

THE RHINOCERAS *TELEOCERAS* FROM THE MIOCENE OF JALISCO, MEXICO

SPENCER G. LUCAS

New Mexico Museum of Natural History and Science, 1801 Mountain Road N.W., Albuquerque, NM 87104

Abstract—Cranial and dental material of a teleoceratine rhinoceros from near Juchitlán, Jalisco, Mexico, is illustrated, described and assigned to *Teleoceras*. The relatively small size and lack of p2 support assignment of these specimens to the late Hemphillian *T. guymonense*, which suggests a late Hemphillian age for the Juchitlán *Teleoceras*. Nevertheless, published records and fossil mammals from near Juchitlán in collections in Guadalajara include Hemphillian, Blancan and Irvingtonian taxa. There are about a dozen records of *Teleoceras* (or probable *Teleoceras*) from Mexico, all (or most) of Hemphillian age, that extend from Chihuahua to Chiapas. They indicate a broad geographic distribution of this rhinoceros in Mexico during the late Miocene.

INTRODUCTION

The teleoceratine rhinoceros *Teleoceras* is one of the most distinctive and widespread fossil mammals known from Miocene strata in the United States (Prothero, 2005). However, despite various published reports of *Teleoceras* from Mexico, beginning as early as Cope (1884), little of the Mexican material has been adequately documented. Here, I provide such documentation of what is one of the best samples of *Teleoceras* known from Mexico, specimens collected near Juchitlán in Jalisco (Fig. 1). These specimens are housed in the Museo Regional de Guadalajara del Instituto Nacional de Antropología y Historia (INAH) and the Museo de Paleontología de Guadalajara (MPG), both in Guadalajara, Mexico.

PROVENANCE

Collection records in INAH and MPG list the *Teleoceras* specimens documented here are listed as coming either from Juchitlán or from between Juchitlán and Tecolotlán in western Jalisco (Fig. 1). No other locality data are available at INAH or MPG.

In March 2002, I visited the area between Juchitlán and Tecolotlán along Highway 80 in western Jalisco. Outcrops there comprise a succession of red beds, dominantly of grayish orange-pink volcanoclastic sands and gravels overlain by grayish orange and pale yellowish brown siltstones. These strata are very fossiliferous, especially in roadcuts and around UTM zone 13, 597413N, 2226144E (NAD 27). They are part of a thick succession of Neogene strata that were deposited on the Jalisco block (Allan, 1986; Ferrari, 1995; Rosas-Elguera et al., 1996) in a small extensional basin that has been called the Tecolotlán basin (Carranza-Castañeda and Miller, 1998).

Older published records (Silva-Barcenas, 1969) and specimens at INAH and MPG indicate the following mammal taxa come from near Juchitlán: *Cuvieronius*, *Mammuthus imperator*, *Equus mexicanus*, *E. conversidens*, *E. occidentalis*, *Nannipus* and *Tetrameryx*. This is clearly a mixture of Hemphillian, Blancan and Irvingtonian taxa. Indeed, more recent published information (Carranza-Castañeda and Miller, 1998, 2000) indicates that the area produces a stratigraphic succession of fossil mammals: a substantial Hemphillian assemblage (e.g., *Notolagus*, *Osteoborus*, *Astrohippus*, *Dinohippus*, *Neohipparion*, *Teleoceras*, *Agriotherium*, *Hemiauchenia*) overlain by a Blancan assemblage (*Nannipus*) capped by Irvingtonian and RanchoLabrean assemblages (*Mammuthus*, *Equus*). Without precise location or stratigraphic data, I thus infer that the *Teleoceras* fossils in the INAH and MPG collections are from the Hemphillian stratigraphic interval near Juchitlán.

