

PROCEEDINGS
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SYNAPTOMYS COOPERII BAIRD IN EASTERN MASSACHUSETTS; WITH NOTES ON SYNAPTOMYS STONEI RHOADS, ESPECIALLY AS TO THE VALIDITY OF THIS SPECIES.

BY OUTRAM BANGS, BOSTON, MASS.

Ever since I began to trap small mammals in the modern improved manner, I have been on the lookout for this species and so was not surprised to find, on June 9th, 1893, a fine adult female in one of my traps. The trap was set in an old cranberry bog that had been allowed to run out, and had grown up to clumps of *Viburnum* and *Vaccinium* bushes, and under these, grasses and sphagnum and carices had crowded out the cranberry vines to a considerable extent. It was in the middle of the Plymouth woods, about seven miles from the town of Wareham, Plymouth County, Mass. The ground was traversed in every direction by the run-ways of *Arvicola riparius* and in one of these run-ways I caught the *Synaptomys*. She was nursing young at the time, although repeated trapping in the same bog yielded nothing but innumerable *Arvicolas*, a *Zapus hudsonius* or two, and a few *Evotomys gapperi*.

I now had a slight notion of the sort of place to look for *Synaptomys* in, and tried all such localities I could find without success until September 21, 1893, when in an almost precisely similar bog about six miles distant from the first place, in the township of Wareham, I caught an adult female, also nursing, and in an *Arvicola* run-way; and on September 24, an adult

male in another trap in the same bog, in an *Arvicola* run-way.

Following is a list of small mammals caught in this last bog, which, as I trapped it pretty clean, may be of interest as showing the species inhabiting such a place, and their relative abundance:

Twenty [20] traps set.

Sept. 19, 1893.	6 <i>Arvicola riparius</i> .
	1 <i>Zapus hudsonius</i> .
Sept. 20.	5 <i>Arvicola riparius</i> .
	1 <i>Evotomys gapperi</i> .
Sept. 21.	3 <i>Arvicola riparius</i> .
	1 <i>Evotomys gapperi</i> .
	1 <i>Sorex personatus</i> .
	1 <i>Synaptomys cooperii</i> .

Sixty-five [65] traps set.

Sept. 22.	17 <i>Arvicola riparius</i> .
	1 <i>Evotomys gapperi</i> .
Sept. 23.	10 <i>Arvicola riparius</i> .
Sept. 24.	6 <i>Arvicola riparius</i> .
	1 <i>Evotomys gapperi</i> .
	1 <i>Synaptomys cooperii</i> .
Sept. 25.	3 <i>Arvicola riparius</i> .
	1 <i>Evotomys gapperi</i> .
Sept. 26.	1 <i>Arvicola riparius</i> .
	1 <i>Evotomys gapperi</i> .
Sept. 27.	1 <i>Evotomys gapperi</i> .
Sept. 28.	Nothing; took up traps.
Totals.	<i>Arvicola riparius</i> , 54.
	<i>Evotomys gapperi</i> , 7.
	<i>Sorex personatus</i> , 1.
	<i>Zapus hudsonius</i> , 1.
	<i>Synaptomys cooperii</i> , 2.

This bog contained about an acre-and-a-half, and was bordered on one side by thick swampy woods and on the other three by open fields of grass, and had a small brook running through it.

Synaptomys cooperii is, I think, rare, or at any rate very local in this section, as I have trapped persistently for two years in every sort of locality the county affords, and have only taken these three examples.

As the country about Wareham, Mass., is not unlike that of

South Central New Jersey, I was anxious to see if my specimens were not referable to *S. stonei* Rhoads rather than to *S. cooperii*. For this purpose Dr. C. Hart Merriam kindly lent me a fine series of fourteen skins and many skulls of *S. cooperii*, partly from his own private collection, and partly from the collection of the Department of Agriculture at Washington. I also, through the kindness of Mr. S. N. Rhoads, of the Academy of Natural Sciences, Philadelphia, had a chance to examine his type of *Synaptomys stonei* and a topotype in the collection of Mr. Whitmer Stone, for whom the species was named.

In the light of this fine material, the specific character claimed for *S. stonei* faded away to mere individual variation, and *S. stonei* will have to stand as a synonym of *S. cooperii*, pure and simple.

