

VI. RESTORATION OF MERYCHYUS ELEGANS SUBSP.  
MINIMUS PETERSON.

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(PLATES VII-VIII.)

The material upon which this subspecies was based has recently been completely extracted from the matrix. It is found that enough has been obtained to set up an articulated skeleton composed of parts of a number of different individuals. No. 3,397 is used as the base, because it contains more parts of the skeleton than any of the others referred to this subspecies. This specimen is only a very little

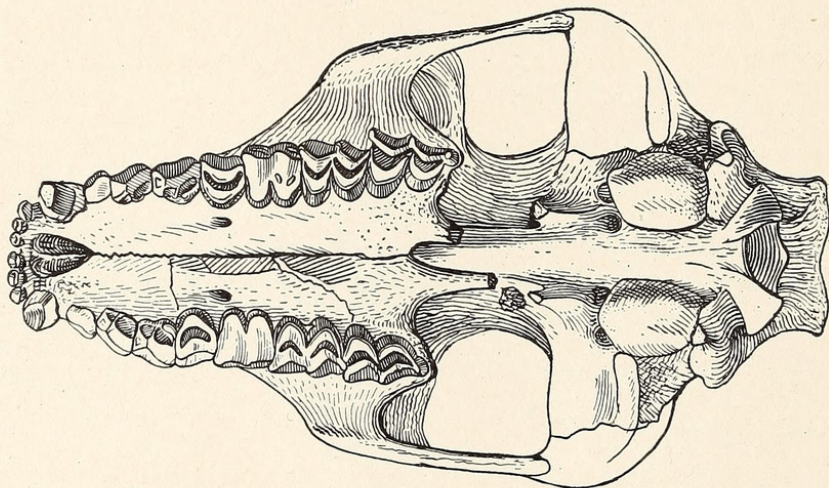


FIG. 1. Palatal view of Skull of *M. minimus* Peterson, type, C. M. No. 1466.  
 $\frac{1}{2}$  nat. size.

smaller than the type and the only noteworthy difference between the skulls of the two specimens is the fact that in the type the distance between the canine and the first upper premolar is slightly greater than in No. 3,397. The latter specimen consists of the skull, jaws, and the vertebral column to, and including, the seventh dorsal, with some



FIG. 2. Lower dentition of *M. minimus* Peterson, type.  $\frac{1}{2}$  nat. size.



of the ribs attached. The fore and hind limbs are also associated with this specimen. The skull and lower jaws of the articulated skeleton is the type specimen of *Merychys minimus*<sup>1</sup> No. 1,466.

#### SKULL.

The principal differences between the subspecies *Merychys minimus* Peterson, and *M. leptorhynchus* Cope, are the shorter sagittal crest of the former, the more posterior location of the infraorbital foramen, the shorter symphysis of the lower jaw, and the slightly shallower ramus. These differences may disappear upon further study, should more abundant material of *M. leptorhynchus* be found. *M. elegans* Leidy is larger and appears to have longer and narrower upper and lower third molars, a specialization which probably represents a later horizon. On the other hand it is altogether possible that with a large series of individuals of the latter species, the array of subspecies, namely *Merychys arenarum*, *M. leptorhynchus* Cope, and *M. minimus* Peterson, may ultimately be referred to *Merychys elegans* Leidy. *Merychys medius* Leidy and *M. harrisonensis* Peterson are of considerably larger size than the above mentioned species, while *M. major* Leidy most likely belongs to a different genus. *Merychys parigonus* Cope from the Deep River formation of Montana may possibly also pertain to a different genus. (See Cope, Scott, and Douglass.)

#### VERTEBRAL COLUMN AND THORAX.

The vertebral formula of *Merychys minimus* appears to be as follows: cervicals seven; dorsals fourteen;<sup>2</sup> lumbar six; sacral from five to seven; caudals five (+?).

