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The Little Horses (Genus *Equus*) of the Pleistocene of North America

ABSTRACT: Nine species of small horses have been named from Pleistocene deposits of the United States and Mexico. Only two are valid. *Equus barcenai*, *E. conversidens leoni* and *E. zoyatalis* are synonyms of *E. conversidens* Owen, and *E. littoralis*, *E. francisci*, *E. achates* and *E. quinni* are synonyms of *E. tau* Owen.

INTRODUCTION

Remains of small horses are not uncommon in Pleistocene (post-Blancan) deposits of the United States and Mexico. Several species names are based on such fossils, and there is controversy as to their status. Savage (1951) summarized the species of American Pleistocene horses, and pointed out some of the problems involved in their taxonomy. Discoveries in the past 25 years have resulted in considerable progress in understanding the taxonomy of the small horses. Hibbard (1955) rediscovered the holotype of *Equus conversidens* and corrected the description of the dentition of the species. Dalquest and Hughes (1965) reported the partial skeleton of *E. conversidens* from Texas, and showed that the species had short, stout limb bones. Lundelius and Stevens (1970) restudied the holotype skeleton of *E. francisci* and showed that the species had long, slender limb bones. Skinner *et al.* (1972) referred *E. francisci* and other American stilt-legged horses to the subgenus *Hemionus*, to which the living kiang of Mongolia belongs. Mooser and Dalquest (1975) showed, with the aid of measurements published by its discoverer, that the holotype maxillary of *E. tau* belongs to a species distinctly smaller than *E. conversidens*. Study of specimens and literature indicates to me that only two species of small horses lived in North America during the Pleistocene, and the other nominal species are synonyms of *E. conversidens* or *E. tau*.

Measurements that follow are in millimeters. In measurements of diameters, the first figure is the anteroposterior, the second the transverse. Synonymies are limited to original descriptions. The combinations of names that have been applied to fossils of small horses during the past century are so numerous that listing would be tedious and serve little purpose, and is best left to a future revision of the genus.

Equus conversidens Owen

Equus conversidens Owen, 1869, Royal Soc. London Philos. Trans., 159:563.

Equus barcenai Cope, 1884, Proc. Amer. Philos. Soc., 22:15.

Equus conversidens leoni Stock, 1953, *nomen nudum*, Mem. Congr. Cient. Mex., 3:170-171.

Onager zoyatalis Mooser, 1959, Annal. Inst. Biol. Mexico., 29:422.

Type locality.—"Slopes of Tepeyac Mountain, behind the church of the City of Guadalupe". (Del Castillo, 1869), N of Mexico City, State of Mexico, probably from the Becerra Superior Formation.

Distribution.—Middle Pleistocene to earliest Recent deposits of the Great Plains region of Canada and the United States, westward at least to Arizona, and southward to the vicinity of Mexico City. Churcher (1967, 1972) and Churcher and Stalker (1970) have reported *Equus conversidens* from sites in Alberta dated 8000 to 11,065 years BP. Apparently the species was absent from the wooded, eastern United States.

Characters.—Larger than *Equus tau*; length of upper and lower cheek tooth rows greater than 140 but probably not exceeding 160, and usually 145-155 in lightly to moderately worn teeth; metaconid-metastylid valleys in lower molars and premolars usually broadly "U-" or more rarely "V-" shaped but not sharply "V-" shaped; cheek teeth usually transversely broader and shorter-crowned than those of *E. tau*; cementum of upper cheek teeth usually thick; upper molars only slightly curved; metapodials short and stout; metacarpals of adults about 220-233 in length, and midshaft diam about 25 × 35; metatarsals about 240-265 in length, midshaft diam about 30 × 32.

Synonyms.—*Equus barcenai* was described by Cope in 1884, after he had examined specimens of fossil horses in the Museo Nacional and the Esquela de Minas in Mexico City. Two upper molars from each institution and a partial skull were mentioned. No type was designated. Measurements of an M1 and M2 were given, but from which collection is not stated. The type locality is Tequiquiac, State of Mexico. The species was "distinguished from all the others here mentioned or described by its small size" and "The lakes have the margins but little looped" (Cope, 1884).

Later workers (*e.g.*, Gidley, 1901; Savage, 1951) have placed *Equus barcenai* in the

synonymy of *E. tau* because of the alleged small size. This may be incorrect. The measurements of the molars given by Cope indicate a larger species. The breadth of the teeth given by Cope includes the cementum, as noted by Gidley (1901) and is not comparable. Anteroposterior diam of M1 and M2 of *E. barcenai* are 21.5 and 22.0; corresponding measurements of the holotype of *E. conversidens* are 22.0 and 21.9 (Hibbard, 1955).