The list of specimens I had to work with is as follows :

No.	Sex.	Date.	Locality.	Collector.	Measurement of hind foot.
*215	♀ ad.	June 9, 1893	Mass., Wareham.	O. Bangs	19
216	♀ ad.	Sept. 21, 1893	Mass., Wareham.	O. Bangs	18.5
217	♂ ad.	Sept. 24, 1893	Mass., Wareham.	O. Bangs	19
†3137	♀	Feb. 22, 1887	Indiana, Brookville.	A. W. Butler	18.5
3189	♂	Mar. 7, 1887	Indiana, Brookville.	A. W. Butler	18.5
827	♂	Nov. 10, 1884	Iowa, Knoxville.	C. K. Cherie	17.5
2601	♂	Aug. 18, 1886	Minn., Elk River.	Vernon Bailey	17
3260	♂	Dec. 10, 1886	Minn., Elk River.	Vernon Bailey	18
3261	♂	Dec. 9, 1886	Minn., Elk River.	Vernon Bailey	17.5
3263	♀	Dec. 26, 1886	Minn., Elk River.	Vernon Bailey	18
3264	♀	Mar. 5, 1887	Minn., Elk River.	Vernon Bailey	17
‡33089	♂	Mar. 4, 1889	Minn., Elk River.	N. Bailey	20
53811	♂	May 11, 1893	N. C., Magnetic City.		20
50863	♂	Oct. 23, 1892	N. C., Roan Mt., alt. 6200 ft.	Elmer Edson	18
50862	♂	Oct. 22, 1892	N. C., Roan Mt., alt. 6200 ft.	Elmer Edson	19
35615	♀	Sept. 30, 1892	N. C., Roan Mt., alt. 6200 ft.	Elmer Edson	19.5
55797	♂	Aug. 27, 1893	N. C., Roan Mt., alt. 6000 ft.	Elmer Edson	19
‡576	♀	Dec. 2, 1892	N. J., May's Landing.	S. N. Rhoads	18
168	♂	Feb. 16, 1893	N. J., May's Landing.	W. Stone	20
6401	Skull	Mar. 24, 1890	Maryland, Sandy Springs.		

*Collection of E. A. & O. Bangs, Boston, Mass.

†Collection of Dr. C. Hart Merriam, Locust Grove, N. J.

‡Collection of U. S. Department of Agriculture, Washington, D. C.

‡Collection of Sam'l N. Rhoads [type of *S. Stonei*].

||Collection of Whitmer Stone [topotype of *S. Stonei*].

¶These measurements taken by collector from fresh animal, all the others were taken by me from dried skin.

Many of the specimens I had were unmeasured, and as the hind foot is the only measurement that can be taken with accuracy from the dried skins, I give this only [in millimetres].

The few that were measured show that there is no difference in size or proportion between *S. cooperii* and *S. stonei* and indeed Mr. Rhoads states himself that there is none.

Measurements of eight (8) skulls of <i>Synaptomys cooperii</i> Baird.	Minn., Elk River, Mar. 4, 1892. No. 45c87*	Minn., Elk River, Aug. 18, 1886 No. 3230†	N. C., Roan Mt., Sept. 30, 1892 No. 47858*	Ind., Brookville, Feb. 17, 1887 No. 3771†	N. C., Magnetic City, May 11, '93 No. 53811*	Mass., Warcham, June 9, 1893 No. 215†	N. J. May's Landing, Dec. 2, 1892 No. 567§	N. J. May's Landing, Feb. 16, 1893 No. 168
Basilar length	23.8	23.	23.6	24.	24.4	24.	23.4	24.
Basilar length of Hensel	22.6	21.8	22.	22.6	22.6	22.4	21.8	22.2
Zygomatic breadth	15.2	15.4	16.	16.2	16.6	16.2	16.	16.
Interorbital constriction	3.4	3.4	3.4	3.4	3.6	3.4	3.4	3.4
Greatest length of nasals	7.	6.8	7.	7.	8.	7.4	7.6	7.
Incisor to molar	7.	6.8	6.6	7.	7.	7.	6.6	7.
Incisor to post-palatal notch	12.4	12.	13.	12.8	13.	13.	12.	13.
Foramen magnum to post-palatal notch	9.2	9.	8.8	9.6	9.6	9.2	9.	9.
Upper molar series along crowns	6.4	6.4	6.8	6.6	7.2	6.8	6.8	7.
Basio-occipital to middle of interparietal	7.	7.	6.8	7.2	7.4	7.2	6.8	7.
Fronto-parietal depth at middle of molar series	7.8	7.8	8.	8.	8.8	8.2	8.	8.4
Greatest length of mandible	15.8¶	16.	16.6	16.2	17.	16.4	16.	17.
Lower molar series along crowns	6.	6.	6.4	6.2	6.8	6.4	6.4	6.8

*Skull No. collection of U. S. Department of Agriculture.