The centra of the anterior dorsals are depressed and broad, as usual, and the arches are heavy, while further back in the series they are higher and narrower and the neural arches lighter. The last three dorsal vertebræ are provided with lumbar-like *postzygapophyses* as in *Phenacocælus*, but the last dorsal does not have the transverse process developed to the same degree as in the latter genus. There are

<sup>1</sup> ANNALS OF THE CARNEGIE MUSEUM, Vol. IV, 1907, pp. 67-68.

<sup>2</sup> The number of dorsals is thought to be correct, inasmuch as the animal had the same number of lumbar as *Phenacocælus* and *Promerycochærus*. (See ANNALS CARNEGIE MUSEUM, Vol. IV, 1907, pp. 29 and 21; *Ibid.*, Vol. IX, 1914, p. 166.



no distinct intervertebral foramina of the dorsals as in *Promerycochærus*. The neural spines of the dorsal vertebræ are nearly all restored in the articulated skeleton. This is especially true of the anterior region. (See Pl. VIII.)

The centra of the anterior lumbar vertebræ are sharper ventrally, and consequently present a more nearly triangular outline in cross-section than in *Merycoidodon*, and in this respect are more nearly similar to those of *Phenacocælus* or *Promerycochærus*. The posterior face of the last lumbar has an enlarged rugose surface, which, however, did not abut against the anterior face of the pleurapophysis of the first sacral by a distinct facet, but indicates a strong cartilaginous connection.

The pleurapophyses of the two anterior sacral vertebræ support the ilia, as is usual in other genera of the family; but in the present specimen the neural spines are more distinctly separated than in *Promerycochærus*. The sacrum is longer than in *Merycoidodon*, due to the additional posterior vertebræ, but in the specimen used in the articulated skeleton (No. 1439) the sacrum is not as greatly produced backward as in *Promerycochærus*.

The tail was apparently quite short, as is suggested by the lack of the enlarged and convex anterior surfaces of the centra of the proximal caudals usually found in long-tailed animals.

