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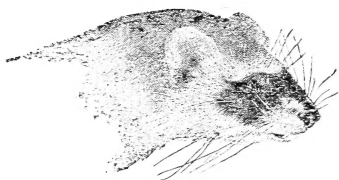
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Results of a Biological Reconnoissance of south-central Idaho

1. General Results
2. Annotated List of Mammals, with descriptions of new species
3. Annotated List of Birds, with description of a new Owl
BY DR. C. HART MERRIAM
4. Annotated List of Reptiles and Batrachians
BY DR. LEONHARD STEJNEGER

Descriptions of a new genus and two new species of North American Mammals

BY DR. C. HART MERRIAM

WASHINGTON
GOVERNMENT PRINTING OFFICE

1891

U. S. DEPARTMENT OF AGRICULTURE,

March 16, 1891.

SIR: I have the honor to transmit herewith the manuscript of No. 5 of NORTH AMERICAN FAUNA. It contains the results of a Biological Reconnoissance of a part of Idaho, which I had the honor to conduct under your instructions during August, September, and October, 1890; and also descriptions of a new genus and several new species of North American mammals.

Respectfully,

C. HART MERRIAM,
*Chief of Division of
Ornithology and Mammalogy.*

Hon. J. M. RUSK,
Secretary of Agriculture.



CONTENTS.

	Page.
LETTER OF TRANSMITTAL	iii
RESULTS OF A BIOLOGICAL RECONNOISSANCE OF SOUTH-CENTRAL IDAHO ..	1-113
Prefatory note	1
Itinerary	1-3
Personnel	3
Acknowledgments	3-4
Introduction	4-5
General description of the region traversed	5-29
Snake Plains	5-8
Birch Creek and Lemhi Valley	8-9
Salmon River Mountains	9-12
Life Zones of the Salmon River Mountains	10-12
Arctic Alpine zone	10
Subalpine or Timber-line zone	10-11
Hudsonian or Spruce zone	11
Canadian or Douglas Fir zone	11-12
Little Lost River Valley	12
Pahsimeroi Valley	12-14
Pahsimeroi Mountains	14-15
Round or Challis Valley	15
Antelope Valley	15
Big Lost River Valley	15-16
Valley of Big Wood River	16-17
Valley at head of Salmon River	17
Saw Tooth Mountains	17-20
Birds of Saw Tooth Mountains	19-20
Brunneau Mountains	21
Life Zones of Idaho	21-25
Arctic-Alpine	22
Sub-Alpine	22
Hudsonian or Spruce	23
Canadian or Douglas Fir	23-24
Neutral or Transition	24
Upper Sonoran	25
Forest Trees of the Mountains of south-central Idaho	25-27
Molluscs of south-central Idaho	27
Effects of water courses on the distribution of species	28
Origin of the name Market Lake	28-29
Mammals of Idaho	31-87
Check List	31-32
Annotated List, with descriptions of new species	32-87
Birds of Idaho, annotated list	89-108
Reptiles and Batrachians of Idaho	109-113
DESCRIPTORS OF A NEW GENUS AND TWO NEW SPECIES OF NORTH AMERICAN MAMMALS	115-119
Description of a new genus and species of Dwarf Kangaroo Rat (<i>Microdipodops megacephalus</i>)	115-117
Description of a new <i>Eutamias</i> from the Black Hills of South Dakota	119

ILLUSTRATIONS.

PLATES.

- Plate I. Colored plate of Dwarf Screech Owl (*Megascops flammeolus idahoensis* subsp. nov.). Frontispiece.
- II. Figs. 1-2, *Arvicola riparius* (teeth $\times 10$).
3-4, *Arvicola mordax* sp. nov. Type (teeth $\times 10$).
5-6, *Arvicola nanus* sp. nov. Type (teeth $\times 10$).
7-8, *Arvicola macropus* sp. nov. Type (teeth $\times 10$).
- III. Figs. 1-2, *Arvicola pauperrimus* (teeth $\times 15$).
3-4, *Phenacomys orophilus* sp. nov. Type (teeth $\times 15$).
5-6, *Erotomys idahoensis* sp. nov. Type (teeth $\times 15$).
7-8, *Erotomys breviceaudus* sp. nov. Type (teeth $\times 15$).
- IV. Fig. 1, *Sorex idahoensis* sp. nov. Type (jaws with teeth $\times 10$).
2, *Sorex dobsoni* sp. nov. Type (jaws with teeth $\times 10$).
3, *Sorex vagrans similis* subsp. nov. Type (jaws with teeth $\times 10$).

FIGURES IN TEXT.

- Figure 1. Cone of *Pinus albicaulis* gnawed by Richardson's Squirrel (natural size).
2. *Onychomys breviceaudus* (teeth $\times 15$).
3. *Hesperomys crinitus* (teeth $\times 15$).
4. *Lepus idahoensis* (skull natural size).

RESULTS OF A BIOLOGICAL RECONNOISSANCE OF IDAHO, SOUTH OF
LATITUDE 45° AND EAST OF THE THIRTY-EIGHTH MERIDIAN, MADE
DURING THE SUMMER OF 1890, WITH ANNOTATED LISTS OF THE
MAMMALS AND BIRDS, AND DESCRIPTIONS OF NEW SPECIES.

By Dr. C. HART MERRIAM.

PREFATORY NOTE.

The present paper consists of the results, hastily brought together, of a biological reconnoissance of Southern Idaho, made during the summer and fall of 1890, by the Division of Ornithology and Mammalogy of the U. S. Department of Agriculture.

The information heretofore available relating to the natural history of Idaho is so exceedingly scanty that all attempts to map the distribution of mammals or birds in the West, or to define the boundaries of faunal and floral zones, have encountered in this State an insuperable barrier, a veritable *terra incognita*.

It was for the purpose of breaking down this barrier that I asked permission of the Honorable Secretary and Assistant Secretary of Agriculture to undertake a biological reconnoissance of a part of Idaho during the summer of 1890. Permission having been granted, the work was done and the results are here briefly recorded. The number of birds known from the State is increased from 64 to 158; and the mammals from 15 to 67. One new owl and twelve new mammals were discovered and are here described. Much remains to be done, particularly in the northern part of the State, but enough has been accomplished to remove the obscurity previously investing the region and to furnish the key to the distribution of life in Idaho.

ITINERARY.

The expedition outfitted at Blackfoot, Idaho, July 8, 1890, crossed Snake River, and proceeded in a westerly direction over the sage plains and lava beds to Big Butte; thence northerly to Big Lost River, which was ascended to a point about 13 kilometers (8 miles) north of Arco; thence skirting the southern spur of the mountain range between Big

and Little Lost River Valleys; the latter was ascended 24 kilometers (15 miles) and crossed to the mountains on the east side ('Lost River Mountains'); returning to the mouth of Little Lost River and crossing the sage plains in an easterly direction to the sinks of Big Lost River and Birch Creek, Birch Creek was ascended to its headwaters, and the low divide was crossed to Lemhi River, which was descended to its junction with Salmon River near Salmon City, the most northerly point reached.

Several side trips were made into the Salmon River Mountains from Birch Creek and Lemhi Valleys. There being no wagon pass over these mountains, it was necessary to return south by means of the same valleys and recross the sage plains to the mouth of Little Lost River. Little Lost River was then followed to its source and the divide between it and Pahsimeroi Valley was crossed.

A side trip was made to a cluster of high mountains at the sources of the Pahsimeroi on the south side of the east end of the valley of the same name. This valley was then descended to its junction with Salmon River, whence, turning south, the valley of Salmon River was ascended to Round or Challis Valley; thence, continuing southward through Antelope Valley and across the divide between Antelope Valley and Thousand Spring Valley to Big Lost River, Big Lost River was ascended to its very head, and the divide was crossed to Trail Creek, which was descended to its junction with Wood River near the town of Ketchum; Wood River was ascended to its headwaters, and the high divide, 2,750 meters (9,000 feet) in altitude, separating it from the head of Salmon River, was crossed, and Saw Tooth Lake and Mountains were visited.

Returning from the Saw Tooth Mountains, the route lay thence southerly, following in the main the course of Wood River (which, after it enters the sage plains, is called Big Wood or Malade) to a point $6\frac{1}{2}$ kilometers (4 miles) northwest of the town of Shoshone; thence directly south across the lava beds and sage plains to Shoshone Falls in the great lava cañon of Snake River. The north side of this cañon was followed down to Payne or Lewis Ferry, where the river was crossed.

Ascending the bluffs on the south side, a southeasterly direction was taken to Castle Cañon and Devil Cañon; the latter being found impassable, the course was changed to south and southwest until intercepted by a long range of unmapped mountains, running from east-northeast to west-southwest from Salmon Falls River westerly across the headwaters of the Brunneau and extending as far at least as the Duck Valley Indian Reservation. The foot of this range was followed in a westerly direction to Three Creek, one of the headwaters of Brunneau River; thence turning southerly the range was crossed through a pass 2,600 meters (8,500 feet) in altitude between the high peaks locally known as Elk Mountain on the east and the Brunneau Mountains on the west; descending on the south side, Cañon Creek was fol-

lowed to its junction with Salmon Creek, and the latter to its headwaters, whence a low and almost imperceptible divide was crossed to the headwaters of Mary River; Mary River was descended to Cold Spring, from which a southeasterly course was taken across the sage plains to Humboldt Wells, Nevada (on the Central Pacific Railroad), where the expedition disbanded October 17.

A detailed biological survey was not attempted, but a reconnoissance was made of about 51,800 myriares (20,000 square miles). Altitudes were determined by aneroids and must be regarded as approximate only. The aneroids were compared with standard cistern barometers at the signal station in Salt Lake City at both ends of the journey, and were checked by known elevations of several stations on the lines of the Utah Northern and Oregon Short Line railroads.

PERSONNEL.

The members of the expedition, in addition to myself, were: Vernon Bailey, chief field naturalist; Basil Hicks Dutcher and Clark P. Streator, assistants, with one man as cook and teamster. Mr. Bailey acted in charge from July 8 until August 23, when relieved by me. On the latter date Mr. Streator was sent to Oregon and Washington in order to ascertain the relations of the fauna of the Plains of the Columbia to that of the Snake Plains.

ACKNOWLEDGMENTS.

Capt. Charles E. Bendire, Curator of the Department of Oölogy in the U. S. National Museum, has had the kindness to read the manuscript of the bird chapter and has added several species from his own unpublished notes, as well as additional information concerning other species.

Mr. Robert Ridgway, Curator of the Department of Birds in the National Museum, has rendered important assistance by comparing certain subspecies with specimens in the Museum collection.

Dr. Leonhard Stejneger, Curator of the Department of Reptiles in the National Museum, has identified the reptiles and batrachians collected by the expedition, and has prepared an annotated list, which will be found at the end of the present report.

Dr. R. E. C. Stearns has identified the molluscs collected, and Mr. Walter Faxon the crayfish.

Most of the plants mentioned in the report were identified in the field by Mr. Bailey and myself. Others were brought back and have been determined by Mr. John M. Holzinger, Assistant Botanist U. S. Department of Agriculture, who also confirmed many of our field identifications.

The Museum of the Academy of Natural Sciences of Philadelphia

contains several types of mammals collected by Townsend in Idaho and Oregon more than half a century ago and described by Bachman in 1839.* Through the courtesy of the officers of the Academy these types have been sent me for examination and I have been able to compare them with specimens collected by us in the same region, thus establishing in several instances the identity of species previously in doubt or wrongly referred.

INTRODUCTION.

Very much less is known of the natural history of Idaho than of any other State or Territory in the Union; and no map of Idaho thus far published can claim even approximate accuracy.

In May, 1806, Lewis and Clark, returning from the Pacific to the headwaters of the Missouri, crossed the northern part of Idaho along the course of the Clearwater (about latitude $46^{\circ} 30'$). The narrative of their travels mentions the Deer, Elk, Moose, Bear, Bighorn, Burrowing Squirrel, [tree] Squirrel, Ducks, Pheasants, Buzzards, Hawks, Eagles, and Sand hill Cranes as observed in the region at present included within the boundaries of the State. Nearly 30 years later (in 1834) John K. Townsend made an overland journey from St. Louis to Oregon, in the course of which he crossed the Snake Plains and reached the southern spurs of the mountains which extend into the plains from the great mountain mass of central Idaho. His narrative mentions the Buffalo and other game, and a few of the smaller animals. From 1853 to 1857 several of the exploring parties of the Pacific Railroad Surveys passed through Idaho, but their reports contain nothing relating to the natural history of the region, except the occasional incidental mention of game. With these exceptions nothing was known to naturalists of the animal life of Idaho until 1872, when it was my privilege to accompany, in the capacity of naturalist, the U. S. Geological Survey of the Territories, under the command of the late Dr. F. V. Hayden. This expedition entered southeastern Idaho from Utah, passed up Malade Valley, and continued northward through eastern Idaho to Fort Hall and Market Lake (crossing Snake River at Eagle Rock); then, turning in an easterly direction, it visited Teton Basin, and, again bearing northward, followed Henry Fork of Snake River to Henry Lake, and thence passed into Montana and the Yellowstone National Park through Tahgee Pass. Returning in October, the expedition reëntered Idaho from Wyoming south of the Teton Range, revisited Fort Hall, and thence moved southward over essentially the same route as that taken on the northward march in June and July. During this expedition I collected in Idaho fifteen species of mammals and recorded sixty-four species of

* Journal Acad. Nat. Sci., Phila., vol. VIII, 1839, pp. 57-74, 101-105.

birds, all of which are enumerated with precise localities and dates in my official report.*

In 1875 Mr. Robert Ridgway published a list† of five species of birds observed by him at 'City of Rocks,' in extreme southern Idaho, when attached to the Clarence King expedition as ornithologist.

In 1877 Capt. Charles E. Bendire published a paper on the '*Birds of Southeastern Oregon*,' in which eighteen species are mentioned that were observed by him in Idaho, mainly in the neighborhood of Fort Lapwai.‡

The scanty information above indicated comprises all the records heretofore published, so far as I am aware, relating to the mammals and birds of Idaho, save the incidental mention of a few species in notes on hunting and fishing that have appeared in 'Forest and Stream' and 'The American Field.'

GENERAL DESCRIPTION OF THE REGION TRAVERSED.

SNAKE PLAINS.

The Basin of Snake River in Idaho is an undulating, sage-covered plain stretching completely across the State in its widest part. It is crescentic in shape (with the convexity to the south) and measures about 600 kilometers (375 miles) in length by 120 to 160 kilometers (75 to 100 miles) in average breadth. Its boundaries on the north and east are everywhere sharply defined, consisting of rugged mountains rising more or less precipitously from the plain. In several places these mountains project southward in parallel ranges, like so many fingers, alternating with northward extensions of the plains, which occupy the valleys between them. Such valleys are those of Birch Creek and Lemhi River, Little Lost River, Big Lost River, and Malade or Big Wood River. On the south and west the Snake Plains are not so well defined, passing southward into Utah and Nevada between irregular ranges of mountains, and westward and northwestward into Oregon and Washington, where they are continuous with the Malheur Plains and Plains of the Columbia. The altitude of the basin along the course of Snake River is about 1,800 meters (nearly 6,000 feet) at the eastern end and less than 900 meters (3,000 feet) at the western, and its sides rise on the north and south to the altitude of 2,000 or even 2,150 meters

* Sixth Annual Report U. S. Geological Survey of the Territories, for 1872, 1873. Report on the Mammals and Birds of the Expedition, by C. Hart Merriam, pp. 661-715. I was then a lad of 16, and a boyish exaggeration of the unreliability of ocular evidence led me to the extreme course of omitting mention of every species of which specimens were not actually brought back to Washington. Nothing is said, therefore, of the deer and elk, with which our camp was often supplied, or of the turkey buzzard, white pelican, and other birds that were many times observed.

† Bull. Essex Inst., VII, 1, January, 1875, p. 24. Also, 4^o Report U. S. Geological Expl. Fortieth Parallel, Clarence King in Charge, vol. IV, 1877, pp. 365, 366.

‡ Proc. Bost. Soc. Nat. Hist., vol. XIX, 1877, pp. 109-149.

(approximately 6,500 to 7,000 feet), forming a broad trough whose general direction is east and west.

The dominant feature of the Snake River Basin is sage plains—rolling, uninterrupted plains, rising so gradually from the bottom of the basin as to appear almost level, and stretching away in every direction as far as the eye can reach. The plains are everywhere arid. The few streams that reach Snake River by a surface course usually flow in lava channels and do not water the region on either side.

The surface rock which crops out here and there over the sage plains proper is dark basaltic lava. It appears in the form of irregular masses or beds, extensive lava flows, and in a few instances of broken-down craters, the largest of which, Big Butte, rises about 600 meters (2,000 feet) above the plain. Some of the cañons of Big Butte support a growth of Douglas fir and Murray pine. The lava flows present great diversity of form; elevated ridges of rough rock irregularly fissured and with jagged edges alternate with smooth, flat domes, suggesting giant bubbles; nearly level stretches marked by wavelets and ripples which bend and double, spread out as if just escaped from a seething, tumultuous caldron, while in many places the thick crust has fallen in, leaving deep pits of circular or elliptical outline, exposing the mouths of dark caverns that extend to unknown depths and furnish homes to owls and bats and a multitude of other nocturnal animals. This black lava or basalt overlies an earlier flow of porphyritic trachite, gray in color and much less firm in texture. The Great Shoshone Fall, commonly known as the 'Niagara of the West,' results from the cutting down of the river bed through the hard basalt to the softer trachite below.

In summer the heat is excessive, the thermometer frequently reaching 110° in the shade, while in winter the snow covers the ground, and icy winds sweep over the plain. The forms of life which inhabit the region, therefore, are such as can endure great heat during the season of reproductive activity, and can avoid the cold of winter by migration or hibernation; or if they remain active throughout the year they are hardy species, able to withstand great extremes of temperature and humidity.

