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Rodents of the Rincon Fauna, Western Chihuahua, Mexico

ROBERT W. WILSON

With two plates

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[ISSUED JUNE 22, 1949]
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U. S. National Museum, for
stitution. The present paper;
Research Fellow in paleontol
Rodents of the Rincon Fauna, Western Chihuahua, Mexico

INTRODUCTION

As a result of intensive field work over a number of years, a considerable collection of fossil vertebrates has been obtained by the California Institute of Technology from continental deposits exposed in the drainage basin of the Rio Papigochic in western Chihuahua, Mexico. Quarries in fossiliferous outcrops have been opened in the vicinity of Matachic, Yepomera, and to the north of Yepomera in the general area called the Rincon.

A few of the fossil species from these deposits have been described, but the bulk of the material is only now being studied in detail. Among the former may be mentioned a leporid, *Notolagus velox* (Wilson, 1937); a badger, *Taxidea mexicana* (Drescher, 1939); and an antilocaprid, *Hexobelomeryx fricki* (Furlong, 1941). The relative ages of the various quarry sites have not been determined in detail, but the fauna is of Hemphillian age, probably late in this interval. Because earlier papers referred to the described forms as from Rincon, a rather broad geographic area, the writer continues to do so in the sense of a general Rincon fauna which may involve local faunas of perhaps slightly different ages.

Fossil rodent material from the Rincon area is relatively scarce, and at present consists exclusively of ground-dwelling sciurid types. This rodent group, however, is represented by a number of species, perhaps five in all, and compares very favorably in diversity with present-day sciurid faunas from local areas. Two of the types are giants in their respective genera, and a third type is represented by unusually complete material. The remaining two are not given specific assignments, for it is hoped that additional collecting will serve to determine their relationships more clearly than can be done at present.

The photographs, with the exception of those in plate 1, have been retouched by Mr. David P. Willoughby, scientific illustrator of the Division of the Geological Sciences, California Institute of Technology. Plate 1 was made up a number of years ago by Mr. John L. Ridgway, onetime illustrator for the same institution. My thanks are due to Dr. Remington Kellogg, Curator of Mammals, U. S. National Museum, for the loan of Recent *Citellus* material from that institution. The present paper was prepared during the writer’s tenure as National Research Fellow in paleontology.
Marmota mexicana, n. sp.

(Type specimen. Mandible with P4-M3 of both sides; right P1-M2, left M2-M3; fragmentary superior incisors; and skeletal fragments; no. 3546, Calif. Inst. Tech. Vert. Pale. Coll.


Geologic age. Hemphillian.

Specific characters. Largest of known Nearctic Sciuridae. Incisors with grooved and rugose enamel. P4 fully molariform, larger than M1. Inferior cheek teeth relatively long. Talonid basins with accessory folds. Posterior cingula of superior cheek teeth relatively strong. M3 with metaloph of development similar to that in other cheek teeth, not directed posteriorly as in most species of Marmota. Mental foramen anterodorsal in position.

Description

The incisors are relatively compressed, and characterized by rugose enamel and anteroposterior furrows. A prominent groove is present on the lingual face of both upper and lower incisors.

In the superior dentition, the three molars increase in size progressively to the rear, although the measurements do not bring this out very clearly. P4 is approximately the size of M1. The posterior cingula are strong and distinct even after considerable wear. Small mesostyles are present. The third upper molar is distinctive in that the metaloph has an orientation similar to that in the anterior cheek teeth instead of showing the customary backward bend found in other species of Marmota. As a result of this feature, the posterior basin is relatively unreduced. The talon of M3 shows an accessory fold extending across the basin from metaloph to posterior cingulum.

The ramus is heavy, especially the forward part. Anteriorly, it rises sufficiently to bring the dorsal border immediately in back of the incisor to a point level with, or slightly higher than, the alveolar border of the cheek teeth. The masseteric fossa appears to terminate beneath the posterior margin of P4, but the actual border is indistinct. This characteristic is also shown by Marmota nevadensis of the Hemphillian Thousand Creek formation. The mental foramen is considerably more anterodorsal in position than in other species of Marmota.

