

ARTICLE XX.—*Description of supposed New Species and Subspecies of Mammals, from Arizona.* By EDGAR A. MEARNs, Assistant Surgeon, U. S. A.

***Sciurus hudsonius mogollonensis*, subsp. nov.**

(MOGOLLON CHICKAREE.)

Types, No. 2300,\* ♂ ad., Quaking Asp Settlement, summit of Mogollon Mountains, Central Arizona, May 25, 1887; No. 2996, ♀ ad., from near General Springs, Mogollon Mountains, Arizona. Collected by Dr. Edgar A. Mearns.

The Chickaree of Arizona is intermediate between *Sciurus hudsonius* of the Eastern Province and var. *fremonti* of the Rocky Mountain region. Its closest affinities are naturally with the geographically nearer form, var. *fremonti*; but, in its extreme phase approaches very closely in coloration var. *hudsonius*, except in the color of the tail, which is a little redder than in var. *fremonti*. It is somewhat larger than the eastern Red Squirrel, and considerably larger than the neighboring form of the Rocky Mountains—*Sciurus hudsonius fremonti*.

*Description of Types.*—Color above reddish centrally from the occiput to the base of the tail, finely grizzled with gray and black, becoming more grayish on sides and outer aspect of thighs; black line of sides indicated, though not strongly pronounced; coloring of limbs externally corresponding in the main with that of the sides of the body, except the feet, which are whitish, sprinkled with black and fulvous hairs; fore part of head grayish, inclining to dusky on forehead; under surface, except the tail, a circle around eye, and end of nose except a narrow blackish line above, white; entire pelage plumbeous at base, that below appearing plumbeous on the surface, in places, by reason of the wearing away of the white tips of the hairs; tail, viewed beneath, gray centrally, bordered with black, succeeded by grayish white, and gray all round at base of tail, the black lateral stripes beginning narrowly, and gradually encroaching on the gray central

\* The numbers of the type specimens are those of the American Museum Catalogue; those given in the tables, where the specimens were collected by myself, are my own original numbers.

MEASUREMENTS\* OF 16 FRESH SPECIMENS OF *S. h. mogollonensis* FROM THE MOCOLLON MTS., CENT. ARIZ.

Number.	Sex and age.	DATE.	Nature of specimen.	Total length.	Head and body (measured from nose to <i>tuber saccus</i> ).		TAIL.			EARS.					FROM TIP OF NOSE TO						FORE LIMB.						HIND LIMB.						
					Head and body (measured from nose to <i>tuber saccus</i> ).	From root to end of vertebrae.	From root to end of hairs.	Width outspread.	Height above crown.	Height above notch.	Width.	Length of ear-tuffs.	Distance between eyes.	Eye.	Centre of pupil.	Bar.	Tip of ear.	Occlus.	End of outstretched hind limb.	Length, measured from coracoid process to end of claws.	From olecranon to end of claws.	Mann's, from behind pish.	Form bone to end long claw.	Mann's, width.	Length, measured from greater trochanter to end of claws.	From knee-joint to end of claws.	Pes, length.	Pes, width.					
185	♂ ad.	Oct. 4, 1884	Fresh	372	197	190	175	.....	20	53	82	.....	96.5	94.0	.....	44	.....	53	319	.....	34	.....	84	.....	.....	.....	.....	.....	.....	53	0	.....	
186	♂ ad.	" 4, 1884	"	385	205	195	180	.....	22	30	33	.....	98	92.0	.....	45	.....	55	323	.....	85	.....	85	.....	.....	.....	.....	.....	55	0	.....		
197	♂ ad.	" 5, 1884	"	378	210	191	168	.....	21	30	33	.....	98	92.0	.....	45	.....	55	323	.....	85	.....	85	.....	.....	.....	.....	.....	55	0	.....		
403	♂ ad.	May 23, 1887	"	403	225	195	189	75	21	80	23	.....	12	30	25.0	90.0	45	69	326	104	70	35	10	37	35	10	37	35	10	37	35	10	
438	♂ ad.	" 23, 1887	"	390	220	191	180	75	22	30	33	.....	11	27	25.0	89.0	45	71	326	99	72	35	10	37	35	10	37	35	10	37	35	10	
543	♂ ad.	" 25, 1887	"	385	217	186	181	70	20	30	33	.....	12	27	22.7	88.0	45	71	322	87	72	35	10	37	35	10	37	35	10	37	35	10	
544	♂ ad.	" 25, 1887	"	380	210	186	182	75	18	29	33	.....	12	25	22.7	88.0	42	70	325	94	69	35	10	37	35	10	37	35	10	37	35	10	
558	♂ ad.	" 27, 1887	"	400	215	192	182	80	21	29	21	.....	9	27	23.0	88.0	44	70	328	95	70	34	9.5	328	85	0	328	85	0	328	85	0	
559	♂ ad.	" 27, 1887	"	422	229	196	192	80	24	32	23	.....	10	28	23.0	89.0	45	70	333	101	70	34	9.5	328	85	0	328	85	0	328	85	0	
560	♂ ad.	" 27, 1887	"	404	211	191	192	75	20	30	35	.....	6	28	23.0	88.5	43	71	337	100	71	34	9.5	328	85	0	328	85	0	328	85	0	
561	♂ ad.	" 27, 1887	"	405	214	191	195	80	24	31	26	.....	8	28	23.0	89.0	43	71	337	100	71	34	9.5	328	85	0	328	85	0	328	85	0	
562	♂ ad.	" 27, 1887	"	420	217	198	204	80	20	30	23	.....	9	28	23.0	89.0	43	71	337	100	71	34	9.5	328	85	0	328	85	0	328	85	0	
563	♂ ad.	" 28, 1887	"	385	211	192	184	70	22	29	33	.....	6	30	22.0	87.5	43	69	325	96	70	34	9.5	328	85	0	328	85	0	328	85	0	
579	♂ ad.	June 6, 1887	"	385	210	198	177	85	21	29	24	.....	7	30	23.0	89.0	39	69	315	92	71	37	11.0	133	84	54	54	54	54	54	54		
587	♂ ad.	" 9, 1887	"	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	
596	♂ ad.	" 15, 1887	"	383	208	140	182	70	21	30	23	.....	26	23.0	89.0	.....	72	54	325	96	69	34	8	0	136	84	51	0	10	0	0		
611	♂ ad.	July 21, 1887	"	400	230	145	185	70	22	31	23	.....	3	28.5	83.0	90.0	44	74	338	110	72	37	10.5	141	97	58	0	11.5	0	0	0		
667	♂ ad.	Aug. 22, 1887	"	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	
Average of 16 of <i>S. h. mogollonensis</i> .				394	214	142	186	76	21	30	28	.....	9	28.1	82.0	89.6	44	71	56	881	99	71	85	9.8	138	98	52	8	11.6	0	0	0	
" 8 of <i>S. h. fremontii</i> †				.....	199	126	168	.....	18	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
" 5 of <i>S. h. hudsonius</i> †				381	204	137	159	83	18	27	19	.....	13	26.8	81.4	86.8	40	65	51	307	91	67	83	9.3	128	94	49	8	11.2	0	0	0	0

\* All measurements given in this paper are in millimetres, unless otherwise stated. † Taken from Allen. ‡ All from Fort Snelling, Minnesota.

MEASUREMENTS OF SKULLS OF FIVE SUBSPECIES OF *Sciurus hudsonius*.

Number.	Sex.	LOCALITY.	DATE.	AGE.	Total length.	Greatest width.	Basilar length.	Distance between orbits.	Nasal bones, length.	Nasal bones, width behind.	Upper incisors, from front to molars.	Upper incisors, from front to hinder margin of palate.	Upper incisors, height.	Upper incisors, width between external edges.	Upper molars, length taken together.	Upper molars, distance between.	Lower jaw, length.	Lower jaw, height.
<i>S. h. mogollonensis</i> .	♂	Quaking Asp., Arizona.....	May 27, 1887	Adult.	52.3	29.5	41.0	19.0	17.2	8.7	15.5	27.0	8.0	5.6	9.1	6.0	33.0	17.0
"	♂	"	" 27, 1887	"	50.0	29.0	40.0	18.0	15.0	8.2	15.5	27.0	9.5	5.4	9.0	6.0	32.3	16.5
"	♂	"	" 27, 1887	"	50.0	29.0	39.5	16.5	16.0	8.2	15.3	26.3	9.0	5.3	9.0	6.0	31.5	16.2
"	♂	"	" 28, 1887	Very old.	50.5	28.5	40.0	17.5	16.5	4.0	15.2	27.0	9.0	5.8	9.0	5.9	32.5	16.8
"	♂	Mormon Lake, Arizona.....	" 28, 1887	Very old.	48.4	28.0	38.0	16.5	16.0	8.4	15.4	25.6	7.2	5.0	8.4	6.1	31.0	16.0
"	♂	Baker's Butte, Arizona.....	Aug. 22, 1887	"	51.0	29.0	40.0	17.0	17.1	8.4	15.5	26.5	9.5	5.1	8.4	5.9	32.5	16.5
"	♂	San Francisco Mt., Arizona.....	June 9, 1887	Adult.	49.0	28.9	38.9	17.0	15.5	8.3	15.0	25.7	8.4	5.0	8.5	6.0	31.5	16.3
"	♂	"	" 9, 1887	"	59.7	28.0	38.8	16.5	16.0	4.0	15.0	26.0	8.7	5.0	9.0	6.1	31.6	16.3
"	♂	"	" 15, 1887	Very old.	50.2	28.7	39.3	17.4	16.0	8.0	15.1	26.6	8.9	5.1	9.0	6.0	32.2	16.8
"	♂	Quaking Asp., Central Ariz.....	May 23, 1887	"	51.0	29.3	40.2	17.4	17.0	4.0	15.4	27.0	8.9	5.2	9.0	6.0	33.0	16.8
"	♂	"	" 27, 1887	"	50.0	28.4	39.3	17.2	16.5	4.0	15.0	27.0	8.9	5.0	9.1	6.0	32.0	16.0
"	♂	Baker's Butte, Arizona.....	July 21, 1887	"	49.5	28.3	38.8	17.0	16.0	8.4	15.0	26.0	9.8	.....	8.8	6.0	32.0	16.0
<i>S. h. fremonti</i> .....	♂	Mill City, Colorado.....	June 30, 1877	Adult.	49.0	28.4	38.8	17.0	15.0	8.0	14.3	25.3	8.5	4.9	9.0	5.4	31.0	16.7
"	♂	"	July 9, 1877	"	46.5	28.4	37.0	17.0	15.0	8.4	14.3	24.0	8.5	5.0	8.6	5.4	31.0	16.5
Average of 12 skulls of <i>Sciurus hudsonius mogollonensis</i> .....					51.0	28.7	39.4	17.3	16.2	8.5	15.2	26.5	8.8	5.3	8.9	6.0	32.1	16.4
" 2 " <i>Sciurus hudsonius fremonti</i> .....					47.8	28.4	37.8	17.0	15.0	8.2	14.8	24.7	8.5	5.0	8.8	5.3	31.0	16.7
" 36 " <i>Sciurus hudsonius hudsonius</i> *.....					45.2	26.2	.....	.....	.....	8.8	13.7	.....	.....	4.8	7.9	5.3	25.7	14.5
" 3 " <i>Sciurus hudsonius richardsoni</i> *.....					48.3	28.7	.....	.....	.....	14.7	8.8	14.7	24.4	8.1	.....	.....	5.8	26.2
" 5 " <i>Sciurus hudsonius douglasii</i> *.....					46.2	26.7	.....	.....	.....	16.8	13.7	.....	.....	.....	.....	.....	6.1	26.2

\* Taken from Dr. J. A. Allen's Monographs of North American Rodentia.

stripe until the latter becomes obliterated at the extremity, which is nearly all black; the 5-striped pattern of the tail less distinct above, and the central area reddish; the slightly developed ear-tufts dusky, and the long, full whiskers jet black.