Most of the rivers which flow down through the mountain valleys disappear on reaching the plains, and the greater part of the water which reaches Snake River does so by subterranean channels. Hundreds of springs pour their waters into the lava cañons of Snake River, usually at or near the bottom, and many of them are of great size. In winter their temperature is considerably higher than that of the river. Crayfish, identified by Mr. Walter Faxon as *Astacus gambellii* (Girard), abound in these warm springs and are much sought after by raccoons (*Procyon lotor* ?); and a small shell, identified by Dr. R. E. C. Stearns as *Fluminicola nuttalliana* Lea, is exceedingly abundant on stones in the same springs.

It is a common feature of the Snake Plains, as of many other arid parts of the West, that the rivers which do not sink cut for themselves

deep channels with precipitous walls, their present beds being several hundred feet below the general surface level. Of this character are the grand lava cañons of Snake River itself and many of its tributaries, particularly on the south side. As a rule these cañons can not be seen until their very brinks are reached, and it is not often that they can be crossed on horseback.

The northern boundary of the Snake Plains is formed by the lofty mountains of central Idaho, and by that part of the main range of the Rocky Mountains which bends directly westward from the Yellowstone National Park. Three narrow parallel valleys penetrate the mountains of east-central Idaho in a northwesterly direction, carrying slender tongues of the sage plains all the way to Salmon River.

The soil of the Snake Plains, where not lava or sand, is generally alkaline, and the characteristic plants, in addition to the ever present sage (*Artemisia tridentata*), are such Sonoran species as *Atriplex confertifolia*, *Atriplex nuttallii*, *Artemisia pedatifida*, *Sarcobatus vermiculatus*, *Tetradymia canescens*, *Eurotia lanata*, *Eriogonum cernuum tenue*, several species of *Bigelovia*; a *Malvastrum*, and two or three kinds of cactus. *Artemisia trifida* and *Purshia tridentata* are common in the higher levels; and *Iva axillaris*, a saline species, was found at the sinks of Big Lost River.

The characteristic birds of the sage plains are the Sage Sparrow (*Amphispiza belli nevadensis*), Brewer's Sparrow (*Spizella breweri*), Sage Thrasher (*Oroscoptes montanus*), Burrowing Owl (*Speotyto cunicularia hypogaea*), Sage Hen (*Centrocercus urophasianus*), and Sharp-tailed Grouse (*Pediocetes phasianellus columbianus*), though the latter is rare in the area traversed. Ravens (*Corvus corax sinuatus*) and Magpies (*Pica pica hudsonica*) are common in places, and the Cañon Wren (*Catherpes conspersus*) was found near Shoshone Falls in the lava cañon of Snake River.

The most common diurnal mammals are the Great Basin or Sage Chipmunk (*Tamias minimus pictus*) and a small Spermophile (*Spermophilus townsendi*). Other equally characteristic species are the nocturnal Kangaroo Rat (*Dipodops ordii*), Pocket Mouse (*Perognathus olivaceus*), Grasshopper Mouse (*Onychomys leucogaster brevicaudus*). Four species of Rabbits, namely, the White-tailed and the Black-tailed Jack Rabbits (*Lepus campestris* and *L. texianus*), the Idaho Pigmy Rabbit (*Lepus idahoensis*), here described for the first time, and the Great Basin Cotton-tail (*Lepus sylvaticus nuttalli*) are common. Antelope roam over the plains in small herds, and Badgers and Coyotes are abundant. In the lava cañon of Snake River, near Shoshone Falls, the Plateau Lynx (*Lynx baileyi*), Raccoon (*Procyon lotor* ?), Little Striped Skunk (*Spilogale saxatilis* ?), Dusky Wood Rat (*Neotoma cinerea occidentalis*), and Cliff Mouse (*Hesperomys crinitus* sp. nov.) are common, and tracks of Porcupine (*Erethizon epixanthus*) were seen. Black-tailed Deer (*Cariacus macrotis*) inhabit the cañon in winter.

Rattlesnakes (*Crotalus lucifer*), Horned Toads (*Phrynosoma douglasii*), and small Lizards (*Sceloporus graciosus*) are common on the Snake Plains, and extend north through the principal sage-covered valleys. Two Bull Snakes, provisionally referred to *Pituophis catenifer* by Dr. Stejneger, were collected at Big Butte and Arco, and a single *Bascanion vetustus* at Big Butte.

Salmon and Sturgeon ascend Snake River to the Great Shoshone Fall. When we crossed the river at Lewis Ferry, October 12, we saw several large Sturgeon (*Acipenser transmontanus*) tied by the tails to stakes driven in the bank. One weighed fully 70 kilograms (150 pounds), and we were told by Mr. Lewis that he sometimes catches individuals weighing as much as 300 kilograms (660 pounds). He told us also that the fall run of Salmon reached his place about October 1, and that the fish that do not die go back in November. We met a number of Shoshone or Bannock Indians on their way to the river to spear Salmon. Some of them came all the way from the Lemhi Reservation.

A kind of Mole Cricket locally known as the Idaho Devil (*Stenopalma-tus fasciatus*) is common on the Snake Plains in October. It is a large wingless insect with a great yellow head, powerful jaws, and a banded abdomen. I first saw it in eastern Idaho in October, 1872, and found it common from Shoshone Falls and Lewis Ferry to the headwaters of Brunneau River in October, 1890. It lives in burrows in the sage plains and its holes resemble those of the small Pocket Mice (*Perognathus olivaceus*) in being clean cut, going straight down at first, and having no mound at the opening. In crossing the plains during cold stormy weather the heads of these curious animals were often seen at the mouths of their burrows and many were met with walking about among the sagebrush. They walk much, with seeming dignity and deliberation, and their tracks may be seen in every direction. If two are held together they immediately bite off one another's legs and inflict other serious wounds. They bite a large straw in two at a single nip.

BIRCH CREEK AND LEMHI VALLEY.

The most easterly and longest of the series of parallel valleys which penetrate the mountains of east-central Idaho is that of Birch Creek and Lemhi River. It is 160 kilometers (100 miles) in length by 6 or 8 kilometers (4 or 5 miles) in average breadth, and may be described as a single valley containing two streams which run in opposite directions, the divide between them being only a little over 2,130 meters (7,000 feet). Birch Creek sinks where it enters the Snake River Desert near the intersection of latitude 44° and longitude 113°; the Lemhi empties into Salmon River at Salmon City. The eastern boundary of Lemhi Valley is formed by the main chain of the Rocky Mountains (here occupying the boundary line between Idaho and Montana); and that of Birch Creek Valley by a southern offshoot or ridge of the same which terminates abruptly in a spur known as Rattlesnake Point. The west-

ern boundary of the whole valley is the Salmon River Mountains (the southern part of which is sometimes called the 'Lost River Mountains'). The Salmon River Mountains are much higher and more rugged than the Rocky Mountains, the peaks attaining an altitude of nearly 3,950 meters (13,000 feet) and being everywhere blotched with snow, while those of the latter rarely reach 3,350 meters (11,000 feet) and as a rule do not exceed timber line except near Salmon City.

The vegetation of the valley of Birch Creek and the Lemhi is much the same as that of the Snake Plains already described. Sage brush (*Artemisia tridentata*) covers the whole valley and reaches up over the foothills to the lower border of the coniferous forests which come down from the mountains. *Artemisia trifida* and *Bigelovia graveolens* are common in places along the higher parts of the valley and sides of the foothills. *Atriplex confertifolia*, *Sarcobatus vermiculatus*, and *Tetradymia canescens* occur in large patches in the lower levels up to about 1,950 meters (6,400 feet). This lower or Sonoran zone reaches northward to the lava dike at Johnston's Ranch, 16 kilometers (10 miles) south of Nicholia, and reappears about 48 kilometers (30 miles) farther north, in the upper Lemhi Valley, whence it extends down to Salmon River. The intervening divide rises gradually to the height of a little more than 2,100 meters (7,000 feet) and is everywhere covered with sage.

Rattlesnakes (*Crotalus*) and Horned Toads (*Phrynosoma douglassii*) are common in Birch Creek and Lemhi Valley, though the Rattlesnakes seem to be confined to the Sonoran or lower levels. *Oroscoptes montanus* and *Amphispiza belli nevadensis* are common; and *Parus atricapillus septentrionalis* inhabits the willow thickets along the streams. *Lepus campestris*, *L. texianus*, *L. sylvaticus nuttalli*, and *L. idahoensis* range throughout the entire length of the valley, as does the Sage Chipmunk. Pocket Mice inhabit the gravel benches, but Kangaroo Rats extend only a short distance up the valley.

SALMON RIVER MOUNTAINS.

The above heading has been somewhat loosely applied to various masses of mountains in the neighborhood of the upper Salmon River in central Idaho. The use of the name is here restricted to the range universally known as the Salmon River Range, lying between the Lemhi Valley on the east and Salmon River and the Pahsimeroi on the west. Its southward continuation (between the valleys of Birch Creek and Little Lost River) is called 'Lost River Mountains' on the Land Office map, though there is no break in the range, either in continuity or direction, and I would suggest that the name 'Lost River Mountains' might be far more appropriately applied to the nameless range between Big and Little Lost Rivers. Between Birch Creek and Little Lost River the range is narrow and culminates in a single ridge of peaks, so that the profile is nearly the same from both valleys. Dome Peak is

the highest point in the southern part of the range, and Needle Peak* only a little lower. Both are nearly 3,950 meters (13,000 feet) in altitude. The northern part of the Salmon River Mountains is very much broader than the southern and has no appearance of a range except from the valleys of the Lemhi and Pahsimeroi Rivers. Between these valleys is a great mass of high mountains culminating in a large number of irregularly disposed peaks, many of which exceed 3,650 meters (12,000 feet) in altitude. The geologic history of the region has not been studied, but it is evident that great and violent disturbances have taken place. Not only are mountains of granite, carboniferous limestone, and lava found in close proximity, but these three kinds of material, formed during widely remote periods of time, sometimes exist in actual contact in single peaks. Examples of such peaks may be found between the heads of Timber Creek and Eight-Mile Cañon. Looking west, northwest, and southwest from the summit of a high mountain north of Timber Creek nothing could be seen but a sea of lofty, rugged peaks heavily marbled with snow and separated by narrow gulches and deep cañons. The Pahsimeroi valley was not visible.

LIFE ZONES OF THE SALMON RIVER MOUNTAINS.

Arctic-Alpine Zone.—Many arctic-alpine plants grow upon the rocky summits of these mountains and five species were collected which were found by us on San Francisco Mountain, Arizona, in 1889,† namely, *Oxyria digyna*, *Sibbaldia procumbens*, *Geum rossii*,‡ *Polemonium confertum*, and *Silene acaulis*. Dense mats of a dwarf willow (*Salix reticulata*) only 50 to 75 millimeters (2 or 3 inches) in height and bearing quantities of beautiful white wool which the chipmunks were carrying off in large mouthfuls, abound below some of the snow banks; beds of wiry *Bryanthus taxifolius* border many of the springs, and *Draba alpina* occurs here and there among the rocks. To these should be added *Anemone baldensis*, collected by Mr. Bailey on Needle Peak, and *Actinella grandiflora*, collected on a peak near the head of Timber Creek. The birds found above timber line are *Leucosticte atrata* and *Anthus pensilvanicus*; probably the former belongs to this zone and the latter to the next. Mountain Goats (*Mazama montana*) and Sheep (*Ovis canadensis*) inhabit the summits in summer, but probably belong to the zone below. The upward ranges of the Pika (*Lagomys princeps*) and Marmot (*Arctomys* sp. —?) extend far above timber line.

Sub-alpine or Timber-line Zone.—The altitude of timber line on the Salmon River Mountains varies from 3,050 to nearly 3,350 meters (10,000 to 11,000 feet), according to slope exposure. The trees which attain timber line and constitute the upper forest belt are *Pinus albicaulis* and

* Needle Peak is carboniferous limestone. Fossils collected there by Mr. Bailey have been determined by Mr. Charles D. Walcott as belonging to the genus *Zaphrentis*.

†N. Am. Fauna No. 3, Sept. 1890, pp. 7-8.

‡Mr. Holzinger determines this form to be the subspecies *humile*.

Abies subalpina, with an occasional *Picea engelmanni*. This belt may be divided into two zones—Sub-alpine and Hudsonian—as was done in treating of the life of San Francisco Mountain, Arizona. In the upper or dwarf timber zone the following small plants were found: *Arenaria biflora carnulosa*, *Arenaria congesta subcongesta*, *Aplopappus lyellii*, *Aplopappus suffruticosus*, *Chaenactis douglassi alpina*, *Delphinium menziesii*, *Heuchera hallii*, *Pentstemon menziesii*, *Phleum alpinum*, *Potentilla nivea dissecta*, *Sedum debile*, *Senecio aureus compactus*, and *Solidago virgaurea alpina*. Several of these range above timber line. The Titlark (*Anthus pensilvanicus*) probably breeds in this zone. The only characteristic mammal obtained is a new species of Lemming Mouse (*Phenacomys orophilus*), though the Pika (*Lagomys princeps*) seems to find here its center of abundance. The Mountain Goat and Sheep (*Mazama montana* and *Ovis canadensis*) inhabit both the Sub-alpine and Arctic-alpine zones in summer, but I am inclined to believe that they really breed in the former, and therefore should be classed among the species properly belonging to this zone.

Hudsonian or Spruce Zone.—As stated in the previous section, the characteristic trees of the Hudsonian or upper timber belt of the Salmon River Mountains are *Pinus albicaulis* and *Abies subalpina*, sparingly mixed with *Picea engelmanni*. Another species, *Picea alba*, occurs with them and descends into the lower timber belt also. The altitude of the lower border of this zone on the eastern slope of the mountains is about 2,750 meters (9,000 feet). Among the small plants found in this zone on the Salmon River Mountains during the latter part of August were: *Astragalus kentrophyta*, *Calochortus gunnisoni*, *Calochortus nitidus*, *Eriogonum compositum trifidum*, *Eriogonum ovalifolium*, *Gaultheria myrsinites*, *Heuchera parvifolia*, *Saxifraga bronchialis*, *Senecio canus*, and *Silene douglasii*. Among birds, Clark's Crow (*Picicorvus columbianus*), the Goshawk (*Accipiter atricapillus*), Pine Bullfinch (*Pinicola enucleator*), and Pink-sided Junco (*Junco annectens*) are characteristic species. *Phenacomys orophilus* sp. nov., is the only mammal found in this zone and not found below.

Canadian or Douglas Fir Zone.—On the east slope of the Salmon River Mountains the lower timber belt occupies the plane between 2,375 and 2,750 meters (7,800 and 9,000 feet) and consists chiefly of *Pseudotsuga douglasii* and *Pinus murrayana* mixed with a variable quantity of *Picea alba*. Small groves of *Populus tremuloides* are scattered here and there, usually occupying drier situations than those in which the conifers thrive best. Among the small plants of this zone are *Pyrola secunda*, *Rubus nutkanus*, *R. strigosus*, *Vaccinium microphyllum*, *Arctostaphylos uva ursi*, and at least three species of *Ribes*, one related to *R. floridum*, one to *R. cereum*, and one to *R. irriguum*. *Potentilla fruticosa* is abundant along the lower part of the zone, but is equally abundant in parts of the neutral zone below. Frogs (*Rana pretiosa*) were com-

mon in the marshes; and a Garter Snake (*Eutainia vagrans*) was collected.

Among the birds that breed in the Canadian Zone are: *Turdus auduboni*, *Regulus calendula*, *Parus gambeli*, *Sialia arctica*, *Sitta canadensis*, *Perisoreus canadensis capitalis*, *Cyanocitta stelleri annectens*, *Spinus pinus*, *Dendroica auduboni*, *Dendragapus obscurus richardsoni*, *Bonasa umbellus togata*, and *Bubo virginianus saturatus*. The characteristic mammals are *Neosorex*, *Evotomys*, and *Zapus*. Many others are common to this and the Hudsonian Zone, as the Bears, Wolverine, Marten, Fisher, Weasel, Shrews, Arvicolas, Richardson's Squirrel, Gray Ground Squirrel, Flying Squirrel, Chipmunk, Porcupine, Snow-shoe Rabbit, Moose, and Black-tailed Deer.

LITTLE LOST RIVER VALLEY.

The next valley west of and nearly parallel to Birch Creek is that of Little Lost River. It is about 70 kilometers (43 miles) in length by 13 to 16 kilometers (8 or 10 miles) in average breadth, and is walled in on both sides by high mountains—the Salmon River Mountains on the east and a nameless range on the west, the former separating it from Birch Creek Valley, the latter from Big Lost Valley.

The tongue of the Sonoran Zone which extends up the valley of Little Lost River from the Snake Plains reaches about 5 kilometers (3 miles) north of the ranch where the post-office of Clyde is now located, and is characterized by the presence of the species mentioned as occupying the same level in the valley of Birch Creek. The head of Little Lost Valley expands into a springy basin, into which a spur of the Salmon River Mountains projects from the north. Little Lost River heads northeast of this spur, while to the northwest a low pass (2,050 meters or 6,700 feet) connects directly with the head of the Pahsimeroi Valley. The pass is grassy and fed by many springs, most of which are surrounded by clumps of willows. *Artemisia trifida* is the prevailing sage here.

PAHSIMEROI VALLEY.

