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MIOCENE VERTEBRATES FROM AGUASCALIENTES, MEXICO

by

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MIOCENE VERTEBRATES FROM AGUASCALIENTES, CENTRAL MEXICO

By Walter W. Dalquest¹ and Oswaldo Mooser²

Abstract

Mammalian fossils from an unnamed formation 4 km. southeast of Aguascalientes, state of Aguascalientes, central Mexico, comprise the Zoyatal local fauna. The fauna appears to be of Barstovian age and includes rhinoceros (*Aphelops* sp.), peccary (*Dyseohyus* cf. *D. stirtoni*), oreodont (*Merychys* cf. *M. elegans*), and camelid (*Miotylopus wilsoni* new species). Nearest known occurrences of Miocene mammals are in the Big Bend region of Texas and the state of Oaxaca, in southern Mexico.

Resumen

Fósiles mamíferos que provienen en una formación sin nombre a 4 kms. del sureste de la ciudad de Aguascalientes, estado de Aguascalientes, del centro de México, incluye la fauna local Zoyatal. La fauna parece ser de la edad Barstoviana e incluye rinocerontes (*Aphelops* sp.), pecaríes (*Dyseohyus* cf. *D. stirtoni*), oreodontos (*Merychys* cf. *M. elegans*), y camélidos (*Miotylopus wilsoni* sp. nov.). La era donde mas se encuentran estos mamíferos son del período Mioceno en el Big Bend región de Texas y el estado de Oaxaca al sur de la República Mexicana.

Terrestrial mammalian fossils of Miocene age have been reported in Mexico only from the state of Oaxaca in the southern part of the republic (Stirton, 1954; Wilson, 1967; Wilson and Clabaugh, 1970). The junior author has obtained a small but important collection of Miocene vertebrates from near the city of Aguascalientes, state of Aguascalientes, in central Mexico. The nearest site to the north is in Big Bend National Park (Stevens, Stevens, and Dawson, 1969). The Aguascalientes site is approximately midway between, but west of the Oaxaca and Texas localities.

The fossils occur (fig. 1) in a thick layer of massive, dull, rust-colored, tufaceous sandstone, just east of the bridge where National Highway 70 (the Aguascalientes-San Luis Potosi Highway) crosses a small ravine called Arroyo Cedazo, approximately four kilometers southeast of the city of Aguascalientes. Here, centered a few hundred yards south of the highway, is a quarry covering several acres where the tufaceous sandstone has been removed for building rock and concrete additive. The quarry face is about six meters deep, but the base of the formation is not exposed. Its thickness is unknown. No formal description of the formation is available, and we do not intend to furnish one here, so the formation remains unnamed. The

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Fig. 1.—Dots indicate sites where Miocene mammals have been collected in Texas, Aguascalientes, and Oaxaca.

fossils are neither common nor concentrated but are occasionally exposed by the crude quarrying methods in use. The specimens obtained were saved by quarry workers and have accumulated over ten years.

We suggest that the vertebrate assemblage from this site be called the *Zoyatal local fauna* (zoyatal: the Nahuatl name for the “palm,” and the local name of the hill at the collecting locality). The *Zoyatal local fauna* includes tortoise, rhinoceros, peccary, camel, and oreodont. The tortoise will not be discussed here. We are indebted to Dr. John A. Wilson of the University of Texas at Austin for the identification of the mammals. Catalog numbers given are those of the Midwestern University Collection of Fossil Vertebrates. The photographs were made by Maurice Gilbert.

SYSTEMATIC ACCOUNT
Order Perissodactyla Owen
Family Rhinocerotidae Owen
Aphelops sp.
Fig. 2

Material.—A small rhinoceros is represented by a single upper molar, prob-
M¹ or M² (MU 8685). The tooth resembles the molars of a skull in The
University of Texas (TMM* 31219-227) from Cold Springs, San Jacinto
County, Texas, of Barstovian age. The anteroposterior length of the tooth,
along the ectoloph, is 32.6 mm. The greatest transverse breadth at the base
of the enamel is 40.0 mm.



Fig. 2.—*Aphelops*, upper molar, MU 8685.