The fourth lower premolar is fully molariform, and larger than M1. An anterior cingular ridge connects protoconid and metaconid. The trigonid is slightly wider than the talonid. An ectostylid appears to be present, as well as a mesostylid. A mesoconid is indicated on the ectolophid. The talonid basin is marked by strong accessory folds.

The size of the lower molars increases progressively from M1 to M3, with the latter tooth decidedly the largest cheek tooth. These teeth are relatively long anteroposteriorly, and hence lack the pronounced compression characteristic of living species of the genus. Mesostylids appear to be present, and M3 bears a mesoconid on the ectolophid. M1 and M2 have linear ectolophids, at least in their present stage of wear. As in the premolar, the basin floors are complicated by heavy corrugations.
Rodents of the Rincon Fauna, Western Chihuahua

Relationships

Although *Marmota mexicana* shows several presumably primitive features such as the rugose and furrowed incisors, relatively long lower cheek teeth, and more transverse metaloph on *M*³, there is no present reason for regarding the species as anything other than a primitive representative of the modern genus of marmot. Its extremely large size at once distinguishes it from all other sciurid species with the exception of the slightly smaller *Marmota nevadensis* (Kellogg, 1910, pp. 422-425, figs. 1, 2; Bryant, 1945, p. 363). It is truly a giant rodent. Among all the North American rodents with sciurid dentition, it is only exceeded in size by the type of *Manis*.

Comparison of *Marmota nevadensis* and *M. mexicana* reveals certain similarities which may indicate that the species are nearly related. These are: (1) extremely large size, (2) heavy ramus, (3) anterior circular ridge connecting protoconid and meta-conid of *P*⁴, ectostylid present, (4) indistinct anterior termination of masseteric fossa, (5) rugose talonid floors, (6) rugose and striated incisors, and (7) long lower molars.

The more outstanding differences between the two species are: (in *M. mexicana*) (1) *P*⁴ larger than *M*⁴ and (2) mental foramen more anterodorsal in position. Additional distinctions seem to be: (1) the somewhat larger size of *M. mexicana*, (2) heavier corrugations of talonid basins, and (3) slightly greater relative length of lower cheek teeth. In several features, particularly the relatively large *P*⁴, *M. mexicana* is advanced over *M. nevadensis*, but better material of both and particularly of *M. nevadensis* is necessary for any real judgment.*

**Measurements (in millimeters) of Marmota mexicana**

<table>
<thead>
<tr>
<th></th>
<th>C.I.T. no. 3546</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Left</td>
</tr>
<tr>
<td><strong>Upper dentition:</strong></td>
<td></td>
</tr>
<tr>
<td><em>P</em>⁴, anteroposterior diameter</td>
<td>7.8</td>
</tr>
<tr>
<td><em>P</em>⁴, transverse diameter</td>
<td>8.3</td>
</tr>
<tr>
<td><em>M</em>¹, anteroposterior diameter</td>
<td>7.3</td>
</tr>
<tr>
<td><em>M</em>¹, transverse diameter</td>
<td>8.6</td>
</tr>
<tr>
<td><em>M</em>², anteroposterior diameter</td>
<td>7.9</td>
</tr>
<tr>
<td><em>M</em>², transverse diameter</td>
<td>8.9</td>
</tr>
<tr>
<td><em>M</em>³, anteroposterior diameter</td>
<td>7.9</td>
</tr>
<tr>
<td><em>M</em>³, transverse diameter</td>
<td>8.4</td>
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<tr>
<td><strong>Lower dentition:</strong></td>
<td></td>
</tr>
<tr>
<td><em>I</em>, anteroposterior diameter</td>
<td>8.3</td>
</tr>
<tr>
<td><em>I</em>, transverse diameter</td>
<td>4.6</td>
</tr>
<tr>
<td><em>P</em>–<em>M</em>₂ alveolar length</td>
<td>34.1</td>
</tr>
<tr>
<td><em>P</em>₄, anteroposterior diameter</td>
<td>8.1</td>
</tr>
<tr>
<td><em>P</em>₄, transverse diameter</td>
<td>7.9</td>
</tr>
<tr>
<td><em>M</em>₁, anteroposterior diameter</td>
<td>6.9</td>
</tr>
<tr>
<td><em>M</em>₁, transverse diameter</td>
<td>7.7</td>
</tr>
<tr>
<td><em>M</em>₂, anteroposterior diameter</td>
<td>7.65</td>
</tr>
<tr>
<td><em>M</em>₂, transverse diameter</td>
<td>8.4</td>
</tr>
<tr>
<td><em>M</em>₃, anteroposterior diameter</td>
<td>9.2</td>
</tr>
<tr>
<td><em>M</em>₃, transverse diameter</td>
<td>8.7</td>
</tr>
<tr>
<td>Length of diastema between <em>I</em> and <em>P</em>₄</td>
<td>22.85</td>
</tr>
<tr>
<td>Depth of jaw beneath <em>M</em>₃</td>
<td>22.7</td>
</tr>
<tr>
<td>Thickness of jaw at anterior end of masseteric fossa</td>
<td>14.3</td>
</tr>
</tbody>
</table>