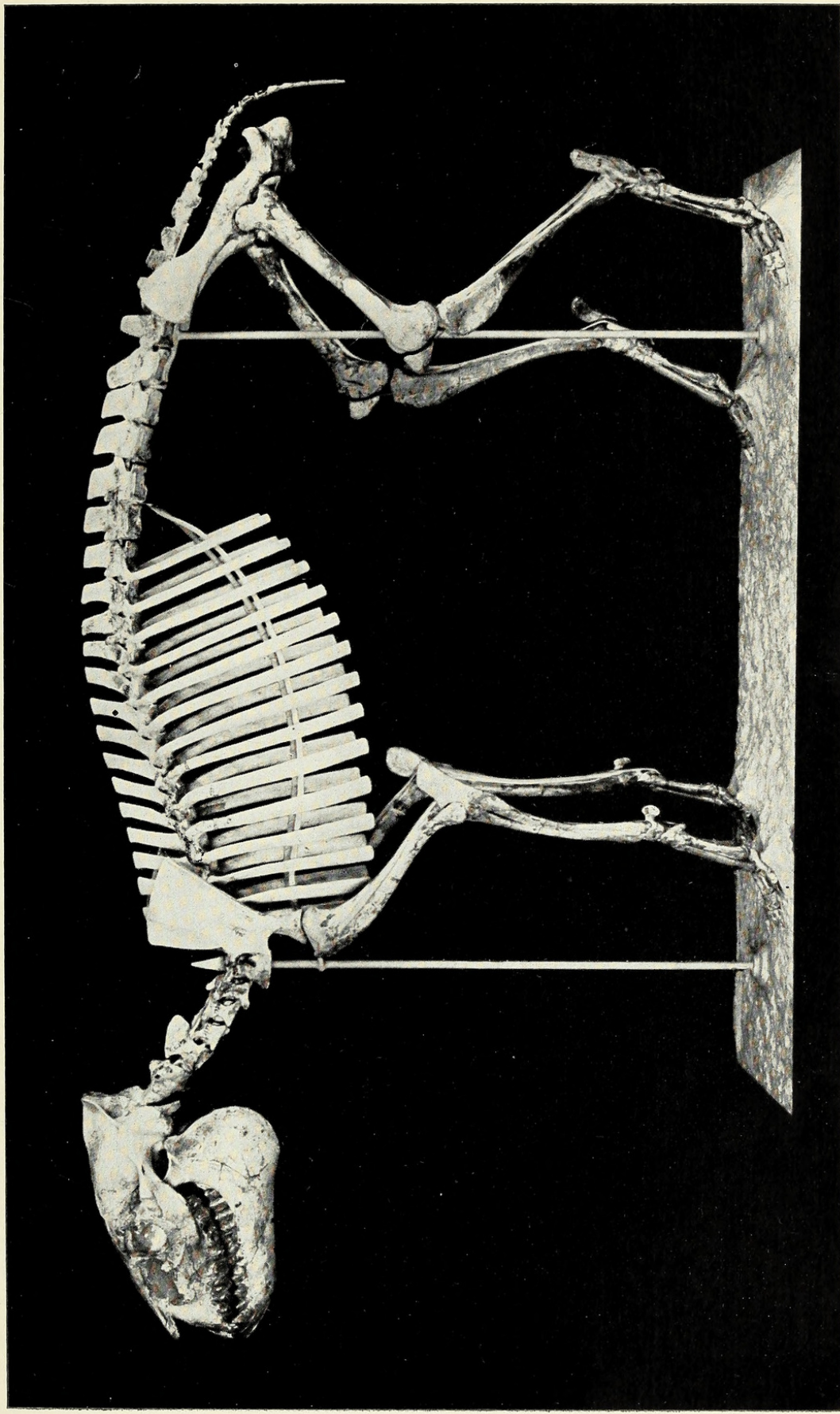
The anterior ribs are robust, flattened, and indicate a thorax of normal proportions. The posterior ribs shown in Plate VIII have all been restored. The sternum is not represented in the material at hand.

#### LIMBS.

*Scapula*.—The general outlines of the scapula are more nearly like those of *Leptauchenia* or *Phenacocælus*. The bone as a whole is shorter than in the latter genus, but the acromion process is less developed, and the coracoid border of the blade is more suddenly expanded. There is no metacromion process, as in *Merycoidodon* or *Promerycochærus*, and in this respect the present genus again suggests *Phenacocælus* or *Leptauchenia*.

*Humerus*.—The humerus is quite similar to that of *Phenacocælus* in its general proportions. The supinator ridge and the internal epicondyle are smaller, otherwise the differences are only of very minor importance.





Restored skeleton of *Merychyrus minimus* Peterson (composite of C. M. Nos. 565, 1331, 1439, 1462, 1466, 1525, 3397).







*Radius and Ulna.*—The radius and ulna are very different from those of *Merycoidodon* and *Phenacocælus*; in fact they differ from most of the Oreodonts by the reduction in the thickness of the ulnar shaft and the broadening of the shaft of the radius. These bones are