DESCRIPTION AND IDENTIFICATION

The most complete specimen of a rhinoceros from Juchitlán is an incomplete skull and lower jaw collected in 1960 in the INAH collection that is uncatalogued and on display (Figs. 2, 3D). This skull is missing its



FIGURE 1. Map of Jalisco, Mexico, showing the location of Juchitlán and Tecolotlán.

posterior portion (braincase, basicranium, etc.) and preserves left and right P2-M3 (well worn); the associated lower jaw has both i2s and the right and left p3-m3. Salient features that justify its assignment to *Teleoceras* include: size (Tables 1-2), fused nasals that are narrow and have strongly downturned lateral edges, small nasal horn, nasal incision above posterior portion of P4; relatively large premaxilla and I1 (judged from alveolar size), broad zygomatic arches, hypsodont teeth with strong antecrochets, dP1/p1 absent and p2 absent. Among *Teleoceras*, this specimen is relatively small (length M1-3 = 140 mm) and p2 is absent, both features diagnostic of *T. guymonense*, a small and temporally late (late Hemphillian) species of *Teleoceras* (Prothero, 2005). The only other similar-sized, small *Teleoceras* species is Hemingfordian *T. americanum* and it is readily distinguished from the Juchitlán *Teleoceras* by its low-crowned teeth, complete cingula on the upper premolars, M2 and M3 of subequal size and presence of p2 (Prothero, 2005). Therefore, the INAH skull and lower jaw can be assigned to *T. guymonense*. It is the first skull of this species to be documented (cf. Prothero, 2005).