A small stream ('Bullberg Creek') trickles down the northwest side of the pass over the divide between the valley of Little Lost River and that of the Pahsimeroi. This stream joins the Pahsimeroi, which in turn empties into Salmon River. The axis of Pahsimeroi Valley is more nearly east and west than indicated on the Land Office and other maps (which represent it as nearly north and south). The valley is about 70 kilometers (43 miles) in length and is narrowly wedge-shaped, the base of the wedge being at the head of the valley, which is about 24 kilometers (15 miles) in width, while the apex (at the junction with Salmon River) is only 2 or 3 kilometers (1 or 2 miles) across. It is hemmed in on all sides by high mountains, the highest of which feed and protect the headwaters of the Pahsimeroi. Just west of this cluster of lofty

peaks is a pass leading south to 'Thousand Spring' Valley, on Big Lost River.

A conspicuous band of timber stretches along the mountains on the north side of the valley, but does not come down within 300 meters (1,000 feet) of the plain; above it the bare rocky summits project from 300 to 600 meters (1,000 to 2,000 feet). About the middle of the valley on the south side (the northeast or cold slope) is a springy marsh covered with scattering Douglas fir and aspen. The bottom of the valley slopes rather steeply to the river, and the Sonoran zone runs up its full length to within about 5 kilometers (3 miles) of the divide, where it stops at an altitude of about 1,950 meters (6,400 feet). The altitude of the junction of the Pahsimeroi with the Salmon is about 1,400 meters (4,600 feet). The valley is covered with sage brush (*Artemisia tridentata*), mixed with grease woods (*Sarcobatus vermiculatus* and *Atriplex confertifolia*), with a sprinkling of *Tetradymia canescens* and *Opuntia*. Some of the fields of *Atriplex* are miles in extent, rivaling those near the sink of Little Lost River.* Pocket mice (*Perognathus olivaceus*) are common on the gravel benches; the Great Basin Chipmunk (*Tamias minimus pictus*) is abundant everywhere, and not less than four strongly marked species of rabbits inhabit the valley, namely, *Lepus texianus*, *L. campestris*, *L. sylvaticus nuttalli*, and the new *L. idahoensis*, the type of which was caught on the upper part of Pahsimeroi River, near the great bend. Still another species (*L. bairdi*) lives in the adjacent mountains. Coyotes (*Canis latrans*) are very common, and many were seen in the daytime sneaking along the edge of the willows, hunting for rabbits. Badgers abound throughout the valley, and in some places the large circular disks of pebbles which still remain to mark their former diggings are so numerous as to cover almost as much ground as the spaces between them. Sage Hens in large flocks were seen at the head of the valley; Magpies, Brewer's Blackbirds, Horned Larks, Meadowlarks, Sparrow Hawks, and Vesper Sparrows were common; a few Turkey Vultures and Mourning Doves were seen, and Green-winged Teal, Marsh Hawks, and Kingfishers were common along the river. A single White-rumped Shrike was observed.

At the time of our visit, September 12 to 18, the lower part of the Pahsimeroi River, which averages about 15 meters (50 feet) in width and two-thirds of a meter (2 feet) in depth, was full of large Salmon (probably *Oncorhynchus chouicha*), still working upstream. Many of them were bruised, others were in excellent condition, and I never saw a finer

* In descending the Pahsimeroi Valley we passed through a tract of *Atriplex confertifolia* at least 13 kilometers (8 miles) in length. Both this species and *Tetradymia canescens* are excellent examples of 'social' plants, each covering large areas, often hundreds or even thousands of acres in extent, to the exclusion of most other forms of vegetation, and ending abruptly with a sharp line of demarcation. In other places they associate together and are mixed with sage-brush (*Artemisia tridentata*) and *Sarcobatus vermiculatus*. The latter species also is a 'social' plant, but was not observed in such large patches.

Salmon than one we took for our own use. It weighed about 18 kilograms (40 pounds) and measured 1,170^{mm} (46 inches) in length by 610^{mm} (2 feet) in girth; its flesh was hard and delicious.

PAHSIMEROI MOUNTAINS.

This name is here applied for the first time to a group of lofty, rugged, snow-marbled peaks, arranged in the form of a double or triple amphitheater, surrounding the sources of the Pahsimeroi River, and about 32 kilometers (20 miles) south of the pass between the Little Lost and Pahsimeroi Valleys. On the south these same mountains face 'Thousand Spring Valley,' which is an offshoot from Big Lost River Valley. There are two main amphitheaters, facing each other obliquely and feeding the two principal heads of the Pahsimeroi—an east and a west, of which the latter is the larger. The two forks unite to form the Pahsimeroi proper, which flows north about 19 kilometers (12 miles) through a nearly straight, terraced cañon, so deep that the trees bordering the river do not reach halfway to the top, and then bends abruptly to the west, soon taking the course of the main valley. The west fork forks again, and successions of beautiful cascades adorn both branches. On one of these I found a family of Water Ouzels and discovered their large nest of moss in a niche in the rock. The level stretches along both forks are bordered by broad thickets of willows, which shelter many Snowshoe Rabbits; and the woody *Potentilla fruticosa* grows profusely along the lower border of the timber, where it is associated with *Frasera speciosa*. The bleak rocky summits of the mountains, the home of many Mountain Sheep, rise nearly 900 meters (3,000 feet) above timber line, and their precipitous north slopes are marked by enormous banks of perpetual snow. Lower down are dark coniferous forests abounding in Elk and Black-tailed Deer; and below these still are thickets of mountain mahogany (*Cercocarpus ledifolius*). The prevailing timber is *Pseudotsuga douglasii*, *Pinus murrayana*, and *Picea alba*, with *Pinus albicaulis*, and *Abies subalpina* occupying the higher elevations and reaching timber line. *Pinus flexilis* grows sparingly in some places, and *Populus tremuloides* occurs with the Douglas fir below. These forests fairly swarmed with Squirrels (*Sciurus richardsoni*) and Chipmunks (*Tamias quadrivittatus amoenus*) at the time of our visit (September 13–16). Beaver were common in the streams, and small herds of Antelope grazed over the non-forested hills. Bleaching skulls and skeletons of the Buffalo attested the former presence of this nearly extinct species. Burrows of Spermophiles and Marmots (*Arctomys*) were found, but the inhabitants had gone into winter quarters. Colonies of Pikas (*Lagomys princeps*) dwelt in the rock slides high up, and two new species of *Arvicola* were abundant in the springy meadows at and below timber line—one a huge species (*A. macropus*), the largest yet found in America except *Arvicola (Neofiber) alleni* of Florida; the other a very small species (*A. nanus*). A single Shrew was secured (*Sorex vagrans similis*). Blue

Grouse (*Dendragapus obscurus richardsoni*) were common in the forests and willow thickets; Clark's Crows (*Picicorvus columbianus*) and Townsend's Solitaire (*Myadestes townsendi*) were numerous in the higher levels, and both species of *Regulus* were observed. *Zonotrichia leucophrys* and *Melospiza lincolni* were killed in the willow thickets, and several Kingfishers were seen along the streams.

ROUND OR CHALLIS VALLEY.

Round or Challis Valley occupies both sides of Salmon River, and is about 13 kilometers (8 miles) long and 9 kilometers (5½ miles) broad. It is surrounded by low, rounded mountains, and is continuous to the northward with the narrow valley of Salmon River, and to the southeast with Antelope Valley. Late as was the time of our visit (September 18-21) we found a beautiful *Malvastrum* in flower near the river. Other characteristic Sonoran plants growing in great abundance in the valley are *Atriplex confertifolia*, *Sarcobatus vermiculatus*, and *Eurotia lanata*. Sage brush (*Artemisia tridentata*) is the prevailing plant at all levels. Kangaroo Rats and Pocket Mice are common, and both White and Black Tailed Jack Rabbits were seen. Muskrats and Ducks abound in the sloughs of the river; Wood Rats inhabit the cliffs on its east bank, White-footed Mice swarm in the willow thickets, and two kinds of Arvicolas are common in the grassy bottoms. Several Fishhawks and Kingfishers, many Magpies and Crows, a few Turkey Buzzards, a Great Blue Heron, a Jack Snipe, and a Gull were noted along the river; and large flocks of Titlarks abounded throughout the valley.

Several Garter Snakes (*Eutainia vagrans*) were found in the water in small, cold streams emptying into Salmon River a few miles north of Round Valley.

ANTELOPE VALLEY.

Antelope Valley (altitude about 1,850 meters or 6,100 feet) is about 10 kilometers (6 miles) long by 6 kilometers (3½ miles) broad, with the longest axis nearly north and south, and is continuous with Challis Valley on the north. Its eastern boundary is a high rocky range rising sharply from the plain and culminating in a single lofty ridge, not broken into separate peaks. It is an ideal 'mountain wall.' On the west the mountains are rounded and grassy, and are not so high. The bottom of the valley is sandy, and in it were noticed numerous burrows of Kangaroo Rats. *Atriplex confertifolia* and *Eurotia lanata* were conspicuous plants. Antelope Valley is separated from the valley of Big Lost River by a divide about 2,225 meters (7,300 feet) in altitude at the lowest point.

BIG LOST RIVER VALLEY.

The valley of Big Lost River is the largest of the three parallel valleys which penetrate the mountains of east-central Idaho from the sage

plains of Snake River, and the river from which it takes its name is larger than the other two together. The valley is about 80 kilometers (50 miles) long and ends in a broad, triangular basin, with the river flowing along its south side and bordered by trees. The west side of this basin is crescent-shaped, the south horn of the crescent curving westward to the narrow valley of the upper part of the river, the north arm containing 'Thousand Spring Valley' and Willow Creek, and connecting by a pass 2,225 meters (7,300 feet) in altitude with Antelope Valley, and thence with Salmon River at Round or Challis Valley. The Sonoran zone occupies the main part of Big Lost Valley and of Antelope and Challis Valleys. Above 'Thousand Spring Valley' Big Lost River flows through a narrow valley or cañon, with mountains close by on both sides. Through the gaps on the south side rugged, snow-capped peaks appear. A large branch rises in these mountains. The headwaters of Big Lost River are separated from those of Trail Creek by a divide more than 2,440 meters (8,000 feet) in altitude at the lowest pass and with much snow in the cañons on both sides. The divide is covered by a forest of *Pinus murrayana*, with a few scattering trees of *Pseudotsuga douglasii* and *Picea alba*. Here we found the Moose Bird or Canada Jay, Clark's Crows, and many Richardson's Squirrels and Snowshoe Rabbits. In the rock slides were colonies of Pikas (*Lagomys*) and Gray Ground Squirrels (*Tamias cinerascens*).

The descent to the valley of Trail Creek is precipitous. Though the date of our crossing was near the end of the hot season (September 23), several snowdrifts 9 meters (30 feet) in depth were found, and three extensive snow-bridges were observed. These are the remains of huge avalanches, and hundreds of large trees were seen which had been snapped off or torn up by the roots and carried into the bottoms of the valleys. Trail Creek Valley contains the largest groves of poplars met with during the season.

VALLEY OF THE BIG WOOD RIVER.

Wood River rises in high mountains only a few miles distant from the ultimate sources of Salmon River, from which it is separated by a divide, the lowest pass in which is 2,750 meters (9,000 feet) in altitude. For many miles it flows through a narrow valley with high mountains on both sides, and with Douglas fir and Murray pine growing down to the lowest levels. It was here that a colony of *Lagomys* was found in a rock slide as low as 2,250 meters (7,400 feet), and *Sorex*, *Neosorex*, and *Arvicola* were caught in the marshy bottoms. A little lower down the river is bordered with groves of aspens (*Populus tremuloides*) and cottonwoods (*P. balsamifera*) alternating with extended stretches of willow thickets. On reaching the neighborhood of the town of Hailey the valley begins to widen and the mountains become lower. A few miles below it spreads out into the sage plains, the mountains disappear altogether, and the river changes its name to Big Wood or Malade,

This river, and Little Wood which finally empties into it, are the first streams west of Henry Fork, 240 kilometers (150 miles) distant, which succeed in crossing the arid Snake Plains from the north and actually reach Snake River.

VALLEY AT THE HEAD OF SALMON RIVER.

The valley at the head of Salmon River is a sage-covered basin about 12 kilometers ($7\frac{1}{2}$ miles) in width between the Saw Tooth Mountains on the west and a nameless range on the east. It extends in a north and south direction from the sources of Salmon River in northern Alturas County to Stanley Basin in western Custer County, and is about 2,135 meters (7,000 feet) in altitude. The Sage Chipmunk (*Tamias minimus pictus*) is common in the valley, and Sage Hens (*Centrocercus urophasianus*), Horned Larks (*Otocoris alpestris arenicola*), Titlarks (*Anthus pensilvanicus*), and Meadowlarks (*Sturnella neglecta*) were seen there early in October. The head of Salmon River is separated from the headwaters of Wood River by a divide 2,745 meters (9,000 feet) in altitude at its lowest pass. Forests of Murray pine and Douglas fir come down to the level of the valley on the west side.

SAW TOOTH MOUNTAINS.

The Saw Tooth Mountains form the western boundary of the valley of the upper part of Salmon River. They are covered with coniferous forests from the very base on the east side to timber line. The principal trees are Douglas fir and Murray pine below, and *Pinus albicaulis* and *Abies subalpina* above, mixed with *Picea engelmanni* and *P. alba*. The peaks are rocky and jagged, but not so high as those of the Salmon River and Pahsimeroi Mountains. At the east foot of the range are several lakes, known collectively as the 'Red Fish Lakes' because inhabited by a bright red Salmon called Nerka (*Oncorhynchus nerka*). One of these, Saw Tooth or Alturas Lake, is about 5 kilometers (3 miles) in length by 2 (a little over a mile) in breadth, and is surrounded by forests of Murray pine with here and there a little Douglas fir. It lies between two spurs of the mountains and is about 2,200 meters (7,200 feet) in altitude. There is a fine sand beach at the head (west end) of the lake, bordered by a narrow strip of Murray pine, behind which is an extensive willow marsh dotted with clumps of pine and fir.

The narrow valleys and cañons west of the lake were almost impassable at the time of our visit because of the fallen timber brought down by avalanches during the heavy snows of the previous winter (winter of 1889-90). As a rule each avalanche takes all the trees in its path, tearing them up by the roots on the higher mountain sides and snapping off their trunks where the snow is drifted in the hollows, carrying them down into the valleys below and piling them up in wild confusion. In several instances these snow slides not only swept completely

across the bottoms of the valleys, but rushed up the opposite sides to a height of 200 meters (650 feet) and deposited there the ruins of the forests they had destroyed. Miles and miles of the torn and shattered trunks of trees fill the valleys and cañons, and ages may pass before the barren mountain sides regain a forest covering.

Along the outlet of the lake are several large flats or parks, some of which are covered with grass, others with sage brush. Near the lake a blue gentian (*Gentiana affinis*) was in flower, and *Potentilla fruticosa* was abundant (a few still in flower). *Rubus nutkanus* was common in the forest, as were two species of currant (*Ribes*), one having bright red berries; and service berries (*Amelanchier alnifolia*), some of exceptionally large size, were found in places. High up in the mountains near the snow were large beds of the handsome purple *Pentstemon kingii* in full bloom; and also beds of a yellow *Eriogonum*, and a few stems of a beautiful bright red *Gilia* related to *G. aggregata*. Frogs (*Rana pretiosa*) were common in the marshes.

Lynxes, Foxes, Badgers, Black-tailed Deer, Bears, Wolverines, Fishers, Martens, Weasels, Porcupines, Snow-shoe Rabbits, and Flying Squirrels inhabit the forests about the lake; Otters, Mink, and Muskrats live along the shores, Beavers in the mountain streams; Red Squirrels and Chipmunks were extraordinarily abundant everywhere, and Pocket Gophers were common in the parks. Numerous burrows of Spermophiles and the Gray Ground Squirrel were observed, but the season was so late that the animals had gone into winter quarters. The marshes and grassy places are inhabited by a water shrew (*Neosorex palustris*), two small shrews (*Sorex idahoensis* and *S. dobsoni*, both new), and two new species of *Arvicola* (*A. mordax* and *A. macropus*). White-footed Mice (*Hesperomys leucopus*) abound in all sorts of places; a new species of Red-backed Mouse (*Evotomys idahoensis*) lives under rotten logs in the woods, and a new Lemming Mouse (*Phenacomys orophilus*) makes its home high up in the mountains. Elk roam through the most inaccessible parts of the forests, and are said to be common about the sources of the Payette. Mountain Goats are common and Sheep less common on the summits of the range, where Pikas (*Lagomys princeps*) inhabit the rock slides, and Marmots (*Arctomys sp. ?*) have their dens.

The following meat-eating birds were caught in traps set for Martens (baited with chipmunks, squirrels, and birds): One Goshawk (*Accipiter atricapillus*), one Great Horned Owl (*Bubo virginianus saturatus*), three Clark's Crows (*Picicorvus columbianus*), six Rocky Mountain Jays (*Perisoreus canadensis capitalis*), and four Magpies (*Pica pica hudsonica*). We were surprised to find the latter species remaining about camp after the ground was covered with snow. A flock of Robins was seen several times in the pines at the head of the lake, but left with the appearance of snow. An adult Bald Eagle was seen at the same place October 1. Great Horned Owls were heard hooting every night, and one was caught in a steel trap baited with the head and wings of a duck. Its

stomach contained two Pocket Gophers, one White-footed Mouse, one *Arvicola*, and one new species of Lemming Mouse (*Phenacomys orophilus*).

LIST OF BIRDS NOTED IN THE SAW TOOTH MOUNTAINS, AT OR NEAR SAW TOOTH OR ALTURAS LAKE, SEPTEMBER 25 TO OCTOBER 4, 1890.

Colymbus auritus. Horned Grebe.

Abundant on the lake; several killed; at least a hundred seen in one day.

Urinator imber. Loon.

One seen on the lake near camp October 2.

Merganser serrator. Red-breasted Merganser.