*After the description of *M. mexicana* was in press, Hibbard and Schultz described *Paenemarmota barbouri* (Bull. Univ. Nebraska State Mus., vol. 3, no. 3, Nov. 1948), which is of comparable size to it, and appears to be very closely related.


Geologic age. Hemphillian.

Specific characters. Similar in general to primitive species of Citellus except for its somewhat higher crowns, but distinguished from all known members of the genus by its greater size. Parastyle ridge of P₄ relatively well developed.

Description

The subquadrate cheek teeth increase in size gradually from P₄ to M₃. The lingual faces of the cheek teeth are moderately high and decidedly convex. Small mesostyles are present. All lophs converge moderately toward the protocones. The metalophs have relatively distinct metaconules except in M₂, and a sulcus separates these lophs from the protocones. This sulcus is deep in P₄, but in M₂-M₃ additional wear would unite metalop and protocone. The metaconules show some tendency toward fusion into the lophs. The anterolophs lie only moderately below the level of the protocones. The parastyle of P₄ is little expanded. An outstanding feature is the development of a distinct metalop in M₂. Citellus pattersoni is larger than any other known American form referable to the genus.

Relationships

In size this species resembles the marmots, but it does not have any other features which are diagnostic of Marmota. Characters opposing an assignment of Citellus pattersoni to Marmota are: (1) P₄ smaller than M₂, (2) teeth subquadrate in outline, (3) anterlophs moderately high, (4) parastyle of P₄ small, and (5) metalop of M₂ not directed posteriorly. From the extinct marmot Arctomyoides (Bryant, 1945, p. 361), the Mexican species differs in: (1) smaller parastyle of P₄, (2) larger P₄, (3) less well developed mesostyles, (4) protocones of P₄ and M₂ more extended anteroposteriorly, and these teeth subquadrate rather than triangular in outline, and (5) protolophs not constricted near union with protocones. The marmot-like Palaeartomyx also appears to be distinct genetically from C. pattersoni, if reliance can be placed on the figures of Douglass' genus (1903, pp. 182-183, figs. 23-25). Palaeartomyx is apparently characterized by: (1) triangular P₄, (2) metalophs united with protocones, (3) anterlophs very weak, and (4) no metalop on M₂. Some but not all of the distinguishing features of Palaeartomyx and Arctomyoides are simply primitive characters. The presence elsewhere of Marmota species in beds comparable in age to those at Matachic, however, makes it unlikely that C. pattersoni represents a stage intermediate between the older marmot-like forms and Marmota.

It seems necessary to refer the new species to the genus Citellus. Within this genus are now recognized various subgenera representing several stages of evolutionary development. Citellus pattersoni is comparable in stage of dental development to the more primitive existing representatives (e.g., Protospermophilus). From these it seems to differ principally in the somewhat higher crowns. It is distinguished from all known North American species by its larger size. It also differs from most in the presence of a metalop on M₂.