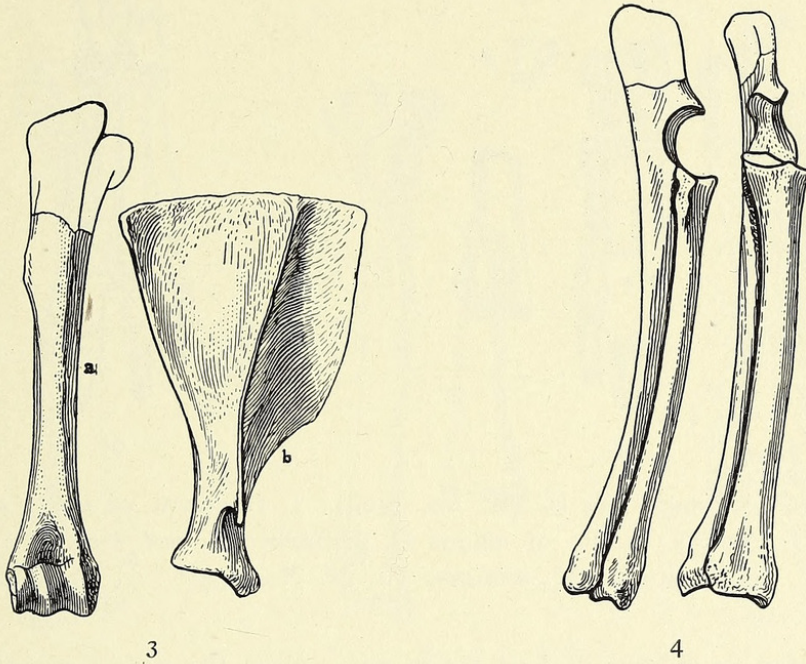


FIG. 3. a, humerus; b, scapula of *M. minimus* (C. M. No. 1439);  $\frac{1}{2}$  nat. size.

FIG. 4. Radius and ulna of *M. minimus* Peterson (C. M. No. 3397);  $\frac{1}{2}$  nat. size.

proportionally longer than in *Phenacocælus*, *Merycoidodon*, *Promerycochærus*, and many other forms. The proximal and distal articulations are, however, typically oreodont in their general character.

*Manus.*—The forefoot is high and narrow, when compared with most other oreodonts. The lunar, magnum, and in particular the trapezoid are strongly reduced in transverse diameter, while vertically the lunar is considerably increased; in fact the entire carpus appears to be more specialized in the direction of other cursorial forms. The lateral digits are, however, very little, if at all, reduced, when compared with those of *Merycoidodon*. The phalanges are of the typical broad and flat oreodont type.

*Pelvis.*—The pelvis is proportionally shorter than in *Merycoidodon* and the point of the ilium is possibly less developed than in this genus and in *Phenacocælus*; but its transverse diameter is fully equal to that in these genera. The pelvic cavity appears to be broad, but



not deep. The acetabulum is deep, and the heavy anterior border has a slight backward curve, in order to more completely lock the head of the femur. There is a well developed ischial tuberosity. The obtura-

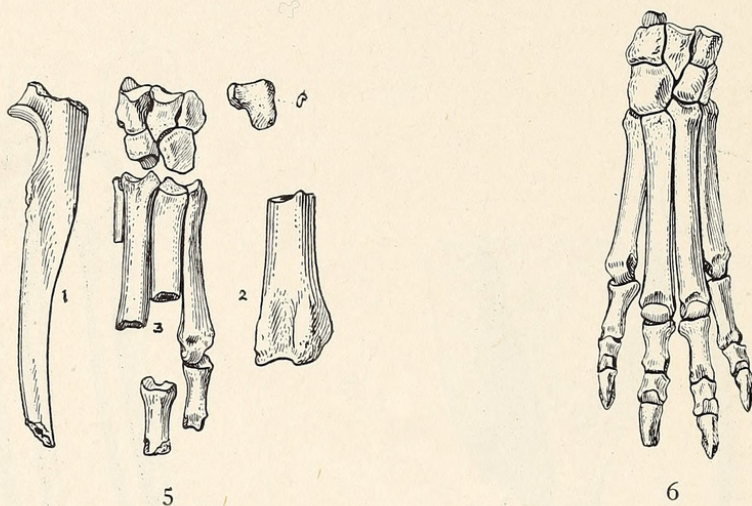


FIG. 5. *M. minimus* type (C. M. No. 1466); 1, fragment of ulna; 2, do. of radius; 3, do. of manus *P. pisiform*;  $\frac{1}{2}$  nat. size.

FIG. 6. Manus of *M. minimus* (C. M. No. 3397);  $\frac{1}{2}$  nat. size.

tor foramen is oblong and of large size, while the pubic symphysis is quite solidly coössified. The two ossa pubis form a broad bony surface, which terminates posteriorly in a v-shaped emargination.