*Cranial and Dental Characters.*—In this Chickaree we have the largest skull of any of the five races of *Sciurus hudsonius*, which is remarkable, since in *hudsonius* (verus) there is a notable increase in size to the northward, as shown by Dr. Allen's table of measurements, in the "Monographs of North American Rodentia," p. 688. The dental formula is I.  $\frac{1-1}{1-1}$ ; Pm.  $\frac{2-2}{1-1}$ ; M.  $\frac{2-3}{2-3} = \frac{12}{10}$ , a minute and functionless premolar being present in nine of the thirteen skulls examined.

*Habitat.*—This handsome Squirrel is an inhabitant of the fir and spruce woods of the alpine portions of Arizona, where it resides throughout the year, seldom descending into the pines, which constitute a forest zone below the firs and spruces. It is very abundant on the San Francisco peaks, and thence southward in the Mogollon Mountains, and in the eastern spur of that range known as the White Mountains. A Chickaree also inhabits the mountains of New Mexico.

### **Fiber zibethicus pallidus**, subsp. nov.

(PALE MUSKRAT.)

Types, No. 2346, ♂ ad., September 17, 1885, and 2348, ♀ ad., August 28, 1886, both from Fort Verde, Central Arizona. Collected by Dr. Edgar A. Mearns.

*Description of Types.*—Size, two-thirds that of the eastern Muskrat. General color, rusty brown, paler and grayish beneath; under fur gray, tipped with rusty or yellowish brown; coarse outer hair scanty, glossy brown, reddish in places; whiskers, and scattered hairs of tail, rich liver-brown.

*Cranial Characters.*—The skull shows no constant differences from that of the common species, except its very much smaller size, as shown in the subjoined table of measurement.

[February,

MEASUREMENTS OF SKULLS OF *Fiber zibethicus pallidus* AND *Fiber zibethicus*.

Number.	Sex.	Locality.	Age.	Total length.	From foramen magnum to post- rior margin of incisors.	Zygomatic breadth.	Breadth measured at anterior border of auditory meatus.	Height of skull.	Nasal bones, length.	Nasal bones, greatest width taken together.	Upper incisors, from front to upper molars.	Upper incisors, from front to pos- terior margin of palate.	Upper incisors, height from alveolae.	Upper incisors, width between external edges at alveolae.	Length of upper molar series.*	Distance between middle upper molars.*	Greatest width across upper molars (outside).	From foramen magnum to hind margin of palate.	From internasal suture to hinder extremity of interparietal suture.	Antero-posterior diameter of antrial bullae.	Length of mandible, measured from condyle to tip of incisors.	From back of condyle to distal portion of alveolae of incisor.	Height of mandible, measured from condyle to inferior angle.	Height of mandible, mea. from coronoid to inferior angle.	Length of under molar series.*
200	♂	Beaver Creek, Arizona.	Aged.	59.5	54.2	38.0	35.3	24.1	19.2	9.60	35.0	36.1	14.5	9.00	14.0	7.00	12.0	21.0	33.8	13.2	45.5	42.0	19.6	21.1	13.2
225	♂	Fort Verde, Arizona.	Adult.	62.5	54.3	37.0	35.7	25.5	20.8	9.30	35.0	37.0	14.5	9.00	14.4	7.10	12.2	20.5	34.5	12.4	46.0	42.0	19.6	21.9	14.7
231	♂	"	Adult.	55.0	48.5	34.0	32.3	22.0	17.0	8.00	32.0	32.5	13.8	8.00	14.0	6.10	11.3	16.5	30.0	11.7	40.3	37.3	18.0	20.0	14.3
241	♂	Beaver Creek, Arizona.	Aged.	53.5	53.0	37.0	35.3	23.7	19.2	8.00	33.5	33.5	13.2	8.40	14.1	7.10	12.5	21.3	33.2	12.0	44.2	40.2	19.0	21.0	14.5
451	♂	Fort Verde, Arizona.	Yg. ad.	59.0	52.0	36.5	35.0	23.3	18.8	8.00	33.5	33.5	14.0	8.70	15.0	6.30	12.0	20.0	33.0	13.0	43.0	40.0	19.0	21.0	15.8
464	♂	"	Aged.	57.5	51.5	36.3	34.9	23.0	19.0	8.40	32.7	33.5	12.0	8.50	15.0	6.10	11.4	19.5	32.5	12.0	43.0	40.0	18.5	20.5	15.8
754	♂	Fort Snelling, Minn.	Yg. ad.	64.1	58.3	41.0	39.2	26.0	20.8	9.20	35.5	38.0	15.0	9.00	16.0	6.25	13.0	22.0	36.8	14.0	49.0	48.5	22.0	23.5	16.0
755	♂	"	Adult.	65.0	59.1	40.3	39.0	27.0	20.6	9.30	37.0	39.0	15.0	8.20	15.2	6.50	13.2	21.6	34.6	15.0	49.7	44.2	21.2	22.5	16.0
757	♂	"	"	65.0	59.3	40.9	39.0	26.4	21.5	9.25	37.0	39.0	15.0	9.00	15.1	6.90	12.7	21.2	36.0	14.5	50.5	45.6	22.5	24.0	16.5
758	♂	"	"	64.6	58.5	39.5	37.9	25.2	21.1	9.20	37.0	39.0	15.2	8.20	15.1	6.25	13.0	21.6	35.0	14.6	49.5	43.5	21.5	23.2	15.3
759	♂	"	Yg. ad.	64.0	57.5	40.0	38.3	26.0	21.9	9.50	36.1	39.0	14.0	8.20	15.0	6.90	13.0	21.6	35.2	14.5	49.0	42.5	21.5	23.4	16.0
761	♂	"	Adult.	65.0	59.0	41.0	39.0	26.0	22.0	9.00	37.0	40.0	15.0	8.50	16.0	6.90	13.0	21.6	36.4	13.5	50.4	45.0	23.0	25.1	15.9
762	♂	"	Yg. ad.	64.5	58.5	39.0	37.9	25.1	21.0	9.70	36.0	40.0	14.0	8.60	16.0	6.20	12.0	21.8	36.4	13.0	49.0	44.2	21.0	22.4	15.9
764	♂	"	Adult.	66.0	58.5	40.0	37.9	26.5	21.5	9.00	36.5	40.0	15.0	9.00	15.5	6.80	13.0	21.8	36.5	15.0	51.0	47.0	22.0	23.5	15.9
769	♂	"	Aged.	66.0	59.6	41.7	39.7	27.0	21.0	9.70	37.6	41.0	15.0	9.00	16.0	6.80	13.0	21.8	36.5	15.0	51.0	47.0	22.0	23.5	15.9
771	♂	"	Yg. ad.	64.5	58.5	38.5	37.2	24.0	20.8	9.50	37.0	39.0	14.0	8.70	16.0	6.90	13.0	21.8	36.5	14.0	48.5	43.5	22.0	22.5	16.0
880	♂	Ohio	Adult.	68.0	62.0	41.0	39.0	28.4	23.0	9.90	37.5	41.5	16.0	9.30	16.3	7.10	13.5	23.4	38.0	15.5	50.5	46.0	21.2	24.2	16.0
650	♂	Average of 6 skulls of <i>F. zibethicus pallidus</i> .		58.8	52.2	36.3	35.0	23.6	19.0	8.88	33.5	35.0	13.8	8.65	14.4	6.67	11.9	20.1	32.8	12.4	49.3	44.3	19.0	20.9	14.6
"	12	" <i>Fiber zibethicus</i> .		65.0	58.6	40.0	38.7	26.3	21.1	9.83	36.9	39.0	14.8	8.75	15.4	6.87	12.9	21.6	35.5	14.5	49.3	44.3	21.5	24.1	16.7
Percentages of basilar length in <i>F. s. pallidus</i>				1.11	1.00	.695	.478	.451	.368	.170	.449	.670	.257	.166	.276	.136	.228	.385	.628	.237	.837	.773	.864	.400	.379
" " <i>F. zibethicus</i>				1.11	1.00	.682	.491	.449	.360	.159	.456	.677	.252	.150	.302	.114	.220	.368	.605	.248	.839	.754	.866	.411	.367

\* Measured on alveolae.

MEASUREMENTS OF 9 SPECIMENS OF *Fiber zibethicus pallidus* FROM THE VERDE RIVER, CENT. ARIZONA.