Named in honor of Dr. J. Wilfred Patterson, who supervised most of the excavations at Rincon and Matachic.
RODENTS OF THE RINCON FAUNA, WESTERN CHIHUAHUA

Measurements (in millimeters) of Citellus pattersoni, C.I.T. no. 3547

<table>
<thead>
<tr>
<th>Tooth</th>
<th>Anteroposterior Length</th>
<th>Transverse Diameter</th>
</tr>
</thead>
<tbody>
<tr>
<td>P4-M1</td>
<td>17.6</td>
<td>5.4</td>
</tr>
<tr>
<td>P4</td>
<td>4.15</td>
<td></td>
</tr>
<tr>
<td>M1</td>
<td>4.3</td>
<td>4.5</td>
</tr>
<tr>
<td>M2</td>
<td>6.1</td>
<td>6.3</td>
</tr>
<tr>
<td>M3</td>
<td>5.15</td>
<td>5.8</td>
</tr>
</tbody>
</table>

Citellus matachicensis, n. sp.

(Plate 2, figures 1a–3a)


Geologic age. Hemphillian.

Specific characters. Rostrum short, very gradually tapering. Tooth row long relatively to greatest length of skull. Zygomatic breadth relatively great. Lateral pterygoid plates greatly developed. Superior incisors little curved. Small mesostyles present. Slight cingular ridge from protoconid of P4. Alveolar length of P4–M3, 10.65 mm. Metaconules of P4–M3 slightly less conical, less clearly separated from metacones, metaconule of M3 less prominent and less centrally located than in Citellus bensoi. Ectolophid indentations more U-shaped, cheek teeth perhaps slightly larger than in C. argonautus.

Description

Citellus matachicensis is of medium size in comparison with living species of the genus (cf. C. r. richardsonii). The brain case is somewhat globular and flattened transversely. It is less expanded dorsally than in living species. Parietal crests are weak but quite distinct, are relatively close together, and do not meet posteriorly in the type specimen. Prominent lambdoidal crests are present, although slight crushing of the skull is partly responsible for their distinctness. The foramen magnum appears to be relatively wide, and smoothly elliptical on its dorsal margin, much as in Protospermophilus malheurensis (Gazin, 1932, pp. 56–59; Bryant, 1945, pp. 347–349). The zygomatic arches are relatively strong and moderately convergent anteriorly. The fossae on the arches for attachment of the masseter lateralis are weak but end anteriorly in small processes. Posteriorly the arches are wide as compared with the length of the skull. It appears that the temporal muscles may have been somewhat more powerfully developed than in many living forms. The basioccipital processes abutting against the tympanic bullae are well developed, and have free, tuberculate ends. The pterygoid fossae are wide, and the lateral pterygoid plates are unusually well developed, being larger than in any Recent specimen examined. In no. 3551, the palatine foramina lie in the sutural boundary between palatines and maxillaries, and exactly oppose the most anterior extent of the palatal part of the palatines. This position agrees most nearly with that in Citellus; in Otospermophilus and Callospermophilus the foramina tend to lie posterior to the more medial part of the suture. The rostrum is moderately short and robust. It is nearly parallel-sided, a feature sug-
gested in some species of the subgenus Otospermophilus, but more nearly comparable to this structure in representatives of the subgenus Citellus. Premaxillary fossae for attachment of cheek-pouch musculature are strongly developed. The masseteric tubercles are fairly prominent and somewhat lateral to the elongate-oval infraorbital foramina. The postorbital processes are long, slender, and bent down and slightly backward. Supraorbital notches rather than foramina are present. The interorbital breadth is relatively great. Except for greater breadth of the interorbital and postorbital regions, no. 3551 seems very similar to Citellus r. richardsonii in size and general skull proportions. The coronoid processes of the mandible are well developed, falcate, and blunt-tipped. The superior border of the ramus at the diastema slopes gradually downward from P₄ as in Otospermophilus instead of bending sharply downward as in Citellus.