Specimens in the MPG collection are maxillary and dentary frag-

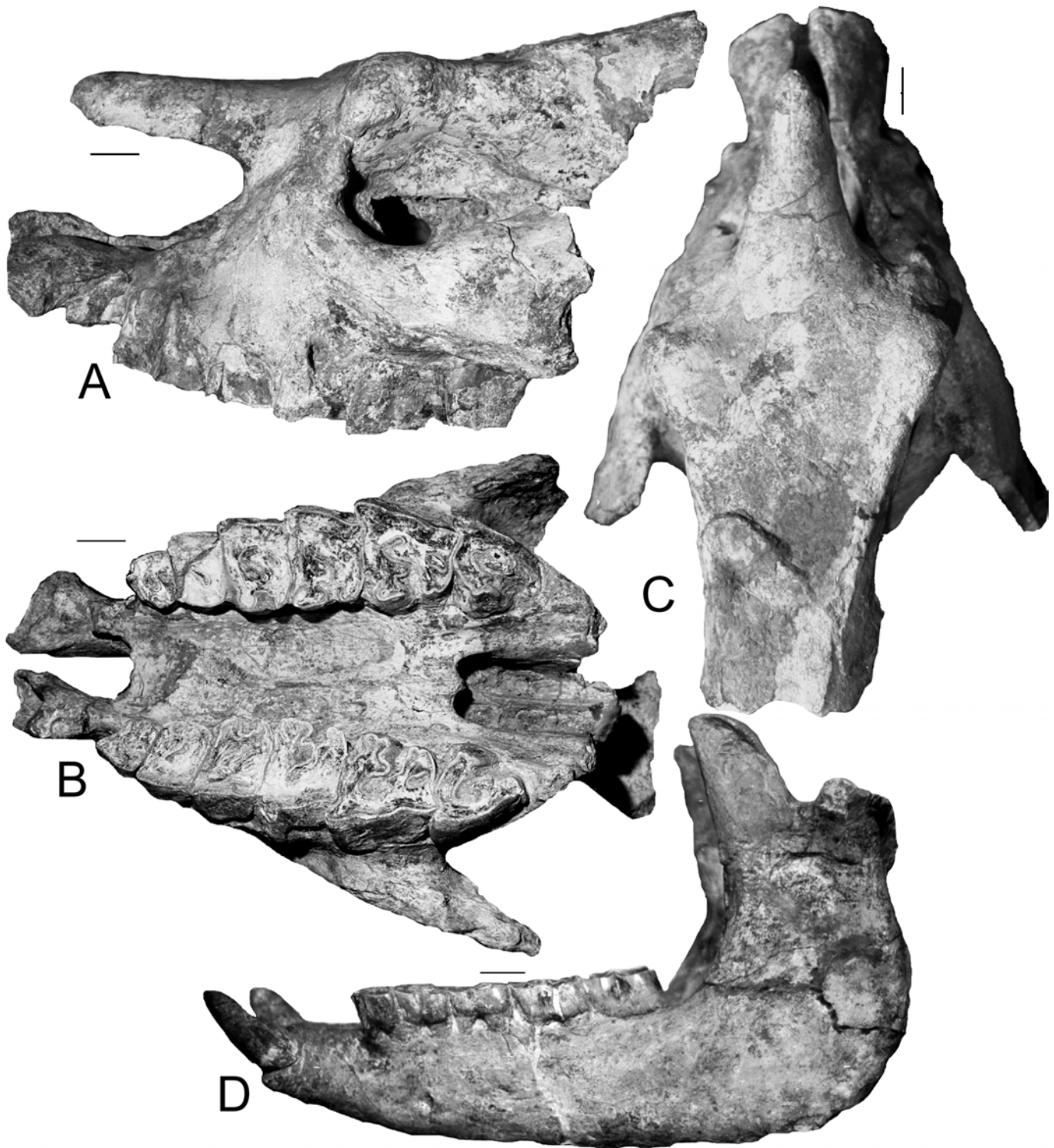


FIGURE 2. Incomplete skull and lower jaw of *Teleoceras fossiger* from Juchitlán, uncatalogued specimen in the INAH collection. A-C, Incomplete skull with left and right P2-M3, left lateral (A), ventral (B) and dorsal (C) views. D, Lower jaw with left and right i2 and p2-m3, left lateral view. Scale bars = 3 cm.

ments that add little to the information gleaned from the INAH specimen—they are of similar size and morphology, so they can also be assigned to *Teleoceras guymonense*. They are: MPG 144, jaw with left p4-m2 and right p3-m3; 145, jaw with left i2, left p4-m3 and right p3-m3 (Fig. 3C); 575, incisor, jaw and skull fragments; 576, fragments of postcrania; 577, right dentary fragment with incomplete m1 and m2-3; 578, left maxillary fragment with M2-3 (Fig. 3B); 579, right dentary

fragment with m3; 580, coprolites; 581, lower jaw fragments and left maxillary fragment with M3; 582, right dentary fragment with incomplete m2 and complete m3; 583, tusk and jaw fragments including a left dentary fragment with dp2-4 and right M2 (Fig. 3A); 584, skull and jaw fragments; 585, badly damaged lower and upper jaw fragments with a right P4 and left m3; 586, two skull fragments, one bearing a right M1; 587, vertebrae, tooth fragments and a left p3; 588, various isolated mo-

