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**Pleistocene Pocket Gophers  
From San Josecito Cave,  
Nuevo León, México**

BY  
ROBERT J. RUSSELL

UNIVERSITY OF KANSAS  
LAWRENCE  
1960

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# From San Josecito Cave, Nuevo León, México

BY  
ROBERT J. RUSSELL

Cueva de San Josecito in the province of Aramberri, near the town on Aramberri, Nuevo León, México, is at an elevation of approximately 7400 feet above sea level on the east-facing slope of the Sierra Madre Occidental in a limestone scarp. The dominant vegetation about the cave is the decidedly boreal forest association of pine and live oak. Additional information concerning the cave is provided by Miller (1943:143-144).

Animal remains recovered from San Josecito Cave are among the most important Pleistocene finds in México, and include the most extensive collection of Pleistocene geomyids. The vertebrate remains are probably late Pleistocene in age; certainly they are post-Blancan, since the genera *Equus*, *Preptoceras*, *Smilodon*, and *Aenocyon* (all Pleistocene genera) are present. According to Miller's (*loc. cit.*:145) extensive report on the avifauna, the bird remains from the cave are a remarkable assemblage and beautifully preserved. Most of the mammalian remains have been studied in detail, and the results of these studies have been published in a number of papers each treating specific groups. These reports provide valuable information concerning the distribution of mammals in northeastern México in the late Pleistocene, a knowledge of which is most important to an understanding of present patterns of distribution and evolution of Mexican mammals.

Cushing's (1945:182-185) report on his study of the rodents and lagomorphs includes a description of an extinct pygmy species of rabbit, *Sylvilagus leonensis*. He records three kinds of pocket gophers from San Josecito; Cushing was able to separate the genus *Thomomys* from two unidentified geomyids (*loc. cit.*:185). These prove to belong to the genera *Cratogeomys* and *Heterogeomys*; the materials are described below. Cushing records also larger mammals, including the antilocaprid (*Stockoceros conklingi*), saber-toothed cat (*Smilodon*), dire wolf (*Aenocyon*), a large oviboid (*Preptoceras*), and deer (*loc. cit.*:182).

More recently Findley (1953:633-639) has written on the remains of the family Soricidae taken from the cave, and Hooper (1952:59) has studied the bones of the genus *Reithrodontomys* and found them not different from those of *R. megalotis* that inhabits the region of the cave today. Handley (1955:48) has described a new species of plecotine bat, *Corynorhinus tetralophodon*, from the collection. Jones (1958:389-396) published an account of the bats of San Josecito, and described a new vampire bat, *Desmodus stocki*, from the cave. Jakway (1958:313-327) has reported on the lagomorphs and rodents in detail, and compared this part of the cave fauna with that of Rancho La Brea and Papago Spring Cave, Arizona. Jakway (*lit. cit.*:323-324) suggests that the fauna from San Josecito is late Pleistocene, probably contemporaneous with the remains from Papago Spring Cave and pre-Rancholabrean.

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I thank Professor E. Raymond Hall and Dr. Robert W. Wilson for their permission to examine this material and for critical comments and advice on the manuscript. The drawings were made by Miss Lucy Remple. The specimens are a part of the collection of fossil vertebrates formerly belonging to the California Institute of Technology, but now the property of the Los Angeles County Museum. The specimens had been lent by the late Professor Chester Stock to Professor Hall and Dr. Wilson for study and report. All measurements herein are in millimeters.

## **Thomomys umbrinus** (Richardson)

Material referable to *Thomomys* consists of a nearly complete cranium, L.A.C.M. (C.I.T.) No. 3952, with nasals, maxillary teeth, and lower parts of braincase missing and zygomata broken; four rami (unnumbered), one of which is badly broken; and two isolated molariform teeth. The skull has a sphenoidal fissure, a feature typical of the *umbrinus* group of *Thomomys*. The fossil specimens closely approximate in size the living subspecies *Thomomys umbrinus analogus* Goldman. *Thomomys* is not known from the vicinity of the cave at the present time and has not been reported from southwestern Nuevo León, even though there has been extensive collecting for pocket gophers there in recent years. To my knowledge the nearest record of occurrence of modern *Thomomys* is a series of *Thomomys umbrinus analogus* from 12 miles east of San Antonio de las Alazanas at an elevation of 9000 feet in the state of Coahuila (Baker, 1953:511), approximately 85 miles to the northwest. The fossil gophers are not from the talus of the cave floor, which is evidently of subrecent origin, but from the Pleistocene deposits below. Close resemblance to the living subspecies *T. u. analogus*, however, indicates that these remains are not so old as some of the other geomyid fossils from the cave.