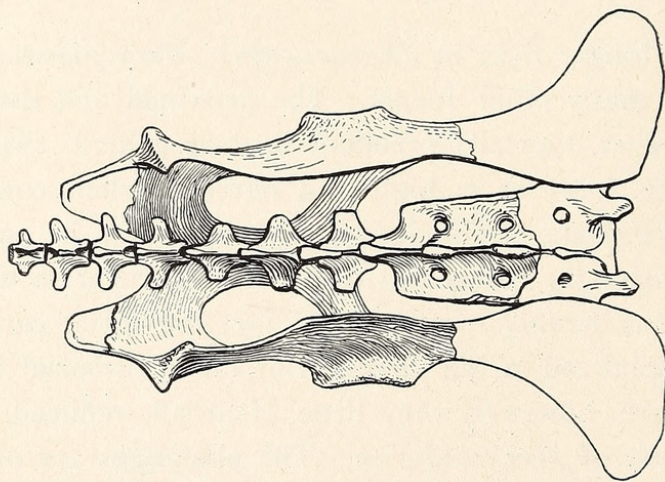


Fig. 7. Pelvis of *M. minimus* (C. M. No. 1439);  $\frac{1}{2}$  nat. size.

*Femur*.—The femur is relatively slightly longer and slenderer than in *Merycoidodon*; the lesser trochanter is more directly posterior on the shaft; the fibular border of the shaft is sharper, and terminates dis-



tally in a more prominently developed external supracondylar ridge; the supracondylar fossa is unusually large and its anterior border apparently separates the supracondylar ridge from the external tuberosities of the distal end. (See fig. 8 and plate VIII.)

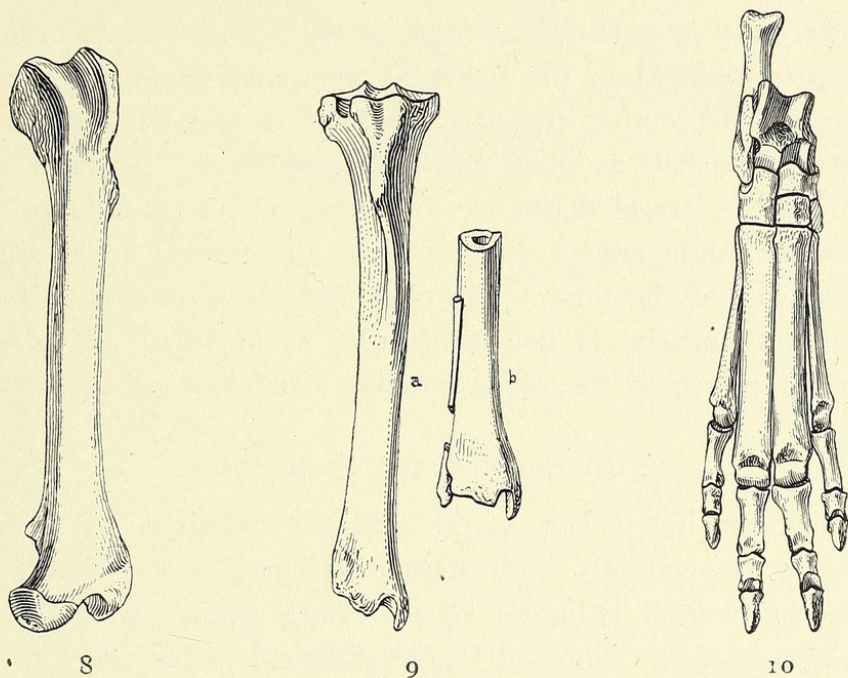


FIG. 8. Antero-tibial view of femur of *M. minimus* (C. M. No. 1439);  $\frac{1}{2}$  nat. size.