Number.	SEX AND AGE.	DATE.	Total length.	EARS.										FROM TIP OF NOSE TO					FORE LIMB.				HIND LIMB.			
				Head and body (measured from nose to tuberosity of ischium).	Tail vertebra.	Tail, greatest depth.	Distance between eyes.	Longest whiskers.	Girth of chest.	Height above crown.	Height above notch.	Width at base.	Eye.	Centre of pupil.	Auditory meatus.	Tip of ear.	Ocuput.	End of outstretched hind limb.	From coracoid process of scapula to end of claws.	From olecranon to end of claws.	Mannus, from behind platform bone to end of claws.	Longest claw of manus.	From great trochanter to end of claws.	From knee-joint to end of claws.	From length, measured on plantar surface.	Pes, length of longest claw.
106	♂ ad.	June 26, 1884	245	208	28	62	185	21.0	19.0	30	30	30	68.0	875	32	9.0	62	12.0								
200	♂ ad.	" 15, 1885	500	200	28	60	185	17.0	20.0	31	34.0	57	77	70.0	78	83	9.0	138	69	11.0						
225	♂ ad.	July 22, 1885	495	197	25	60	170	19.0	20.0	83	35.0	54	84	71.0	75	31	9.0	120	69	10.0						
232	♂ ad.	Aug. 19, 1885	484	171	24	58	180	18.0	16.0	28	31.0	53	74	61.0	67	28	9.0	102	62	10.0						
241	♂ ad.	Sept. 17, 1885	480	206	28	60	190	15.0	18.0	30	33.5	57	78	67.0	73	29	9.0	120	67	10.0						
451	♂ ad.	Aug. 23, 1886	500	237	23	70	175	17.5	18.0	31	34.5	56	81	67.0	75	81	9.0	157	132	70	10.0					
454	♀ ad.	Aug. 28, 1886	498	235	26	70	185	18.0	20.5	32	33.5	56	80	67.0	74	31	8.5	146	120	68	11.0					
464	♂ ad.	Sept. 20, 1886	479	237	23	56	160	20.0	20.0	31	32.6	60	83	371	84	72	8.0	146	128	65	9.0					
663	♂ ad.	May 15, 1888	475	230	26	65	190	15.0	21.0	30	33.0	50	80	67.0	86	78	8.0	142	118	67	9.5					
Average measurements of nine specimens.....			482	204	26	62	180	17.3	19.1	31	33.4	55	80	69.5	87	91	8.7	146	122	67	10.3					

*Remarks.*—This Muskrat is abundant on all the streams of Arizona that are tributary to the Colorado River; but I did not find it south of the Gila River. It is very numerous at Fort Verde, where it never builds houses for winter, but lives in burrows in the banks of streams, similar to those occupied by the Beaver, and feeds on fishes and vegetation. The naturalists of the Mexican Boundary Survey found this animal at the mouth of the Gila River. "In one nest which we accidentally opened in the bottom of the Colorado, and supposed to be the habitation of a Muskrat, we found a large store of screw-beans, on which the animal seems to feed in winter time."—(A. Schott.)

The Muskrat inhabiting the plains of Montana, represented in the American Museum Collection by a specimen (No. 552, ♂) from the mouth of Rosebud River, collected by George H. Troom, agrees with the Arizona form both in its small size and pallid coloration. I have been impressed with the general similarity of these two regions, aside from the severity of the winter season in the former, especially the close resemblance of their respective flora; and it is not improbable that the range of the Pale Muskrat of the Great Basin region extends through the dry central plains to Montana.

### *Arvicola mogollonensis*, sp. nov.

(MOGOLLON MOUNTAIN VOLE.)

Type, No. 2351,\* ♂, collected by Dr. Edgar A. Mearns, near Baker's Butte, Mogollon Mountains, Central Arizona, July 26, 1887.

*Description of Type.*—Color above yellowish brown mixed with gray; sides fulvous; belly grayish, washed with pale fulvous; feet and tail grayish; whiskers mostly white, black in front; pelage short and hispid. Forefoot 5-tuberculate; hindfoot 6-tuberculate; soles nearly naked. The dentition shows this species to be a member of the restricted genus *Arvicola*.

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\* Nearly adult; the skull is manifestly immature, although nearly grown.

## MEASUREMENTS OF FRESH SPECIMEN.

	MM.
Total length.....	121.00
Head and body (measured from nose to tuberosity of ischium)	88.00
Tail, measured to end of vertebræ.....	31.00
"    "    "    hairs.....	35.00
Ear, height above crown.....	7.00
"    "    "    notch.....	9.00
"    width at base.....	9.00
From tip of nose to eye.....	10.50
"    "    centre of pupil.....	12.50
"    "    auditory meatus.....	19.00
"    "    tip of ear.....	31.00
"    "    occiput.....	25.00
"    "    end of outstretched hinder extremity.....	117.00
Fore limb measured from head of humerus to end of claws...	34.00
"    "    "    olecranon process to end of claws...	23.00
"    "    "    behind pisiform bone to end of claws	11.00
Hind limb measured from great trochanter to end of claws ...	44.00
"    "    "    patella to end of claws.....	31.00
"    "    "    hinder border of calcaneum to end of	
"    "    "    claws.....	18.00
Longest claw of manus.....	2.00
"    "    "    pes.....	2.20

## MEASUREMENTS OF SKULL.

	MM.
Total length.....	23.00
Basilar length (from foramen magnum to incisors).....	19.50
Greatest zygomatic breadth.....	13.20
Greatest parietal breadth.....	11.00
Interorbital constriction.....	3.70
From front of incisor, at base, to molar series.....	7.60
Length of upper molar series (on alveolæ).....	6.00
Length of nasals.....	6.20
Greatest width of nasals.....	3.00
Length of mandible (from condyle to distal point of alveolus)..	15.00
"    "    "    (from condyle to tip of incisor).....	16.00
Height "    "    "    (from angle to highest point of coronoid	
"    "    "    process) .....	8.20
Length of lower molar series.....	6.00

*Remarks.*—This Vole is abundant in the Mogollon Mountains of Arizona, preferring moist openings overgrown with tall brakes and grasses, in which its numerous runways may usually be seen.

***Hesperomys leucopus sonoriensis, Auct.***

It has been with much hesitation that I have divided the group of short-tailed Deer Mice of the west, now known collectively as *Hesperomys leucopus sonoriensis*, into five subspecies; but, in view

[February,



of the growing inclination on the part of naturalists to acknowledge slight geographical races in zoölogical nomenclature, and of the importance of their recognition in connection with the study and definition of faunal areas, a subdivision of this group appears to be inevitable. Surveying the quite extensive series of specimens in the collection of the American Museum of Natural History, together with those in the Museum of Comparative Zoölogy, at Cambridge, it is found that no less than five very distinct types are represented from the interior region of North America, viz. : a very dark arctic race ; a pale grayish form from the treeless plains of the north ; a more reddish or cinnamon-colored race from the treeless regions of the south ; a darker and browner southern alpine form ; and a pallid race from the desert regions of California and Arizona. Three of these races have received names, all of which can be retained, although the types of the early descriptions may be far from typical examples of these races as they appear to-day, in the light of accumulated material. It becomes necessary, therefore, to redescribe them from specimens reflecting the extreme characters of each subspecies.

These several races should now stand as follows :

**Hesperomys leucopus arcticus**, subsp. nov. ARCTIC DEER MOUSE.

**Hesperomys leucopus nebrascensis** (*Baird*). BLACK-EARED DEER MOUSE.

**Hesperomys leucopus texanus** (*Woodhouse*). TEXAN DEER MOUSE.

**Hesperomys leucopus sonoriensis** (*Le Conte*). ALPINE DEER MOUSE.

**Hesperomys leucopus deserticolus**, subsp. nov. DESERT DEER MOUSE.

*Synopsis of Subspecies.*

Ears medium ; tail long ; pes, about 20 mm. ; pelage very long and dense, everywhere plumbeous at base. Color above, dark grayish brown, with considerable admixture of black in the median line, and little or no fulvous on sides ; ears densely hairy, black outside, edged and coated inside with white ; no white spot in front of the base of the ear ; tail stripe broad and black, occupying about one-half of its circumference ; feet and under parts white ; a black area around the eye.....*arcticus*.\*

\* Type of diagnosis, No. 5555. Mus. Comp. Zool. (= No. 4531, Smithsonian Institution), from Fort Simpson, Hudson's Bay Territory. ♂ ad., Sept. 7th. Collected by R. Kennicott. For measurements of this specimen, and many others of this subspecies, see Dr. Elliot Coues's Monographs of North American Rodentia, 1877, pp. 66 and 83.

MEASUREMENTS OF FOUR SUBSPECIES OF *Hesperomys leucopus*.

	Number.	Sex and age.	LOCALITY.	DATE.	COLLECTOR.	Nature of specimen.	Total length.	Length of head and body.	Tail to end of hairs.	Ears, height above crown.	Length of hind foot.
<i>H. leucopus nebrascensis</i>	1199	♂ ad.	Calif Creek, Montana.....	Oct. 16, 1887	Elliot and Richardson...	Skin.	159.0	92.0	66.0	12.0	90.0
"	1200	♀ ad.	"	"	"	"	154.0	86.0	64.0	12.0	91.0
"	1201	♂ ad.	"	"	"	"	155.0	88.0	66.0	12.0	90.0
"	1202	♂ ad.	"	"	"	"	158.0	92.0	68.0	11.0	90.0
"	1203	♂ ad.	"	"	"	"	162.0	96.0	68.0	11.0	90.0
"	1204	♂ ad.	Big Porcupine Creek, Mon.	18, 1887	"	"	144.0	80.0	56.0	11.2	90.0
"	1205	♂ ad.	Little "	"	"	"	165.0	95.0	67.0	12.2	90.0
<i>H. leucopus texanus</i>	588	♂ ad.	Northwest corner of Texas.	Oct. 27, 1889	Mr. Jenness Richardson...	Skin.	139.0	80.0	59.0	11.0	18.5
"	584	♂ ad.	North Beaver River, I. Ter.	"	"	"	145.0	86.0	63.0	10.5	19.0
"	586	♂ ad.	"	"	"	"	146.0	87.0	64.0	10.5	18.5
"	587	♂ ad.	"	"	"	"	165.0	92.0	64.0	11.0	19.5
"	583	♂ ad.	Tepee Creek, Indian Ter...	Nov. 8, 1889	"	"	169.0	89.0	77.0	10.5	19.0
"	585	♂ ad.	"	"	"	"	157.0	73.0	66.0	10.5	19.0
"	582	♂ ad.	Beaver River, Indian Ter.	Oct. 30, 1889	"	"	157.0	88.0	70.0	11.0	19.0
"	589	♀ ad.	"	"	"	"	151.0	84.0	68.0	10.5	19.0
<i>H. leucopus sonoriensis</i>	581	♂ ad.	San Francisco Mts., Ariz.	June 6, 1887	Dr. Edgar A. Mearns...	Fresh	158.0	87.0	74.0	14.0	19.5
"	585	♂ ad.	"	"	"	"	146.0	81.0	65.0	14.0	19.0
"	610	♂ ad.	Baker's Butte, Cent. Ariz.	July 30, 1887	"	"	157.0	90.0	78.0	16.0	19.0
"	632	♂ ad.	"	"	"	"	146.0	86.0	60.0	17.0	18.5
"	592	♂ ad.	San Francisco Mts., Ariz.	June 7, 1887	"	"	163.0	88.0	77.0	15.0	19.0
"	629	♀ ad.	Baker's Butte, Cent. Ariz.	Aug. 15, 1887	"	"	162.0	87.0	67.0	17.0	21.0
<i>H. leucopus deserticolus</i>	1175	♂ ad.	Mojave Desert, California...	June 5, 1887	Mr. F. Stephens.....	Skin.	168.0	88.8	78.7	11.2	20.8
Average of 7 specimens of <i>Hesperomys leucopus nebrascensis</i> .....	156.7						90.6	64.7	11.7	20.1	
" 7 specimens of <i>Hesperomys leucopus texanus</i> .....	150.7						88.7	67.4	10.7	19.0	
" 6 specimens of <i>Hesperomys leucopus sonoriensis</i> .....	155.3						88.2	69.3	15.5	19.2	
One specimen of <i>Hesperomys leucopus deserticolus</i> .....	168.0						88.8	78.7	11.2	20.8	

\* These measurements were taken from fresh specimen by the collector.

