CONTRIBUTIONS TO PALEONTOLOGY

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A NEW PLIOCENE ANTELOPE FROM MEXICO WITH REMARKS ON SOME KNOWN ANTILOCAPRIDS

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With two plates and one text figure

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CONTENTS

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Introduction

In the paleontological collections of the California Institute of Technology are remains of a new antelope recently collected with a Pliocene mammalian assemblage (Rincon fauna) in northern Mexico. Through the kindness of Dr. Chester Stock this material has been allocated to the author for description. There are likewise now available specimens of the antilocaprid genera *Ilingoceros* and *Sphenophalos* which have remained undescribed. Opportunity is therefore taken in the present paper to make some further observations on these forms, especially with regard to *Ilingoceros*.

Appreciation is expressed to Dr. J. C. Merriam, who originally described and discussed the relationships of *Ilingoceros* and *Sphenophalos*, for his continued interest in and support of the research on the fossil Antilocapridae.

Hexobelomeryx[1] fricki, n. gen. and n. sp.

(Plate 1, figures 2, 4, 5; plate 2)

Type specimen. C.I.T. no. 2780, a frontlet with horn cores partially preserved on both sides (pl. 1, fig. 2).

Paratypes. C.I.T. nos. 2769, 2771, and 2772, horn cores; nos. 2761, 2787, and 2799, upper and lower dentitions.

Locality. C.I.T. Vert. Pale. locality 291; Rincon Pliocene deposits, western Chihuahua, Mexico.

Generic and specific characters. The horn cores are not supraorbital as in *Antilocapra americana* and *Stockoceros*; only the anterior part of the base reaches above the posterior part of the orbit. The horn core is broad anteroposteriorly above the solid frontal base. Rising from a common base is a fork with two prongs or tines, and in addition a third prong, which usually projects anteriorly, sometimes posteriorly. The cleft between the tines of the fork is narrower than that between the fork and the third prong. The bottom of the cleft between the tines has a variable position above the base of the horn core, sometimes well above, at other times only a relatively short distance above. Of the three prongs, the anterior shows the largest cross section; the remaining two have cross sections of subequal size. When viewed from above, the middle prong is seen to project inward farther than either the anterior or the posterior prong.

[1] ἕξ *(hex)*, six; ὀβελός *(obelos)*, a pointed object; μήρυξ *(meryx)*, a ruminant.

Anteroventral portion of orbital rim situated above M^3; superior cheek-tooth series short; root of M^3 reaching almost to malar-maxillary suture. Teeth hypsodont. Rami relatively short; diastema short, deep dorsoventrally at M_3.

Description. The horn cores of *Hexobelomeryx* are not supraorbital in position as in *Merycodus*, *Sphenophalos*, *Stockoceros*, or *Antilocapra*. In other words, their base does not extend so far forward with reference to the orbit as in the genera mentioned. The horn core itself is of most peculiar type and not like any corresponding structure seen in antelopes previously described from the North American Tertiary. Rising from a single, anteroposteriorly elongated base (pl. 1, fig. 5), the horn core gives rise to a forward prong and a posterior fork of two prongs. The border of the cleft between the forward prong and the fork forms approximately a right angle. The forward prong is large and swings outward, upward, and forward. The fork consists of two prongs, the posterior of which swings outward, upward, and backward. The anterior prong of the fork is directed inward, upward, and backward (pl. 1, fig. 4). The cleft between the two prongs of the fork is much compressed and has a variable position above the base of the horn core. Of the several types of antelope horn core described by Childs Frick, none seems to correspond closely to this from the Rincon Pliocene. In *Texoceras* and in *Hayoceras*, for example, the horns appear to be of simpler construction than in the Mexican genus, and more like those in *Tetrameryx* or *Stockoceros* in this respect.