FIG. 9. *a*, tibia of *M. minimus* (C. M. No. 1439); *b*, fragment of distal end of tibia with fragments of fibula (C. M. No. 1403).  $\frac{1}{2}$  nat. size.

FIG. 10. Hind foot of *M. minimus* (C. M. No. 1439);  $\frac{1}{2}$  nat. size.

*The Patella.*—The upper portion of the patella is relatively thick antero-posteriorly, but tapers rapidly towards the lower end. The trochlear articulations are of equal size and are separated by a prominent ridge.

*The Tibia and Fibula.*—The tibia is relatively slightly longer than in *Merycoidodon* and considerably longer and slenderer than in *Phenacocælus*. The most characteristic feature of this bone is the short, though stout, cnemial crest; thus differing markedly from most of the oreodonts and again suggesting that it was more fleet-footed. The fibula is not very well represented, but enough is preserved to indicate that it is much reduced in thickness when compared with *Merycoidodon*, *Phenacocælus*, and other genera. In No. 1403 a portion of the shaft of the fibula is connected by matrix to the shaft of



the tibia, and thus conclusively shows that the shaft, though slender, was complete (See fig. 9, b).

*Pes.*—The hind foot of *Merychys minimus* is as much specialized in the direction of a cursorial habit as the forefoot. The tuber of the calcaneum is shortened. The tarsus and metatarsus are actually or very nearly the same length as those in the skeleton of *Merycoidodon culbertsoni* exhibited in the Carnegie Museum, while the transverse diameters of the shafts, especially of Mt. III and IV, are only very little more than half as great as in *M. culbertsoni*. In their general proportions the lateral digits are, however, not much reduced, not as much as one might expect, judging from the change in the tibia and other features of the limb. The phalanges of metatarsals II and V function very nearly, if not identically, as those in *Merycoidodon*. The phalanges are on the whole possibly somewhat reduced in length.

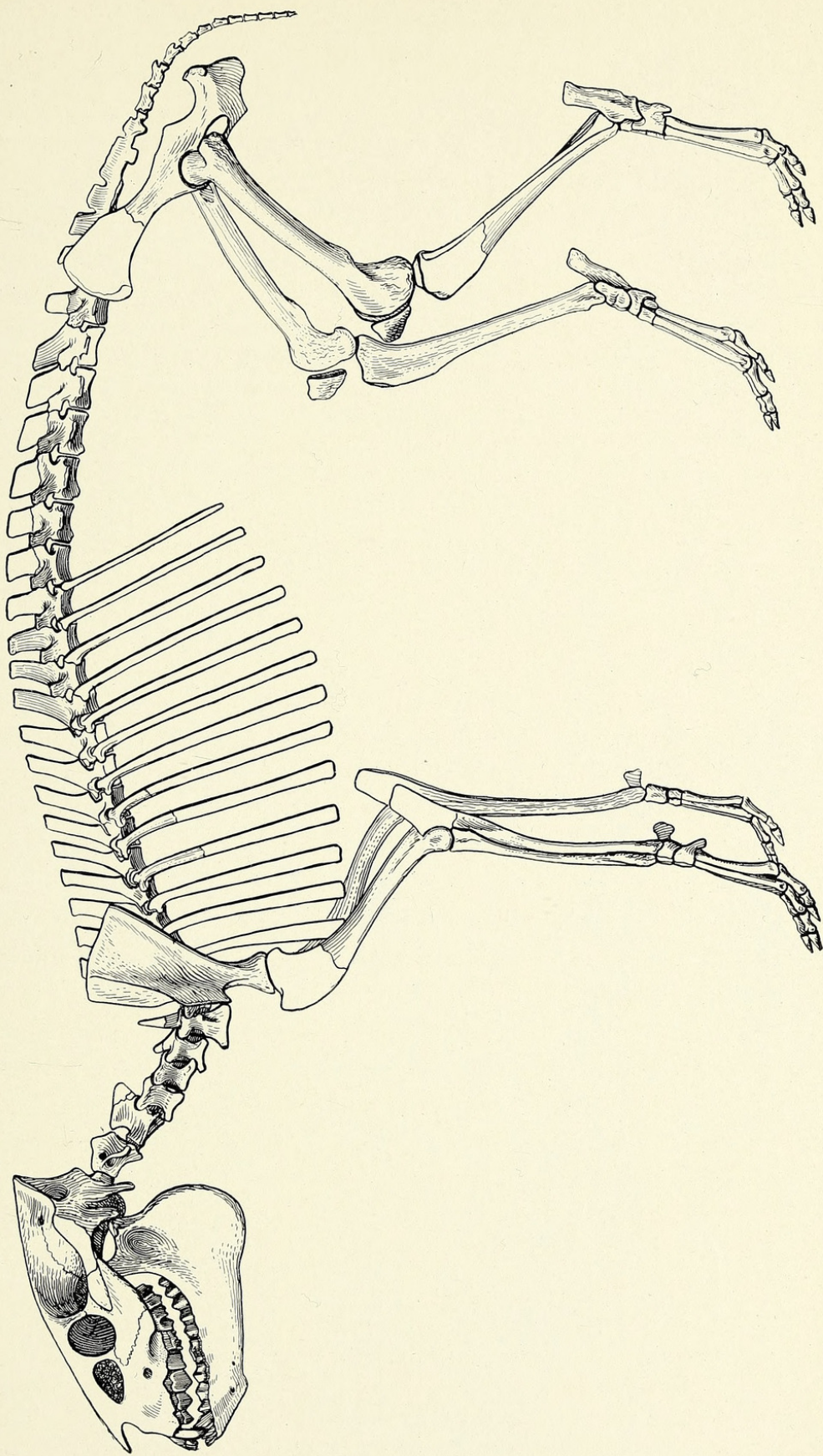
#### THE ARTICULATED SKELETON.