*Texas Memorial Museum, The University of Texas at Austin

Order Artiodactyla Owen
Family Tayassuidae Palmer
Dyseohyus cf. *D. stirtoni* Woodburne

Fig. 3

Material.—Right and left M³s and an M² or M¹. The two third molars are almost identical in structural details and all three teeth are in the same stage of wear. Probably all were derived from one individual. They were cataloged together (MU 8696).

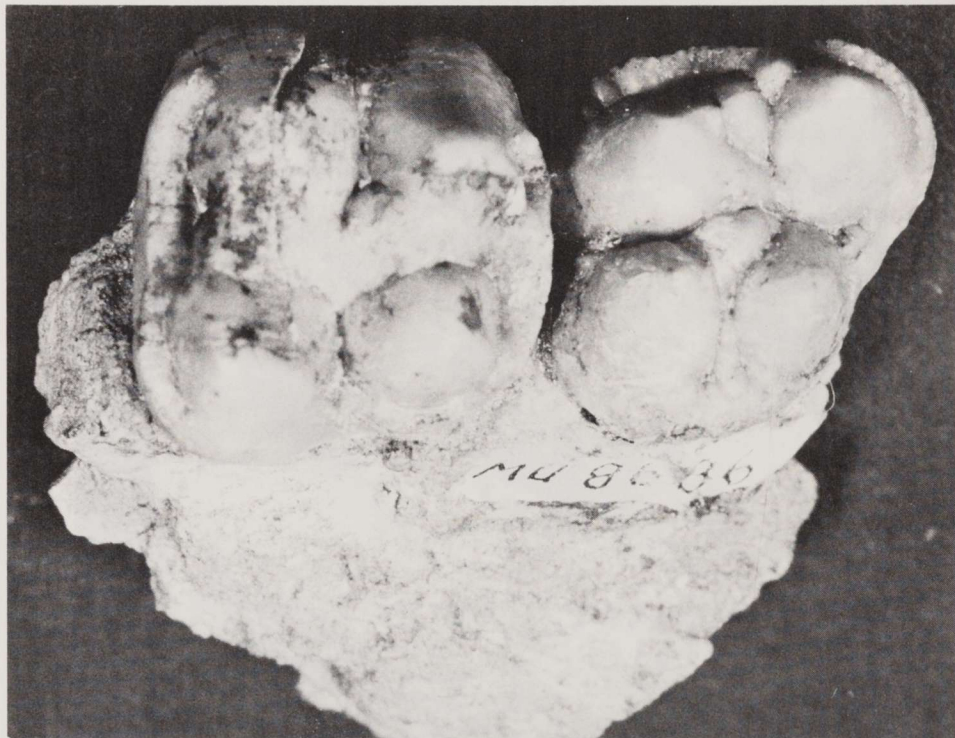


Fig. 3.—*Dyseohyus* cf. *D. stirtoni*, right M³ and M² or M¹, MU 8696. The M² or M¹ has been rotated at right angles to the axis of M³.

Description.—The teeth are of the size and resemble those of *Dyseohyus fricki* Stock and *D. stirtoni*, as figured by Woodburne (1969, plate 49). They resemble *D. stirtoni* in having the protocone and hypocone of M² closer together, and, additionally, differ from Woodburne's figure of *D. stocki* in having the lingual cusps of the M³s almost unwrinkled. Other, minor, differences can be seen between the molars of the Mexican animal and *D. stocki* and *D. stirtoni* but these are probably within the range of specific variation to be expected in *D. stirtoni*. The third molars of the Zoyatal peccary measure, across the cingula: anteroposterior length, right 16.0, left 15.8; transverse breadth, right 16.2, left 15.9, mm.

Discussion.—Until the discovery of the Mexican specimens, *Dyseohyus* was known from the Great Plains region, westward to California and south to the coastal plain of Texas. *D. stirtoni* was known from Nebraska, Colorado, and Texas (Woodburne, *loc. cit.*). The genus seems to be almost confined to Barstovian sites.