A curious anomaly occurs in the horn cores of this form from Mexico. Usually the largest of the three prongs of each horn core projects forward. This is the case in the type specimen, no. 2780, and in most of the additional horn-core material from the Rincon. In two well preserved specimens, nos. 2779 and 2772, however, the prong, which is distinct from the two comprising the fork, has a posterior position and projects backward (pl. 2, fig. 3). So different are these two horn cores from the usual type that one may question whether all the specimens can be referred to a single form. The view that all the horn cores belong to a single species and that the anomalous specimens probably represent curious variations from the norm is suggested in this paper. The following evidence may be marshaled to support this view: (1) The basic type of horn core is essentially the same in all specimens; in the variant, only the anterior prong is transposed; (2) no structural differences appear in the skeletal parts or in the dentition to warrant a separation of the antelope material into two groups; and (3) type and variant occur at the same locality. Furthermore, in the mammalian assemblage associated with *Hexobelomeryx*, as represented by the collection obtained from the several localities in the Rincon deposits, there is thus far no basis for establishing more than one faunal horizon.

Measurements of horn cores of Hexobelomeryx fricki (in millimeters)

S, specimen number (C.I.T. Coll.).
AP, anteroposterior diameter of constriction at base of antlers above orbit.
T, transverse diameter above orbits.

Loc. 275			Loc. 276			Loc. 277			Loc. 289			Loc. 291		
S	AP	T	S	AP	T	S	AP	T	S	AP	T	S	AP	T
2765	42.2	27.0	2770	43.0	22.3	2772	43.6	24.0	2774	40.7	19.5	2779	61.0	32.0
2764	41.9	24.0	2771	41.0	25.3				2773	48.0	28.0	2780	45.3	23.5
2766	48.5	29.6	2769	40.8	24.3				2776	46.0	22.5			
2768	41.2	23.0							2775	41.5	18.0			
									2777	43.0	22.0			
									2778	45.0	23.0			

The supraorbital foramen in the frontal is situated anterior to and on the median side of the horn core. Between the supraorbital foramina the frontal appears convex, in which respect it differs from that in *Antilocapra americana*. The anteroventral part of the orbital rim is situated above the last molar, and is therefore placed farther forward than in the modern pronghorn. The external opening of the infraorbital canal has a position above P^2 as in *Antilocapra*. The posterior part of the horn cores, the position of M^3 below the anteroventral portion of the orbital rim, and the shortened cheek-tooth series suggest a shortening of the facial part of the skull.

The horizontal ramus is deep below M_3 (pl. 2, figs. 1, 2). Anteriorly, the depth decreases toward the diastemal portion of the jaw more rapidly than in *Antilocapra*. The ramus is heavier and deeper than in *Stockoceros conklingi*. The depth of the ramus at the posterior end of M_3 ranges from 30 to 37 mm. in *Hexobelomeryx*. In *Stockoceros conklingi* the comparable measurement of a ramus of maximum size is 28 mm. The masseteric ridge, situated near the ventral border and immediately behind the level of M_3, is much more strongly developed than in *Antilocapra*. The diastema between the anterior premolar and the incisors is short.

The cheek teeth are hypsodont. In both upper and lower premolar series P2-P4 are present, although in several rami (for example, no. 2787, pl. 2, fig. 2) the premolars are reduced to P_3-P_4. P^4 is smaller in proportion to the molar teeth in *Hexobelomeryx* (pl. 2, fig. 5) than in *Antilocapra*. This tooth has the characteristic half-molar pattern, the inner crescent being completely formed. In P_3 a broad groove on the inner side demarcates the anterointernal crest from the principal cusp. A small groove of limited vertical extent occurs behind the principal cusp. At the posteroexternal angle of the crown a style is formed, its presence being accentuated by the shallow vertical groove in front of it. The same type of crown construction is present in P_4 except that the styles at the anterointernal and posteroexternal corners of the crown are stronger. M_3 is usually a three-lobed tooth, but in no. 2799 (pl. 2, fig. 1), because of lengthening out of the posterior part of the crown, four lobes are present.