†Skull No. collection of Dr. C. Hart Merriam.

‡Collection of E. A. & O. Bangs.

§Collection of S. N. Rhoads [type of *S. stonei*].

||Collection of Whitmer Stone [topotype of *S. stonei*].

¶This measurement is a little too short, as the bone is broken slightly.

From the above measurements, it will be seen that there are no differences of proportion in the skulls of *S. cooperii* and *S. stonei* more than a mere individual variation of the very slightest degree.

I shall now quote from Mr. Rhoads' original description* the specific characters claimed for *S. stonei*.

*American Naturalist, Vol. 27, pp. 53 and 54, January, 1893.

Mr. Rhoads says:

"*Special characters*, outward appearance and proportions as in *S. Cooperii*. Above blackish-brown, with black hairs more predominant over the shorter brown hairs than in *Cooperii*. The same color reaching around sides of belly instead of being confined to dorsal area as in *Cooperii*. Hoary, gray belly and neck of *Cooperii* replaced by dark plumbeous gray. Feet, including soles, plumbeous, without brown shade. Two middle toes of fore feet, and four inner toes of hind feet, including nails, white. Tail unicolor plumbeous gray. Lips encircled with narrow white edgings."

The color of the type and a topotype of *S. stonei* can be exactly matched by specimens from Massachusetts, Minnesota, Iowa, and North Carolina, of *S. cooperii*.

"Skull narrower," [not so,] "shallower, and viewed from above, less angular than that of *Cooperii*," [not so,] "but of same length. Lower jaws viewed from below, ditto" [exactly like specimens of *Cooperii*]. "Incisors shorter, broader, and less cylindrical, with sulcation of upper pair much more distinct" [characters entirely inconstant]. "Zygomatic foramen longer and narrower" [not so]. "Sagittal suture and parietals relatively much longer; interparietal transversely narrower, longitudinally longer" [characters not constant]. "Supraoccipital in *cooperii* twice as wide as deep, in *stonei* thrice as wide as deep."

In the type of *stonei*, the only specimen Mr. Rhoads had at the time he described the species, this bone is so broken that its shape cannot be seen. In a topotype of *stonei* I have examined, I can find no difference from *cooperii*.

"Molars one-third wider and one-eighth longer in *stonei*" [width and length vary with age]. "In *cooperii* the length of the symphysis mandibuli just equals the distance from its posterior end to the angle formed by the antero-inferior border of the masseteric fossa; in *stonei* the symphysis is one-third longer" [inconstant].

"Posterior face of angle of lower jaw in *stonei* very stout, abruptly rounded, and recurved outward; in *cooperii* it is slender, spatulate, elongated posteriorly in a nearly vertical plane, and the margin below the condyle not thickened as in the former species."

It is hard to understand just what Mr Rhoads means. I can find no differences whatever between the lower jaws of *S. stonei* and *cooperii*.

Let us now look at the geographical distribution of *Synaptomys cooperii*, and bearing in mind the powerful effect of well defined faunal areas on a species, see what we should expect the *Synaptomys* of south central New Jersey to be.

We have *Synaptomys cooperii* from Minnesota, Iowa, Indiana, Ohio, North Carolina, Maryland and Massachusetts; would it not seem extremely improbable that we should find anything but *cooperii* in New Jersey?

Prof. Baird, in his original description of *Synaptomys cooperii*, says the specimen was "received from Mr. William Cooper of Hoboken. No locality was assigned, but the animal is undoubtedly North American, probably from the New England States or New York; possibly from Iowa or Minnesota." Why not even more probably from New Jersey, as Mr. Cooper lived there?

Since writing this article I have taken two more *Synaptomys cooperii* in Plymouth County, Mass.; one at Plymouth, January 15, 1894 [ad. ♀], and one at Wareham, March 31, 1894 [ad. ♂]. Both were caught in old cranberry bogs, associated with *Arvicola riparius* and using their run-ways.



Bangs, Outram. 1894. "Synaptomys cooperii Baird in eastern Massachusetts; with notes on Synaptomys stonei Rhoads, especially as to the validity of this species." *Proceedings of the Biological Society of Washington* 9, 99–104.

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