

Measurements.

	mm.
Prosthion to basion	132
Prosthion to nasion	75
Basion to nasion	93
Prosthion to bregma	107
Basion to bregma	77
Bizygomatic diameter (est.)	104
Diameter of postorbital constriction	26
Bimastoid diameter, max.	60
Palatal length	67
Posterior palatal breadth	41
Inferior orbital margin to alveolar margin	24
Infraorbital foramen to posterior margin of zygomatic process of maxilla	26
Length of mandibular ramus	109.5
Length of mandibular symphysis	39
Depth of mandible posterior to P ₄	23
Depth of flange (estimated)	41
Length of tooth row, C to M ¹ , inc.	59
Length of tooth row, P ³ to M ¹ , inc.	32
Diastema, C to P ³	13
Diastema, C to I ³	1
Superior canine, maximum diameter at alveolus	15.5
Superior canine, transverse diameter at alveolus	7.5

Crown of P ³ , length of base	11
Crown of P ³ , maximum width	5
Crown of P ⁴ , length of base	21.5
Crown of P ⁴ , maximum width	10
Length of tooth row, P ₃ to M ₁ , inc.	37
Diastema, C to P ₃	20
Inferior canine, maximum diameter at alveolus	7
Inferior canine, transverse diameter at alveolus	4.5
Crown of P ₄ , length of base	12.5
Crown of P ₄ , maximum width	6
Crown of M ₁ , length of base	17
Crown of M ₁ , maximum width	7.5

FIG. 5.

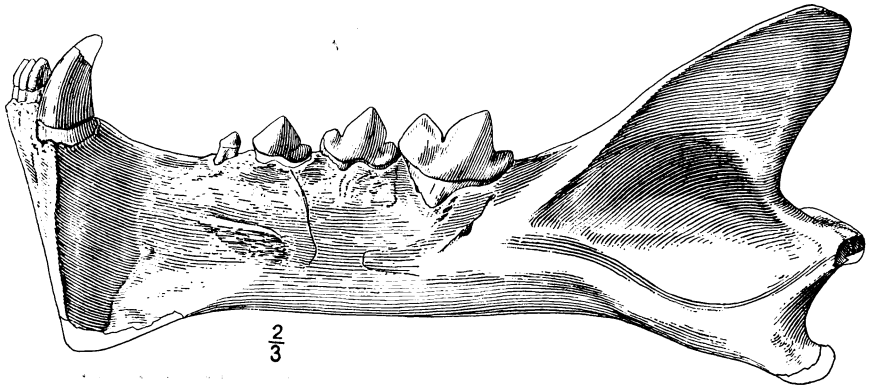


FIG. 5.—*Pogonodon cismontanus*, n. sp. Left ramus, two-thirds natural size.

Pogonodon cismontanus, sp. nov.

(FIG. 5.)

Holotype, Cat. No. 10053 Y. P. M. White River (Oligocene), Hermosa, South Dakota.

This specimen, collected by H. F. Wells in 1893, consists of a complete left mandibular ramus and the anterior portion of the right. The left M₁ and P₄ are complete. The anterior portion of P₃ is broken away, but the corresponding tooth on the right ramus is complete. The left P₂ is missing, but its alveolus is very distinct, while the right P₂ is complete. Hence, considering both rami, there is one complete tooth row from P₂ to M₁, inclusive. The tip of the left canine is broken off and, with the exception of I₃, the incisors are either missing or damaged.

This is the first reference of *Pogonodon* to the Oligocene of the Big Badlands. The size is close to that of the type of the genus, *P. platycopis* Cope, although in nearly every dimension this specimen is slightly smaller. This size difference is, however, to be expected, since *Hoplophoneus* is largely restricted to the Great Plains region and is generally smaller than *Dinictis* and *Nimravus*, characteristic of the John Day fauna, to which *P. platycopis* belongs. When Cope established the genus *Pogonodon*, he recognized that it had characters referable to both *Hoplophoneus* and *Dinictis*, both of which genera he also founded.

In most respects, *Pogonodon* resembles *Dinictis* more closely than it does *Nimravus*, e. g., in the number of teeth, configuration of horizontal rami, and position of the mastoid. The coronoid process curves backward as in *Dinictis*, and the masseteric fossa is triangular rather than horizontally oval-shaped, and the carnassial notch is deep. On the other hand, it resembles *Hoplophoneus* in that it lacks M_2 , which *Dinictis* has, and yet it possesses P_2 , a factor which removes it from *Hoplophoneus* toward *Dinictis*. It differs from either *Dinictis* or *Hoplophoneus* in that the sectorial is primitive, having no metaconid but possessing a robust posterior heel with a grinding surface, which is a unique character. The dental formula is I_3, C_1, P_3, M_1 . The lateral angular process below the anterior portion of the ramus is not so deep as in *Hoplophoneus*, but corresponds more closely to *Dinictis*. The chin is quite vertical and oblong-square as in *Hoplophoneus*. The canines are considerably larger than the third incisors and are noticeably recurved. The incisors have conic crowns. The inferior border of the mandibular ramus, which underlies the cheek teeth, projects outward and downward as in *Hoplophoneus*. The rami in general are not so deep and are more robust than in *Nimravus*.

The writer's opinion is that the genus *Pogonodon* should be restored to its former position as an independent genus, or at least be considered as a subgenus, but with its affinities clearly recognized. In 1910, Matthew,¹⁴ in a footnote, writes that he regards *Pogonodon* as a distinct subgenus, although in the same reference he includes the then known species of this genus under *Nimravus*.

¹⁴ W. D. Matthew, Bull. Am. Mus. Nat. Hist., vol. 28, 290.

As stated in the first part of this paper, there are now five species of this genus. It also seems evident that the position of the genus in the phylogeny of the Felidæ should be somewhere between *Dinictis* and *Hoplophoneus*, probably a little closer to the former than to the latter.

Measurements.

	mm.
Length of mandibular ramus	175
Depth of mandibular symphysis	48
Depth of mandible posterior to P ⁴	30
Depth of flange (estimated)	47
Length of tooth row, P ₃ to M ₁ , inc.	55
Diastema, C to P ₂	24
Diastema, C to P ₃	31
Crown of P ₄ , length of base	17
Crown of P ₄ , maximum width	9
Crown of M ₁ , length of base	24
Crown of M, maximum width	10
Canine, maximum diameter at alveolus	12
Canine, transverse diameter at alveolus	9