Measurements of dentition (in millimeters)

Hexobelomeryx				*Stockoceros*			
C.I.T. no.	P_2-P_4 inc.	M_1-M_3 inc.	P_2-M_3 inc.	C.I.T. no.	P_2-P_4 inc.	M_1-M_3 inc.	P_2-M_3 inc.
2785	16.3	50.0	65.4	2931	22.0	47.3	69.0
2786	15.0	50.0	65.9	2932	20.2	40.4	61.5
2787 (P_3-P_4)....	15.0	44.0	60.9	2933	21.5	41.4	64.0
2788	20.6	46.0	61.0*a*	2934	21.0	41.2	62.3
2789 (P_3-P_4)....	12.4	47.9	61.3	2935	22.0	39.0	61.8
2790	16.0*a*	44.0*a*	61.0	2936	25.0	43.0	67.0
2791	17.3	47.0	67.0	2937	20.8	38.8	60.5
2792	21.2	44.5	66.5	2938	21.5	38.2	62.0
2793	18.0	44.2	62.5	2939	21.3	41.4	64.2
2794	18.0	44.6	64.3	2940	21.0	40.0	63.0
2799	18.0	47.3	65.0	2941	20.5	39.3	61.5
2800	14.9	43.5	57.3	2942	19.0	44.2	65.0
Averages......	16.7	46.1	63.2	....	21.2	41.2	63.5

a, approximate.

Few rami of *Hexobelomeryx* are complete anterior to the third incisor. In those that are complete, the length of the diastema ranges from 42 to 51 mm. In *Stockoceros conklingi* the length ranges from 47 to 65 mm.

Length of diastema between I_3 and P_2 (in millimeters)

Hexobelomeryx		*Stockoceros*	
C.I.T. no.	Length of diastema	C.I.T. no.	Length of diastema
2785	....	2931	61.9
2786	....	2932	62.0
2787	....	2933	62.0
2788	....	2934	65.0
2789	46.9*a*	2935	62.0
2790	47.8	2936	60.9
2791	....	2937	65.0
2792	....	2938	50.3
2793	....	2939	59.0*a*
2794	45.5	2940	59.2
2799	47.0	2941	....
2800	47.0	2942	58.2

a, approximate.

Ilingoceros alexandrae Merriam

(Plate 1, figure 1)

Among numerous fragmentary horn cores and skeletal parts of *Ilingoceros alexandrae* found in the Thousand Creek Middle Pliocene of Nevada is the frontlet of a skull, C.I.T. Vert. Pale. Coll. no. 494, from locality 63, shown in plate 1, figure 1. The inner, superior faces of the orbits are present. The twisted horn cores rise immediately above the supraorbital foramina and orbits. The frontal bone is broken near the line of the anterior parietal suture and across the forehead in line with the supraorbital foramina. The bone between the horn cores is relatively thick and ventrally shows a part of the inner surface of the brain case.

Orienting the frontlet on the basis of the orbital parts that are present, it is seen that the horn cores incline backward and outward. Thus, the attitude of the horn core in *Ilingoceros* is noticeably different from that in *Sphenophalos* and *Antilocapra*. There is no abrupt depression of the frontals between the supraorbital foramina as in *Antilocapra americana* or in *Sphenophalos*.

The parts of horn-core shafts present above and behind the orbits are (right) 107.0 mm. and (left) 111.0 mm. long. The truncated distal ends of the cores project laterally 48.0 mm. beyond the orbital rims. The greatest diameter of the first spiral above the base is 29.0 mm., that of the second spiral 33.5 mm. As the spirals show no diminution in size distally, no estimate of complete length or character of termination can be made.

Merriam[2] in discussing the probable relationships of *I. alexandrae* suggested that it belonged in a new family. Childs Frick[3] in his classification of the horned ruminants has erected the subfamily Ilingocerotinae for this genus.