## **Cratogeomys castanops** (Baird)

Seven rami pertain to the genus *Cratogeomys*. All except three, L.A.C.M. (C.I.T.) Nos. 2974, 2978, and 3954, lack cheek teeth and the posterior processes are missing on most of the mandibles. No. 2974 is smaller than the other specimens, and probably is from a young individual. No. 3954 may have been fossilized at an earlier date than the other six jaws; however, it is comparable to them in size and morphology. Also present in the deposits are three limb bones of *Cratogeomys castanops*. One, a right humerus bearing L.A.C.M. (C.I.T.) No. 2982, is

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slightly larger than that of the pocket gophers living in the area now. Two tibias, L.A.C.M. (C.I.T.) Nos. 2983 and 2984, complete the material referable to this species.

*Cratogeomys castanops planifrons* (see Russell and Baker, 1955:607) occurs in the immediate vicinity of San Josecito today. None of the rami from the cave differs appreciably from those of the *subnubilus* group of *Cratogeomys castanops*, a group of small subspecies including *planifrons*, *subnubilus*, *rubellus* and *peridoneus*. All are small in external measurements and skull and differ markedly in this respect from the group of large subspecies (the *subsimus* group) that occurs farther northward in Coahuila and Nuevo León.

### Cratogeomys sp.

A rostral part of a skull, L.A.C.M. (C.I.T.) No. 2927, is referable to the genus *Cratogeomys*. This fragment consists of the anterior part of the skull, including a portion of the frontals, the premaxillae, a small part of the left maxilla, and the anterior parts of the palatines. The nasals are missing, but both incisors are in place including most of the roots. The single median sulcus on the anterior face of each incisor is typical of the genus *Cratogeomys*. The rostrum is long (25.8), as great in length as in the largest subspecies of the *subsimus* group of *Cratogeomys castanops* (see previous account for explanation) and as long as the rostrum of *Cratogeomys perotensis* which is now known only from Veracruz, México. The length of the rostrum was measured from the most anterior median projection of the premaxillary to the most posterior dorsal projection of the same bone. Actually, and especially in relation to its length, the rostrum of the fossil is remarkably narrow. The breadth of the rostrum measures 10.4, which is comparable to that in the *subnubilus* group of small subspecies, and less than that (11.4 in the smaller adult females to 13.7 in the larger adult males) in the *subsimus* group of large subspecies. The breadth of rostrum in the fossil is 40.3 per cent of the length of the rostrum. In living *Cratogeomys castanops* (both the large and small subspecies groups, and including both females and males) the breadth of rostrum amounts to between 44.0 and 51.4 per cent of its length. The rostrum in *Cratogeomys perotensis* (and in other species of the *merriami* group) is relatively much broader than in *Cratogeomys castanops*. Even though the rostrum of the fossil is narrower than in Recent species of *Cratogeomys*, the ventral border in the area of the palatine slits is more heavily constructed than in any of the living species, and it is nearly parallel-sided rather than tapered toward the midline anteriorly. At the lateral edge of the enamel plate of the incisors there is a distinct shelf, a characteristic of the *merriami* group of species and a feature not well developed in *Cratogeomys castanops*.

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I hesitate to refer this fragment to any of the living species, although I would judge it to represent a form closer to the species *castanops* than to the *merriami* group (*C. perotensis*). The rostrum may represent, and probably does, an undescribed and extinct species of *Cratogeomys*, but in my opinion it should not be given formal taxonomic status until more adequate material is available.

If the fossil is actually *Cratogeomys castanops*, and if the fragment is from an earlier deposit in the cave than is the material here assigned to *Cratogeomys castanops*, the fossil stock could be ancestral to the group of small subspecies provided there had been a trend in evolution toward smaller size. Another possibility is that a shift in geographic range of the kinds of *Cratogeomys* that lived in the vicinity of the cave has occurred, and that the fossil represents an evolutionary line with no close relationship to Recent species and now is extinct. Additional material is needed before the history of these species can be reconstructed with validity.