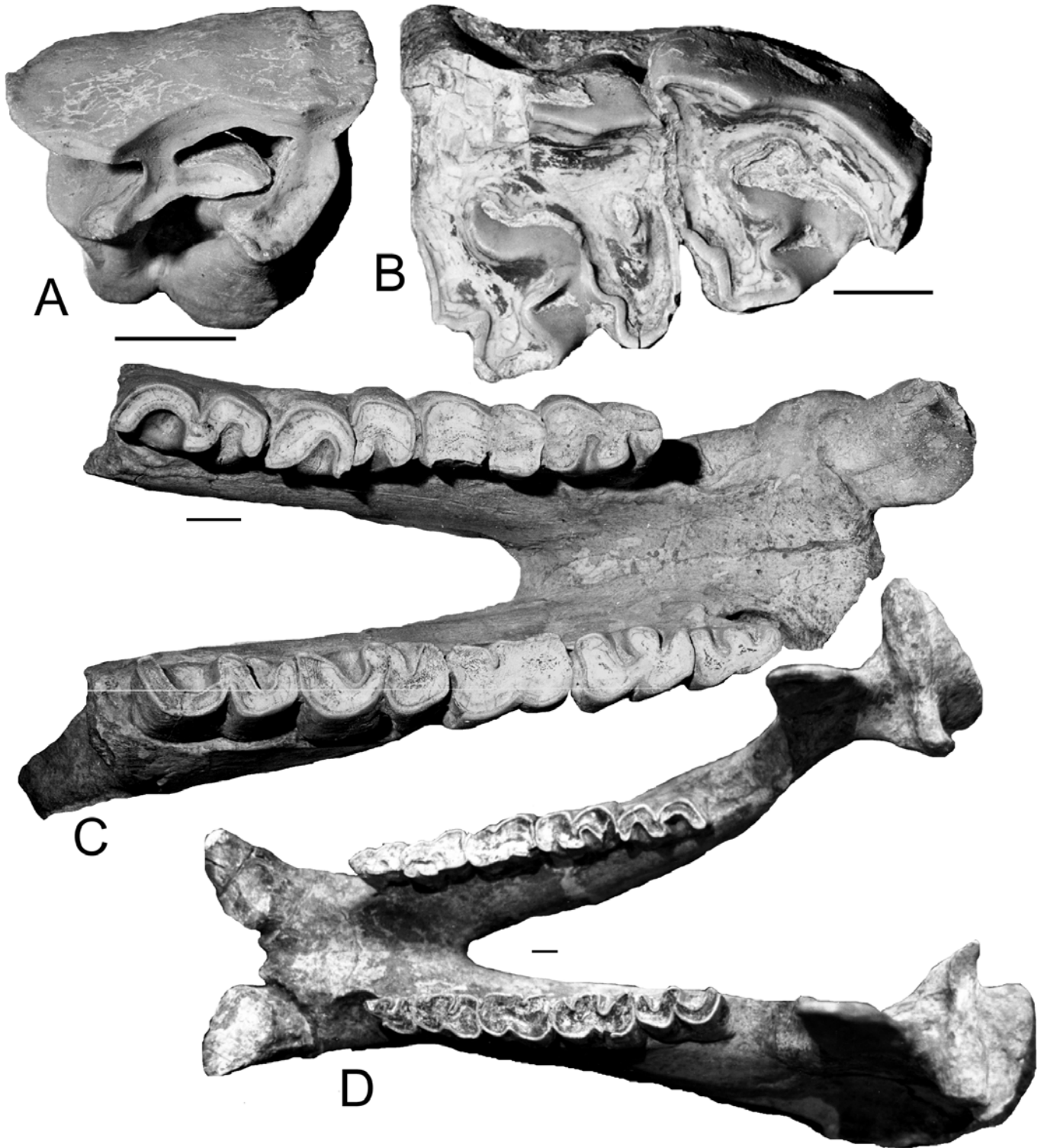


FIGURE 3. Selected specimens of *Teleoceras fossiger* from Juchitlán. **A**, MPG 583, right M2 in occlusal view. **B**, MPG 578, occlusal view of left M2-3. **C**, MPG 145, occlusal view of lower jaw with left i2 and left p3-m3 and right p2-m3. **D**, INAH uncatalogued, occlusal view of lower jaw with left and right i2 and p2-m3 (same specimen as Figure 2D). Scale bars = 2 cm.

lars (mostly lowers); 589, skull fragments, including a maxillary fragment with right P3 and a dentary fragment with left p4-m1

TELEOCERAS IN MEXICO

Various records of *Teleoceras* (or cf. *Teleoceras*, *Aphelops* or cf. *Aphelops*) have been reported from Mexico, and most (or all) of these are of Hemphillian age (Carranza-Castañeda and Miller, 2004). Indeed, the

Juchitlán occurrence was earlier mentioned, without documentation, by Silva-Barcenas (1969, p. 14) and by Brunet (1969). Documentation of the Juchitlán specimens allows them to be assigned to *T. guymonense*, which indicates they are of late Hemphillian age.

Most of the Mexican *Teleoceras* records are fragmentary material (isolated teeth or jaw fragments), and few have been illustrated or described. These records (from north to south) are:

TABLE 1. Selected measurements (in mm) of INAH uncatalogued, skull and lower jaw of *Teleoceras guymonense* from Juchitlán, Jalisco, Mexico.

Width of skull above orbits	185
Length upper diastema	58
Length P2-M3	235
Length P2-P4	98
Length M1-M3	140
Length mandible	450
Length mandibular symphysis	125
Length of i2	31.9
Width of i2	49.2
Height horizontal ramus below m1	83
Height of coronoid process	277
Width of mandibular condyle	97
Length p3-m3	208
Length p3-p4	69
Length m1-m3	138

1. *Teleoceras* has been reported but not documented from the Hemphillian Yepómera local fauna, Chihuahua (Brunet, 1969; Tedford et al., 2004).