- Ears rather large; tail short; pes, about 20 mm.; pelage long and dense. Color above, pale grayish fulvous, very finely lined with black; ears densely hairy, black outside, edged and coated inside with white; a small but conspicuous white patch in front of each ear; tail stripe narrow and black; with less black around the eye. . . . . *nebrascensis*.\*
- Ears small; tail short; pes, 19 mm.; pelage dense, but shorter. Color above, cinnamon-fulvous, inclining to reddish, slightly darker in the median line; ears not densely pilose, brownish, with hoary edging extending but little inside; white patches in front of ears inconspicuous; tail stripe brownish black; without black around the eye. . . . . *texasus*.†
- Ears very large; tail short; pes, about 19.2 mm.; pelage dense, but rather short. Color above, brownish fulvous, mixed with black; ears dusky, with hoary edging; tail stripe narrow and dusky. . . . . *sonoriensis*.‡
- Ears medium; tail long; pes, nearly 21 mm.; pelage short and hispid. Color above, pale cinereous drab, slightly darkened in the median line, becoming light fulvous on sides and rump; ears nearly naked, hoary edged; tail very narrowly striped with dark brown above; whiskers reaching to shoulders. . . . . *deserticolus*.§

The skulls of these four races afford no tangible differential characters.

I am fortunate in being able to present the foregoing measurements of a series of adult specimens of *nebrascensis* and *texasus*, from skins prepared by the same person. The measurements of *sonoriensis* were all taken by me, from fresh specimens, in the field.

***Sigmodon hispidus arizonæ*, subsp. nov.**

(ARIZONA COTTON RAT.)

Type, No. 2370, ♂ ad., Fort Verde, Arizona, September 13, 1885. Collected by Dr. Edgar A. Mearns.

*Description of Type.*—Larger than *Sigmodon hispidus* Say & Ord, with more hairy and relatively larger ears, and longer tail. Colors much paler, both as to the coarse outer coat and the under fur. Pelage coarser, and more hispid. Skull and dentition heavier. Above light yellowish brown, mixed with ashy, lined sparingly with black; below white; pelage everywhere plumbeous at base; tail dusky above, whitish below. Ears large, orbicular, clothed with yellowish brown hairs on both surfaces, more sparingly outside.

*A Young Male of the Year* (No. 2372, ♂ juv., Fort Verde, Arizona, October 2, 1885. Dr. Edgar A. Mearns) differs from adults

\* Type of diagnosis, No. 1200, American Museum Collection.

† Type of diagnosis, No. 2508, American Museum Collection.

‡ Type of diagnosis, No. 2357, American Museum Collection.

§ Type of diagnosis, No. 1175, American Museum Collection.



in being less yellowish brown, especially about the nose and flanks ; it is more ashy.

*Remarks.*—The material at hand for comparison comprises a large series of skins and skulls of *Sigmodon hispidus* (verus) from Florida and the Atlantic coast, and of *S. hispidus littoralis* from the East Peninsula, opposite Micco, Brevard County, Florida, together with *S. hispidus berlandieri* from Corpus Christi, Texas, and the type of the very distinct *S. fulviventer* of Dr. Allen. In the survey of this material, the discrepancy in the sizes of Arizona and eastern or southern specimens is very apparent ; but, in the absence of detailed measurements of fresh specimens, it is impossible to make exact comparisons. However, the following measurements, taken from fresh specimens by competent collectors, will prove useful. Only adults, having prominently beaded skulls, with the sutures reasonably closed, are included :

	Total length.	Tail.
Average of 10 specimens of <i>Sigmodon hispidus</i> *...	262.74	100.87
Average of 8 specimens of <i>S. hispidus littoralis</i> †..	275.75	104.63
Type of Baird's <i>Sigmodon berlandieri</i> ‡.....	250.86	116.84
Specimen of De Saussure's " <i>Hesperomys toltecus</i> "‡	218.44	91.44
Type of <i>Sigmodon hispidus arizonæ</i> .....	320.00	121.00

\*Six males and four females. Six are from Gainesville, Florida, and measured by Mr. Frank M. Chapman, and four from Raleigh, N. C., measured by Mr. Brimley.

†Measured by Mr. Frank M. Chapman.

‡Taken from Dr. Coues's table, the total length being the sum of the measurements of head and body, and tail, there given separately.

The excellent series of skulls in the collection of the American Museum of Natural History, N. Y., affords better material for size comparisons. In the accompanying table of measurements only well-grown skulls, in which the supraorbital bead is well displayed, have been selected.

From a study of this material, it is apparent that there are four recognizable races of the single representative of this genus found within our borders. Of these *S. hispidus berlandieri* is the smallest, and, perhaps, the least deserving of subspecific rank. The specimens of this race from Corpus Christi, Texas, above alluded to, are in the collection of Mr. Geo. B. Sennett. 1890.]

In size they correspond with Prof. Baird's type, adult skulls affording similar measurements to those of Dr. Coues, from Mexico.

***Dipodomys merriami*,\* sp. nov.**

Type, No. 2394, ♂ ad., New River, Arizona, May 16, 1885. Collected by Dr. Edgar A. Mearns.

*Description of Type.*—Toes 5-4. Form slender and delicate; tail elongate; ears large, scantily haired. Pelage above mouse gray at base, overlaid with pinkish buff; sides sandy; sides of nose and face nearly back to the eyes, spot at posterior base of ears, band across thighs and encircling base of tail, and all below, pure white, except a dusky stripe on plantar surface of foot; a dusky spot at root of tail above, at base of whiskers, and at the end of the nose; whiskers mixed white and blackish; tail with a white band on each side becoming obsolete near the extremity, drab-gray on upper and under sides and terminal one-fourth.

*Remarks.*—The tail and limbs are much more slender than in *D. ordi* or *D. chapmani*. The skull, likewise, is much lighter, and considerably smaller than in *D. ordi*, which is a stouter, heavier animal.

The principal agreement between this species and Gray's description of *D. phillipsi* consists in the character "toes 5-4," given in the description of the genus, of which his "*D. Phillipii*," taken by John Phillips, Esq., near Real del Monte, Mexico, is the type. His description reads as follows: "*Dipodomys Phillipii*, Gray. Grey-brown, with longer black hairs; sides sandy; sides of the nose, spot near the base of the ears, band across the thighs and beneath, pure white; nose, spot at the base of the long black whiskers, and at the base of the tail, black; tail black-brown, with the band on each of its sides and tip white. Length: body and head, 5 inches; tail, 6½ inches; hind feet, 1½ inch."

\* Named in honor of Dr. C. Hart Merriam, Chief of the Division of Economic Mammalogy and Ornithology, U. S. Department of Agriculture.

## MEASUREMENTS.

	MM.
Total length.....	281.00
Head and body (measured from nose to tuberosity of ischium)	110.00
Tail, from root to end of vertebræ .....	149.00
“ “ “ hairs.....	170.00
Ears, height above crown .....	10.00
“ “ “ meatus .....	13.00
Girth of chest .....	72.00
From tip of nose to eye.....	23.00
“ “ ear.....	36.00
“ “ auditory meatus.....	37.00
“ “ tip of ear.....	49.00
“ “ occiput .....	40.00
From olecranon to end of claws.....	31.00
Manus (measured from behind pisiform bone to end of claws.	12.00
From patella to end of claws.....	73.00
Pes (measured from calcaneum to end of claws).....	36.00

**Dipodomys chapmani**,\* sp. nov.

Types, No. 2400, ♂ ad., January 26, 1887, and No. 2398, ♀ ad., October 1, 1885, both from Fort Verde, Arizona. Collected by Dr. Edgar A. Mearns.

*Description of Types.*—Toes 5-5. Above the predominant color is mouse gray, mixed with black and buff, becoming sandy buff on sides; sides of nose, spot behind the whiskers, above the eye, and at the base of the ear, band across thighs and encircling base of tail and all below, pure white, except a broad blackish stripe on plantar surface of foot; a black spot at the root of the whiskers; a dusky circle around eye, and a dusky spot on nose, at base of tail, and above heel; whiskers blackish mixed with white; tail banded with white on sides nearly to end of vertebræ, residue drab-gray. Ears clothed with very short hairs on both surfaces. Sexes alike.

*A young specimen* (No. 131, ♀ juv., Fort Verde, Arizona, September 20, 1884. Collected by Dr. E. A. Mearns) is darker than adults, having the pelage considerably mixed with black, the sides having the coloring of *Perognathus*—buff, lined with black; whiskers with more white than black; caudal pencil jet black.

*Two suckling young* (Nos. 2396, ♂ juv., and 2395 ♀ juv., April 27, 1886, Fort Verde, Arizona. Collected by Dr. Mearns), taken

\*Named in honor of Mr. Frank M. Chapman, of the American Museum of Natural History.

MEASUREMENTS OF SEVEN SPECIMENS OF *Dipodomys chapmani*, FROM FORT VERDE, ARIZONA.