Cope examined skulls, jaws and teeth, probably including the holotype palate, of *Equus conversidens* (which he considered a synonym of *E. tau*), but the only measurements of teeth given are of premolars. Since molars of horses are invariably smaller than premolars, this exaggerated the supposed difference between the teeth of *E. barcenai* and *E. tau*. The molars of *E. barcenai* are the proper size for *E. conversidens*, the common small horse of the Tequixquiac area.

Equus conversidens leoni Stock, from San Josecito Cave, Nuevo Leon, Mexico, is a *nomen nudum*. The name was first used (Stock, 1950) in the caption of an illustration, and later (1953) in an abstract. None of the usages constitutes a valid description and the name has no status. A mounted, composite skeleton was deposited in the Instituto Geologico Nacional de Mexico, in Mexico City. I examined this skeleton, through the courtesy of the Director, Dr. Silva-Barcenas. The enamel pattern of the teeth is simple, but the teeth, both upper and lower, are relatively large, broad and short, and have heavy deposits of cementum that give them the bulged appearance so often seen in Texas specimens referred to *E. conversidens*. The metapodials are short and stout, like metapodials from the vicinity of the type locality, from Aguascalientes, Mexico, and Texas. I see no basis for recognition of this form as a distinct taxon, and Stock was correct in referring it to *E. conversidens*.

Onager zoyatalis was placed in the synonymy of *Equus francisci* by Lundelius and Stevens (1970), but removed to the synonymy of *E. conversidens* by Mooser and Dalquest (1975). In size, the holotype lower jaw resembles jaws referred to *E. conversidens*, but the teeth have rather "V-" shaped metaconid-metastylid valleys, like those of *E. tau*. *Equus conversidens* is the common small horse at the type locality of *E. zoyatalis*, near Aguascalientes, Mexico.

Equus (Hemionus) tau Owen

Equus tau Owen, 1869, Royal Soc. London Philos. Trans., 159:565.

Equus littoralis Hay, 1913, Proc. U.S. Nat. Mus., 44:575.

Equus francisci Hay, 1915, Proc. U.S. Nat. Mus., 48:547.

Equus achates Hay and Cook, 1930, Proc. Colorado Mus. Nat. Hist., 9:15.

Equus quinni Slaughter, 1962; in Slaughter, *et al.*, U. Texas Bureau Econ. Geol., Rept. Invest., 48:33.

Type locality.—Tequixquiac area (Tequixquiac-Thalen, Del Castillo, 1869), State of Mexico.

Distribution.—Early Pleistocene (earliest post-Blancan) to late Pleistocene of southeastern United States and the Great Plains (possibly westward to Arizona), and southward to vicinity of Mexico City.

Characters.—Size smallest of North American Pleistocene horses; length of upper and lower cheek tooth rows ca. 120-135 in known specimens, and probably rarely exceeding 135; metaconid-metastylid valleys of lower molars and premolars often "V-" shaped; cheek teeth relatively long-crowned and slender; upper molars, when lightly worn, strongly curved; cementum of cheek teeth usually thin; limb bones long and slender; metacarpals of adults about 235 long; metatarsals 277-285 long in known specimens, and about 26 × 24 in midshaft diam.

In the description of this species, Owen (1869) gave no measurements of the maxillary (designated the lectotype by Mooser and Dalquest, 1975) of *Equus tau*, but his figure, made from a photograph provided by Del Castillo, was stated to be natural size. The figure of the palate of *E. conversidens*, on the same page, was shown by Hibbard (1955) to be distorted, as Cope (1884) had guessed. The length (P2-M3) of the lectotype maxillary of *E. tau* was given by Del Castillo (1869) as 122 mm, or distinctly smaller than shown in Owen's figure. The error, probably considered insignificant at the time, has caused much confusion. Del Castillo's measurements prove that *E. tau* was a tiny species, and Owen's figure shows the enamel pattern to be quite simple.

Mooser and Dalquest (1975) referred a partial skull, a lower jaw, some upper teeth and a metatarsal from Aguascalientes, Mexico, to *Equus tau* on the basis of very small size. The specimens were not associated but are all from the same deposit. The P2-M3 length of the

lower dentition is 118.8; that of the lectotype upper jaw was 122. The teeth in the skull are too worn for identification but the P2-M3 length is only 118.4. Reference of all of this material to *E. tau* is as sound as most identification of fossil bones can be. To presume that another tiny species of stilt-legged horse existed in Mexico in the Pleistocene is specious. The lower jaw from Aguascalientes has the dentition in excellent condition.