Several small flocks seen on the lake.

Anas boschas. Mallard.

Common in flocks on the lake; six killed.

Anas americana. Baldpate.

Two shot on the lake.

Anas discors. Blue winged Teal.

Two shot on the lake.

Aythya americana. Redhead.

One shot on the lake.

Grus mexicana. Sandhill Crane.

Several Sandhill Cranes were heard on the big meadow below the lake.

Fulica americana. Coot; Mud-hen.

Two shot on the lake.

Dendragapus obscurus richardsoni. Richardson's Grouse.

A flock of about forty seen.

Dendragapus franklini. Franklin's Grouse.

Said to be tolerably common.

Circus hudsonius. Marsh Hawk.

One seen near the lake.

Accipiter velox. Sharp-shinned Hawk.

One seen.

Accipiter atricapillus. Goshawk.

An adult male shot and an immature bird caught in a marten trap.

Haliaeetus leucocephalus. Bald Eagle.

A fine adult was seen near camp at the head of the lake October 1.

Pandion carolinensis. Fish Hawk; Osprey.

Seen several times before the snow storm.

Bubo virginianus saturatus. Dusky Horned Owl.

One caught in trap and others heard.

Ceryle alcyon. Kingfisher.

Common.

Dryobates villosus hyloscopus. Cabanis's Woodpecker.

Common at foot of lake.

Picoides arcticus. Arctic Three-toed Woodpecker.

One shot at foot of lake.

Colaptes cafer. Red-shafted Flicker.

Several seen.

Pica pica hudsonica. Magpie.

Common about the head of the lake. Four caught in marten traps.

Cyanocitta stelleri annectens. Black-headed Jay.

Three seen, of which two were shot.

Perisoreus canadensis capitalis. Rocky Mountain Jay.

Common. Half a dozen caught in marten traps.

Corvus americanus. Crow.

Several seen about the head of the lake before the storm.

Picicorvus columbianus. Clark's Crow.

Common in the mountains. Three caught in marten traps.

Spinus pinus. Pine Siskin.

Heard several times.

Zonotrichia intermedia. Intermediate Sparrow.

Abundant in bushes everywhere.

Spizella socialis arizonæ. Western Chipping Sparrow.

One shot at head of lake.

Junco hyemalis shufeldti. Rocky Mountain Junco.

Common.

Junco annectens. Pink-sided Junco.

Common.

Melospiza lincolni. Lincoln's Sparrow.

One caught in an *Arvicola* trap.

Dendroica auduboni. Audubon's Warbler.

Several seen.

Anthus pensilvanicus. Titlark.

A few seen. Common in the sage parks below the lake.

Cinclus mexicanus. Ouzel; Dipper.

Two seen—one running along the sand beach at head of lake.

Troglodytes hiemalis. Winter Wren.

One seen.

Certhia familiaris montana. Rocky Mountain Creeper.

One shot and several seen.

Sitta carolinensis aculeata. Slender-billed Nuthatch.

One seen.

Parus gambeli. Mountain Chickadee.

Common.

Regulus satrapa. Golden-crowned Kinglet.

Seen several times.

Regulus calendula. Ruby-crowned Kinglet.

A few seen.

Merula migratoria propinqua. Western Robin.

A flock staid about the head of the lake before the storm.

Sialia arctica. Mountain Bluebird.

Small flocks seen at foot of lake.

BRUNNEAU MOUNTAINS.

This name is applied to an unmapped* range of mountains on or near the boundary between Owyhee County, Idaho, and Elko County, Nevada. The general course of the range is ENE. by WSW. On the Idaho side it rises abruptly from the plain (base level about 1,850 meters, or 6,000 feet), and its highest peaks, which are near the headwaters of the Brunneau River, attain an altitude of 3,350 to 3,650 meters (11,000 or 12,000 feet). The altitude of the lowest pass is about 2,600 meters (8,500 feet). Many deep cañons come out of these mountains and reach far into the Snake Plains. At the time of our visit the range was entirely covered with snow. Ranchmen living along the Brunneau River know the western part of these mountains as the Brunneau Mountains. Since the eastern part has no name, the whole range is here called the Brunneau Range. The mountains are chiefly bare, particularly on the Nevada side, though there are some extensive tracts of coniferous forests and many groves of aspens, below which is considerable mountain mahogany (*Cercocarpus ledifolius*). The higher parts of the divide are dotted with large patches of *Ceanothus velutinus*, an evergreen shrub, whose bright, deep green foliage contrasts handsomely with the snow-covered mountain sides. Elk are said to inhabit these mountains, and we found tracks of Deer, Porcupine, and Weasel on the snow in a grove of *Abies subalpina* on the north side of the pass. Such a storm was raging when we crossed the mountains (October 14) that we saw no birds, and had great difficulty in finding the way.

LIFE ZONES OF IDAHO.

It is with considerable reluctance that an attempt is here made to define the Life Zones of Idaho, even in a general way. The fact that I did not reach the field until the latter part of August, when most of the migratory birds were well on the way south and most of the plants had ceased flowering—if indeed they had not disappeared altogether—coupled with the circumstance that no means were at hand for precise determination of altitudes, make the task exceedingly difficult, and it is still further complicated by the effects of slope exposure and aridity. The limitations of the zones here announced, therefore, and the assignment of species must be regarded as provisional only. The zones recognized are the same as those of San Francisco Mountain, Arizona (defined in North America Fauna, No. 3, pp. 7-13), namely: Arctic Alpine; Sub-Alpine or Timber line; (Central) Hudsonian or Spruce; (Central) Canadian or Douglas fir; Neutral or Transition; and Upper Sonoran. Of these, the first four belong to the *Boreal Province*, which in Idaho consists of a mixture of species characteristic of the Rocky Mountain and Pacific arms or divisions.

* Bonneville's map of 1837 shows this range as part of a range supposed to reach from Wyoming to California.

ARCTIC-ALPINE ZONE.

(Above timber line.)

This zone extends from the upper limit of tree growth to the summits of the highest peaks, and is characterized by the presence of small but often showy-flowered Arctic plants. The following species were obtained notwithstanding the lateness of the season :

<i>Actinella grandiflora.</i>	<i>Geum rossii humile.</i>
<i>Anemone baldensis.</i>	<i>Oxyria digyna.</i>
<i>Bryanthus taxifolius.</i>	<i>Polemonium confertum.</i>
<i>Carex festiva.</i>	<i>Salix reticulata.</i>
<i>Delphinium andersoni.</i>	<i>Sibbaldia procumbens.</i>
<i>Draba alpina.</i>	<i>Silene acaulis.</i>

The breeding season of birds was over before the mountains were reached, but young and old Rosy Finches (*Leucosticte atrata*) were common in small flocks above timber line. The mammals known to inhabit this zone are *Lagomys princeps*, *Arctomys*, sp.—?, *Mazama montana*, and *Ovis canadensis*. All of them are found also in the zone below, and consequently are not characteristic. The altitude of timber line varies from about 3,050 meters (10,000 feet) to nearly 3,350 meters (11,000 feet) according to slope-exposure.

SUB-ALPINE OR TIMBER-LINE ZONE.

(Approximate altitude 3,050 to 3,350 meters, or 10,000 to 11,000 feet).

This zone comprises the belt of *stunted trees* extending from the uppermost limit of tree growth, however depauperate, to the upper limit of full grown, perfect trees; and I am inclined to give it greater vertical range than in my report on San Francisco Mountain in which it was first defined. The dwarf trees which grow in this zone in central Idaho are *Abies subalpina* and *Pinus albicaulis*, with an occasional *Picea engelmanni*. The smaller plants observed are :

<i>Agrostis varians.</i>	<i>Juniperus communis.</i>
<i>Arenaria biflora carnulosa.</i>	<i>Pentstemon menziesii.</i>
<i>Arenaria congesta subcongesta.</i>	<i>Phleum alpinum.</i>
<i>Aplopappus lyellii.</i>	<i>Potentilla nivea dissecta.</i>
<i>Aplopappus suffruticosus.</i>	<i>Sedum debile.</i>
<i>Aster kingii.</i>	<i>Selaginella rupestris.</i>
<i>Chaenactis douglassi alpina.</i>	<i>Senecio aureus compactus.</i>
<i>Delphinium menziesii.</i>	<i>Silene douglassi.</i>
<i>Heuchera hallii.</i>	<i>Solidago virgaurea alpina.</i>

Titlarks (*Anthus pensilvanicus*) were common at the upper part of this zone and in the zone above. The Mountain Sheep (*Ovis canadensis*) and Mountain Goat (*Mazama montana*) probably breed here. The most characteristic small mammals are *Phenacomys orophilus*, *Lagomys princeps*, and *Arctomys*, sp.—? Other species that reach timber line from below are *Tamias cinerascens*, *Tamias quadrivittatus amoenus*, *Arvicola macropus*, *Neotoma cinerea* (not normally ?), *Hesperomys leucopus*, *Erethizon epixanthus*, and a weasel provisionally referred to *Putorius longicaudus*.

(CENTRAL) HUDSONIAN OR SPRUCE ZONE.

(Approximate altitude 2,750 to 3,050 meters, or 9,000 to 10,000 feet.)

This zone extends from the lower limit of the Timber-line Zone to the upper border of the Canadian or Douglas fir Zone. Its characteristic trees are *Pinus albicaulis* and *Abies subalpina* with here and there *Picea engelmanni*. Some of the smaller plants are:

<i>Astragalus kentrophyta.</i>	<i>Gaultheria myrsinites.</i>
<i>Calochortus gunnisoni.</i>	<i>Heuchera parrifolia.</i>
<i>Calochortus nitidus.</i>	<i>Pentstemon kingii.</i>
<i>Erigeron compositus trifidus.</i>	<i>Saxifraga bronchialis.</i>
<i>Eriogonum ovalifolium.</i>	<i>Senecio canus.</i>
<i>Spiraea (Eriogynia) caspitosa.</i>	

Among the birds that breed in the Hudsonian Zone in Idaho are: *Accipiter atricapillus*, *Bubo virginianus saturatus*, *Coccothraustes vesperina montana*, *Junco annectens* (?), *Myadestes townsendi*, *Picicorvus columbianus*, *Perisoreus canadensis capitalis*, and *Regulus calendula*.

Among mammals, *Phenacomys orophilus* and *Lagomys princeps* apparently find their normal lower limit here. The mammals which are common to this zone and the next below will be mentioned under the latter.

(CENTRAL) CANADIAN OR DOUGLAS FIR ZONE.

(Approximate altitude 2,300 to 2,750 meters or 7,700 to 9,000 feet.)

This zone extends from the lower border of the Hudsonian to the upper border of the Neutral Zone, which latter, in Idaho, consists mainly of sage brush. The characteristic trees of the Canadian Zone are *Pseudotsuga douglasii* and *Pinus murrayana*, more or less mixed with *Picea alba* and *Populus tremuloides*. The low altitude reached by some of these trees in springy bogs and along the courses of streams must not be taken into account in fixing the lower boundary of this zone, for the reason that the water in these mountain springs and streams is very cold, often coming but a short distance from melting snowbanks, consequently lowering the temperature of the soil in which the trees are rooted and (by surface evaporation) of the atmosphere to which their foliage is exposed. Among the smaller plants of this zone are:

<i>Arctostaphylos uva-ursi.</i>	<i>Ribes cereum.</i>
<i>Potentilla fruticosa.</i>	<i>Ribes irriguum.</i>
<i>Pyrola secunda.</i>	<i>Ribes floridum.</i>
<i>Rubus nutkanus.</i>	<i>Vaccinium microphyllum.</i>
<i>Rubus strigosus.</i>	<i>Frasera speciosa.</i>

Among the characteristic birds are:

<i>Turdus auduboni.</i>	<i>Dendroica auduboni.</i>
<i>Parus gambeli.</i>	<i>Dendragapus obscurus richardsoni.</i>
<i>Sialia arctica.</i>	<i>Dendragapus franklini.</i>
<i>Sitta canadensis.</i>	<i>Bonasa umbellus togata.</i>
<i>Cyanocitta stelleri annectens.</i>	<i>Bubo virginianus saturatus.</i>
<i>Spinus pinus.</i>	

Many mammals inhabit the Douglas fir Zone in Idaho. Those supposed to be characteristic are *Eutamias idahoensis*, *Arvicola mordax*, *Zapus hudsonius*, *Neosorex palustris*, *Sorex dobsoni*, *S. idahoensis*, *S. vagrans similis*, but it is by no means certain that they do not range up into the Hudsonian. Mammals believed to be common to the Douglas fir and Hudsonian Zones are:

<i>Ursus americanus.</i>	<i>Erethizon epixanthus.</i>
<i>Ursus horribilis.</i>	<i>Tamias cinerascens.</i>
<i>Gulo luscus.</i>	<i>Tamias quadrivittatus amœnus.</i>
<i>Mustela pennanti.</i>	<i>Sciurus richardsoni.</i>
<i>Mustela americana</i>	<i>Sciuropterus volans sabrinus.</i>
<i>Putorius longicauda.</i>	<i>Lepus bairdii.</i>
<i>Arvicola macropus.</i>	<i>Alce americanus.</i>
<i>Arvicola nanus.</i>	<i>Cariacus macrotis.</i>

Arvicola pauperrimus was found on dry knolls in this zone, but may more properly belong to the Neutral Zone. *Arvicola riparius* inhabits wet grassy places in this and the Neutral Zone.

NEUTRAL OR TRANSITION ZONE.

(Approximate altitude 1,950 to 2,300 meters or 6,400 to 7,500 feet.)

This zone is notable for what it lacks rather than for what it possesses. Its dominant and omnipresent plant is sage brush (*Artemisia tridentata*), but sage brush can not be said to be distinctive of the zone, for it occurs below throughout the Upper Sonoran, and above in the lower part of the Douglas fir Zone, where it occupies the dry barren knolls.

The Neutral Zone lacks the trees of the Canadian Zone and the greasewoods of the Sonoran Zone. Its sage plains, therefore, are purer sage than elsewhere, though invaded by a few species from above and below. *Artemisia trifida* and *Bigelovia graveolens* are common in places, and *Frasera speciosa* occurs in the foothills of the Pahsimeroi Mountains. *Cercocarpus ledifolius* begins in this zone and extends up into the zone above. It is common in the foothills of the Pahsimeroi and Brunneau Mountains, but rather rare in the Salmon River Mountains. *Potentilla fruticosa* is common about springy places in this zone and in the Canadian or Douglas fir Zone also.

If any birds may be said to be characteristic of the Neutral Zone they are the Sage Hen (*Centrocercus urophasianus*) and Sharp-tailed Grouse (*Pediocætes phasianellus columbianus*). The characteristic mammals are believed to be *Arvicola pauperrimus*, *Tamias minimus pictus*, *Spermophilus elegans*, and *Neotoma cinerea*. *Arvicola pauperrimus* ranges up over the dry, sage-covered knolls of the lower part of the Canadian Zone, and *Tamias minimus pictus* follows the sage brush down into the Upper Sonoran Zone. *Spermophilus grammurus* probably belongs to the Neutral or Transition Zone, but is not widely distributed. *Arvicola riparius* is common in suitable marshes in this zone but occurs also in the zone above.

UPPER SONORAN ZONE.

(Approximate altitude below 1,950 meters or 6,400 feet.)

The only part of the great Sonoran or semi-tropical element that reaches Idaho is the upper zone of the Great Plains division of the Sonoran Province. This zone occupies the whole of the Snake Plains proper and extends up to about 1,950 meters (6,400 feet) in the valleys of east-central Idaho. Among its characteristic plants are *Atriplex confertifolia*, *A. canescens*, *A. nuttallii*, *Sarcobatus vermiculatus*, *Tetradymia canescens*, a *Malvastrum*, a cactus, and perhaps *Eurotia lanata* also. Other plants found in this zone in September and October were *Eriogonum cernuum tenue*, *Oryzopsis cuspidata*, *Iva axillaris*, and *Bigelovia douglassii*, *B. tortifolia*, *B. stenophylla*, and *B. latifolia*. Since these *Bigelovias* were found growing together near Shoshone they must be distinct species or have no rank at all.

Its characteristic mammals are a Kangaroo Rat (*Dipodops ordii*), Grasshopper Mouse (*Onychomys brevicaudus*), Pocket Mouse (*Perognathus olivaceus*), Sage Chipmunk (*Tamias minimus pictus*), Townsend's Spermophile (*Spermophilus townsendi*), and the Idaho Rabbit (*Lepus idahoensis*), though the three last-mentioned species range a little higher than the limit here assigned to the zone. The Black-tailed Jack Rabbit (*Lepus texianus*) may belong to this zone.

The characteristic birds are the Sage Sparrow (*Amphispiza belli nevadensis*), Brewer's Sparrow (*Spizella breweri*), and Sage Thrasher (*Oroscoptes montanus*). Horned Larks (*Otocoris alpestris arenicola*) are common, but occur higher up than the true Sonoran, as is the case with the Burrowing Owl and White-rumped Shrike, which species were rarely seen in the region traversed.

FOREST TREES OF THE MOUNTAINS OF SOUTH-CENTRAL IDAHO.

All the forests explored are coniferous, the only deciduous trees met with being the Aspen (*Populus tremuloides*), one or two species of Cottonwoods (chiefly *Populus balsamifera*) which grow in the bottoms along the streams, and the Western Birch (*Betula occidentalis*) which hardly attains sufficient height to be ranked as a tree. Junipers were not found except on the extreme southern spur of the mountains between Big and Little Lost River Valleys, and in the lava cañon of Snake River.*

The coniferous forests which clothe the sides of the mountains everywhere from an altitude of 2,450 meters (8,000 feet) or less to timber line (3,050 to 3,350 meters or 10,000 to 11,000 feet) are divided into two zones, an upper and a lower, which meet and overlap at an elevation of about 2,750 meters (9,000 feet). The characteristic trees of the lower zone are the Douglas Fir (*Pseudotsuga douglasii*) and Murray Pine (*Pinus murrayana*). Those of the upper zone are Alpine Fir (*Abies subalpina*), White-bark Pine (*Pinus albicaulis*), and *Picea engelmanni*. *Picea alba* is found

* A specimen from Shoshone Falls in the Snake River Cañon is identified by Mr. Holzinger as *Juniperus virginiana*.

scattered through the forest at different elevations, but does not reach timber line.

