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Author(s): Robert W. Wilson

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A NEW PLEISTOCENE DEER-MOUSE FROM SANTA ROSA ISLAND, CALIFORNIA

BY ROBERT W. WILSON

Subsequent to 1928, collections of fossil vertebrate remains from Santa Rosa Island, California, have been made by the California Institute of Technology. These have included a considerable number of fragmentary remains of elephants (Stock, C., and E. L. Furlong, *Science*, vol. 68, pp. 140-141, 1928; Stock, C., *Sci. Monthly*, vol. 41, pp. 205-214, 1935). Material representing this mammal has been known from the island for more than 60 years, but, curiously, no other sort of fossil mammal was discovered in this locality until the fall of 1934, when there was collected in Pleistocene deposits a rodent specimen of the genus *Peromyscus*, quite distinct from the species inhabiting the area at the present time.

Peromyscus nesodytes, new species

Locality and Geological Horizon—Locality 106, Calif. Inst. Tech., Coll. Vert. Pal., Santa Rosa Island, Santa Barbara County, California; Pleistocene.

Type Specimen—A right ramus with M_1-M_3 , no. 1780, Calif. Inst. Tech. Coll. Vert. Pal.

Specific Characters—Partially bipartite antero-median cusp in M_1 . Antero-internal valley in M_1 V-shaped. No accessory tubercles on cheek-teeth. Size very large, slightly larger than *Peromyscus antiquus*. Length of tooth-row, M_1-M_3 , 5.9 mm.

Remarks.—The outstanding character of *P. nesodytes* is its large size, which is greater than any living species of *Peromyscus* native to the United States; it appears to be exceeded in size only by members of the subgenus *Megadontomys* of southern Mexico and Central America.

There exists in the cheek-teeth of *Peromyscus* a relatively large amount of individual variation. Hence, the following discussion is subject to some uncertainty, inasmuch as *P. nesodytes* is known only from a single specimen.

The cheek-teeth of *P. nesodytes* are comparable in size—relative to each other—and in shape to those of living members of the genus. Absence of supplementary tubercles in the cheek-teeth and the large size of *P. nesodytes* suggest relationship with the subgenus *Haplomydomys*, and especially with *P. californicus*. The fossil species not only exceeds the latter in size, however, but the antero-median cusp of M_1 is separated from the antero-internal cusp by a pronounced V-shaped valley. In *P. californicus* the valley is extremely compressed and parallel-sided, and the anterior and posterior enamel borders with wear show a tendency to become united at the inner margin of the tooth. When the latter condition exists, the outer tip of the valley commonly assumes a lake-like appearance.

A number of specimens of *P. californicus* were studied and the last-mentioned character apparently is significant for both *P. c. californicus* and *P. c. insignis*. In a recent paper by Grinnell and Orr (*Jour. Mamm.*, vol. 15, pp. 210-220, 1934), *P. californicus* is differentiated into 5 races instead of the 2 heretofore recognized. The specimens studied in the present connection apparently do not represent all 5 of these races but are from sufficiently varied localities to indicate that the character under discussion is not one of merely subspecific value. Reference to *P. c. californicus* in this paper is not to the race as restricted by Grinnell and Orr, but to the subspecies recognized by earlier authors.

An additional character which may help to distinguish the fossil species from at least some races of *P. californicus* is the partially divided antero-median cusp in M_1 . In *P. nesodytes* the division is quite clearly marked and is distinct enough to give some indication of its presence even in worn teeth. In *P. c. californicus*, as represented by the series of specimens of this subspecies examined during the course of the present study, it is generally but not invariably absent. In *P. c. insignis* the divided antero-median cusp sometimes is present.

Peromyscus eremicus is another member of the subgenus *Haplomyomys* with which comparison might be made. In several of its characters it resembles the fossil species. The inner borders of the antero-internal valley are usually separate as in the Pleistocene type, although the re-entrant V is commonly narrower and more parallel-sided. *P. e. eremicus* has a bicusate antero-median cusp in M_1 as in *P. nesodytes*. The species is much smaller than the new type, however. On the other hand, there are cases of insular rodents that are larger than related mainland forms, and it is not outside the bounds of possibility that the Santa Rosa Island form is an extremely large member of the *eremicus* group. With only the present material available this hypothesis can be neither

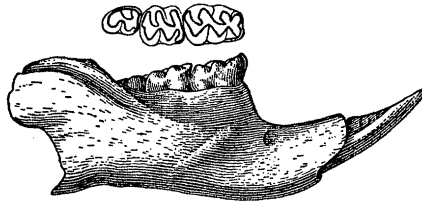


FIG. 1. Type specimen of *Peromyscus nesodytes*, right ramus with lower dentition, no. 1780 Calif. Inst. Tech. Vert. Pal. Coll.; lateral view and occlusal pattern of teeth; approximately $\times 3$.

proved nor disproved. Doctor E. Raymond Hall has suggested to the author that a species identical with or similar to *P. nesodytes* may now be living on Santa Rosa Island, but has not been recorded in the Recent fauna.