Number.	Sex and age.	DATE.	Nature of specimen.	Total length.	Head and body.	Tail vertebrae.	Tail, measured to end of hairs.	Distance between eyes.	Cheek, girth.	Ears, height above crown.	Ears, height above notch.	Ears, width at base.	FROM TIP OF NOSE TO						FORE LIMB.				HIND LIMB.								
													Eye.	Centre of pupil.	Auditory meatus.	Tip of ear.	Occlusor.	End of outstretched hind limb.	From head of humerus to end of claws.	From olecranon to end of claws.	Mannus, length.	Mannus, width.	Mannus, length of longest claw.	From great trochanter to end of claws.	From patella to end of claws.	Pes, length.	Pes, width.	Pes, length of longest claw.			
250	♀ ad.	Oct. 1, 1885	Fresh	280	107	148	175	18.0	80	11.0	13.0	12.0	24.0	26.0	35.0	50	42	160	40	29	11.5	.....	6.2	.....	68	88	.....	68	88	.....	4.0
408	♀ ad.	April 27, 1886	"	260	102	140	160	17.0	90	10.0	13.0	18.0	24.0	27.0	35.0	48	41	178	40	31	13.0	4.5	5.5	88	88	.....	88	88	.....	5.0	
442	♂ juv	Aug. 3, 1886	"	230	100	132	138	18.0	70	12.0	12.0	12.0	22.0	25.0	33.0	47	38	168	37	30	12.0	.....	.....	85	87	.....	87	87	.....	.....	
488	♂ ad.	Jan. 26, 1887	"	255	106	137	158	18.0	68	11.0	13.0	10.5	22.5	24.5	33.0	48	38	175	40	30	12.5	4.9	4.4	88	70	.....	88	86	.....	7.0	4.0
484	♀ ad.	"	"	245	102	125	144	18.3	65	11.0	13.0	10.5	22.0	24.5	33.0	46	38	172	40	29	12.0	4.8	4.2	91	72	.....	88	88	.....	7.3	4.5
485	♂ ad.	"	"	252	100	138	161	18.4	66	10.5	13.0	11.0	22.0	25.0	33.5	47	38	170	38	29	13.0	4.7	5.0	88	72	.....	88	86	.....	7.0	4.0
486	♂ ad.	"	"	268	110	142	168	18.0	70	11.5	14.0	12.0	22.0	25.0	33.0	47	38	180	41	31	12.5	4.5	4.5	94	70	.....	88	88	.....	7.0	4.0
Average*				260	104	138	161	18.0	73	10.8	13.2	11.5	22.8	25.3	33.7	48	39	176	40	30	12.4	4.7	5.0	90	70	.....	87	87	.....	7.0	4.2

\* No. 442 is excluded from the average, it being immature.



MEASUREMENTS OF FIVE SKULLS OF *Dipodomys chapmani*.

Number.	SEX AND AGE.	LOCALITY.	DATE.	Total length.	From foramen magnum to posterior border of incisors.	Zygomatic breadth.	Greatest width of skull (measured across tympanic bullae).	From base of incisors, in front, to molar series.	From foramen magnum to base of palatal spine.	Interorbital width at point of greatest constriction.	Length of nasal bones.	Upper incisors, length.	Lower incisors, length.	Length of upper molar series.	Length of lower molar series.	Length of mandible, measured from condyle to tip of incisors.
250...	♀ ad.	Fort Verde, Arizona.....	October 1, 1885 .....	37.2	23.5	17.0	28.0	10.1	11.1	13.0	13.5	5.8	6.0	5.0	4.6	13.3
483...	♂ ad.	" .....	January 26, 1887.....	37.3	23.0	.....	23.7	10.1	10.9	13.0	13.1	6.0	5.7	4.2	4.4	17.7
484...	♀ ad.	" .....	" .....	35.5	21.2	.....	23.5	10.1	10.0	12.5	12.6	6.0	5.1	4.8	4.6	17.3
485...	♂ ad.	" .....	" .....	36.2	22.0	.....	23.4	10.0	10.4	12.0	13.2	5.9	5.7	4.9	4.6	13.0
486...	♂ ad.	" .....	" .....	36.2	21.3	16.3	23.0	10.1	10.0	12.4	13.0	6.0	5.4	4.4	4.2	17.0
Average of five skulls.....				36.5	22.2	16.7	23.3	10.1	10.5	12.6	13.1	5.9	5.6	4.7	4.5	17.7

with their mother, are extremely interesting. The color pattern is very sharply defined. They differ from adults in having the fore part of the back and sides broccoli brown, sparingly lined with black, while the back part of the dorsal surface—a diamond-shaped area—is very dark gray-brown, producing a striking contrast with the front part of the dorsal region, which is not apparent in adults.

*Remarks.*—This species differs from specimens of *D. ordi*, from near the typical locality, in being much more slender, with relatively longer tail, and much darker colors. The skull is very much lighter, and smaller, as shown by the accompanying table of measurements.

***Lepus alleni*,\* sp. nov.**

(ALLEN'S HARE.)

Type, No. 2412, ♂ ad., from Rillito Station, on the Southern Pacific Railroad, Arizona, May 8, 1885. Collected by Dr. E. A. Mearns.

*Description of Type.*—Size large, much exceeding *Lepus callosotis* or *Lepus texianus*; ears very large, nearly naked, except on edges. Color above yellowish brown, strongly mixed with black, this color extending from the nape to the rump, but not reaching the tail; hairs of nape plumbeous, tipped with fulvous; base of ears white; sides, including outer side of limbs, hips and rump, white, with fine black points to some of the hairs, which gives a general light gray to these parts; chin, throat and under surface in the median line, pure white, as are the inner sides of the fore legs above, the inner sides of the hind limbs throughout, and the upper surface of the feet; sides of neck whitish above; breast bright fulvous, this color extending backward upon the lower part of the neck and blending with that of the back; entire head with a whitish cast, more or less mixed with black and suffused with fulvous; orbital ring white; lashes black; whiskers chiefly black, instead of white as in *Lepus callosotis* (?) and *Lepus texianus*. The ears, except the long fringes on their edges and tips, which are white, are nearly naked, being sparsely covered with short, whitish or pale fulvous down, with a few blackish

\*Named in honor of Dr. Joel Asaph Allen, Curator of the department of Mammals and Birds, American Museum of Natural History.

hairs near the tip. Tail lined above with plumbeous-black, which color extends forward upon the rump; residue gray. The dense coating upon the under side of the feet is brown, strongly contrasting with their white upper surface.

Salient features in the general aspect of this Hare are its whitish sides, fulvous gular patch, and enormous, whitish ears.

A specimen taken earlier in the season (No. 175, ♀ ad., Mearns Collection, from Picacho Station, on the Southern Pacific Railroad, Arizona, April 2, 1885) still retains the winter pelage above, which is much longer than the summer coat, and more variegated with black and fulvous. There remain a few long hairs of the winter coat upon the sides, whose broad fulvous tips indicate that the fulvous extends farther down in winter.

*Cranial Characters.*—The skull and dentition of this species are remarkably heavy, as compared with *Lepus texianus*, as is well shown in the accompanying table of measurements. The supra-orbital process of the frontal bone is less arched, probably never forming the highest point of the skull, as is frequently the case in *Lepus texianus*, in which, however, the highest point is often at the middle line of the frontal bone opposite to the posterior supraorbital foramen. The nasal bones, premaxillaries, malars, and in fact the entire skull, has a heavy, massive appearance, contrasting in this respect with the more fragile skull of *L. texianus*.

*Remarks.*—This large and remarkably handsome Hare is a characteristic species of the extensive desert lying between Phoenix and Benson, Arizona, in which remarkable region it is very abundant. It was associated with the *Lepus texianus*, both species having been often seen at once, their different gaits, when running, at once distinguishing them. They were found together over a large area, each manifesting its specific characters typically, and neither showing any approach whatever to the other.

Allen's Hare appears to be a very distinct species. Two other Jackass Hares are known to inhabit Arizona. *Lepus californicus* ranges eastward through California to the Colorado River, and has been ascertained to inhabit sparingly the western border of Arizona, where I have myself seen what I supposed to be that species, on the Colorado River, near Fort Mojave. It requires no comparison with *Lepus alleni*.

1890.]

The common Jackass Hare of Arizona, abundant almost throughout the Territory, is the *Lepus texianus* of Waterhouse. In this species *the nape and base of the ear are never black*, as these parts are in the Mexican Hare (*Lepus callotis* Wagler). It differs considerably from the Jackass Hares of northwestern Texas, Indian Territory and Kansas,\* and is widely different from the descriptions of Wagler's *L. callotis*, of Wagner's three "varieties" of *callotis*, and in fact from all of the forms described from Mexico, lately synonymized with *L. callotis* Wagler.

There is no conclusive evidence that the Mexican Hare (*Lepus callotis* Wagler) has ever been found in California or Arizona. There is an old specimen of Verreaux's in the American Museum, labeled "*Lepus calotis*, Waterh., Californie," which agrees in every detail with the early descriptions of *Lepus callotis*. Waterhouse had before him the type specimen of Bennett's *L. nigricaudatus*, said to have come "from that part of California which adjoins to Mexico," and he states that *L. callotis* "inhabits Mexico and the adjoining part of California;" but, as remarked by Dr. Allen, these specimens "doubtless came from Western Mexico."† Comparing *Lepus alleni* with this specimen, assumed to be from Western Mexico, the two appear to be wholly distinct. Verreaux's specimen (No. 5562, Verreaux Collection, No. 798 American Museum Collection) has the ear measuring but 115 mm. in length from the notch by 75 mm. in width, and the hind foot only 123 mm. in length, while *L. alleni* has an ear measuring 156 mm. in length from the notch and 95 mm in width, and a hind foot 138 mm. in length. The coloration is likewise very different, when due allowance has been made for the fading of the Verreaux specimen. In this comparison, *Lepus texianus*, also, appears as a very distinct species from *L. callotis*, from Mexico, whatever may be its relationship to the Hares of the United States east of the Rocky Mountains.

*Lepus callotis* exhibits considerable variation in color, even in specimens from south of the United States. The Tehuantepec

\*The Jackass Hare of this region is usually termed *Lepus texianus* or *Lepus callotis texianus*, and, while it is the *L. texianus* of Audubon and Bachman, it is not the *L. texianus* of Waterhouse, as will be shown later.

†Baird says (Mam. N. Amer., 1857, p. 591) "not a single one of the species assigned by him [Bennett] to 'California, adjoining Mexico,' has been found in that State. The probabilities are that they came from the Southern part of Sonora, west of the Sierra Madre."

specimens described by Dr. Allen, and Wagner's "var. *flavigularis*," approach *L. alleni* most closely, but present important points of difference, particularly the black color of the nape and base of ears, and are very much smaller, as shown by the measurements, more especially those of the skulls.

***Lepus melanotis*, sp. nov.**

(EASTERN JACKASS HARE.)