The most striking feature of the articulated skeleton of *Merychys minimus* is its relatively high stature in comparison with its small size and the general reduction of its caudal region, when compared with *Merycoidodon*. The tail in the different genera of this family found in the later Tertiary, so far as we now know, seems to be much reduced, especially when such genera as *Protoreodon* and *Agriochærus* are considered. In the present genus it is very evident that the limbs were specialized in the direction of a cursorial habit. The thorax is also well proportioned in size, while the head is perhaps somewhat large for an animal which possibly inhabited open country. The robustness of the upper and lower jaws and their large teeth indicate the power of masticating coarse vegetation. They did not require the incisors specially adapted to cropping grasses seen in other contemporary *Artiodactyla*. Tall grasses and shrubbery in close vicinity to streams perhaps furnished their pabulum.

#### MEASUREMENTS.

Length of skeleton from upper incisors to tip of tail measured along curves of the vertebral column, approximately.....	800 mm.
Length of skeleton measured in a straight line from upper incisor to end of ischium.....	680 mm.
Greatest length of skull.....	160 mm.
Length of skull from incisors to occipital condyle.....	145 mm.





Articulated skeleton of *Merychys elegans*, subsp. *minimus* Peterson ( $\frac{1}{4}$  natural size).



Length of the cervical region.....	98 mm.
Length of the dorsal region.....	228 mm.
Length of the lumbar region.....	128 mm.
Length of the sacrum.....	90 mm.
Length of the caudal region, approximately.....	98 mm.
Height of skeleton at first dorsal.....	350 mm.
Height of skeleton at fourteenth dorsal.....	385 mm.
Height of skeleton at anterior portion of pelvis.....	350 mm.
Height of skeleton at end of ischium.....	275 mm.
Transverse diameter of thorax at 7th rib.....	100 mm.
Transverse diameter at point of ilia.....	108 mm.
Transverse diameter at ischial tuberossities.....	58 mm.

CARNEGIE MUSEUM,

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