Pseudotsuga douglasii Carrière. Douglas Fir.

Douglas Fir is the prevailing tree of the lower or Canadian timber zone throughout most of the mountains and is commonly associated with *Pinus murrayana*. On the east side of the Salmon River Range it begins at an elevation of 2,300 to 2,400 meters (7,500 to 7,900 feet) and runs up to a little above 2,750 meters (9,000 feet). Along some of the mountain streams it descends lower into the valleys. Its maximum of development is attained at an altitude of about 2,450 meters (8,000 feet). Here I measured one tree which 2 meters above ground was more than 5 meters (16½ feet) in circumference and about 27 meters (90 feet) in height; another tree in the same neighborhood was 4½ meters (nearly 15 feet) in circumference, 2 meters above the ground, and 24 meters (nearly 80 feet) in height. Many others were nearly as large.

Pinus murrayana Balfour. Murray Pine; Black Pine.

Murray Pine is common throughout the Douglas fir or lower timber zone, and in some places is the prevailing tree. This is notably the case in the Saw Tooth Mountains, on the east side of which it extends from an altitude of 2,150 meters (a little over 7,000 feet) up to about 2,750 meters (9,000 feet). In the Salmon River and Pahsimeroi Mountains it forms large forests alternating or mixed with those of Douglas Fir. It rarely exceeds 300 millimeters (1 foot) in diameter. The branches of this pine are thickly beset with small cones that do not fall off when mature.

Pinus albicaulis Engelmann. White-bark Pine.

This singular pine is the dominant tree of the Hudsonian or upper timber zone in the Salmon River, Pahsimeroi, and Saw Tooth Mountains, where it grows from below 2,750 meters (9,000 feet) up to timber line. In many places it forms extensive belts in which no other trees occur; in other places it is associated with *Abies subalpina* and *Picea engelmanni*. On some of the spurs of the Salmon River Mountains *Pinus albicaulis* covers the northeastern slopes while *Abies subalpina* covers the adjacent southeastern slopes.

Though not a botanist, I am tempted to express the conviction that *Pinus albicaulis* is a perfectly good species, and not a form of *Pinus flexilis* as commonly stated in the books. Its heavy, rounded, purple cones with thick scales firmly glued together,* its peculiar bark, and even its habit of growth—the trunk splitting up near the ground into several parts of nearly equal size—serve to distinguish it at a glance from any other pine known to me.

Pinus flexilis Linnæus. White Pine.

Not common in the region traversed; grows sparingly in the Pahsimeroi Mountains.

*A figure of one of these cones may be found in the article on Richardson's Squirrel, p. 49.

Abies subalpina Engelmann. Sub-Alpine Fir.

The Sub-Alpine fir is common in the Hudsonian or upper timber zone of the mountains of south-central Idaho, ranging from an altitude of about 2,750 meters (9,000 feet) to timber line. It is sometimes associated with *Pinus albicaulis* and *Picea engelmanni*; in other places it forms small forests alone.

Picea engelmanni (Parry). Engelmann's Spruce.

Tolerably common in the upper timber zone and usually associated with *Abies subalpina*.

Picea alba Poiret. White Spruce.

The spruce provisionally referred to this species is tolerably common throughout the lower timber zone of the mountains visited. It does not form extensive forests, but is scattered through forests of other conifers, chiefly Douglas fir. Professor Sargent, who has examined cones collected by us in the Salmon River Mountains, informs me that the tree is in some respects intermediate between *Picea alba* and *P. engelmanni*.

Populus tremuloides Michaux. Aspen.

This tree, which is commonly known in the West by the name of quakenasp, aspen, or popple, occurs along many of the streams in the bottoms, and forms groves and thickets on the sides of the mountains.

Populus balsamifera Linnæus. Balsam Poplar.

Common in some of the bottoms, particularly along Big Wood River, where it grows to be the largest deciduous tree observed by us in Idaho.

MOLLUSCS OF SOUTH-CENTRAL IDAHO.

The following species were collected by us and have been identified by Dr. R. E. C. Stearns:

Helix (*Patula*) *hemphilli* Newe.

Needle Peak, Lost River Mountains.

Limnæa lepida Gould.

Salmon River near Challis.

Limnæa palustris Müll.

Salmon River near Challis; also Saw Tooth or Alturas Lake.

Limnæa adelinæ Tryon.

Salmon River near Challis.

Planorbis trivolvis Say.

Saw Tooth or Alturas Lake.

Physa heterostropha Say.

Birch Creek.

Fluminicola nuttalliana Lea.

Salmon River near Challis; and warm springs in Snake River Cañon near Shoshone Falls.

EFFECTS OF WATER-COURSES ON THE GEOGRAPHIC DISTRIBUTION OF SPECIES.

Mountain streams, in passing down into the plains, exert a twofold influence on the distribution of animals and plants. By their constant efforts to reach base level, these streams are continually cutting down and lengthening the valleys in such a way as to produce gradually sloping bottom lands, which penetrate the highlands from the plain below, carrying with them narrow prolongations or tongues of the fauna and flora of lower levels, which follow the contour lines in a general way.

The second effect mentioned is of an exactly opposite character. The low temperature of the water, coming from melting snow-banks or cold springs in the mountains, lowers the temperature of the soil supporting the vegetation on its immediate banks, while the evaporation from its surface cools the air to which the foliage of such vegetation is exposed, thus bringing the northern or higher fauna and flora down along the immediate course of the stream.

The length of the stream and steepness of the slope determine whether the first or second effect is most pronounced. Rivers having long courses over the plains, such as the Missouri and Platte, become so thoroughly warmed during their long journey that the second effect is inappreciable, while the first is very strongly marked, southern forms of life ascending these valleys a hundred kilometers or more beyond their usual limit. Short streams, on the other hand, and particularly those that head in mountains and have rapid courses, carry northern forms many kilometers below their normal limit, but do not afford the same facility for the northward extension of southern forms. Streams of intermediate character (in the respects indicated) present intermediate conditions, and where the two types balance, the northward (or upward) and southward (or downward) extensions of the life zones are of equal length, the latter inclosing the former like the involuted finger of a glove.

ORIGIN OF THE NAME 'MARKET LAKE.'

Governor Isaac I. Stevens, in his narrative of the Pacific Railroad surveys carried on under his direction in 1853, makes the following interesting statement concerning the place known as Market Lake, which, it may be added, is now dry and occupied by ranches. Governor Stevens says:

"In years past the bed of this lake was an immense prairie bottom or basin, and a favorite resort for game of all kinds; even, indeed, the buffalo have been killed in and near it in large numbers, the evidences of which were shown by the skulls of the animals found near the present border of the lake.

"So abundant, indeed, was the game here that the trappers and mountain men of that day, who in squads and bands trapped and hunted in

this wilderness of mountains, always said to each other, when their supply of subsistence grew scanty, 'Let us go to the market,' referring to this resort of the herds of game; and they never visited it in vain until, by one of those strange freaks of nature in this valley of the Snake River, which is fed at many points throughout its length by subterranean streams, this market was converted into an immense sheet of water. It is only accounted for by supposing that the streams making down from the Snake River Mountains and losing themselves in the sand or sage desert of the valley, break forth at or near the latter, which is thus fed from year to year by the meltings of the snows and the rains from those mountains. In order, therefore, to retain and hand down the name of this once favorite resort, and the legend connected with it, Lieutenant Mullan named this sheet of water the Market Lake.

"Traveling along the banks of this lake for 8 miles, he left it, and in a short time fell upon the main stream of Snake River, which was from 150 to 200 yards wide and very deep, with high clay banks on either side, and bordered with a slight growth of willow." (Pacific R. R. Rept., vol. XII, Book 1, 1860, p. 170.)



MAMMALS OF IDAHO.

Idaho presents great diversity of physical features, comprising immense coniferous forests, ranges of lofty, rugged mountains, fertile, grassy valleys, arid sage-brush plains, and alkali deserts, and it is about equally divided between the Boreal and Sonoran Life Zones. Its mammal fauna is correspondingly rich and varied. Sixty-seven species and subspecies of mammals are now known from the State and the number will be increased by future explorations. The principal additions are likely to come from the bats and arvicoline mice, and except in so far as the former group is concerned, the numerical relations of the several families are not likely to be disturbed; hence a statement of the number of genera and species in each may be of interest. For convenience, subspecies are here treated as species. The boreal group *Mustelidæ* leads in genera but not in species, having 8 genera and 9 species. The family *Muridæ* comes next in number of genera and outranks the *Mustelidæ* in species, having 7 genera and 13 species, and the number of species is likely to be slightly increased. The *Sciuridæ* is represented by 5 genera and 10 species; the *Cervidæ* by 4 genera and 5 species; the *Bovidæ* by 4 genera and 4 species; the *Canidæ* by 2 genera and 3 species; the *Felidæ* by 2 genera and 2 species, the *Soricidæ* and *Leporidæ* each by 1 genus and 4 species; the *Sacomylidæ* by 2 genera and 2 species; the *Geomyidæ* by 1 genus and 2 species; the *Ursidæ* by 1 genus and 2 species; and the following families by 1 genus and 1 species each: *Hystericidæ*, *Zapodidæ*, *Lagomyidæ*, *Castoridæ*, *Procyonidæ*. The *Vespertilionidæ* is probably represented by 3 genera and 4 or 5 species. The genera most largely represented in species are: *Arvicola*, 5; *Spermophilus*, 4; *Lepus*, 4; *Sorex*, 4; *Tamias*, 3. No other genus has more than 2 species.

CHECK LIST OF SPECIES AND SUBSPECIES.

1. *Sorex idahoensis* sp. nov.
2. *Sorex dobsoni* sp. nov.
3. *Sorex vagrans similis* subsp. nov.
4. *Sorex palustris* Richardson.
5. *Vespertilio nitidus* H. Allen.
6. *Arctomys* sp. — ?
7. *Spermophilus columbianus* (Ord).
8. *Spermophilus armatus* Kennicott.
9. *Spermophilus elegans* Kennicott.
10. *Spermophilus townsendi* Bachman,
11. *Tamias cinerascens* Merriam.
12. *Tamias quadrivittatus amanus* J. A. Allen.
13. *Tamias minimus pictus* J. A. Allen.
14. *Sciurus richardsoni* Bachman.
15. *Sciuropterus volans sabrinus* (Shaw).
16. *Castor canadensis* Kuhl.
17. *Onychomys leucogaster brevicaudus* subsp. nov.
18. *Hesperomys crinitus* sp. nov.

CHECK LIST OF SPECIES AND SUBSPECIES—continued.

- | | |
|--|---|
| 19. <i>Hesperomys leucopus</i> (Rafinesque). | 44. <i>Cervus canadensis</i> Erxleben. |
| 20. <i>Neotoma cinerea</i> (Ord). | 45. <i>Cariacus macrotis</i> (Say). |
| 21. <i>Neotoma cinerea occidentalis</i> Baird. | 46. <i>Cariacus virginianus macrourus</i> Rafinesque. |
| 22. <i>Arvicola riparius</i> Ord. | 47. <i>Antilocapra americana</i> Ord. |
| 23. <i>Arvicola macropus</i> sp. nov. | 48. <i>Mazama montana</i> Rafinesque. |
| 24. <i>Arvicola mordax</i> sp. nov. | 49. <i>Ovis canadensis</i> Shaw. |
| 25. <i>Arvicola nanus</i> sp. nov. | 50. <i>Bison bison</i> (Linnæus). |
| 26. <i>Arvicola pauperrimus</i> Cooper. | 51. <i>Felis concolor</i> Linnæus. |
| 27. <i>Phenacomys orophilus</i> sp. nov. | 52. <i>Lynx baileyi</i> Merriam. |
| 28. <i>Evotomys idahoensis</i> sp. nov. | 53. <i>Canis latrans</i> Say. |
| 29. <i>Fiber zibethicus</i> (Linnæus). | 54. <i>Canis nubilus</i> Say. |
| 30. <i>Thomomys clusius</i> Coues. | 55. <i>Vulpes macrourus</i> Baird. |
| 31. <i>Thomomys clusius fuscus</i> subsp. nov. | 56. <i>Taxidea americana</i> (Boddaert). |
| 32. <i>Dipodops ordii</i> Woodhouse. | 57. <i>Mephitis</i> sp. —? |
| 33. <i>Perognathus olivaceus</i> Merriam. | 58. <i>Spilogale saxatilis</i> Merriam. |
| 34. <i>Erethizon epixanthus</i> Brandt. | 59. <i>Lutra hudsonica</i> (Lacépède). |
| 35. <i>Zapus hudsonius</i> (Zimmermann). | 60. <i>Mustela americana</i> Turton. |
| 36. <i>Lagomys princeps</i> Richardson. | 61. <i>Mustela pennanti</i> Erxleben. |
| 37. <i>Lepus idahoensis</i> sp. nov. | 62. <i>Gulo luscus</i> (Linnæus). |
| 38. <i>Lepus sylvaticus nuttalli</i> Bachman. | 63. <i>Lutreola vison</i> (Schreber). |
| 39. <i>Lepus texianus</i> Woodhouse. | 64. <i>Putorius longicauda</i> Bonaparte. |
| 40. <i>Lepus campestris</i> Bachman. | 65. <i>Procyon lotor</i> (Linnæus). |
| 41. <i>Lepus bairdii</i> Hayden. | 66. <i>Ursus horribilis</i> Ord. |
| 42. <i>Alce americanus</i> Jardine. | 67. <i>Ursus americanus</i> Pallas. |
| 43. <i>Rangifer caribou</i> (Kerr). | |

ANNOTATED LIST OF THE MAMMALS OF IDAHO, WITH DESCRIPTIONS OF NEW SPECIES.

Sorex idahoensis sp. nov. Idaho Shrew.

This tiny shrew, the smallest of the three here described, is common in the Salmon River Mountains of Idaho, and was found in the Saw Tooth Mountains also. It differs widely from all known species inhabiting the western United States, as pointed out below.

SOREX IDAHOENSIS sp. nov.

[Jaws with teeth, Pl. IV, Fig. 1.]

Type No. $\frac{33537}{30945}$ ♀ ad., U. S. National Museum (Department of Agriculture collection). From Timber Creek, Salmon River Mountains, Idaho, August 26, 1890. Altitude about 2,500 meters (8,200 feet). Collected by C. Hart Merriam and Vernon Bailey. (Original number, 1674.)

Measurements (taken in flesh).—Total length, 95; tail vertebræ, 40; pencil, 6; hind foot, 12.

General characters.—This shrew presents no striking external peculiarities. It is about the size of *S. platyrhinus*, which seems to be its nearest relative. It has no affinities with *S. personatus* or *vagrans*.

Color.—Upper parts dull sepia brown, darkest over the rump; under parts drab-gray, tinged with buffy. Tail bicolor, its upper and lower surfaces concolor with the corresponding surfaces of the body, with a rather long pencil, which is dusky all round.

Cranial and Dental characters.—The skull is smaller and lighter than that of *S. personatus*. The lateral unicuspidate teeth decrease in size

uniformly from first to fourth; the fifth is minute but distinctly visible from the outside. This is the only species of *Sorex* yet described from anywhere west of the Rocky Mountains, so far as I am aware, in which the fourth unicuspid is smaller than the third, in which respect it resembles *S. platyrhinus* of the Eastern States.

An old nursing female, with much worn teeth (No. $\frac{2}{3}\frac{4}{1}\frac{2}{6}\frac{7}{7}$), from the Saw Tooth Mountains, is here referred to this species, but, as pointed out by Dobson, it is exceedingly difficult to determine the species of shrews when the teeth are much worn.

Record of specimens collected of Sorex idahoensis.

U. S. National Museum No.		Original No.	Locality.	Date.	Sex.	Total length.	Tail vertebræ.	Hind foot.
Skin.	Skull.							
23519	30937	1623	Salmon River Mountains, Idaho	Aug. 23, 1890	♂?....	97	42	11.5
23523	30941	1624	....do .....	....do	♀....	97	40	11.5
23521	30939	1646	....do	Aug. 24, 1890	♀....	94	38	12
23527	30945	*1674	....do	Aug. 26, 1890	♀....	95	40	12
24273	31677	†1898	Saw Tooth Lake, Idaho.....	Sept. 28, 1890	♀old..	96	37	12

* Type. †Nursing teats : p $\frac{0}{0}$, s $\frac{1}{1}$, i $\frac{2}{2} = \frac{3}{3} = 6$.

***Sorex dobsoni* sp. nov.** Dobson's Shrew.

This interesting shrew was captured near Saw Tooth or Alturas Lake at the eastern base of the Saw Tooth Mountains in central Idaho, October 3, 1890, at which time the ground was covered with several inches of newly fallen snow. It belongs to the *Sorex personatus* group, and may be known from the following description :

SOREX DOBSONI * sp. nov.

[Jaws with teeth, Pl. iv, Fig. 2.]

Type No. $\frac{24274}{31677}$ ♀ ad. U. S. National Museum (Department of Agriculture collection). From Saw Tooth or Alturas Lake, Saw Tooth Mountains, Idaho, October 3, 1890. Altitude about 2,200 meters (7,200 feet). Collected by C. Hart Merriam and Vernon Bailey (original number 1929).