In identifying the Arizona Hare (*Lepus texianus* Waterhouse) I compared it with the form of *Lepus callotis* found east of the Rocky Mountains, which Dr. Allen has designated as a northern race, under the name of *Lepus callotis texianus*, not having in his hands the material necessary to show the true status of the Great Basin form—*texianus*. Finding that the two animals were at least subspecifically distinct, I turned to the original description of *Lepus texianus*, where the Arizona Hare is unmistakably described, Waterhouse's excellent description being based on a single specimen "in the collection of the Zoological Society, of which the history is not known," and consequently from an unknown locality. He states that Mr. J. W. Audubon recognized it as a species with which he was well acquainted, and informed him that it inhabited Texas, and would shortly be published in the great work on the North American Quadrupeds, having been named *Lepus texianus*. Accordingly, Waterhouse adopted the MS. name of Audubon and Bachman; but those authors subsequently described a different Hare, from Texas, under the name of *Lepus texianus*. This leaves the northern animal, inhabiting the region east of the Rocky Mountains without a name, Audubon and Bachman's *L. texianus* being preoccupied, and also unfortunately gives to the Arizona and Great Basin form a name geographically inappropriate. It has been treated by the various writers on mammalogy under but two names (*Lepus callotis*, and *L. texianus* or *L. callotis texianus*), both of which were preoccupied. Professor Baird (Mammals of North America, 1857, p. 590; United States and Mexican Boundary Survey, II, ii, 1859, p. 45) united all the Hares of the *callotis* type under *Lepus callotis*; while Dr. Allen discriminated between the northern and southern forms, naming the former *Lepus callotis texianus*, unfortunately applying Water-  
1890.]

house's name, which pertains exclusively to the form west of the Rocky Mountains, which his scanty material did not then warrant him in separating from the eastern form. All other synonyms for the Hares of the *callotis* group are based on specimens from Mexico.

*Description.*—Type, No. 2422, ♂ ad., from Independence, Kansas,\* January 27, 1890. Collected by Dr. Edgar A. Mearns.

Color above brownish fulvous, much mixed with black, the fulvous extending down upon shoulders and outer side of fore legs; breast much brighter, more ochraceous fulvous; haunches and outer side of hind limbs abruptly white, pointed with black; inner side of limbs white; a tuft of long, fulvous hair on sides of abdomen, in front of thighs; below pure white; ears having the very long fringe on their anterior edge ochraceous, the shorter fringe on posterior edge white, their concave surface with a long, dusky patch adjoining the white fringe of the posterior edge, in which the hairs are black, tipped with fulvous; anterior half of convex surface of ear ochraceous, varied with black, its posterior half being white, except the apical portion, where it is jet black for the distance of 30 mm.; nape and base of ears white, with a mesial stripe of fulvous; upper surface of tail black, that color extending forward on the rump to opposite the acetabulum.

On comparing the type, above described, with other specimens in the American Museum Collection, from Kansas, western Texas and Indian Territory, I can find no appreciable difference, save in the very slightly paler colors of the western examples.

This Hare differs from *Lepus texianus* in just about the same particulars that the two forms of *Lepus sylvaticus*, from corresponding localities, differ from each other. That is to say, in the Arizona animals the ears are much larger, the colors paler and more ashy; while, conversely, those from east of the Rocky Mountains have a richer coloring, and small ears. In *L. melanotis* the gular patch is bright fulvous, while in *texianus* this part is pale brownish

\*This is a market specimen, invoiced with several hundred pairs from the above locality, most of which I examined, and which I am informed were doubtless killed on the northern border of Indian Territory. They command a ready sale, in the New York markets, at \$1.50 per pair.

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yellow, the same color staining the haunches, inner side of limbs, and sometimes the abdomen, which parts are white in *melanotis*. The ears are more ochraceous in *melanotis* than in *texianus*. The accompanying table of comparative measurements shows the relative dimensions of these two, and of *L. alleni*, the measurements of their skulls being presented in another table.

*Remarks.*—In naming the eastern Jackass Hare, a perplexing question arises as to its relationship with *Lepus callotis* and *L. texianus*. Dr. Allen has shown that at least two of these Hares probably intergrade, but it is quite improbable that the aggregate material hitherto accumulated in our museums is sufficient to show the true relationship of the three forms in question; and, as I have no intergrades, all of my specimens being typical of one or the other forms, I am unable to surmise in which direction its closest affinity lies, and therefore accord it, for the present, specific rank.

We have, excluding the California species, four Jackass Hares in the region lying between the Mississippi River and California, belonging to what we may designate as the *callotis* type—species which do not change to white in winter, and have the upper surface of the tail black. There is a northern and a southern form east of the Rocky Mountains, and a northern and a southern species west of that range. The northern species west of the Rocky Mountains, and the northern form east of them, resemble each other most closely in general appearance; while the two southern species, likewise, have many features in common. The two northern forms, and also the southern, are separated from each other by a lofty range of mountains, which is quite an effectual barrier to these inhabitants of the plains, and which is recognized as one of the sharpest lines of division between faunal provinces of which we have any knowledge. Therefore, notwithstanding the close resemblance between *Lepus texianus* and *L. melanotis*, I must hesitate to unite them as races of a single species until the narrow gulf which separates them is bridged by intermediate specimens. It sometimes occurs that the line of division is most inflexible between very closely-allied species, as, to cite an ornithological instance, in the case of the species of the 1890.]

genus *Empidonax*; and so it may be with these two Hares, whose points of difference are mainly anatomical, they belonging to a very homogenous genus, in which there is a tendency to special group marks, such as the pronounced gular patch, found in *Lepus timidus* and various old world Hares, as well as those of the present group; indeed, I can well imagine that an example of *L. campestris*, deprived of its white tail, and in summer coat, could be mistaken for one of this group, if color were made the basis of comparison, and anatomical peculiarities not brought into requisition. Moreover, if this Hare does intergrade with *L. texianus* the transition must take place over a very limited area, as the American Museum contains specimens of either, from points as near together as Deming, in south-central New Mexico, and the north-western corner of Texas, where three States and Territories meet.

In view of the evidence adduced by Dr. Allen, it would seem quite natural to unite this with *Lepus callotis*, assuming that it merged into that species near the Mexican border; but I am enjoined to caution in this direction, by the proof of the positive distinctness of the two corresponding species, on the opposite side of the Rocky Mountains.

Although it is highly probable that two or more of the forms under discussion will be united as races of a common species, I should not be greatly surprised to see all of them holding the rank of specific distinctness in the classification of the future. It seems to be a case where judgment may be properly suspended to await the evidence of new material and new facts.

*Synopsis of Four Species of Jackass Hares.*

Largest. Color above, brownish fulvous back to the sacrum; whole of sides, sides of rump, and outer surface of limbs, white, lined with black; inner side of hind limbs, posterior edge of fore limbs, and median line below, pure white; back of neck, in summer, pale plumbeous; base of ears white; under surface of feet and gular patch, bright fulvous; general color of head, pale yellowish gray; ears enormous, nearly bare, whitish, with white fringes; whiskers black. Total length, 643; caudal vertebræ, 69; ear from crown, 195; ear from notch, 156; hind foot, 138. Skull, 113 x 50; mandible, 83. . . . . *Lepus alleni*.

Smallest. Color above, pale yellowish gray, varied with black and fulvous; lower half of the sides of the body, limbs, and rump, white, lined with black; below white, or tinged with fulvous; back of neck, and base of ear

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externally, black in summer ; little or no black at apex of ears, which are yellowish or whitish ; whiskers usually black. Ear from crown,\* 138 ; ear from notch,† 115 ; hind foot,† 123. Skull, 99 x 46 ; mandible, 70.

*Lepus callotis.*

Size large. Color above, pale grayish fulvous, much mixed with black ; breast and shoulders pale yellowish brown ; throat, edge of abdomen, sides of rump, thighs, inner side of limbs, and often the abdomen, washed with fulvous ; long fringe on anterior edge of ear, nearly white ; general color of head, grayish ; whiskers white. Total length, 640 ; caudal vertebræ, 106 ; ear from crown, 171 ; ear from notch, 141 ; hind foot, 145. Skull, 94 x 43 ; mandible, 71 . . . . . *Lepus texianus.*

Size medium. Color above, bright fulvous, not grayish or ashy, much mixed with black ; breast and shoulders, deep fulvous ; below, and on inner surface of limbs, clearer white ; sides of rump and thighs white, lined with black, but without fulvous staining ; long fringe on anterior edge of ear, bright fulvous ; general color of head, brownish yellow ; whiskers white. Total length, 590 ; caudal vertebræ, 77 ; ear from crown, 142 ; ear from notch, 111 ; hind foot, 130. Skull, 97 x 45 ; mandible, 74.

*Lepus melanotis.*

\*Average of four nominal species from Mexico ; taken from Waterhouse's Nat. Hist. Mam. II, 1848, p. 140.

†Taken from the Verreaux specimen, above noticed.

COMPARATIVE MEASUREMENTS OF SKULLS OF *Lepus.*

	<i>Lepus callotis</i> , from Tehuantepec, Mexico.	<i>Lepus ateni</i> , from Arizona.	<i>Lepus melanotis</i> , from Kansas.	<i>Lepus texianus</i> , from Arizona.
Number of specimens. . . . .	. . . 2 . . .	. . . 2 . . .	. . . 2 . . .	. . . 16 . . .
Basilar length (from posterior incisors to foramen magnum) . . . . .	99.8	86.0	74.0	72.8
Total length . . . . .	640	112.5	97.0	93.9
Greatest breadth . . . . .	46.0	49.8	45.0	43.2
Distance between orbits . . . . .	23.4	36.0	27.0	26.6
Nasal bones, length . . . . .	43.9	47.7	42.5	39.5
Nasal bones, width behind . . . . .	21.8	24.5	20.0	19.2
Nasal bones, width before . . . . .	20.8	17.5	14.0	14.4
Upper incisors, from front to molars . . . . .	80.5	35.0	81.0	28.9
Upper incisors, from front to hinder margin of palate . . . . .	42.7	44.5	40.8	37.6
Upper incisors, height . . . . .	9.9	12.9	11.5	10.2
Upper incisors, width between external edges . . . . .	8.8	9.3	9.0	8.8
Upper molars, length taken together . . . . .	17.0	19.2	16.9	16.4
Upper molars, distance between . . . . .	13.7	14.4	12.2	12.2
Lower jaw, length . . . . .	70.4	83.2	78.5	70.7
Lower jaw, height . . . . .	48.0	50.8	45.2	42.9

COMPARATIVE MEASUREMENTS OF *Lepus alleni*, *Lepus texianus*, AND *Lepus melanotis*.