Family Merycoidodontidae Thorpe

Merychys cf. *M. elegans*

Fig. 4

Material.—A small species of oreodont is the commonest mammal in the collection. Numerous upper and lower jaw fragments and isolated teeth, plus a few tentatively referred foot elements, are cataloged under eleven different numbers. The most helpful is MU 8707, parts of two lower jaw rami pressed together, with the left C-P4 (P4 greatly damaged) and right M₁-M₃. The teeth, other than P₄, are well preserved, except that the posterior lobe of M₃ is mostly broken away, and are in a moderate stage of wear. MU 8711 includes a right maxillary fragment with P²-M², with rather worn teeth. MU 8692 is a maxillary fragment with M¹-M³. The suite of specimens includes nearly all of the lower teeth, from incisors to M₃, but the upper dentition is not well represented.

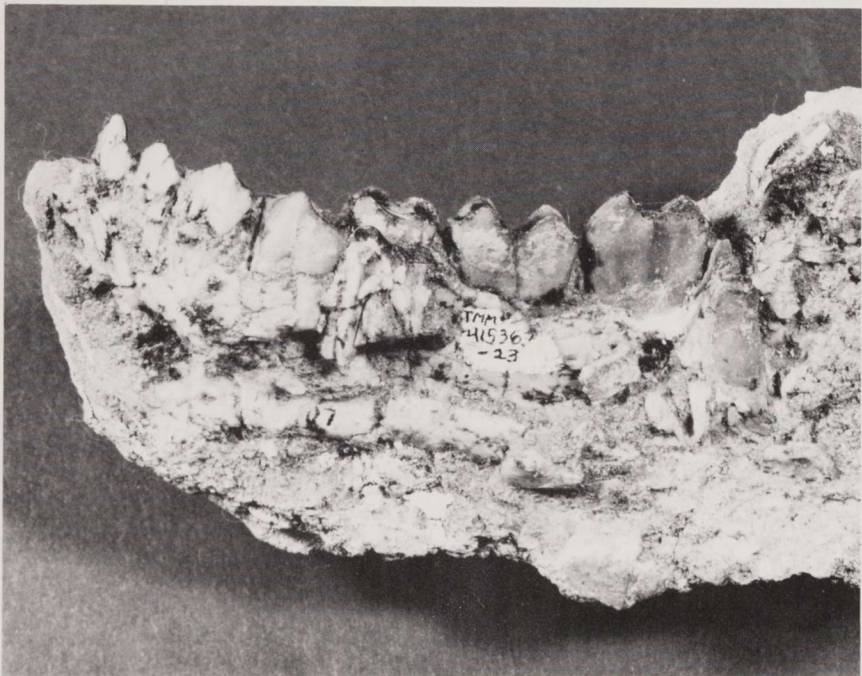


Fig. 4.—*Merychys*, cf. *M. elegans*, right and left lower jaw rami, pressed together, with left C-P₄ and right M₁-M₃, MU 8707. Left P₄ greatly damaged and most of third lobe of right M₃ broken away.

Description.—Margaret S. Stevens has compared the present material with specimens of oreodonts in the American Museum of Natural History, and found it to resemble *M. elegans*, the type species of the genus *Merychys*. The teeth are certainly of similar size and proportions. If good cranial material were available, the Mexican fossils might be distinguished on the basis of other than dental characters.

Measurements of the lower teeth of MU 8707 involve some approximation. The distance from the left canine to the estimated position of the posterior edge of P₄ is 43.6 mm. The distance from the right M₁ to the estimated position of the posterior edge of the posterior lobe of M₃ is 50.0 mm. The estimated C-M₃ length is thus 93.6 mm. Anteroposterior maximum crown lengths of individual teeth are: C, 6.1; P₁, 6.9; P₂, 10.0; P₃, 10.7; P₄, ?; M₁, 12.2; M₂, 16.0; M₃, ?, mm.

Discussion.—The genus *Merychys* is known from early to late Miocene deposits of the Great Plains of the United States and westward to California (Schultz and Falkenbach, 1947) and southward to the Big Bend of Texas (Stevens, Stevens, and Dawson, 1969). *M. elegans* has only been recorded from the late Miocene of the northern Great Plains region. The presence of *Merychys* cf. *M. elegans* in the Zoyatal local fauna shows that *Merychys* had a much greater geographic range than previously known. This is the third oreodont ever to be described outside the U. S. and Canadian borders, and the second one from Mexico (Whitmore and Stewart, 1965; Wilson and Clabaugh, 1970; Ferrusquia, 1973 in press).