Measurements (taken in flesh).—Total length, 105; tail vertebræ, 47; pencil, 4.5; hind foot, 12.5.

General characters.—Similar to *S. personatus* in size and coloration, but differing in having a somewhat longer tail and in cranial and dental characters.

Color.—Upper parts uniform dull sepia brown, not darker on the rump. Under parts drab-gray slightly tinged with brown. Tail indistinctly bicolor, concolor with the upper and under surfaces of the body.

Cranial and Dental characters.—The skull is larger and heavier than that of *S. personatus*. The first and second unicuspidate teeth are largest and subequal; the third and fourth are considerably smaller

* Named in honor of Dr. G. E. Dobson, M. A., F. R. S., etc., the distinguished author of 'A Monograph of the Insectivora.'

and nearly subequal, but the third is a trifle smaller than the fourth; the fifth is completely in the tooth row and more than half as large as the fourth (when seen from below) and the tip is chestnut, as in all the others. Compared with *Sorex personatus*, its nearest relative, the lateral unicuspid is higher; the first, second, third, and fourth are more crowded; the first and second are larger in relation to the third and fourth; and the fifth is very much larger. All of these teeth are higher than long, while in *S. personatus* the contrary is true. The first molariform tooth is conspicuously larger than in *personatus* and its principal cusp is directed more obliquely backward. The internal basal lobe of the middle incisor is rudimentary; the external lateral lobe or hook is larger than in *S. personatus*.

Record of specimen collected of Sorex dobsoni.

U. S. National Museum No.		Original No.	Locality.	Date.	Sex.	Total length.	Tail vertebræ.	Hind foot.
Skin.	Skull.							
24274	31678	*1929	Saw Tooth Lake, Idaho.....	Oct. 3, 1890	♀	105	47	12.5

* Type.

Sorex vagrans similis subsp. nov. Shrew.

This is the commonest shrew inhabiting the marshes and borders of streams of the Salmon River Mountains, and it was found in the Pahsimeroi Mountains also. It is nearly related to *S. vagrans* of the Pacific coast region about Puget Sound, but differs from that species as pointed out below.

SOREX VAGRANS SIMILIS subsp. nov.

[Jaws with teeth, Pl. iv, Fig. 3.]

Type No. 33545 ♀ U. S. National Museum (Department of Agriculture collection). From Timber Creek, Salmon River Mountains, Idaho, August 26, 1890. Altitude about 2,500 meters (8,200 feet). Collected by Basil Hicks Dutcher (original number 1670).

Measurements (taken in flesh.)—Total length, 111; tail vertebræ, 46; pencil, 4; hind foot, 13.

General characters.—Similar to *S. vagrans*, but slightly larger, with the skull and mandible conspicuously larger and heavier.

Color.—Upper parts uniform dull sepia brown slightly tinged with very pale rufous. Under parts drab gray slightly tinged with buff. Tail bicolor, concolor with upper and lower surfaces of body.

Cranial and Dental characters.—Compared with *S. vagrans* the skull is large and heavy (the under jaw in particular is everywhere conspicuously thicker and heavier) and the angular process is longer. The base of the third upper unicuspidate tooth does not come down to the plane of the bases of the rest of the series. The principal cusp of the first molariform tooth is directed more obliquely backward than in *S. vagrans*; the mandibular teeth are larger, higher, and more crowded,

and the antero-inferior border of the second lateral tooth is emarginate or notched for the reception of the posterior part of the preceding tooth.

Record of specimens collected of Sorex vagrans similis.

U. S. National Museum No.		Original No.	Locality.	Date.	Sex.	Total length.	Tail vertebrae.	Hind foot.
Skin.	Skull.							
23520	30938	1625	Salmon River Mountains, Idaho....	Aug. 23, 1890	♀	102	39	12.5
23522	30940	1645	...do	Aug. 24, 1890	♀	110	48	13
23526	30944	1663	...do	Aug. 25, 1890	♂	112	47	12.5
23525	30943	*1670	...do	Aug. 26, 1890	♀	111	46	13
23524	30942	1682	...do .....	...do	♀	105	45	13.5
23838	31238	1708	...do	Aug. 28, 1890	♀	110	47	13
23908	31312	1709	...do .....	...do	?	112	47	12.5
23839	31239	1723	...do	Aug. 30, 1890	♂	117	50	12.5
.....	31942	1796	Pahsimeroi Mountains, Idaho.....	Sept. 15, 1890	♀	100	44	13

*Type.

Sorex palustris Richardson. Marsh Shrew.

This large and handsome shrew is common along the streams and in marshy places in many parts of Idaho, and is easily caught in traps baited with meat.

I agree with Dobson that the genus *Neosorex*, erected for this (or a closely allied) species by Baird, is not based on characters entitled to generic recognition, but differ with him in the opinion that it "can not even be considered as representing a subgenus."* I regard *Neosorex* as an excellent subgenus.

Record of specimens collected of Sorex palustris.

U. S. National Museum No.		Original No.	Locality.	Date.	Sex.	Total length.	Tail vertebrae.	Hind foot.
Skin.	Skull.							
23367	30827	1537	Birch Creek, Idaho.	Aug. 5, 1890	♂.....	149	72	19.5
23368	30828	1554	...do	Aug. 8, 1890	♂.....	140	65	18
23474	30892	1570	...do	Aug. 9, 1890	♀.....	151	73	19
23475	30893	1580	...do	Aug. 11, 1890	♀.....	159	78	18
23516	30934	1621	Salmon River Mountains, Idaho ...	Aug. 23, 1890	♀.....	162	75	20
23517	30935	1622	...do .....	...do	♂.....	158	74	20
23514	30932	1647	...do	Aug. 24, 1890	♂.....	164	78	20
23515	30933	1648	...do .....	...do	♀.....	156	72	20
23518	30936	1664	...do	Aug. 25, 1890	♀ ad ..	174	82	20
24038	31454	1858	Head of Wood River, Idaho	Sept. 25, 1890	?.....	152	75	20
24360	31766	1915	Saw Tooth Lake, Idaho.....	Sept. 30, 1890	♀.....	158	80	20
24362	31768	1918	...do	Oct. 1, 1890	♀.....	145	73	20
24361	31767	1919	...do	Oct. 2, 1890	♀?....	135	57	20
23472	30890	159	Birch Creek, Idaho	Aug. 11, 1890	♀?....	150	74	17
23473	30891	160	...do	Aug. 13, 1890	♂.....	146	72	18

*Synopsis of Genera of Soricidæ, Proc. Zool. Soc. Lond., 1890, 51.

Vespertilio nitidus H. Allen. California Bat.

A single specimen of a small brown bat, provisionally referred to this species, was shot by Mr. Clark P. Streater on Birch Creek, August 10. It is a female, and apparently immature.

Record of specimen collected of Vespertilio nitidus.

U. S. National Museum No.	Original No.	Locality.	Date.	Sex.	Head and body.	Tail.	Head.	Ear from infernal basal angle.	Tragus from inner base.	Humerus.	Forearm.	Thumb.	Third finger.	Fifth finger.	Tibia.	Hind foot.
23448	142	Birch Creek, Idaho...	Aug. 10, 1890	♀ im.	43	38	15	12	5.2	...	35	7.5	58	46	14.5	10.5

Arctomys sp. — ? Marmot.

Nearly extinct in the region traversed, though very abundant a year or two ago. Only two individuals were seen, and they were above timber line in the Salmon River Mountains. One sat at the mouth of a cave at an altitude of about 3,350 meters (11,000 feet). It seemed to have a narrow red belly and gray back. Remains of *Arctomys* are common at Big Butte and in the lava beds. The inhabitants attribute their destruction to the severe drought of the past few years.

In 1872 I collected specimens of an *Arctomys* on Henry Fork of Snake River and in the Teton Basin (Nos. 12406 and 12407, U. S. Nat. Mus.).

*Spermophilus** *townsendi* Bachman. Townsend's Spermophile.

Spermophilus townsendi Bachman, Journ. Acad. Nat. Sci. Phila., vol. VIII, 1839, pp. 61-62. (Type from Plains of Columbia near the mouth of Walla Walla River. Not of Allen, Monog. Rodentia, 1877, pp. 848-860).

Spermophilus mollis Kennicott, Proc. Acad. Nat. Sci. Phila., 1863, p. 158. (Type from Camp Floyd, now Fairfield, Utah. This form may prove to be subspecifically separable from true *townsendi*).

* For several years I have made a special effort to secure series of the Spermophiles of the Great Basin and Plains of the Snake and Columbia for the purpose of correcting synonymy and ascertaining the true status of the species, and have succeeded in bringing together in all about 100 specimens. The number would have been at least twice as great but for the inconvenient and seemingly unnecessary haste which these animals manifest in going into winter quarters when the summer is little more than half gone, thus disappointing the collectors, who, in several instances, reached the localities aimed at just too late.

In addition to the specimens mentioned, which are of excellent quality and accompanied by skulls, I have examined the types of all the species known to inhabit the region, namely, Bachman's *S. townsendi* (in the museum of the Philadelphia Academy of Natural Sciences), and Kennicott's *mollis*, *elegans*, and *armatus* (in the U. S. National Museum), and also, as stated in another place, have received specimens of *S. columbianus*, from within a few miles of the type locality. The conclusions resulting from this study were intended to appear first in a revision of the genus, upon which the author has been engaged for some time, but the necessity for naming species in faunal lists renders it imperative to forestall the more formal paper by an announcement of the general results so far as they relate to the determination of the species.

Common at Blackfoot and along Big Lost River and Birch Creek, and probably throughout the Snake Plains and sage-covered valleys of Idaho, as well as the Plains of the Columbia. This Spermophile is silent and shy and goes into winter quarters early; it was not seen after the middle of August. Mr. Bailey says: "Those taken were all very fat and were excellent eating, the flesh being white, tender, and sweet, without unpleasant flavor."

In 1872 I collected this species at Ross Fork, near Fort Hall, July 3, recording it under the name *Spermophilus mollis* of Kennicott (Sixth Annual Rept., U. S. Geological Survey Terr., 1872, 1873, p. 664. Specimen No. $\frac{11134}{12448}$ ♂ U. S. National Museum).

It is with great reluctance that I am forced to adopt for this Spermophile a name which has been in common use for another species since 1877, but adherence to the rule of priority leaves no other course open. The type of the present species was collected by John K. Townsend, "on the Columbia River, about 300 miles above its mouth, in July," and was described by Bachman, in 1839, under the name *Spermophilus townsendi*.* Nineteen years later Professor Baird based his description "upon the original of Bachman's article, in the collection of the Philadelphia Academy of Natural Sciences," because "no specimens of this species were collected by any of the expeditions" (Mammals of N. Am., 1857, 326).

In 1863 Robert Kennicott described a Spermophile from Camp Floyd (now Fairfield), on the west side of Utah Lake, Utah, under the name *Spermophilus mollis* (Proc. Phila. Acad. Nat. Sci., 1863, 157). In 1874 J. A. Allen placed *mollis* under *townsendi* as a subspecies—an arrangement in which I fully concur, though the habitat given is erroneous (Proc. Bost. Soc. Nat. Hist., XVI, 1874, p. 293). Three years later, however, in his monograph of the group (Monog. N. Am. Rodentia, 1877, pp. 848-860), he receded from his former position, accorded full specific rank to *S. mollis*, and transferred the name *townsendi* (as a subspecies of *richardsoni*) to the animal described by Kennicott in 1863 as *S. elegans*. This course is easily explained by the fact that Allen never saw the type of *townsendi*, and was misled by the erroneous measurement of its length given by Bachman—"8 inches 9 lines," which is nearly 51^{mm} (2 inches) too much. The measurements of the hind foot and tail (correctly recorded by Bachman as "1 inch 4 lines and 1 inch" [approximately 33^{mm} and 25^{mm}] respectively), apply to this species and fall far short of the dimensions of the same parts in *S. elegans*. In *S. elegans* the hind foot averages about 41^{mm} and the tail 70^{mm}, while in *S. townsendi* the corresponding measurements are 33^{mm} and 39^{mm}. Through the courtesy of the authorities of the Philadelphia Academy of Natural Sciences, I have recently examined and measured the type of *S. townsendi*, and can not see that it differs in any way from the series collected by our party on the Snake Plains of Idaho. The length of the hind foot is a fraction less than 33^{mm}.

* Jour. Phila. Acad. Nat. Sci., vol. VIII, 1839, pp. 61, 62.

Record of specimens collected of *Spermophilus townsendi*.

U. S. National Museum No.		Original No.	Locality.	Date.	Sex.	Total length.	Tail vertebrae.	Hind foot.
Skin.	Skull.							
23025	30471	1419	Blackfoot, Idaho	July 10, 1890	♂	195	45	32
23063	30509	1436	....do	July 12, 1890	♂	209	49	33.5
23061	30507	1438	....do	July 14, 1890	♂	188	39	30
23064	30510	1440	....do	July 15, 1890	♂	210	46	32
23066	30512	1449	....do	July 16, 1890	♀	202	44	34
23926	31331	1463	Big Lost River, Idaho.....	July 22, 1890	♀	198	37	32
23927	31332	1486	....do	July 24, 1890	♂	198	40	31
23332	30791	1534	Birch Creek, Idaho.....	Aug. 4, 1890	♂	176	39	29
23489	30907	1573	....do	Aug. 9, 1890	♂	188	43	31
23490	30908	1576	....do	Aug. 10, 1890	♂	183	40	30
23024	30470	3	Blackfoot, Idaho.....	July 10, 1890	♂	207	45	32
23067	30513	33	....do	July 16, 1890	♂	195	43	30
23933	31338	43	Big Lost River, Idaho.....	July 22, 1890	♂	191	50	32
23065	30511	44	....do .....	....do	♂	192	53	31
23932	31337	46	....do .....	....do	♂	208	43	33
23930	31335	47	....do .....	....do	♂	210	44	32
23931	31336	48	....do .....	....do	♂	204	39	32
23929	31334	51	....do	July 23, 1890	♂	181	89	31
23925	31330	53	....do .....	....do	♂	206	43	32
23928	31333	54	....do .....	....do	♀	175	40	31
23334	30793	90	Birch Creek, Idaho.....	Aug. 4, 1890	♀	167	35	30
23331	30790	117	....do	Aug. 6, 1890	♂	177	34	29
23333	30792	130	....do	Aug. 8, 1890	♂	180	32	30
23492	30910	162	....do	Aug. 13, 1890	♂	187	33	29

***Spermophilus armatus* Kennicott. Mountain Spermophile.**

Spermophilus armatus Kennicott, Proc. Acad. Nat. Sci. Phila., 1863, p. 158 (type from foothills of Uinta Mountains near Fort Bridger, Wyoming).

This species inhabits the Blackfoot Mountains east of the town of Blackfoot, on Snake River, where Mr. Bailey found it common from the foothills to the higher parts of the range. The ranchmen living along the foothills complain that their crops suffer from its depredations. It may occur also in other mountain ranges visited, but had denned up before these mountains were reached. Burrows of some species of Spermophile abound in the Sawtooth and Pahsimeroi Mountains. The local name Picket Pin, by which Spermophiles are known in Idaho and other parts of the west, is suggestive of the upright position these animals assume when sitting at the mouths of their holes.

Record of specimen collected of *Spermophilus armatus*.

U. S. National Museum No.		Original No.	Locality.	Date.	Sex.	Total length.	Tail vertebrae.	Hind foot.
Skin.	Skull.							
23062	30508	1435	Blackfoot Mountains, Idaho	July 12, 1890	♀	275	68	45

Spermophilus elegans Kennicott. Kennicott's Spermophile.

Spermophilus elegans Kennicott, Proc. Acad. Nat. Sci. Phila., 1863, p. 158 (type from Fort Bridger, Wyoming).

Spermophilus richardsoni var. *townsendi* Allen, Monog. Rodentia, 1877, p. 848+ (not *S. townsendi* of Bachman, 1839).

Common in the sage brush of the Neutral zone on the sides of Birch Creek and Lemhi Valley (just below the Canadian or Douglas fir zone and above the Sonoran); probably common in many similar localities visited, but hibernating so early that it was not observed. The last specimen seen was captured August 22.

In 1872 I collected this species at Henry Lake and near Teton Cañon in July and August (Nos. $\frac{11104}{12418}$, $\frac{11105}{12419}$, $\frac{11115}{12431}$, $\frac{11116}{12432}$, U. S. Nat. Mus.).

This species has been long known as *S. townsendi*, but the name *townsendi* was originally applied (by Bachman) to the small gray Spermophile of the Plains of the Columbia and Snake Rivers, to which species it is here restored. The present species, therefore, requires another name, which is found in the *S. elegans* of Kennicott. As Kennicott stated, it "is most nearly related to *S. richardsoni*," from which it may be found to differ subspecifically only.

Record of specimens collected of *Spermophilus elegans*.

U. S. National Museum No.		Original No.	Locality.	Date.	Sex.	Total length.	Tail vertebrae.	Hind foot.
Skin.	Skull.							
23330	30789	1548	Birch Creek, Idaho	Aug. 7, 1890	♂	271	70	42
23560	30978	1591	...do	Aug. 12, 1890	♂	252	62	41
23491	30909	116	...do	Aug. 6, 1890	♂	256	68	42
23798	31198	1607	Lemhi Valley, Idaho.....	Aug. 19, 1890	♀	255	73	40

Spermophilus columbianus (Ord). Burrowing Squirrel.

Arctomys columbianus Ord, "Guthrie's Geog., 2d Am. ed., II, 1815, pp. 292-303" (based on the 'Burrowing Squirrel' of Lewis and Clark).