A relation between *I. alexandrae* and *S. nevadanus* has been suggested on the basis of morphology of horn-core structure. The tight spiral twist in *Ilingoceros* horn cores, however, differs decidedly from the slight twist outward of the anterior tine in *Sphenophalos*. The horn cores of *Sphenophalos*, with their broad anteroposterior diameter, are not comparable to those of *Ilingoceros*, with their cylindrical proximal ends. C.I.T. specimen 597 (pl. 1, fig. 3), belonging to a very young individual of *Sphenophalos*, shows no tendency to develop a spiral structure. In C.I.T. no. 494 *(Ilingoceros)*, the dorsoventral axis of the horn core is situated above the posterior end of the orbit; in *Sphenophalos* it lies over the middle of the orbit. The long

[2]J. C. Merriam, Univ. Calif. Publ., Bull. Dept. Geol., vol. 5, pp. 319-330, 1909; ibid., vol. 6, pp. 302-303, 1911.

[3]C. Frick, Bull. Amer. Mus. Nat. Hist., vol. 69, p. 469, 1937.

axis of the core normal to the former axis in *Ilingoceros* (no. 494) extends through the supraorbital foramina, whereas in *Sphenophalos* it lies above the anteroorbital rim. The positions of the supraorbital foramina in relation to the base of the horn core are very different in the two genera. On the other hand, the foramina open into the orbits in the same way. The position of the supraorbital foramina in *Sphenophalos* is comparable to that in *Stockoceros conklingi*, *Tetrameryx*, and *Antilocapra americana*.

Stirton[4] states that on the basis of available evidence it has not been shown that the genus *Plioceros* Frick differs from *Sphenophalos*. The geographic distribution as well as stratigraphic occurrence of the former genus might have some bearing on the matter.

No horn cores of *Ilingoceros* have been found at any C.I.T. locality where *Sphenophalos* remains occur, with the one exception of the original Thousand Creek locality. It appears highly improbable that sex dimorphism accounts for the difference between the horn cores of the two genera.

So far, no remains of *Ilingoceros* are recorded from any but the type locality in Thousand Creek, Nevada. The genus *Sphenophalos* has a much wider geographical distribution through the Great Basin province. If *Plioceros* is congeneric with *Sphenophalos* and has a similar geological age, the range of *Sphenophalos* may include areas in Nebraska and New Mexico.

Conclusions

To the extraordinary number and variety of antilocaprids from the later Cenozoic deposits of North America is added a new genus, *Hexobelomeryx*. This type from the middle Pliocene of northern Mexico shows an unusual type of specialization of its horn cores, in which three distinct prongs are present.

Discovery of this form emphasizes the fact that the greatest diversity in the structure of the horn core is found among the antilocaprids of the later Pliocene. Unique among these are not only *Hexobelomeryx*, but also *Ilingoceros* from the Thousand Creek beds of Nevada.

[4]R. A. Stirton, Amer. Jour. Sci., ser. 5, vol. 24, pp. 46-51, 1932.