Family Camelidae Gray
Miotylopus wilsoni new species
Fig. 5 (Table 1)

Holotype.—MU 8710, right and left lower jaw rami with left canine, left P₃-M₃ and right P₄-M₃.

Referred.—MU 8698, maxillary fragment with left M²-M³ and mandibular fragment with left P₂-M₁; MU 8703, lower right M₃; MU 8702, lower M₁-M₂; MU 8701, teeth and jaw fragments; MU 8705, maxillary fragment with DP³-DP⁴; MU 8709, fragment with upper DP⁴-M² and lower DP₄-M₂; MU 8687, two astragali; MU 8699, articulated partial foot; MU 8700, articulated partial foot.

Type locality.—Commercial rock quarry beside the Aguascalientes-San Luis Potosi highway, approximately 4 kilometers southeast of the city of Aguascalientes, state of Aguascalientes, Mexico; Zoyatal local fauna.

Diagnosis.—A small camel with brachyodont teeth, similar to *Miotylopus brachygnathus* Schlaikjer but with very short premolars and strongly developed styles and ribs on the upper molars.

Description.—The holotype consists of right and left lower jaws crushed

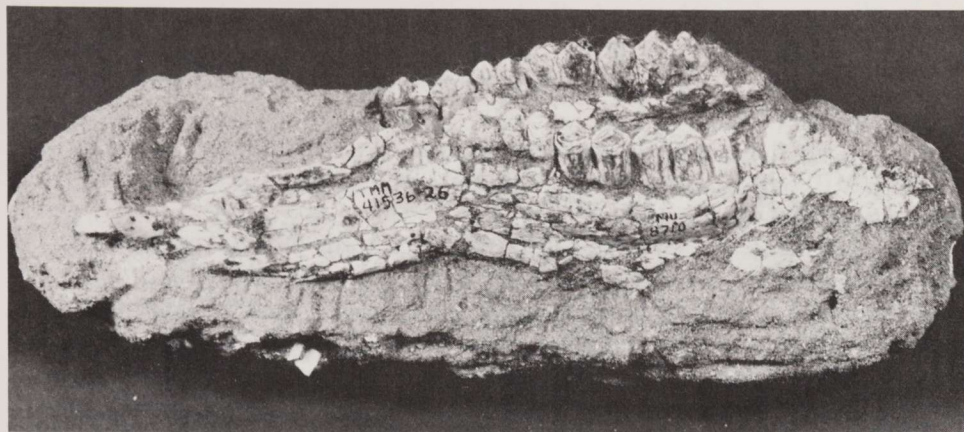


Fig. 5.—*Miotylopus wilsoni* new species, holotype, right and left lower jaw rami with left canine and P₃-M₃ and right P₄-M₃, MU 8710.

TABLE 1
Measurements of *Miotylopus wilsoni* new species

	8698	8710 -----holotype	8702	8702	8698	8703
		right	left	right	left	right
M ²	13.3 x 12.0					
M ³	14.5 x 12.8					
M ² -M ³	25.5					
P ₂					6.5 x 2.6	
P ₃		8.6 x 3.9			7.3 x 3.3	
P ₄		8.7 x 4.8	8.7 x ?		8.1 x 4.2	
M ₁		9.2 x 7.2	9.1 x 12 ?	11.3 x ? 12.0 x ?	10.0 x 6.4	
M ₂		14.8 x 8.4	14.9 x ?	14.8 x ? 14.8 x 8.2		
M ₃		19.4 x 9.4	19.2 x ?			17.6 x 9.0
P ₃ -M ₃		ca. 58.0				
P ₂ -M ₁					ca. 31.7	
M ₁ -M ₂				ca. 26.0 26.1		
Diastema C-P ₂			ca. 50			

together. The bone is much fractured and the portions posterior to the M₃s is missing. The left canine is present but broken across. No P₁ is present nor is a P₁ alveolus visible in the posterior half of the C-P₂ diastema. The anterior half of the diastemal region is somewhat shattered and fractured, and an alveolus might have been present here. Both P₂s and the left P₃ are missing, but the alveoli and roots can be seen on the left side. The remaining cheek teeth are well preserved and are of a young adult animal with the M₃ fully in use, but all teeth only lightly worn.