Anisonyx brachiura Rafinesque, Am. Monthly Mag., II, 1817, p. 45 (based on the 'Burrowing Squirrel' of Lewis and Clark).

Arctomys brachyuva Harlan, Fauna Americana, 1825, pp. 304-306.

Arctomys (Spermophilus) parryi, var. *B. erythrogluteia* Richardson, Fauna Boreali-Americana, I, 1829, p. 161.

Spermophilus parryi var. *erythrogluteia* Allen, Proc. Bost. Soc. Nat. Hist., XVI, 1874, p. 292.

Spermophilus empetra var. *erythrogluteus* Allen, Monog. Rodentia, 1877, p. 839.

"Burrowing Squirrel" Lewis and Clark, Paul Allen ed., 1814, II, pp. 173, 174 (description), 312 (locality).

This Spermophile is abundant in northwestern Idaho and may inhabit the northern part of the region traversed by our party, but it goes into winter quarters so early that it was not captured. It is common in the Clearwater region, living in colonies in the prairies. I have specimens from Moscow and Grangeville. Mr. Clay McNamee writes me

from Moscow, Idaho: "These Spermophiles live in colonies like prairie dogs, and are very abundant in this district. Many can be killed within the city limits of Moscow in the spring. In making their burrows some dirt is thrown out, making a small mound, generally of a circular form. The mounds range from 3 to 10 inches in height. The hole or burrow generally goes straight down for 18 inches or 2 feet. The animals when disturbed sit up erect like a prairie dog and watch a person until within a few yards and then rush into their holes, uttering a series of short squeaks or whistles. When one is shot, unless killed quite dead, it is almost sure to get away. They hibernate during the winter and fall. Nearly all disappear about the 15th of July and remain until the next spring. On account of this habit they are called 'Seven sleepers' as they stay underground about 7 months. They are very fat when they go into winter quarters and are so poor when they come out in the spring that they can hardly walk."

This animal is the 'Burrowing Squirrel' of Lewis and Clark, and the synonymy at the head of this article will be a great surprise to most mammalogists, for the 'Burrowing Squirrel' has been long believed to be a prairie dog (*Cynomys*), while it now proves to be the ground squirrel described by Richardson in 1829 under the name *Arctomys* (*Spermophilus*) *parryi* var. *erythrogluteia*, which is the same animal as the *Spermophilus empetra* var. *erythrogluteus* of Allen, 1877.

Baird, in 1857, cited Ord's *Arctomys columbianus* as a questionable synonym of his own *Cynomys gunnisoni*,* with the following explanation: "Lewis and Clark mention a Burrowing Squirrel from the plains of the Columbia which appears to be a *Cynomys*, and may possibly be the same with the species here described,"—namely, *C. gunnisoni*.

Allen, in 1874, adopted the name *Cynomys columbianus* for the Plateau Prairie Dog, under which *C. gunnisoni* of Baird was given as a synonym; and in 1877 he stated: "the name *columbianus* of Ord becomes the only tenable specific designation" for the prairie dog in question.†

Several years ago I began to doubt that any species of Prairie Dog occurred on the plains of the Columbia, and subsequent investigation satisfied me that my suspicion was well founded. Therefore, in writing of the Plateau Prairie Dog in a recent publication,‡ I discarded the name *Cynomys columbianus* and substituted therefor *Cynomys gunnisoni* of Baird, but did not state the reasons for so doing. Having ascertained positively that no Prairie Dog inhabits any part of the Plains of the Columbia or the region bordering thereon, I set out to procure series of the Spermophiles of the area in the hope of determining the identity

* Mammals of North America, 1857, p. 335.

† Monographs of Rodentia, 1877, p. 906.

‡ Report on the Results of a Biological Survey of San Francisco Mountain, Arizona, N. Am. Fauna, No. 3, September, 1890, pp. 58, 59.

of the 'Burrowing Squirrel' of Lewis and Clark, to which the scientific name *Arctomys columbianus* was given by Ord in 1815.*

The narrative of Lewis and Clark's Expedition† contains the statement: "We saw many sandhill cranes, and some ducks in the marshes near our camp, and a greater number of burrowing squirrels, some of which we killed and found them as tender and well flavored as our gray squirrels." The context shows that the precise locality to which they refer is a camas (called by them 'Quamash') prairie between the forks of the Clearwater or Kooskooskie. I have succeeded in obtaining a fine series of specimens of the large Ground Squirrel which abounds in this region. Most of these specimens were procured in the neighborhood of Moscow, not more than 65 kilometers (about 40 miles) distant (in a northwesterly direction) from the very spot where Lewis and Clark killed their specimens. Others were obtained near Grangeville, a still shorter distance (48 kilometers or about 30 miles south) from the type locality. These animals belong to the species generally known as a form of Parry's Spermophile (*Spermophilus empetra erythrogluteus*). The detailed description of the 'burrowing squirrel' given by Lewis and Clark applies in every particular‡ to this animal, while it does not apply at all to any Prairie Dog or in fact to any other known species of North American mammal. It seems absolutely certain, therefore, that the 'burrowing squirrel' of Lewis and Clark is the present animal, and consequently that the specific name *columbianus* applied to it by Ord in 1815 becomes the only available name for the species.

Stated briefly, the two reasons which render this change imperative are, first, that Lewis and Clark's description fits this particular species, and second, that no other animal which can by any possibility be made to agree with their description inhabits the region.

In the words of Dr. Allen: "As the whole synonymy of the species turns upon Lewis and Clark's description, I quote it in full."§ Lewis and Clark's description is as follows:

"There is also a species of squirrel, evidently distinct, which we have denominated the burrowing squirrel. He inhabits these plains, and somewhat resembles those found on the Missouri; he measures 1 foot and 5 inches in length, of which the tail comprises 2½ inches only; the neck and legs are short; the ears are likewise short, obtusely pointed, and lie close to the head, and the aperture larger than will generally be found among burrowing animals. The eyes are of a moderate size, the

* In the second American edition of Guthrie's Geography, a very rare book.

† Paul Allen edition, vol. II, 1814, p. 312.

‡ The only possible exception is the length of the tail, which is said to be only 2½ inches (about 63^{mm}). As a matter of fact it averages a little over 100^{mm} (4 inches). The tail may have been unusually short, or the tip may have been broken off in the specimen they measured.

§ Monographs of N. Am. Rodentia, 1877, p. 904.

pupil black, and the iris of a dark sooty brown; the whiskers are full, long, and black; the teeth, and, indeed, the whole contour, resemble those of the squirrel; each foot has five toes; the two inner ones of the fore feet are remarkably short, and are equipped with blunt nails; the remaining toes on the front feet are long, black, slightly curved, and sharply pointed; the hair of the tail is thickly inserted on the sides only, which gives it a flat appearance, and a long oval form; the tips of the hair forming the outer edges of the tail are white, the other extremity of a fox red; the under part of the tail resembles an iron gray; the upper is of a reddish brown; the lower part of the jaws, the under part of the neck, legs, and feet, from the body and belly downwards, are of a light brick red; the nose and eyes are of a darker shade of the same color; the upper part of the head, neck, and body, are of a curious brown gray, with a slight tinge of brick red; the longer hairs of these parts are of a reddish white color at their extremities, and falling together, give this animal a speckled appearance. These animals form in large companies, like those on the Missouri, occupying with their burrows sometimes 200 acres of land; the burrows are separate, and each possesses, perhaps, ten or twelve of these inhabitants. There is a little mound in front of the hole formed of the earth thrown out of the burrow, and frequently there are three or four distinct holes, forming one burrow, with these entrances around the base of these little mounds. These mounds, sometimes about 2 feet in height and 4 in diameter, are occupied as watch towers by the inhabitants of these little communities. The squirrels, one or more, are irregularly distributed on the tract they thus occupy, at the distance of 10, 20, or sometimes from 30 to 40 yards. When any one approaches they make a shrill whistling sound, somewhat resembling tweet, tweet, tweet, the signal for their party to take the alarm, and to retire into their intrenchments. They feed on the roots of grass, etc."*

Tamias cinerascens Merriam. Gray Ground Squirrel.

Tamias cinerascens Merriam, N. Am. Fauna, No. 4, Oct., 1890, p. 20 (type from Helena, Montana).

Abundant in the Salmon River, Saw Tooth, and Pahsimeroi Mountains, living in colonies in rocky places, often above timber line, and hibernating early; not found below the Douglas fir zone. By the middle of August this species had become excessively fat and appeared during the hottest days only; after the first of September it was rarely seen. The majority of the specimens obtained still had the red mantle, though a number were in various stages of the change from red to gray.

Two were killed as late as September 23 (a warm day) on the divide between the headwaters of Big Lost River and those of Trail Creek, though none had been seen for about three weeks. On a warm afternoon two days later (September 25) two more were killed and others

* Lewis and Clark's Travels, Paul Allen edition, vol. II, 1814, pp. 173, 174.

seen in the upper part of Wood River Valley and on the divide between the head of Wood River and that of Salmon River.

In a cañon on the west side of the Lost River Mountains (southern continuation of the Salmon River Range) Mr. Bailey met with a colony the members of which differ in habits from those previously known, inasmuch as they climb trees. Mr. Bailey says: "They climb trees readily. We shot several from 6 to 30 feet high in trees, and frequently saw them in bushes after berries. They are very fond of ripe gooseberries, and eat the seeds of numerous small plants."

In 1872 I collected this species at Henry Lake, August 10 (No. $\frac{11103}{12417}$, U. S. Nat. Mus.).

Record of specimens collected of Tamias cinerascens.

U. S. National Museum No.		Original No.	Locality.	Date.	Sex.	Total length.	Tail vertebrae.	Hind foot.
Skin.	Skull.							
23289	30748	1497	Lost River Mountains, Idaho.....	July 29, 1890	♀ ad..	293	110	44
23290	30749	1498	...do .....	...do	♀	271	100	44
23293	30752	1499	...do .....	...do	♂	278	100	43
23266	30722	1505	...do	July 30, 1890	♀ ad..	278	80	44.5
23291	30750	1506	...do .....	...do	♀ ad..	286	109	42
23292	30751	1507	...do .....	...do	♀ ad..	273	91	44
23258	30714	1508	...do .....	...do	♀	284	112	43
23265	30721	1509	...do .....	...do	♀	284	107	45
23260	30716	1510	...do .....	...do	♀	258	94	42
23295	30754	1511	...do .....	...do	♀	278	107	46
23294	30753	1512	...do .....	...do	♂	213	82	40
23267	30723	1520	...do	July 31, 1890	♀ ad..	303	112	44
23259	30715	1521	...do .....	...do	♂ im	277	110	44
23450	30868	1542	...do	Aug. 6, 1890	♀ ad..	273	87	40
23255	30737	61	...do	July 28, 1890	♂	256	101	47
23264	30720	62	...do	July 29, 1890	♀	281	101	44
23251	30707	63	...do .....	...do	♀	274	100	44
23261	30717	64	...do .....	...do	♂	270	106	45
23257	30713	65	...do .....	...do	♀	265	105	44
23252	30708	66	...do	July 30, 1890	♂	257	104	44
23263	30719	67	...do	July 29, 1890	♂	240	99	45
23250	30706	69	...do	July 30, 1890	♂	295	111	45
23256	30712	70	...do .....	...do	♀	290	102	44.5
23983	31388	71	...do .....	...do	♀	270	115	45
23262	30718	72	...do .....	...do	♂	234	95	42
23254	30710	73	...do .....	...do	♂	237	87	41
23253	30709	81	...do	July 31, 1890	♀	262	95	44
23269	30725	82	...do .....	...do	♂	261	101	44
23268	30724	83	...do .....	...do	♀	279	109	45
23561	30979	1583	Birch Creek, Idaho	Aug. 11, 1890	♂	276	94	43
23562	30980	1584	...do .....	...do	♂	295	114	45
23449	30867	115	...do	Aug. 6, 1890	♂	297	105	45
23563	30981	143	...do	Aug. 11, 1890	♀	256	71	41
23451	30869	144	...do .....	...do	♂	267	64	44
23658	31052	1608	Salmon River Mountains, Idaho..	Aug. 19, 1890	♀	275	97	41
23569	30987	1609	...do .....	...do	♂	258	89	42

Record of specimens collected of *Tamias cinerascens*—Continued.

U. S. National Museum No.		Original No.	Locality.	Date.	Sex.	Total length.	Tail vertebrae.	Hind foot.
Skin.	Skull.							
23659	31053	1637	Salmon River Mountains, Idaho..	Aug. 23, 1890	♂.....	265	93	44
23660	31054	1655	...do	Aug. 25, 1890	♂.....	275	93	43
23661	31055	1671	...do	Aug. 26, 1890	♀.....	290	102	46
23779	31179	1699	...do	Aug. 27, 1890	♂.....	292	106	44
23564	30982	173	...do	Aug. 19, 1890	♂.....	263	81	45
24276	31680	1850	Summit, Alturas Co., Idaho	Sept. 23, 1890	♀.....	282	98	45
24277	31681	1851	...do .....	...do	♂.....	255	75	42
24275	31679	1852	Head of Wood River, Idaho	Sept. 25, 1890	♂.....	290	97	46
24278	31682	1853	...do .....	...do	♂.....	258	92	43

Tamias quadrivittatus amœnus* Allen. Klamath Chipmunk.

Abundant throughout the Canadian and Hudsonian forests of central Idaho, descending as low as the upper part of the sage-covered foothills, and occurring, though not abundantly, as high as timber line on the mountains. Just above timber line in the Salmon River Mountains this chipmunk was observed collecting large mouthfuls of the white wool from the beds of dwarf willows (*Salix reticulata*), which are only about 2 inches in height. In the Saw Tooth Mountains during the early part of October it was very abundant and remained active during cold weather, even after the ground was covered with snow, running about and tunneling in the soft snow after the manner of Red Squirrels—a habit I have never before observed in a Chipmunk. It is an active, sprightly animal and climbs trees freely, though rarely going high. Its principal food in the region about Saw Tooth Lake at the time of our visit (last of September and early October) consisted of the seeds of *Pinus murrayana*, of which I removed not less than 332 from the cheek pouches of a single individual.

Seventy-four specimens of this Chipmunk were collected and brought back to Washington—a sufficient series to illustrate many points of seasonal, geographic, and individual variation. All the specimens from the Saw Tooth Mountains are nearly typical *amœnus*, and those from the Pahsimeroi and Lost River Mountains are fairly referable to the same form. Those from the northern Salmon River Mountains show a strong tendency to run into *luteiventris*,† just half of the specimens collected having a decided fulvous wash across the belly. Dr. J. A. Allen, to whom I submitted the specimens, writes:

“If No. 23568 [a yellow-bellied specimen] fairly represents the Salmon River series, I should not hesitate to label them *Tamias quadrivittatus*

**Tamias amœnus* Allen, Bull. Am. Mus. Nat. Hist., III, No. 1, June, 1890, pp. 90–92 (type from Fort Klamath, Oregon).

†*Tamias quadrivittatus luteiventris* Allen, Bull. Am. Mus. Nat. Hist., III, No. 1, 1890, pp. 102–103 (type from Chief Mountain Lake, Montana).

luteiventris. On the other hand, I do not see how it is possible to do otherwise than to refer the Saw Tooth Lake, the Pahsimeroi Mountains, the Lost River Mountains, and the Birch Creek series to *Tamias amoenus*."

Record of specimens collected of Tamias quadrivittatus amoenus.

U. S. National Museum No.		Original No.	Locality.	Date.	Sex.	Total length.	Tail vertebrae.	Hind foot.
Skin.	Skull.							
23999	31422	1860	Saw Tooth Lake, Idaho.....	Sept. 26, 1890	♂	195	80	32
23998	31421	1861	.....do.....	do	♀	203	80	32
23997	31420	1865	.....do.....	do	♂	213	88	33
24000	31423	1866	.....do.....	do	♀	212	92	33
24003	31426	1867	.....do.....	do	♂	195	84	32
24004	31427	1868	.....do.....	do	♂	202	88	33
23994	31417	1869	.....do.....	do	♂	195	78	32
23996	31419	1870	.....do.....	do	♂	195	78	33
23992	31415	1871	.....do.....	do	♂	185	73	32
23995	31418	1872	.....do.....	do	♀	194	80	33
24002	31425	1889	.....do.....	Sept. 28, 1890	♂	210	87	32
24280	31684	1909	.....do.....	Sept. 29, 1890	♀	210	90	32.5
24436	31842	1917	.....do.....	Sept. 30, 1890	♂	202	80	33
23039	30485	1456	Big Butte, Idaho.....	July 19, 1890	♀ ad.	209	93	32.5
23237	30694	1490	Arco, Idaho.....	July 25, 1890	♂	213	98	34
23223	30680	1491	.....do.....	July 26, 1890	♀	216	106	34
23236	30693	59	.....do.....	July 29, 1890	♂	207	100	33
23220	30677	74	Lost River Mountains, Idaho.....	July 30, 1890	♂	195	93	33
23228	30685	75	.....do.....	do	♀	192	86	33
23222	30679	76	.....do.....	do	♂	197	92	33
23226	30683	77	.....do.....	do	♀	200	91	33
23229	30686	78	.....do.....	do	♂	201	94	32
23221	30678	79	.....do.....	do	♀	202	95	32
23225	30682	80	.....do.....	July 31, 1890	♂	201	86	32
23230	30687	1500	.....do.....	July 29, 1890	♀ ad.	213	95	32
23224	30681	1500	.....do.....	do	♂	204	93	32
23233	30690	1502	.....do.....	do	♂	208	98	32
23232	30689	1503	.....do.....	do	♂	205	96	32
23219	30676	1513	.....do.....	July 30, 1890	♀	207	92	33
23227	30684	1514	.....do.....	do	♀	210	97	33
23235	30692	1515	.....do.....	do	♀ im.	195	92	32
23231	30688	1516	.....do.....	do	♂	212	98	33
23234	30691	1517	.....do.....	do	♂	206	96	32
23297	30756	1543	.....do.....	Aug. 6, 1890	♂	211	96	33
23302	30761	1544	.....do.....	do	♀	210	93	32
23328	30787	1545	.....do.....	do	♂	213	95	34
23296	30755	1546	.....do.....	do	♂	190	77	32
23459	30877	1586	.....do.....	Aug. 11, 1890	♂	210	88	32
23329	30788	110	.....do.....	Aug. 6, 1890	♂	212	68	32
23326	30785	111	.....do.....	do	♀	187	93	33
23325	30784	112	.....do.....	do	♀	209	63	31.5
23327	30786	113	.....do.....	do	♀	210	93	33
23452	30870	149	.....do.....	Aug. 11, 1890	♀	211	88	31
23465	30883	150	.....do.....	do	♂	207	60	32
23453	30871	151	.....do.....	do	♀	211	91	33

Record of specimens of *Tamias quadrivittatus amoenus*—Continued.