Hay and Cook (1930) referred the lower jaw of a small horse from the "bison quarry" on Lone Wolf Creek, Mitchell Co., Texas, to *Equus littoralis*. This jaw is essentially identical to the lower jaw from Aguascalientes, and was referred to *E. tau* by Dalquest (1978). The specimen demonstrates the presence of *E. tau* in the Pleistocene of Texas. An isolated upper tooth from the same deposit, also referred to *E. littoralis* by Hay and Cook, is referable to *E. tau*. The tooth measured 21.5 anteroposterior diam. Hay and Cook termed the tooth M2, but it may be M1 or even P4, for the protocone is broad and the tooth rather large.

A metatarsal from the deposits at Aguascalientes is extremely long and slender (length 280; midshaft diam 26.2×24.0). Very similar metatarsals have been recovered in the terraces of the Trinity River at Dallas, Texas (length 277 and 287, Slaughter *et al.*, 1962), and the metatarsal of the holotype skeleton of *Equus francisci* from Wharton Co., Texas, is also similar (minimum length 285, Lundelius and Stevens, 1970). At Dallas and Aguascalientes, the uniquely small, slender metapodials were found in the deposits containing tiny teeth. No small metapodials that might otherwise be thought to belong with such small teeth were found in either deposit.

Synonyms.—*Equus littoralis* was named by Hay in 1913, from two upper teeth, probably an M1 (holotype) and an M2 (paratype), from Peace River, Florida. Gidley (1901) has referred a tooth from this same site to *E. tau*. *Equus littoralis* was characterized by small size, rather folded enamel on the inner borders of the lakes, and curved crowns of the teeth. The holotype measured 21×20 ; the paratype 21.5×22 . The enamel pattern of the teeth is more complicated than that of other teeth here referred to *E. tau*, but the size and curvature of the teeth is typical of *E. tau*. The height of the crown of the type (62) shows that it is only moderately worn. This may in part account for the relatively folded enamel of the lakes. *Equus littoralis* is tentatively referred to *E. tau*. Should metapodials of the *E. conversidens* type be found in the southeastern United States, this reference may need reconsideration.

Equus francisci was named by Hay in 1915, based on a skeleton from the middle Pleistocene Lissie Formation of Wharton Co., Texas. Lundelius and Stevens (1970) corrected the description and showed that *E. francisci* possessed long, slender metapodials, and refigured the dentition of the holotype. The enamel pattern of the upper teeth is simple, like that of the lectotype of *E. tau*.

The lower dentition of the holotype skeleton of *Equus francisci* includes only the right P4-M3. The teeth are quite worn, but closely resemble the teeth in the lower jaw from Aguascalientes and Mitchell Co., Texas.

Measurements of a number of upper and lower cheek tooth series of skulls with articulated lower jaws, representing most recent and several extinct species of horses, show that the P2-M3 length is essentially the same in upper and lower jaws. Variation rarely exceeds 5%, is usually about 2%, with the upper series usually but not always the longer. Since the upper P2-M3 of the holotype of *Equus francisci* measured 135, the lower P2-M3 length was also approximately 135, vs. 118.8 in the jaw from Aguascalientes. The M1-M3 of *E. francisci* is 66.3; in the Aguascalientes jaw it is 56.4. The P2-P4 length of the jaw of *E. francisci* was about 68.7; that of the Aguascalientes jaw is 64.8. The teeth of the skull of *E. francisci* are larger, but the difference, about 16 in length of tooth row, is not greater than the variation to be expected in a species of horse. Both metapodials and dentition suggest that *E. francisci* is a synonym of *E. tau*. The holotype of *E. francisci* may have been near the upper size limit for the species.

Equus achates Hay and Cook was based on an isolated upper M2 from the early post-Blancan Holloman Gravel Pit of Tillman Co., Oklahoma. The tooth is slender, small and curved. Direct comparison with isolated teeth from Aguascalientes shows the type to be referable to *E. tau* (Dalquest, 1978).

Equus quinni Slaughter was described from fossils from the Trinity River terraces near Dallas, Texas. The holotype is a metatarsal. Other material available includes another metatarsal, a metacarpal and two upper and one lower cheek teeth. The teeth are small and have simple enamel patterns. Teeth and metapodials resemble specimens of *E. tau* from Mexico, but the teeth are even smaller than usual in *E. tau* (upper M1, 17.1×19.0 ; M2, 19.4×18.8). Lundelius and Stevens (1970) referred *E. quinni* to the synonymy of *E. francisci*.