The principal character distinguishing *Haplomyomys* from other subgenera of *Peromyscus* is the absence of supplementary tubercles in the cheek-teeth. This feature is not absolute and certain species of the subgenus *Peromyscus* approach *Haplomyomys* in this respect. This is especially true of the lower cheek-teeth. *Peromyscus* (*Peromyscus*) *maniculatus* is a species in which the intermediate tubercles of the lower dentition are rather poorly developed, at least in some races, and individual specimens may have these cusps practically nonexistent. The insular race *P. maniculatus streatori* inhabits Santa Rosa Island at the present time. This form is much smaller than *P. nesodytes* and moreover does not possess the divided antero-median cusp on M_1 . *P. m. streatori* resembles the fossil form, however, in shape of the antero-internal valley in M_1 .

Representatives of the subgenus *Megadontomys* surpass *P. nesodytes* in size. The subgenus is characterized, however, by very prominent accessory cusps, even in the lower molars, and thus is readily distinguished from the island form.

Previously known extinct types of *Peromyscus* appear to be farther removed from *P. nesodytes* than are some of the living forms. *P. antiquus* (Kellogg, L., Univ. Calif. Publ., Bull. Dept. Geol., vol. 5, pp. 432-433, 1910) from the Thousand Creek beds of northwestern Nevada agrees fairly closely with *P. nesodytes* in size but has a large M_3 , whereas in our type and in Recent species M_3 is more reduced. In addition, *P. antiquus*

has a strong antero-external ridge in *M.* In *P. nesodytes* the stage of wear makes it difficult to determine the development of this character, but presumably the ridge is rather weak.

Contribution no. 183, Balch Graduate School of the Geological Sciences, California Institute of Technology, Pasadena, California.

GENERAL NOTES

AN OPOSSUM DIES OF COLD AND HUNGER

An opossum, found in a snow drift near Ann Arbor, Michigan, on March 8, 1936, by A. S. Hazzard and examined by myself, is believed to have died of cold and hunger. Hazzard discovered the dead animal in a hedge-row at his home, 4 miles east of Ann Arbor, when it was revealed by the melting of the drifted snow. It may have died any time during the 6 or 8 weeks of cold weather preceding the thaw. During that time zero or near-zero weather prevailed, and the ground had an unusually thick covering of ice and snow.

An examination of the carcass revealed no injuries nor evidence of disease, but the animal was very lean. The digestive tract was empty except for a small amount of debris in the stomach. This consisted of fragments of dead sticks, weeds and grass and a quantity of gritty material, apparently dirt, that the opossum had eaten, evidently in a desperate attempt to ward off starvation. Undoubtedly many small mammals suffered during the cold weather, but this is the only record that I have of one succumbing to it.—W. FRANK BLAIR, *Museum of Zoology, University of Michigan, Ann Arbor, Michigan.*

WINTER DAYTIME DENS OF OPOSSUMS

During the months of November and December, 1925, in Webster County, Mississippi, the writer took 36 opossums from self-chosen day-time dens. Every individual was removed from its den during daylight hours, and most of the specimens, except those taken several feet above the ground, were located by a dog. The following table shows the occurrence of opossums by den types:

OPOSSUMS TAKEN IN:	NUMBER			PER CENT OF TOTAL
	Male	Female	Total	
Trees (standing, green or dead).....	4	2	6	16.7
Logs (horizontal, on or above ground).....	5	6	11	30.5
Stumps (hardwood, old and decayed).....	1	2	3	8.3
Debris (slashings and brush on ground).....	2	1	3	8.3
Vine-brush tangles (at swamp borders).....	2	0	2	5.6
Leaf dens (squirrel? dens in branch crotches).....	2	0	2	5.6
Underground dens (cavities in soil).....	3	4	7	19.4
Attic of abandoned house (third floor).....	1	1	2	5.6
Totals.....	20	16	36	100.0

In 3 instances 2 opossums were taken in single dens, but no den yielded more than 2 individuals. The sexes never were mixed, as 2 dens produced 2 females each and the