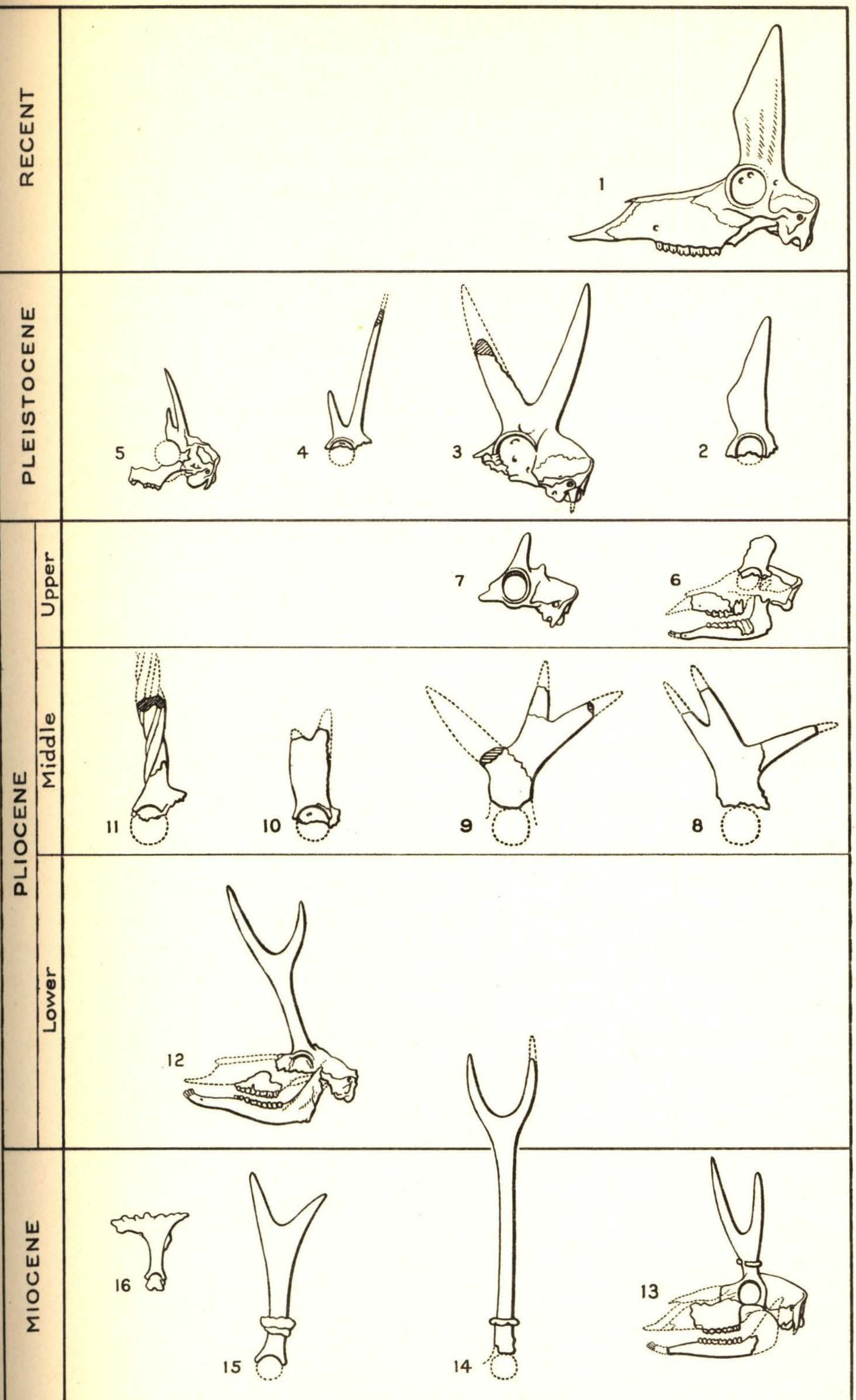


Fig. 1. Horn cores of recent and fossil American antelopes: (1) *Antilocapra americana* Ord; (2) *Antilocapra* cf. *americana* Ord; (3) *Stockoceros conklingi* (Stock); (4) *Tetrameryx schuleri* Lull; (5) *Capromeryx mexicana* Furlong; (6) *Proantilocapra platycornea* Barbour and Schultz; (7) *Ceratomeryx prentici* Gazin; (8) and (9) *Hexobelomeryx fricki* Furlong; (10) *Sphenophalos nevadanus* Merriam; (11) *Ilingoceros alexandrae* Merriam; (12) *Merycodus* cf. *furcatus* Leidy; (13) *Merycodus necatus* Leidy; (14) *Merycodus loxoceros* Furlong; (15) *Merycodus hookwayi* Furlong; (16) *Merriamoceras coronatus* Merriam. Greatly reduced.

PLATES

Plate I

All specimens × 3/5

Fig. 1. *Ilingoceros alexandrae* Merriam. No. 494, frontlet with horn cores. Thousand Creek Pliocene, Nevada.