The superior incisors are little curved, and nearly perpendicular to the basicranial axis. In relation to the greatest length of the skull, the maxillary tooth row is long. Various factors account for this proportion, but in part at least, the feature results from a somewhat heavier dentition than in many species of Citellus. In general, the cheek teeth are Otospermophilus-like, but perhaps are somewhat more advanced in the direction of Lictidomys and Citellus than is usual for that subgenus. The cheek teeth appear to have somewhat higher crowns than in Otospermophilus, particularly in respect to the lingual faces of the upper teeth. P₃ is relatively small, about one-quarter the size of P₁. Mesostyles, though small, are present on the molariform teeth. P₄-M₃ are subquadrate with broadly V-shaped trigons. In these teeth, the metalophs are distinctly interrupted, and the metaconules clearly indicated and somewhat conical. On the whole, the structure of the metalophs is reminiscent of that in Lictidomys. What appears to be a small but nearly obliterated metaconule is present in M₃. The posterior cingulum of this tooth curves posterolaterally without abrupt change in direction, a condition found in most species of the genus except those assigned to Citellus and most specimens of Lictidomys.

The inferior molar teeth are little compressed anteroposteriorly. Ectolophids are only moderately internal in position, and the resulting embayments are U-shaped. The trigonids are relatively broad and little elevated. The posterior cingulum of this tooth curves posterolaterally without abrupt change in direction, a condition found in most species of the genus except those assigned to Citellus and most specimens of Lictidomys.

The elements of the skeleton preserved seem, in general, to be similar to those of a specimen of Otospermophilus beecheyi douglassi available for comparison, except in the distinctly smaller proportions throughout. Differences are to be observed, but it is difficult to assess the value or significance of these with the material at hand. The sacrum consists of four vertebrae. Recent species of Citellus apparently have a variable number. According to Bryant (1945, p. 291), "Sacrum composed of three vertebrae in Tamius, Sciurus, Tamiasciurus, and Glaucomys; in Marmota and Cynomys four vertebrae present. The following percentages of ground squirrels examined have four sacrals: 55% in subgenus Citellus, 100% in Lictidomys, 71% in Otospermophilus, 75% in Ammospermophilus, 60% in Xerospermophilus, and 60% in Callospermophilus." Bryant points out that the higher number is to be correlated with fossorial habits, but is not yet stabilized in the ground squirrels. It is interesting to note the occurrence of four sacral vertebrae in a specimen as old as late Hemphillian.

Of the described Pliocene species of the Arizona fauna are sufficient to show small mesostyles lacking, so conical and are less clearly so. The Mexican species is apparent, and the genus is less prominent and argonautus is very fragmentary. It is difficult to assess the value of these with the material at hand.

Other Pliocene species of the genus Citellus, 1922, pp. 122, pl. 3. Arizona fauna are sufficiently described. The skull of Citellus r. richardsonii is very fragmentary, and the genus is less prominent and argonautus is very fragmentary. It is difficult to assess the value of these with the material at hand.
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Xerospermophilus, and 60%
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Comparisons

Of the described Pliocene species, only Citellus argonautus (Stirton and Goeriz, 1942, pp. 462-465, fig. 76) of the Oakdale, California fauna and Citellus bensoni (Gidley, 1922, p. 112, pl. 34, figs. 3, 4; Gidley, 1942, pp. 485-486) of the Benson, Arizona fauna are sufficiently close to C. matachicensis to warrant comparison. The Mexican species is apparently quite close to C. bensoni, but the superior dentition shows small mesostyles lacking in the Benson form; the metaconules are not quite so conical and are less clearly separated from the metacones; and the metaconule of M^3 is less prominent and more lingual in position. The known material of C. argonautus is very fragmentary, consisting of part of a ramus with P_4 and incomplete M_4, and a second but toothless lower jaw. The new species, however, seems to differ in having more U-shaped ectolophid indentations, and a slight spur running anterolinguad from the protoconid. The measurements given by Stirton and Goeriz in their description of C. argonautus suggest that C. matachicensis is comparable in size of cheek teeth or slightly smaller. The figures and the description, however, suggest that the Mexican species is slightly larger.