2. Maldonado-Koerdell (1954) assigned a dentary fragment with m2-3 to *Teleoceras fossiger* from Santa Rosa in Sinaloa.

3. *Aphelops* has been identified from the Zoyota local fauna in Aguascalientes based on an incomplete upper molar (Dalquest and Mooser, 1974).

4. Carranza-Castañeda and Miller (2004) listed *Teleoceras* sp. from San Luis Potosí, but offered no other data.

5. Silva-Barcenas (1969) first reported *Aphelops?* from Rancho el Ocote in Guanajuato. Dalquest and Mooser (1980) named a new species, *Teleoceras ocotensis*, for isolated teeth from this Hemphillian local fauna. Carranza-Castañeda (1989) described additional material, assigning it to *T. fossiger* (= *T. octoensis*). Prothero (2005) synonymized *T. ocotensis* with *T. hicksi* and thus assigned all the Rancho de Ocote *Teleoceras* to *T. hicksi*.

6. Freudenberg (1922) reported *Teleoceras* sp. from Tehuichila and Zacualpan in Hidalgo.

7. Cope's (1884, 1886) original report was of *Aphelops fossiger* from the Valle de Toluca west of Mexico City.

8. Freudenberg (1922) named *Teleoceras "felicitis"* from the "Hochtal von Mexiko" ("High Valley of Mexico") in the State of Mexico based on the distal end of a humerus from Tequixquiae (Felix and Lenk, 1891). Prothero (2005) considered this species a *nomen dubium*.

9. *Teleoceras* has also been reported without documentation from Morelia, Michoacan (Brunet, 1969).

10. Ferrusquia (1990) documented a tooth and tooth fragments he identified as cf. *Teleoceras* from the Iztapa local fauna of Chiapas.

With the record from Jalisco documented here, there are thus

TABLE 2. Measurements (in mm) of upper and lower cheek teeth of *Teleoceras guymonense* from Juchitlán, Jalisco, Mexico. Asterisks (*) indicate approximate measurements of very worn or damaged teeth.

Uppers:

	P2L	P2W	P3L	P3W	P4L	P4W	M1L	M1W	M2L	M2W	M3L	M3W
INAH uncat	28.9	32.4	33.0	44.5	38.6	54.2	44.8	58.5	60.5	63.3	47.1	57.2
MPG 578										60.2*	43.6	51.4
MPG 579											48.4	49.6*
MPG 581											47.8*	58.9*
MPG 583									56.1	62.4		
MPG 585					36.2*	47.4						
MPG 586							46.3*	56.5*				
MPG 589				39.5								

Lowers:

	p3L	p3W	p4L	p4W	m1L	m1W	m2L	m2W	m3L	m3W
INAH uncat	34.2	22.6	38.1	26.6	42.1	29.7	47.4	29.4	51.2	27.8
MPG 144	29.6	20.5	37.4	25.1	44.2	29.2	51.3	28.6	52.8	26.2
MPG 145	31.9	22.3	39.5	29.1	41.3	29.7	51.0	30.7	54.2	28.4
MPG 577							45.6	29.6	51.4	25.3
MPG 579									53.7	29.5
MPG 582									50.4	28.4
MPG 583							47.4	28.2		
MPG 585									53.3	28.1
MPG 587	31.6	22.9								
MPG 588	33.4	20.9			46.2	25.9	48.2	29.5	53.8	26.2
MPG 489			38.4	28.1	45.6	29.2				

nearly a dozen reports of *Teleoceras*, or likely *Teleoceras*, from Hemphillian (or likely Hemphillian) land-mammal assemblages in Mexico. This indicates a widespread late Miocene distribution of *Teleoceras* in Mexico (from Chihuahua to Chiapas), bridging much of the geographic gap between its records in the United States and in Honduras (Webb and Perrigo, 1984). Further collection, study and stratigraphic work are needed, though, to more thoroughly document the species-level composition and precise temporal distribution of the diverse records of *Teleoceras* in Mexico.