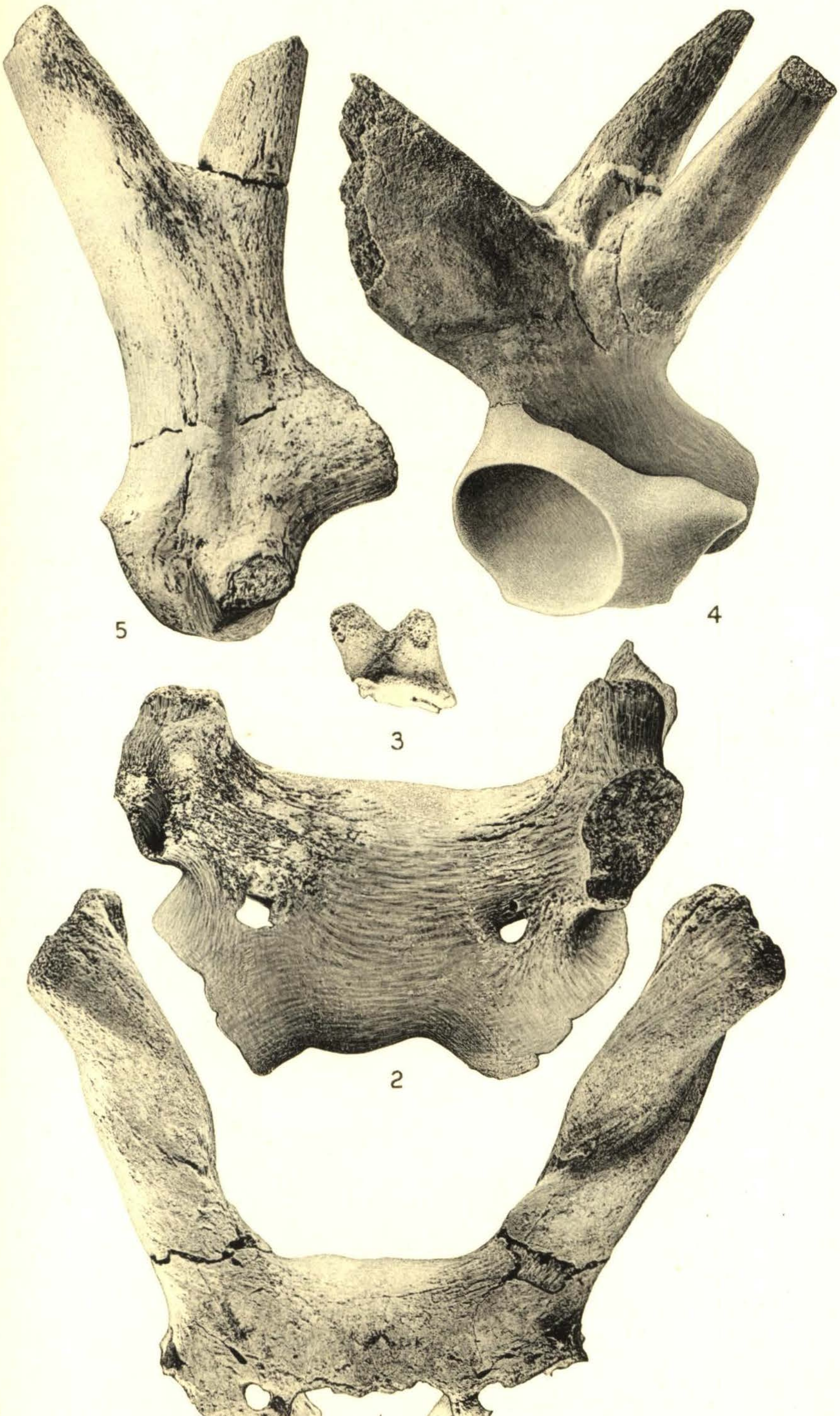
Fig. 2. *Hexobelomeryx fricki,* n. gen, and n. sp. Type specimen, no. 2780, frontlet with bases of horn cores. Rincon Pliocene, Mexico.

Fig. 3. *Sphenophalos* sp. No. 597, horn core of immature specimen. Thousand Creek Pliocene, Nevada.

Fig. 4. *Hexobelomeryx fricki,* n. gen. and n. sp. No. 2769, horn cores. Rincon Pliocene, Mexico.