Number.	Sex and age.	LOCALITY.	DATE.	TAIL.		EARS.			FROM TIP OF NOSE TO				FORE LIMB.			HIND LIMB.					
				From root to end of vertebrae.	From root to end of hairs.	Height above crown.	Height above notch.	Width.	Distance between eyes.	Eye.	Centre of pupil.	Ear.	Tip of ear.	Occiput.	End of outstretched hind limb.	Length, measured from coracoid process of scapula to end of claws.	From olecranon to end of claws.	Manns, length to end of claws.	Longest claw of manus.	Length, measured from great trochanter to end of claws.	From knee-joint to end of claws.
175	♂ ad.	Picacho Sta., Ariz.	April 2, 1885	55	88	200	158	100	52	65	98	315	128	215	73	13	0	365	140		
191	♂ ad.	"	May 8, 1885	77	105	195	155	95	52	66	105	315	125	230	80	13	0	390	140		
192	♂ ad.	Red Rock,	"	75	100	190	156	90	52	68	105	310	127	230	75	18	0	370	133		
168	♂ ad.	Fort Verde, Ariz.	Jan. 8, 1885	95	143	169	144	80	44	60	92	280	118	196	71	13	0	340	230	148	
188	♂ ad.	Deming, N. M.	April 20, 1885	70	110	168	125	80	42	55	66	265	104	180	180	66	9	0	358	130	
331	♂ ad.	Fort Verde, Ariz.	Feb. 25, 1886	660	660	560	100	140	47	60	69	95	270	115	850	210	79	370	377	145	
332	♂ ad.	"	"	555	105	145	130	90	45	55	64	90	270	106	855	203	75	355	145		
333	♂ ad.	"	"	630	105	135	138	90	45	56	64	90	275	110	830	235	195	345	142		
369	♂ ad.	"	"	590	105	155	130	90	45	56	65	91	263	110	790	200	75	345	145		
312	♂ ad.	"	April 3, 1886	510	95	130	155	130	45	56	65	91	263	110	790	200	75	345	145		
513	♂ ad.	"	Feb. 9, 1887	660	545	118	153	172	45	62	71	100	278	118	855	207	76	387	232	142	
521	♂ ad.	"	"	590	124	167	170	150	43	60	69	97	275	115	845	230	80	395	148		
532	♂ ad.	"	"	500	133	167	169	145	40	62	68	97	275	113	815	230	73	387	148		
532	♂ ad.	Mogollon Mts.	May 23, 1887	500	160	178	150	100	43	62	72	99	285	120	890	205	60	375	148		
653	♂ ad.	Fort Verde,	April 15, 1888	553	130	177	143	95	48	62	70	106	290	112	865	275	192	75	380	270	150
.....	♂ ad.	Independence, K's	Jan. 10, 1890	580	140	140	110	75	45	64	92	245	105	770	230	64	10	0	335	240	195
.....	♂ ad.	"	"	535	80	115	118	75	45	68	95	245	108	820	195	66	11	5	365	253	185

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AVERAGE AND EXTREME MEASUREMENTS OF *Lepus alleni*, *Lepus texianus*, AND *Lepus melanotis*.

	Total length.	TAIL.		EARS.		FROM TIP OF NOSE TO				FORE LIMB.			HIND LIMB.						
		From root to end of vertebrae.	From root to end of hairs.	Height above crown.	Height above notch.	Width.	Distance between eyes.	Eye.	Centre of pupil.	Ear.	Tip of ear.	Occlusor.	End of outstretched hind limb.	Length, measured from coracoid process of scapula to end of claws.	From olecranon to end of claws.	Mannus, length to end of claws.	Longest claw of manus.	Length, measured from great trochanter to end of claws.	From knee-joint to end of claws.
Average of 3 specimens of <i>Lepus alleni</i> .....	643	69	96	195	156	95	52	66	103	818	127	...	2223	76	13.0	...	275	188	
" " " " <i>Lepus texianus</i> .....	640	106	144	171	141	90	44	59	68	95	275	113	...	199	75	10.8	...	367	145
" " " " <i>Lepus melanotis</i> .....	590	57	112	142	111	75	45	56	66	93	245	106	...	189	65	10.7	...	246	130
Maximum of 3 specimens of <i>Lepus alleni</i> .....	660	77	105	200	158	100	52	68	105	315	128	...	290	80	13.0	...	290	140	
" " " " <i>Lepus texianus</i> .....	670	124	167	188	150	100	48	63	72	106	290	120	...	210	80	14.0	...	395	158
" " " " <i>Lepus melanotis</i> .....	600	80	115	145	113	75	45	58	68	95	245	108	...	195	66	11.5	...	363	135
Minimum of 3 specimens of <i>Lepus alleni</i> .....	630	55	88	190	155	90	52	65	98	310	125	...	215	73	13.0	...	265	133	
" " " " <i>Lepus texianus</i> .....	590	470	70	110	125	80	40	55	64	88	268	104	...	260	80	8.840	...	250	130
" " " " <i>Lepus melanotis</i> .....	580	115	78	108	140	110	45	54	64	92	245	105	...	182	64	10.0	...	335	240
Average of <i>Lepus alleni</i> in inches and hundredths	25.3	31.5	2.72	6.68	6.14	3.74	2.05	2.60	4.06	12.3	5.00	...	8.74	2.99	0.51	...	10.8	5.43	
" " " " <i>Lepus texianus</i> " "	25.2	20.8	4.17	5.67	5.55	3.54	1.73	2.82	3.68	8.74	10.8	4.45	...	7.96	2.95	0.43	...	14.4	10.8
" " " " <i>Lepus melanotis</i> " "	23.2	20.7	3.03	4.41	5.59	2.95	1.77	2.20	3.60	3.66	4.17	31.8	...	7.44	2.56	0.42	...	13.8	9.7
Ratio of dimensions to total length in <i>L. alleni</i> ...	1.00	849	107	152	303	243	148	081	103	160	467	199	...	345	118	050	...	428	215
" " " " <i>L. texianus</i> " "	1.00	823	166	225	267	200	141	069	092	106	146	430	...	428	311	117	...	678	430
" " " " <i>L. melanotis</i> " "	1.00	890	131	190	241	188	127	076	096	112	158	415	...	458	390	110	...	698	417

MEASUREMENTS OF TWO SKULLS OF *Lepus alleni* AND SIXTEEN SKULLS OF *Lepus texianus*.

Number.	Sex.	Locality.	Total length.	Greatest breadth.	Height of skull.	Orbita*.	Distance between Naasal bones.	Naasal bones length.	Naasal bones width behind.	Naasal bones width before.	UP. incisors from front to molars.	UP. incisors, to pos. nar. of palate.	Upper incisors, height.	UP. incisors, with bet. exor. edges,†	Length of upper molar series,†	Distance between upper molars,†	Width across (up) per molars (across)†	Length of palate.	Foramen magnum to h. of palate.	Posterior incisors to foramen mag.	Greatest breadth across squamosals.	1/4th of mandible.	Ht. of mandible at inferior angle.	Length of inter-frontal suture.	Length of inter-parietal suture.	With bet. squam. parietal sutures.	
191	♂	Elizito Station, Arizona...	113.0	49.5	47.5	38.0	47.5	38.0	17.5	36.0	44.5	12.2	9.4	19.8	14.8	28.5	9.0	12.5	86.0	36.0	83.4	63.4	50.5	47.0	49.0	19.0	32.0
192	♂	Red Rock (S.P.R.E.), Ariz.	112.0	50.0	45.0	34.0	47.5	35.0	17.5	34.0	44.5	13.6	9.4	19.0	14.0	28.5	12.5	12.5	86.0	36.0	84.0	63.4	51.5	47.0	49.0	20.0	32.0
323	♂	Fort Verde, Arizona...	94.7	42.8	38.0	27.0	39.0	30.0	16.0	28.0	36.0	10.7	9.0	17.0	12.7	25.6	8.5	41.0	72.0	30.0	57.1	71.8	48.8	85.0	22.0	27.5	
333	♂	"	95.0	43.0	38.0	26.0	40.0	30.0	17.5	30.0	37.0	8.7	8.0	15.0	12.8	24.2	9.0	43.0	57.4	31.0	69.0	42.1	85.5	23.0	27.0		
351	♂	Phenix	91.5	42.0	37.0	26.0	36.0	28.0	14.0	27.0	36.0	9.8	8.5	16.0	11.2	23.0	9.0	39.0	72.0	30.0	68.4	42.5	85.0	21.0	27.3		
352	♂	Cibola Creek,	93.8	42.0	37.0	26.0	39.0	30.0	15.0	27.0	36.0	8.5	8.2	15.2	12.0	23.0	10.0	40.0	57.2	30.0	70.0	42.0	84.0	23.0	28.5		
353	♂	Pine Springs,	97.0	44.2	40.0	29.0	41.0	32.0	14.0	31.0	39.0	11.0	10.0	16.0	13.0	25.0	10.0	42.0	76.0	31.0	73.0	45.0	87.0	24.0	28.0		
369	♂	Fort Verde,	94.0	42.0	38.0	25.0	39.0	30.0	15.0	28.0	36.0	10.0	8.8	17.0	12.0	24.0	9.0	40.0	57.2	30.0	71.0	43.0	85.0	23.0	27.0		
445	♂	"	98.0	42.5	38.0	25.0	39.0	30.0	14.0	27.0	37.0	10.2	9.5	16.0	11.5	24.0	9.0	39.0	71.0	30.0	57.1	42.1	87.0	21.0	27.0		
163	♂	"	98.0	46.0	42.0	29.0	41.0	32.0	16.0	29.0	38.0	11.0	9.5	16.0	11.5	24.0	8.3	42.0	77.4	32.0	73.0	42.0	89.0	23.0	28.0		
186	♂	Deming, New Mexico.....	91.0	43.0	35.0	26.0	37.0	28.0	14.0	26.0	34.0	10.0	9.5	15.0	10.0	21.0	9.0	38.0	77.0	30.0	70.0	44.0	84.0	20.0	25.0		
381	♂	Fort Verde, Arizona.....	99.0	45.2	41.0	30.0	42.0	33.0	15.0	30.0	40.0	10.9	9.5	18.0	13.0	25.0	10.0	43.0	78.0	30.0	81.0	47.4	85.0	21.0	28.0		
384	♂	"	92.0	41.0	38.0	26.0	42.0	33.0	16.0	33.0	40.0	10.0	8.0	16.0	11.0	24.0	7.6	41.0	77.4	30.0	71.0	45.0	87.0	20.0	27.6		
350	♂	Phenix,	95.0	43.0	38.0	26.0	40.0	30.0	14.0	29.0	37.0	10.2	9.2	17.0	12.0	24.0	8.5	42.0	77.4	30.0	71.0	42.0	88.0	23.0	28.3		
854	♂	Fort Verde,	90.5	43.5	38.0	26.0	37.0	28.0	13.0	27.0	35.0	9.0	8.5	15.0	12.0	24.0	8.5	38.0	69.0	31.0	67.5	89.0	86.0	20.0	26.5		
361	♂	Sulp. Sp. Valley	95.5	42.4	41.0	25.0	38.0	28.0	15.0	29.0	38.0	11.0	9.0	17.0	12.0	24.0	11.5	40.0	77.4	30.0	72.0	43.0	87.0	23.0	27.0		
446	♂	Fort Verde,	91.0	45.5	39.0	26.0	40.0	30.0	14.0	28.0	37.0	11.0	10.0	16.0	13.0	24.0	11.0	39.0	57.1	30.0	70.0	43.0	85.0	17.0	28.0		
447	♂	"	92.0	43.5	38.5	26.5	39.0	30.0	14.0	29.0	36.2	9.8	8.0	15.0	12.0	24.0	10.2	39.0	71.0	32.0	69.5	41.5	85.0	22.0	27.0		
Average of 2 skulls of <i>Lepus alleni</i> .....			112.5	49.8	46.3	36.0	47.7	34.5	18.0	35.0	44.5	12.9	9.3	19.2	14.4	27.9	11.2	47.4	86.0	35.5	85.2	50.8	46.6	19.7	32.0		
16 "		"	98.9	43.2	38.8	26.6	39.5	31.2	14.5	28.8	37.6	10.2	8.6	16.4	12.2	24.0	9.4	40.2	72.0	30.0	70.7	42.9	85.6	21.8	27.5		
Maximum of 2 skulls of <i>Lepus alleni</i> .....			113.0	50.0	47.0	38.0	47.5	35.0	17.5	34.0	44.5	13.6	9.4	19.8	14.8	28.5	12.5	48.0	86.0	36.0	84.0	51.5	47.0	20.0	32.0		
16 "		"	99.0	46.0	42.0	30.0	42.0	33.0	16.0	31.0	40.0	10.0	10.0	18.0	13.0	25.0	11.5	43.0	78.0	30.0	74.2	45.0	89.0	24.0	29.0		
Minimum of 2 skulls of <i>Lepus alleni</i> .....			112.0	49.5	45.0	34.0	47.5	35.0	17.5	34.0	44.5	12.2	9.2	19.0	14.0	27.0	9.8	47.4	86.0	35.5	82.4	50.0	46.5	19.0	32.0		
16 "		"	90.5	41.0	35.5	22.0	36.0	27.0	11.5	28.0	35.5	8.5	7.5	15.0	12.0	21.0	7.6	37.0	69.5	33.0	67.5	89.0	83.0	18.0	26.0		
Ave of <i>L. alleni</i> , inches and hundredths			4.43	1.96	1.82	1.42	1.88	.96	.69	1.38	1.75	.51	.87	.75	.57	1.10	.44	1.87	3.89	1.40	3.28	2.00	1.84	.78	1.26		
<i>L. texianus</i> "			8.70	1.70	1.53	1.05	1.56	.76	.57	1.14	1.48	.40	.95	.65	.48	.95	.37	1.58	2.87	1.22	2.78	1.69	1.41	.86	1.08		
Percentages of total length in <i>L. alleni</i>			1.000	.442	.411	.330	.424	.218	.156	.311	.396	.115	.088	.170	.128	.245	.089	.424	.664	.316	.740	.451	.416	.175	.284		
" "			1.000	.440	.414	.328	.420	.205	.153	.307	.400	.108	.094	.175	.128	.245	.090	.438	.775	.339	.758	.457	.351	.172	.293		