The left P₂ and P₃, not present in the holotype, are splendidly preserved in lower jaw fragment MU 8698. All of the lower cheek teeth of *Miotylopus wilsoni* are known, and other jaw fragments and isolated teeth duplicate those in the holotype jaw.

The upper dentition is represented only by a maxillary fragment with M²-M³ (MU 8698), a fragment with DP³-DP⁴, and another with DP⁴-M² and associated DP⁴-M² (MU 8709).

The foot elements are only tentatively referred and, except for the astragali (MU 8687), remain incompletely prepared.

The specimens have been compared with a small series of *Poebrotherium* from the Brule Formation, 200 feet above the Brule-Chadron contact, Goshen Hole, Goshen County, Wyoming, in the Midwestern University collection. The Mexican camel has slightly larger molars, is scarcely less brachyodont, but has markedly better developed styles on the upper molars. The premolars of *Poebrotherium* are relatively and actually longer, and less reduced.

Miotylopus wilsoni resembles *Miotylopus brachygnathus* Schlaikjer, the type species of the genus *Miotylopus*, in brachyodont teeth, small size (table 1), and deep ramus of the jaw. It differs in shorter premolars and much better developed styles on the molars. *M. brachygnathus* was named from the lower Miocene Harrison Formation, approximately 150 feet above the Brule-Harrison contact, Goshen Hole, Goshen County, Wyoming.

There is close resemblance, also, between *M. wilsoni* and the camelid species undetermined of Stevens, Stevens, and Dawson (1969) from the early Miocene Castolon local fauna, Delaho Formation, Brewster County, Texas. Again, *M. wilsoni* differs in having distinctly shorter premolars. Stevens, *et al.* note (*loc. cit.*, p. 37) that the posterior lakes of the third and fourth premolars of the Texas camel open posteromedially rather than posteriorly. In *M. wilsoni* the posterior lake of P₄ opens posteriorly but the reduced P₃ only has the enamel of the tooth roughened posteriorly by a few minute cuspsules; there is no lake present. The styles of the upper third molar are better developed in the undetermined camelid from Texas than in *Poebrotherium*, but those of *M. wilsoni* are even more strongly developed.

Some specific variation is apparent in the series of specimens from the Zoyatal local fauna but the distinctive characters of the species, i.e., small size, brachyodont teeth, reduced and shortened premolars and very strongly developed styles and ribs on the upper molars, are all borne out by the material.

Etymology.—This species is named in honor of Dr. John A. Wilson, University of Texas, in recognition of his contributions to the knowledge of Tertiary mammals.

Discussion.—At first glance, *Miotylopus wilsoni* seems to be an anachronism in the Zoyatal fauna. Its very small size and brachyodont teeth demand comparison with the late Oligocene *Poebrotherium* species and the early Miocene *Miotylopus brachygnathus*, but the other members of the fauna, especially *Merychyus* cf. *M. elegans* and *Dyseohyus*, seem to indicate late Miocene (Barstovian) age. The premolars of *Miotylopus wilsoni*, however, are much reduced as compared with the Oligocene and early Miocene forms.

This seems to be an advanced feature. Probably *Miotylopus wilsoni* is a camel that retained persistently primitive features of dentition through the Miocene, except in the marked shortening of the premolars.

We believe that there is no possibility of mixing faunal elements from two stratigraphic levels. All of the Zoyatal materials were obtained, to the best of our knowledge, from the single, 20-foot thick layer of almost unstratified, tufaceous sandstone, and from a single small area. No other Miocene vertebrates are known for hundreds of miles in any direction. Both the camel and the oreodont are represented by numerous fossils that belonged in both forms, to a minimum of three individuals. The fossils were delivered by the quarry workmen, in mixed lots, over a period of about 10 years. The Zoyatal local fauna is almost certainly a unit fauna.

A local fauna should be dated, if other methods are not possible, by the most progressive elements. In the Zoyatal local fauna, the peccary and oreodont strongly indicate Barstovian age, and the rhinoceros is suggestive of that age. *Miotylopus wilsoni* also must be Barstovian, probably derived from camelids like *Miotylopus brachygnathus* and the camelid undetermined from Brewster County, Texas, of the early Miocene.

Later work may show that *M. wilsoni* should be placed in a new, separate genus but we see little to be gained by such treatment at this time.

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