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LITERATURE CITED

- CHURCHER, C. S. 1967. Pleistocene ungulates from the Bow River gravels at Cochrane, Alberta. *Can. J. Earth Sci.*, **5**:1467-1488.
- . 1972. Imperial mammoth and Mexican half-ass from near Bindloss, Alberta. *Ibid.*, **9**:1562-1567.
- AND A. McS. STALKER. 1970. A late, postglacial horse from Pashley, Alberta. *Ibid.*, **7**:1020-1026.
- COPE, E. D. 1884. The extinct mammalia of the Valley of Mexico. *Proc. Am. Philos. Soc.*, **22**:1-21.
- DALQUEST, W. W. 1978. *Equus tau* from the Pleistocene of Mitchell County, Texas. *Texas J. Sci.*, **29**:141.
- AND J. T. HUGHES. 1965. The Pleistocene horse, *Equus conversidens*. *Am. Midl. Nat.*, **74**:408-417.
- DEL CASTILLO, A. 1869. (Not separately titled). *Z. Dtsch. Geol. Ges.*, **21**:479-482.
- GIDLEY, J. W. 1901. Tooth characters and revision of the North American species of the genus *Equus*. *Bull. Am. Mus. Nat. Hist.*, **14**:91-141.
- HAY, O. P. 1913. Notes on some fossil horses with descriptions of four new species. *Proc. U.S. Natl. Mus.*, **44**:569-595.
- . 1915. Contributions to the knowledge of the mammals of the Pleistocene of North America. *Ibid.*, **48**:515-575.
- AND H. J. COOK. 1930. Fossil vertebrates collected near, or in association with, human artifacts at localities near Colorado, Texas; Frederick, Oklahoma; and Folsom, New Mexico. *Proc. Colo. Mus. Nat. Hist.*, **9**:4-40.
- HIBBARD, C. W. 1955. Pleistocene vertebrates from the Upper Becerra (Becerra Superior) Formation, Valley of Tequixquiac, Mexico, with notes on other Pleistocene forms. *Contrib. Mus. Paleontol. Univ. Mich.*, **12**:47-96.
- LUNDELIN, E. L. AND M. S. STEVENS. 1970. *Equus francisci* Hay, a small stilt-legged horse, middle Pleistocene of Texas. *J. Paleontol.*, **44**:248-253.
- MOOSER, O. 1959. La Fauna "Cedazo" del Pleistocene in Aguascalientes. *An. Inst. Biol. Univ. Nac. Auton. Mex.*, **29**:409-452.
- AND W. W. DALQUEST. 1975. Pleistocene mammals from Aguascalientes, central Mexico. *J. Mammal.*, **56**:781-820.
- OWEN, R. 1869. On fossil remains of equines from Central and South America referable to *Equus conversidens*, Ow., *Equus tau*, Ow., and *Equus arcidens*, Ow. *Philos. Trans. R. Soc. Lond. Ser. B Biol. Sci.*, **159**:559-573.
- SAVAGE, D. E. 1951. Late Cenozoic vertebrates from the San Francisco Bay Region. *Univ. Calif. Publ. Geol. Sci.*, **28**:215-314.
- SKINNER, M. F. AND C. W. HIBBARD. 1972. Early Pleistocene preglacial and glacial rocks and faunas of north-central Nebraska. *Bull. Am. Mus. Nat. Hist.*, **148**:11-136.
- SLAUGHTER, B. H., W. W. CROOK, JR. AND OTHERS. 1962. The Hill-Shuler local faunas of the upper Trinity River, Dallas and Denton counties, Texas. *Bur. Econ. Geol. Univ. Texas Rep.*, **48**:1-75.
- STOCK, C. 1950. 25,000-year old horse. The skeleton of an Ice Age horse makes a return trip to Mexico. *Eng. Sci. Monthly*, **14**:16-17.
- . 1953. El Caballo Pleistoceno (*Equus conversidens leoni* subsp. nov.) de la Cueva de San Josecito, Aramberri, Nuevo Leon. *Mem. Congr. Cienc. Mex.*, **3**:170-171.
- WALTER W. DALQUEST, Department of Biology, Midwestern State University, Wichita Falls, Texas 76308. Submitted 16 June 1977; accepted 26 September 1977.