borders of supraorbital processes of frontal bone, measured midway between anteorbital notch and postorbital foramen, at the most expanded portion. † Measured on alveole.

. *Cynomys arizonensis*, sp. nov.

Types, No. 2509, ♀ ad., April 9, 1885, from Point of Mountain, near Wilcox, Southern Arizona; No. 2185, ♂ ad., May 3, 1885, from Dragoon Summit, Southern Arizona. Collected by Dr. Edgar A. Mearns.

*Description of Types.*—No. 2509, taken on the 9th of April, is still in winter pelage. Color above, nearly uniform sandy buff, with a few scattered black hairs which are only apparent on close scrutiny; this color extends to the limbs, tail, and inguinal region, being palest on the sides and inner surface of the limbs. The hairs have whitish points, which, however, do not give it the much grizzled appearance of *Cynomys ludovicianus* or *C. columbianus*. At a little distance, it appears to be uniformly yellowish. The color below is nearly pure white, a few yellow hairs extending forward from the inguinal region to the abdomen. The chin, throat and upper lips are white. Tail with a narrow sub-terminal band of snuff-brown. Whiskers and claws, black, the latter tipped with horn-color.

No. 2185, taken May 3d, is in fresh summer coat, except posteriorly, where the winter hair is still retained, and is more ochraceous than in the preceding example. The new hair is light cinnamon color nearly to the base, there being little or no under fur. The summer coat is mixed with black hairs, and has the others barely pointed with whitish. In other respects it agrees with the first specimen, except that the latter, which is in winter coat, has an under fur of buffy white, plumbeous-black at base.

*Cranial and Dental Characters.*—The skull is longer and narrower than in the other species of the genus, and is remarkable for its heavy ossification, the large size of the grinding teeth, and the greater divergence of the upper rows, compared with other species of *Cynomys*, as shown in the accompanying table of comparative measurements.

*Remarks.*—This "Prairie Dog" is abundant, living in large colonies on the edges of the southern deserts of Arizona, extending its range up to the foot-hills of the lower mesas, being replaced at higher levels by another species. It appears to be somewhat  
1890.]

larger than *Cynomys ludovicianus*, and much larger than *C. columbianus*. Its tail is a trifle longer than in the eastern species, and nearly twice the length of that of Colorado specimens of *C. columbianus*.\*

*Synopsis of the Species of CYNOMYS.*

Size medium. *In summer*, reddish clay color above, mixed with black hairs, and much grizzled; forehead sometimes a little dusky; below vinaceous-buff; tail broadly tipped with black. *In winter*, pale vinaceous-buff, grizzled, and mixed with black hairs; below varying from pale buff to ochraceous; forehead often thickly sprinkled with black hairs. *Dimensions* †: head and body, 197-336 (average, 285); tail to end of vertebræ, 51-102 (average, 76); fore foot, 37-54 (average, 43); hind foot, 50-62 (average, 56)..... *Cynomys ludovicianus*.

Size largest. *In summer*, vinaceous-cinnamon above, with but few black hairs, and grizzling obsolete; below whitish; tail with a narrow subterminal bar of broccoli brown. *In winter*, pale sandy buff, with few black hairs, and no black on forehead; below white, in places tinged with buff. *Dimensions* †: head and body, 276-310 (average, 292); tail to end of vertebræ, 76-92 (average, 84); fore foot, 44-49 (average, 46); hind foot, 58-64 (average, 61)..... *Cynomys arizonensis*.

Size smallest. *In summer*, tawney fulvous above, grizzled, much mixed with black hairs; forehead blackish, especially above the eyes; tail without terminal black, but often with many blackish hairs above and a narrow subterminal bar. *In winter*, pale buff above, mixed with black hairs, which aggregate to form blackish patches over the eyes; below varying from pale yellow to fulvous. It appears less grizzled than *C. ludovicianus*, because it lacks the strong vinaceous tint. *Dimensions* ‡: head and body, 270-295 (average, 291); tail to end of vertebræ, 63-80 (average, 69); fore foot, 38-46 (average, 43); hind foot, 55-62 (average, 60)..... *Cynomys columbianus*.

\* It is worthy of remark, in this connection, that the form of *Cynomys* inhabiting the higher portions of Arizona differs notably from *Cynomys columbianus* further north. Its general size is much greater in Arizona specimens, the coloration darker in summer, and the tail relatively much longer, and often blackish above for its entire length. The subterminal bar results from broad black annulation of the hairs, the dark rings increasing in extent from the base of the tail to its extremity. The average length of head and body, in eighteen specimens from the mountain parks of Colorado, measured in the flesh by Dr. J. A. Allen, is 253 mm., whereas eleven fresh specimens from the Mogollon and San Francisco Mountains of Arizona, measured by myself, average 291 mm. The tail to end of vertebræ averages but 48.5 mm. in Dr. Allen's series, in mine 69 mm.; hind foot, 55 mm. in his, against 60 mm. in mine. The adult skulls in my collection from Arizona are also considerably larger than those measured by Dr. Allen. This animal is abundant in the mesas and open parks of Arizona, often living in the pine forests, and sometimes in cliffs, climbing over the rocks like the large *Spermophile* of this region.

† Average of thirty-one specimens; measurements all taken by collectors in the field from fresh specimens. From Dr. Allen's *Monographs of North American Rodentia*, 1877, p. 898.

‡ Average of seven specimens; measurements all taken by myself in the field from specimens in the flesh.

§ Average of eleven specimens; measurements all taken by myself in the field from specimens in the flesh.

COMPARATIVE MEASUREMENTS OF SKULLS OF *Cynomys*.

	<i>Cynomys ludovicianus</i> *.	<i>Cynomys columbianus</i> †.	<i>Cynomys arizonensis</i> .
Number of specimens.....	19	15	2
Basilar length.....	49.0	54.3	
Total length.....	63.0	58.8	66.0
Greatest width.....	45.3	42.3	45.5
Distance between orbits.....	15.0	13.6	14.0
Distance between tips of postorbital processes.....	23.0	23.0	26.7
Nasal bones, length.....	23.9	21.5	25.0
"    width behind.....	6.3	5.6	5.8
"    width before.....	12.7	10.2	10.2
Upper incisors, from front to premolars.....	17.5	16.5	17.9
"    from front to hinder margin of palate.....	35.6	32.5	36.5
"    width between external edges.....	6.3	6.0	7.1
Length of upper molariform series.....	16.3	14.7	16.3
Distance between first upper premolars.....	10.5	11.1	
"    last upper molars.....	5.0	4.8	
Greatest width across upper molars (outside, on crowns).....	18.0	22.0	
Distance between squamoso-parietal sutures.....	15.6	16.0	
Antero-posterior diameter of auditory bullæ.....	13.4	13.7	
Greatest width of zygoma.....	4.1	5.0	
Lower jaw, length.....	41.1	38.2	44.0
"    height.....	22.9	21.6	25.0

\* Taken from Dr. J. A. Allen's Monographs of North American Rodentia, 1877, p. 899.

† Taken, in part, from Allen, five specimens from Arizona having been included in the average.