### Heterogeomys onerosus new species

*Holotype*.—Los Angeles County Museum (C.I.T.) No. 2384, an incomplete left ramus, bearing incisor and p4; the alveolus of m1-m3 is present (Fig. 1a). Paratypes: Two isolated and unnumbered right upper incisors, one isolated premolar, and five additional rami, Nos. 2385, 2386, 2388, and two with no number.

*Horizon and type locality*.—Upper Pleistocene, Cueva de San Josecito, province of Aramberri, near the town of Aramberri, Nuevo León, México; California Institute of Technology, Vertebrate Paleontology Locality 192.

*Description of Holotype*.—Differs from any known living species of *Heterogeomys*, by the significantly heavier and deeper ramus (see Table 1 and Fig. 1). The holotype is compared with the largest adult male of *Heterogeomys hispidus* (*H. torridus* is smaller than *hispidus*) available to me in Table 1. Relative to the length of the ramus (measured from the anterior mental foramen to the posterior margin of the capsule that surrounds the root of the lower incisor), the depth of the ramus anterior to the molariform tooth-row is 33.0 per cent in *H. onerosus* compared with 27.3 per cent in *H. hispidus*. If the fossil ramus is that of a female (females are significantly smaller than males in *Heterogeomys*) then the differences would be greater than recorded.

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TABLE 1. DEPTH OF MANDIBULAR RAMUS

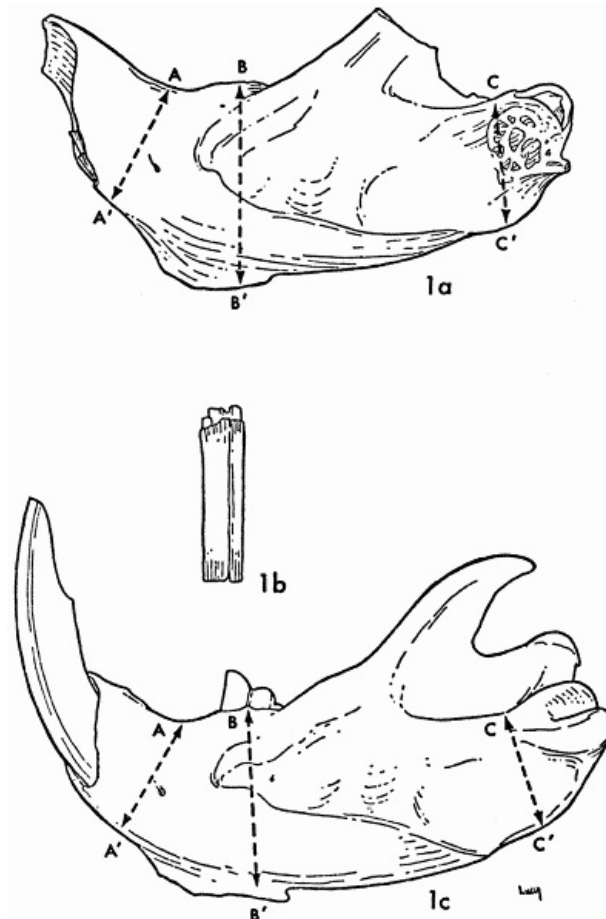
Least depth in front of premolar (See A to A' on Fig. 1c)	Depth of ramus opposite re-entrant angle of p4 (B to B' on Fig. 1c)	Depth from a point in front of capsule for incisor (See C to C' on Fig. 1c)
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<i>H. onerosus</i> holotype	11.0	17.4	11.7
<i>H. h. hispidus</i> ♂ ad., 23979 KU	9.1	15.2	10.5

The angle between the anterior border of the coronoid process and the dorsal border of the ramus of the mandible is more acute, and the posteroventral margin of the ramus is more nearly straight, in *onerosus* than in *hispidus*. The molariform tooth-row in *onerosus* is only slightly longer (13.9 in contrast to 13.5) than in *hispidus* and *torridus*. The ventral border of the masseteric ridge is weakly developed in *onerosus* and hardly discernable whereas in the living species of *Heterogeomys* the masseteric ridge is strongly developed posteriorly forming a noticeable prominence.