Other Pliocene species of Citellus seem obviously distinct. Citellus howelli (Hibbard, 1941, pp. 347-348, fig. 6) and C. gilkeyi (Merriam, Stock, and Moody, 1925, pp. 68-69, fig. 23) are smaller; C. rexaevodensis (Hibbard, 1941, pp. 348-349, fig. 7) has more widely separated trigonid cusps on P_4; and C. (Pliocitellus) fricki (Hibbard, 1942, pp. 253-257, 2 pls.) has a longer rostrum, smaller P_4, triangular M_2, and more primitive construction of the zygomatic plate. The Mexican species shares some characters with Pliocitellus, but these seem for the most part to be simply primitive ones inherited from a remote common ancestor. Differences in the zygomatic plate suggest that the former species is more advanced.

Citellus matachicensis is closest in stage of dental evolution to members of the subgenus Otospermophilus. Characters of the dentition which would serve to distinguish Otospermophilus from C. matachicensis are not very obvious, but the Mexican species seems to differ in: (1) higher-crowned teeth; (2) metalophs shorter or with less distinct metaconules, or both; (3) metalophulid II united weakly with metaconid to form slight pits in P_4 and M_4; although these pits may be present in Otospermophilus, they appear to be stronger in C. matachicensis; and (4) upper incisors not so curved. In the skull also, similarity to that of Otospermophilus is seen, but in C. matachicensis (1) the parietal ridges do not unite to form a sagittal crest; this feature varies with age in Otospermophilus, but may nevertheless have taxonomic significance in the new species; (2) the tubercles for attachment of the masseter lateralis superficialis seem to be slightly more prominent and more lateral in position than in most, but not all, members of Otospermophilus; (3) the rostrum is somewhat more contracted at its base; (4) the posterior zygomatic width is relatively greater; (5) the brain case is flattened dorsally and is slightly shorter; (6) the lateral pterygoid plates are more developed; and (7) the relation of the palatine foramina to the palate-maxillary sutures is somewhat different, as has been indicated before.

Other existing subgenera of Citellus are: Callospermophilus, Xerospermophilus, Polioctellus, Ictidomys, and Citellus. The dentition of C. matachicensis is clearly not that of the advanced subgenus Citellus. From all Recent species of Callospermophilus except C. saturatus, C. matachicensis differs in greater size. The metalophs in P^4-M^3 are united with the protocones in Callospermophilus, a more important distinction. The skull of Callospermophilus is relatively close to that of Otosper-
and distributional grounds. In any case, its dental development is distinctly at a lower level. The upper molars of Otospermophilus were so close to a common ancestor as to make it doubtful whether subgenera could be safely distinguished even if complete material were available, which is not the case. The present Mexican species is a case in point. It is more complete than any other known Pliocene form. Only Pliocitellus fricki is at all comparable, and the others are represented by scraps. Notwithstanding its relative completeness, however, the type of C. matachicensis cannot be referred definitely to any living subgenus. The new species is closest to representatives of Otospermophilus, but characteristics of several other subgenera are also exhibited, and it cannot be shown that these latter features are all primitive ones retained by them. Indeed, C. matachicensis shows some apparent trends toward species of the subgenus Citellus, as in the shape of the rostrum, relatively great width of the zygomatic arches, shape of the brain case, and relation of the palatine foramina to the palatal bones. That the Mexican species is actually in any direct sense ancestral to species of this subgenus is perhaps doubtful on geographic and distributional grounds. In any case, its dental development is distinctly at a lower level. The upper molars of C. matachicensis also show characters which suggest a somewhat more primitive stage in the development of an Ictidomys-like dentition.

If neither Citellus (Pliocitellus) fricki (Hemphillian of Kansas) nor C. matachicensis can be referred to a living subgenus, it seems like taxonomically hazardous procedure to assume that fragmentary material of comparable age really represents Otospermophilus. Especially is this true if differentiation of the modern subgenera of Citellus was just beginning, as is strongly suggested by the available evidence. Only
this much can be positively affirmed, that undoubted representatives of the genus *Citellus* are known as far back in time as Hemphillian, and that no representatives of the subgenus *Citellus* are now known from strata this old. *Citellus matachicensis* may possibly be close to the common ancestor of *Citellus* and *Ictidomys*, without, however, necessarily being the actual ancestor of the living descendants of either.