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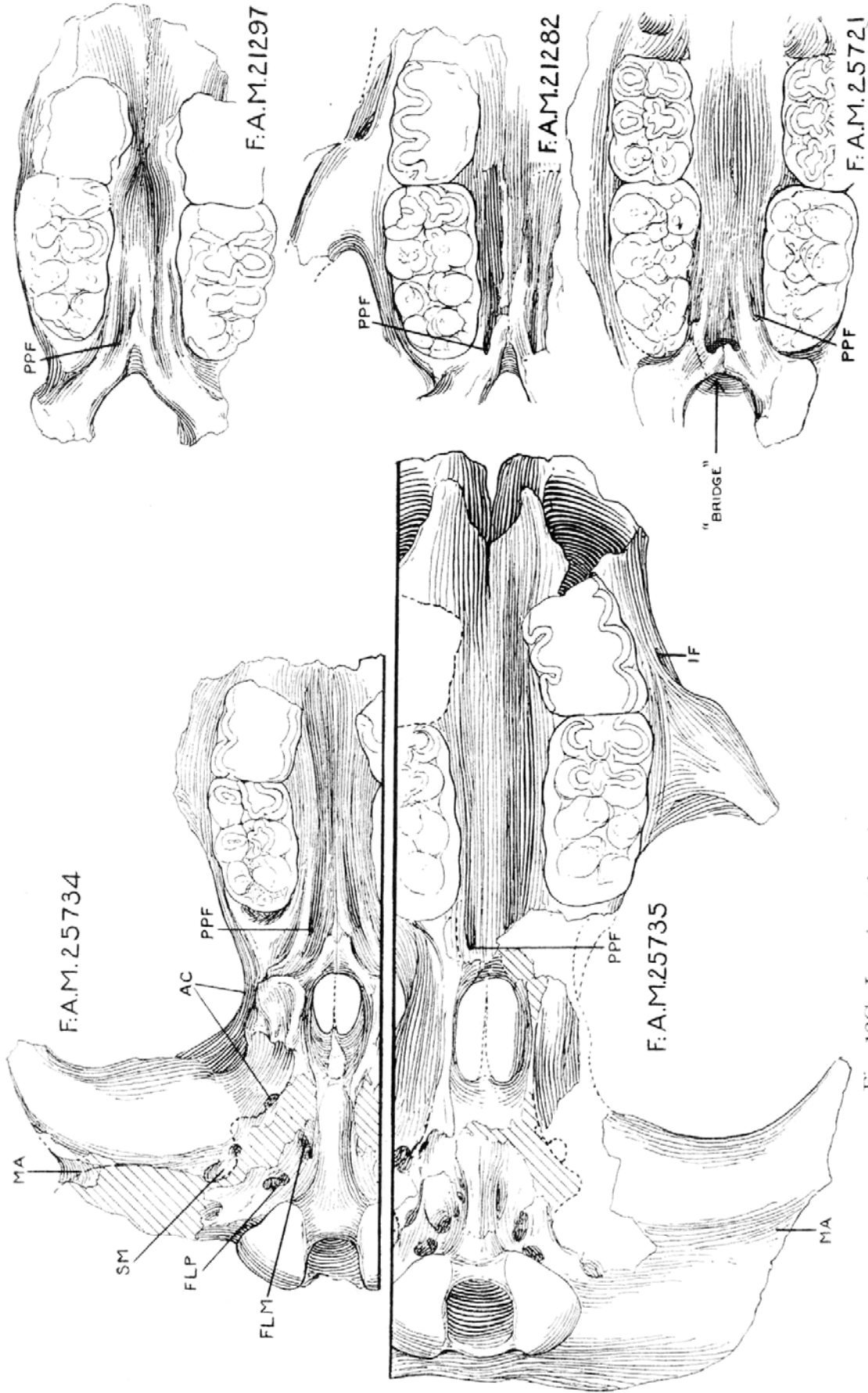


Fig. 12C. Longirostrines from the late Tertiary of Nebraska and New Mexico.