*Description of Paratypes.*—The fossils are referable to the genus *Heterogeomys* on the basis of the short lateral angular processes of the lower jaw and on the basis of the associated upper incisors, which have a single distinct sulcus that lies toward the inner margin of each tooth. The isolated lower premolar that is referred to the new species is as large as that of the holotype and has the enamel pattern of *Heterogeomys*.

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**Figs. 1a-1c. × 1½**

**FIG. 1a. *Heterogeomys onerosus*, lateral view of left lower jaw of holotype.**

**FIG. 1b. *Heterogeomys onerosus*, front view of right, upper incisor.**

**FIG. 1c. *Heterogeomys hispidus*, lateral view of left lower jaw, No. 23979, ♂ adult, from 3 km. E San Andrés Tuxtla, Veracruz.**

One jaw fragment, L.A.C.M. (C.I.T.) No. 2368, is smaller than the others and probably is from a young individual. Two others L.A.C.M. (C.I.T.) No. 2384 and one unnumbered, are smaller than the holotype, and possibly are the remains of females; however, they have the same characteristic shape as the holotype. Nevertheless, the two rami mentioned above are significantly larger than in adult males of modern *Heterogeomys* and are especially larger than in females. Another jaw fragment, L.A.C.M. (C.I.T.) No. 2385, is seemingly as large as, or perhaps larger than, the holotype, although the posterior part of the ramus behind the alveolus of m2 is missing. An additional unnumbered ramus is of somewhat lighter construction than the holotype, but is important since it bears not only the incisor and p4 but also the first two lower molars. The only other material referable to *Heterogeomys onerosus* is a fragmentary and isolated lower molar tooth that has a single posterior enamel blade, a feature characteristic of a number of Recent genera of pocket gophers, and some limb bones which are slightly larger than corresponding elements in Recent species of *Heterogeomys*.

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*Remarks.*—Pocket gophers do not inhabit caves; therefore gophers were brought into the cavern probably by birds of prey, the remains of which were common in the deposits (Miller, 1943:152-156), or conceivably by carnivorous mammals. Since most of the raptorial predators that would

prey on pocket gophers do not have a wide hunting territory, it is likely that the gophers were taken within a short distance of the cave. The presence of the genus *Heterogeomys* in the deposits strongly suggests a tropical situation in the vicinity of the cave when these gophers were taken, because the distribution of this genus today is entirely within the Tropical Life-zone.

Since the presumably early time when tropical conditions, or more nearly tropical conditions, prevailed at San Josecito Cave, climatic shifts account for a humid boreal environment there and its associated fauna. Findley (*lit. cit.*:635-636) reports from San Josecito the remains of the boreal shrew *Sorex cinereus* that today occurs no nearer than 800 miles to the northward in the mountains of north-central New Mexico. As he points out, that species requires hydric communities of cool climates, and in the Wisconsin Glacial age such climates probably prevailed in the high mountainous region where San Josecito is located. Since the time when a more mesic boreal environment occurred at San Josecito, climatic shifts have favored more xeric conditions as are found in the vicinity of the cave today. The more arid environments would support the occurrence of *Cratogeomys* and *Thomomys*; however the ecological affinities of the fragment here referred to *Cratogeomys* sp. are unknown.

The more nearly tropical environment there could have occurred either during a Wisconsin interglacial period or during the Sangamon Interglacial age. *Heterogeomys onerosus* perhaps lived near the cave during an interglacial period; since then it became extinct or evolved into the Recent species *Heterogeomys hispidus*. *Heterogeomys* has not previously been recorded from Pleistocene or earlier deposits.

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*Transmitted October 28, 1959.*

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#### Transcriber's Note

The proportion ( × 1½) in the figure caption is taken from the original text;

actual size may be larger or smaller, depending on your monitor.

The following errors are noted, but left as printed:

Page 541, "the town on Aramberri" should be "the town of Aramberri"  
Page 544, "I hesitate to refer" should be "I hesitate to refer"

\*\*\* END OF THE PROJECT GUTENBERG EBOOK PLEISTOCENE POCKET GOPHERS FROM SAN JOSECITO CAVE, NUEVO LEON, MEXICO \*\*\*

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