**Measurements*** (in millimeters) of *Citellus matachicensis*, C.I.T. no. 3551

<table>
<thead>
<tr>
<th>Character</th>
<th>Measurement</th>
</tr>
</thead>
<tbody>
<tr>
<td>Greatest length of skull</td>
<td>47.6</td>
</tr>
<tr>
<td>Palatilar length</td>
<td>23.4</td>
</tr>
<tr>
<td>Zygomatic breadth</td>
<td>32.0</td>
</tr>
<tr>
<td>Cranial breadth</td>
<td>20.9</td>
</tr>
<tr>
<td>Interorbital breadth</td>
<td>11.3</td>
</tr>
<tr>
<td>Postorbital constriction</td>
<td>13.5</td>
</tr>
<tr>
<td>Length of nasals</td>
<td>16.1</td>
</tr>
<tr>
<td>I-P3, length of diastema</td>
<td>10.5</td>
</tr>
<tr>
<td>P3-M3, anteroposterior length</td>
<td>10.85</td>
</tr>
<tr>
<td>P3-M3, alveolar length</td>
<td>10.65</td>
</tr>
</tbody>
</table>

*Measurements made according to system of Howell, 1938, p. 59.

**Citellus spp.**

Specimen no. 3552, an incomplete mandible with P4–M3 of both sides from Calif. Inst. Tech. Vert. Pale. Loc. 276 (Arroyo de los Burros, Rincon), also represents a species of *Citellus*. This specimen is similar in dental character to *C. matachicensis*, but is to be distinguished from the type of the latter by its lighter rami, relatively heavier and actually larger dentition, and relatively narrower P4. Metastylids are present on the cheek teeth. These last structures may be and probably are also present in *C. matachicensis*, but the greater degree of wear in the type of the latter makes their existence somewhat uncertain. The anteroposterior length of P4–M3 is 8.5 mm.

A second specimen, no. 3553, consisting of a cheek-tooth series, left P4–M3, is from Calif. Inst. Tech. Vert. Pale. Loc. 286 (Arroyo de las Barrancas Blancas, ¼ mile east of Yepomera). This specimen also appears to be distinct from the type of *C. matachicensis*. It is probably slightly shorter-crowned, the cheek teeth are relatively narrower with smaller hypoconids, metastylids are present, and in P4 the trigonid cusps are apparently farther apart. The anteroposterior length of P4–M3 is 10.4 mm.

These two specimens appear to be specifically distinct from each other, and from *Citellus matachicensis*. It is not impossible, however, that they represent individual variants of *C. matachicensis*. Further collecting may furnish additional specimens which will settle this point. In the meantime it is perhaps advisable merely to mention their presence in the fauna.

**LITERATURE CITED**

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narks on some known antilo-
85-33, 2 pls., 1 fig.
22 figs.
San Pedro Valley, Arizona, with

Pliocene of Kansas. Amer.
22 figs.
(a) fricki from the Pliocene of
., vol. 45, no. 27, pp. 253-257,

els, with a classification of the
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an Valley and Thousand Creek,
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of eastern Oregon, with notes

near Knights Ferry, California.
5, no. 5, pp. 447-472, 8 figs.


Marmota mexicana, n. sp. Type specimen, no. 3546

Fig. 1. Mandible, occlusal view. x 1.0.

Fig. 2. Right maxillary with P4-M3, occlusal view. x 1.1.

Fig. 3. Left ramus, lateral view (external). x 1.0.

Fig. 4. Right ramus, lateral view (internal). x 1.0.

Sizes of all figures approximate
Pliocene, Yepomera, Chihuahua, Mexico
Citellus matachicensis, n. sp. Type specimen, no. 3551
Figs. 1a, 1b, 1c. Skull. X 1½. Fig. 1a, dorsal view; fig. 1b, lateral view; fig. 1c, ventral view.
Figs. 2, 3, 3a. Dentition. Fig. 2, right P³-M³, occlusal view, X 4; fig. 3, right ramus, lateral view, X 2; fig. 3a, right P⁴-M⁴, occlusal view, X 4.

Citellus pattersoni, n. sp. Type specimen, no. 3547
Fig. 4. Right P⁴-M⁴, occlusal view. X 4.

Sizes of all figures approximate
Pliocene, Matachic, Chihuahua, Mexico