Fig. 5. *Hexobelomeryx fricki,* n. gen. and n. sp. No. 2771, horn cores. Rincon Pliocene, Mexico.

Calif. Inst. Tech. Vert. Pale. Coll.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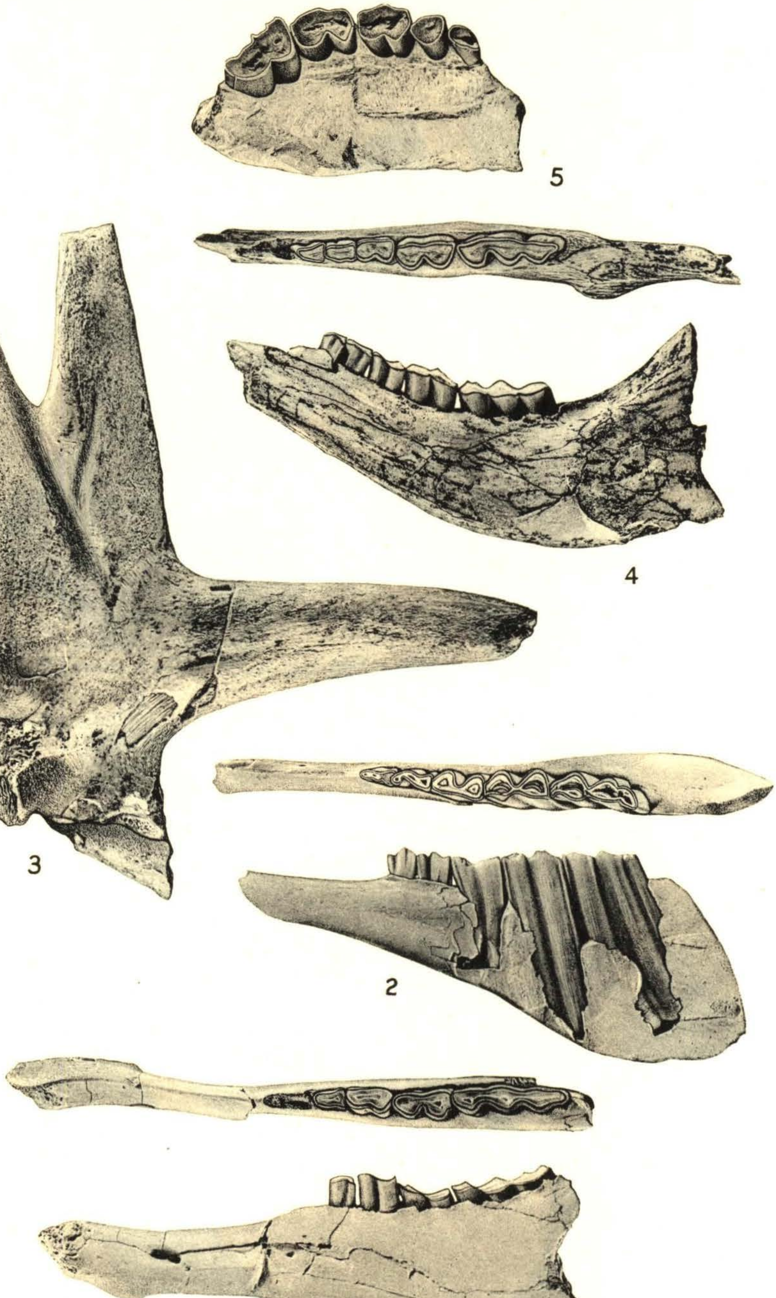

Hexobelomeryx fricki, n. gen. and n. sp.

All specimens × 3/5

FIG. 1. No. 2799, ramus and lower dentition.
FIG. 2. No. 2787, ramus and lower dentition.
FIG. 3. No. 2772, horn cores.
FIG. 4. No. 2793, ramus and lower dentition.
FIG. 5. No. 2761, maxillary fragment with upper cheek teeth.

Calif. Inst. Tech. Vert. Pale. Coll.
Rincon Pliocene, Mexico