U. S. National Museum No.		Original No.	Locality.	Date.	Sex.	Total length.	Tail vertebrae.	Hind foot.
Skin.	Skull.							
23463	30881	152	Lost River Mountains, Idaho	Aug. 11, 1890	♀.....	210	92	31
23457	30875	153	...do .....	...do	♀.....	211	94	33
23454	30872	154	...do .....	...do	♂.....	206	88	31
23460	30878	155	...do .....	...do	♀.....	207	89	31
23571	30989	1610	Salmon River Mountains, Idaho ..	Aug. 19, 1890	♂.....	207	95	32
23570	30988	1611	...do .....	...do	♀.....	205	95	32
23652	31046	1639	...do	Aug. 23, 1890	♂.....	214	95	33
23654	31048	1640	...do .....	...do	♂.....	215	95	33
23653	31047	1641	...do .....	...do	♂.....	220	100	32.5
23657	31051	1642	...do .....	...do	♀.....	221	97	32.5
23651	31045	1643	...do .....	...do	♀.....	210	91	32.2
23656	31050	1651	...do	Aug. 24, 1890	♀.....	220	102	32
23655	31049	1652	...do .....	...do	♂.....	218	95	33
23662	31056	1653	...do	Aug. 25, 1890	♂.....	205	88	33
23650	31044	1654	...do .....	...do	♀.....	204	87	33
23781	31181	1703	...do	Aug. 27, 1890	♀.....	215	90	33
23782	31182	1704	...do .....	...do	♀.....	205	90	31.5
23783	31183	1705	...do .....	...do	♀.....	205	86	32
23780	31180	1706	...do .....	...do	♀.....	192	83	31.5
23777	31177	1722	...do	Aug. 30, 1890	♂.....	202	79	32
23567	30985	172	...do	Aug. 19, 1890	♀.....	126	82	31.5
23566	30984	182	...do	Aug. 22, 1890	♀.....	208	86	31
23565	30983	183	...do .....	...do	♀.....	206	87	32
23568	30986	184	...do .....	...do	♀.....	195	86	30
23788	31188	1771	Lemhi Valley, Idaho	Sept. 4, 1890	♀.....	212	90	32
23895	31299	1787	Pahsimeroi Mountains, Idaho	Sept. 14, 1890	♀.....	214	90	32
23898	31302	1788	...do .....	...do	♂.....	215	93	33
23896	31300	1801	...do	Sept. 15, 1890	♂.....	220	94	32
23993	31416	1845	Head of Big Lost River, Idaho	Sept. 22, 1890	♂.....	215	96	33

***Tamias minimus pictus* Allen.** Great Basin Chipmunk.

Tamias minimus pictus J. A. Allen, Bull. Am. Mus. Nat. Hist., III, No. 1, June, 1890, 115-116 (type from Kelton, Utah).

Tamias minimus melanurus Merriam, N. Am. Fauna, No. 4, Oct., 1890, 22 (type from Blackfoot, Idaho). *

Common locally but not evenly distributed throughout the Snake Plains of Idaho and the larger sage-covered valleys of the mountains. Colonies were observed in the valley of Birch Creek and Lemhi River, and in Big Lost, Little Lost, Pahsimeroi, and Round Valleys, and in the valley at the headwaters of Salmon River (at the east foot of the Saw Tooth Mountains).

These Chipmunks were often seen climbing about in the sage brush and greasewood, feeding on the seeds of *Artemisia tridentata* and *Sar-*

* Additional specimens indicate that this supposed subspecies really represents a peculiar phase of the molt, in which the submarginal black band has not grown out far enough to show the fulvous bases of the hairs.

cobatus vermiculatus. Specimens killed often had their cheek pouches distended with the seeds of these plants. In the Pahsimeroi Valley they came to our camp for crumbs and were such a nuisance we were forced to kill them. The species was seen as late as October 4 in the valley at the head of Salmon River, at the east foot of the Saw Tooth Mountains.

Record of specimens collected of Tamias minimus pictus.

U. S. National Museum No.		Original No.	Locality.	Date.	Sex.	Total length.	Tail vertebrae.	Hind foot.
Skin.	Skull.							
23135	30580	1420	Blackfoot, Idaho.....	July 11, 1890	♂.....	165	67	29
23130	30575	1437	do.....	July 12, 1890	♂.....	195	92	32
23045	30491	1439	do.....	July 14, 1890	♂.....	188	90	29
23040	30486	1445	do.....	July 15, 1890	♀ ad..	190	83	29
23044	30490	1446	do.....	July 16, 1890	♂.....	198	95	30
23042	30488	1447	do.....	do.....	♂.....	189	90	29
23048	30494	1451	do.....	July 17, 1890	♂ im..	84		29
23047	30493	1459	Big Lost River, Idaho.....	July 21, 1890	♂.....	185	88	29.5
23049	30495	1460	do.....	do.....	♂.....	188	91	29.5
23043	30489	1461	do.....	do.....	♀.....	185	91	30
23046	30492	1462	do.....	do.....	♀.....	195	96	30
23038	30484	1464	do.....	July 22, 1890	♀.....	195	93	30
23041	30487	1465	do.....	do.....	♀.....	183	88	29
23052	30498	1480	do.....	July 23, 1890	♂.....	184	87	28
23053	30499	1481	do.....	do.....	♂.....	190	92	29
23050	30496	1482	do.....	do.....	♂.....	192	94	29
23051	30497	1483	do.....	do.....	♂.....	189	91	29
23916	31321	1487	do.....	July 24, 1890	♂.....	182	90	28
23305	30764	1528	Birch Creek, Idaho.....	Aug. 4, 1890	♂.....	185	85	29
23309	30768	1529	do.....	do.....	♂.....	186	90	30
23300	30759	1530	do.....	do.....	♀.....	195	88	29.5
23304	30763	1549	do.....	Aug. 7, 1890	♂.....	192	87.5	30
23299	30758	1556	do.....	Aug. 6, 1890	♂.....	183	85	29
23303	30762	1559	do.....	Aug. 7, 1890	♂.....	188	85	29
23461	30879	1587	do.....	Aug. 11, 1890	♂.....	191	87	28
23306	30765	1590	do.....	do.....	♂.....	189	85	28
23776	31176	1734	Junction, Idaho.....	Aug. 31, 1890	♂ im..	202	93	29
23778	31178	1735	do.....	do.....	♀ im..	199	90	28
23772	31172	1744	Lemhi, Idaho.....	Sept. 2, 1890	♂.....	188	88	29
23773	31173	1745	do.....	do.....	♀.....	204	96	31
23775	31175	1746	do.....	do.....	♂.....	185	86	29
23769	31169	1747	do.....	do.....	♀.....	188	87	31
23771	31171	1760	do.....	Sept. 3, 1890	♀.....	195	89	27
23789	31189	1770	Lemhi Valley, Idaho.....	Sept. 4, 1890	♂.....	188	84	30
23787	31187	1776	Little Lost River, Idaho.....	Sept. 11, 1890	♂.....	188	85	29
23786	31186	1777	do.....	do.....	♂.....	190	83	29
23785	31185	1778	do.....	do.....	♀.....	198	85	30
23784	31184	1779	do.....	do.....	♀.....	182	82	29
23768	.....	1786	Pahsimeroi Mountains, Idaho.....	Sept. 14, 1890	♀.....	186	86	30
23893	31297	1817	Pahsimeroi Valley, Idaho.....	Sept. 16, 1890	♀.....	198	85	30
23892	31296	1818	do.....	do.....	♂.....	190	80	29.5
23894	31298	1819	do.....	do.....	♀.....	195	86	30
23900	31304	1820	do.....	do.....	♂.....	200	87	31

Record of specimens collected of *Tamias minimus pictus*—Continued.

U. S. National Museum No.		Original No.	Locality.	Date.	Sex.	Total length.	Tail vertebrae.	Hind foot.
Skin.	Skull.							
.....	31168	1824	Pahsimeroi Valley, Idaho.....	Sept. 17, 1890	♀.....	192	82	30
23897	31301	1825	...do.....	...do.....	♀.....	195	83	30
23899	31303	1826	...do.....	...do.....	♀ im..	184	79	30
24001	31424	1859	Upper Salmon Valley, Idaho.....	Sept. 25, 1890	♀.....	192	76	30
23307	30766	1560	Birch Creek, Idaho.....	Aug. 7, 1890	♀.....	178	74	29
23308	30767	1564	...do.....	...do.....	♀.....	188	88	28
23298	30757	1588	...do.....	Aug. 11, 1890	♂.....	187	86	28
23311	30770	1589	...do.....	...do.....	♀.....	200	94	30
23770	31170	1743	Lemhi, Idaho.....	Sept. 2, 1890	♀.....	192	86	30.5
23774	31174	1761	...do.....	Sept. 3, 1890	♀.....	199	90	28
23131	30576	4	Blackfoot, Idaho.....	July 11, 1890	♀.....	197	90	29
23134	30579	5	...do.....	...do.....	♂.....	195	91	31
23129	30574	6	...do.....	...do.....	♀.....	173	66	29
23136	30581	14	...do.....	July 13, 1890	♂.....	193	90	30
23128	30573	15	...do.....	...do.....	♀.....	193	89	29
23132	30577	16	...do.....	...do.....	♂.....	179	89	28.5
23059	30505	40	Big Lost River, Idaho.....	July 21, 1890	♀.....	197	91	30
23055	30501	41	...do.....	July 22, 1890	♀.....	185	87	29
23058	30504	42	...do.....	...do.....	♂.....	178	81	29
23057	30503	49	...do.....	...do.....	♂.....	184	90	29
23056	30502	50	...do.....	...do.....	♂.....	184	88	29.5
23915	31320	55	...do.....	July 24, 1890	♀.....	155	49	28
23054	30500	39	...do.....	July 21, 1890	♀.....	197	94	30
23238	30695	58	Arco, Idaho.....	July 25, 1890	♀.....	196	97	29
23239	30696	60	Little Lost River, Idaho.....	July 27, 1890	♀.....	185	87	30
23324	30783	114	Birch Creek, Idaho.....	Aug. 6, 1890	♂.....	181	82	29
23310	30769	131	...do.....	Aug. 8, 1890	♂.....	186	87	28
23301	30760	136	...do.....	Aug. 9, 1890	♀.....	182	79	29
23464	30882	156	...do.....	Aug. 11, 1890	♀.....	189	80	27
23466	30884	157	...do.....	...do.....	♀.....	196	92	27.5
23456	30874	158	...do.....	...do.....	♂.....	177	86	27
23458	30876	161	...do.....	Aug. 13, 1890	♂.....	193	90	29
23462	30880	165	...do.....	Aug. 14, 1890	♂.....	184	89	27
23455	30873	166	...do.....	...do.....	♂.....	154	52	27

Sciurus richardsoni Bachman. Richardson's Squirrel.

Sciurus richardsoni Bachman, Proc. Zool. Soc. Lond., vol. vi, 1838, pp. 100, 101 (type from mountains at head of Big Lost River, Idaho).

Richardson's Squirrel is the most conspicuous mammal of the coniferous forests of central Idaho, and is common from the lower edge of the zone of Douglas fir and Murray pine to timber line, where the prevailing trees are the white-bark pine and alpine fir. It feeds upon the seeds of these conifers and also upon those of *Picea alba*, and the mouths of its burrows are often nearly hidden by the piles of scales which accumulate about its home. The large seeds of the white-bark pine (*Pinus albicaulis*) are especially sought for, and the peculiar character of the cone of this species has given rise to a clever method of gaining

access to the seeds. The scales of the cones are very thick and are firmly glued together, instead of being separate as usual among conifers. To reach the seeds the squirrel gnaws a hole in one side of the cone by means of which he extracts all of the seeds, just as our eastern squirrels obtain the meats of the larger nuts. A cone thus gnawed is shown in the accompanying figure. Squirrels ordinarily reach the seeds of conifers by stripping off the scales from the cones.

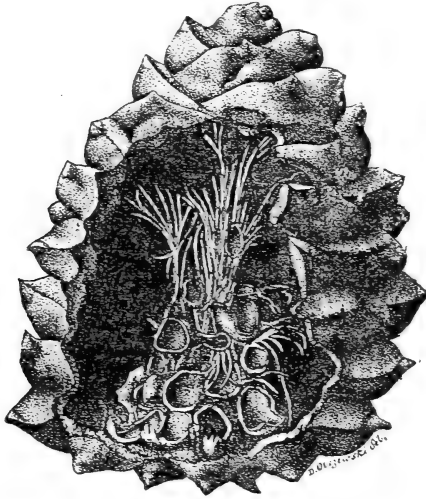


FIG. 1.—Cone of White-bark Pine gnawed by Richardson's Squirrel.

Richardson's Squirrel lives in burrows under decayed logs or among the roots of trees, and in nests in the branches. These nests are made of dry grass and other materials, and are usually placed against the trunk of the tree. They are probably used in summer only, and resemble the summer nests of the common Eastern Red Squirrel (*Sciurus hudsonicus*).

The ordinary note and scolding chipper of this squirrel are nearly identical with those of its eastern congener; and in general the habits of the two are similar. Our marten traps baited with squirrels, chipmunks, mice, and birds, captured Richardson's Squirrel more frequently than any other mammal.

Richardson's Squirrel was discovered by John K. Townsend during his overland journey to Oregon in 1834, and was described by Dr. Bachman in 1838, under the name *Sciurus richardsoni*. The type locality given is "the high range of the Rocky Mountains west of the great chain" (P. Z. S., 1838, 100), which was interpreted by Allen as meaning the Bitter Root Range (Monog. Rodentia, 1877, 686). Bachman states that the label on Townsend's specimen bore the date "August 12, 1834" (Journal Acad. Nat. Sci. Phila., VIII, 1839, p. 67). A critical

examination of Townsend's Narrative shows that on the date mentioned he was attempting to cross the high mountains between the headwaters of Big Lost River (then known as 'Goddin's Creek') and Big Wood River (then known as the Malade—a name still applied to the lower part of the same stream where it crosses the Snake Plains)*. During the past season (in September, 1890) I followed part of Townsend's route and obtained specimens of the squirrel in question at a point not more than a few miles from the spot where his type was secured 56 years previously. Such a specimen is No. $\frac{2}{3}\frac{4}{14}\frac{055}{71}$ ♀, U. S. Nat. Museum, collected in the mountains at the head of Big Lost River, September 22, 1890, which may be regarded, therefore, as typical of the species. It was described as a very small squirrel—in fact, as the "most diminutive of all the known species of genuine squirrel in North America"—but Professor Baird who examined the type specimen pointed out the important fact that it is *immature* (Mammals of N. Am., 1857, 274, footnote). This type specimen, collected by Townsend more than half a century ago, is before me as I write (thanks to Mr. Witmer Stone and the authorities of the Philadelphia Academy of Natural Sciences, to which institution it belongs), and is matched almost exactly by several young specimens, about two-thirds grown, collected by me near the type locality. The black terminal part of the tail, which is the chief characteristic of the species, is not so pronounced in the young as in adults, and the tip is broken off in the type (which is mounted) and the remaining part is somewhat masked by the circumstance that the tail is twisted on its own axis, thus mixing the red and black hairs in such a way as to conceal the predominance of the latter. Townsend stated that "about an inch and three-fourths" of the terminal part of the tail was black, and Bachman remarked that the species could always be distinguished "by the blackness of its tail at the extremity." The whiteness of the incisors spoken of by Bachman is due to immaturity. (P. Z. S., 1838, 100.)

Professor Baird characterized the species correctly when he stated that it has a bushy tail, reddish brown along the center, with the terminal portion glossy black, but he was mistaken in supposing the animal to be larger than the Red Squirrel of the East (with which it agrees in size) and in crediting it with a "peculiarly cylindrical tail" (Mammals of North Am., 1857, 273-274). The tail, when full grown, is as flat as that of the members of the *Sciurus hudsonicus* group.

* This river must not be confounded with another of the same name, a tributary of Bear River in southeastern Idaho.

Record of specimens collected of *Sciurus richardsoni*.

U. S. National Museum No.		Original No.	Locality.	Date.	Sex.	Total length.	Tail vertebrae.	Hind foot.
Skin.	Skull.							
23288	30747	1495	Lost River Mountains, Idaho.....	July 29, 1890	♂.....	330	133	51
23248	30711	1496	...do .....	...do	♀.....	284	121	50
23287	30746	1541	Birch Creek, Idaho	Aug. 6, 1890	♂.....	333	143	51
23467	30885	1581	...do	Aug. 11, 1890	♀.....	330	125	47
23468	30886	1582	...do .....	...do	♂.....	333	120	50
23531	30949	145	...do .....	...do	♂.....	338	147	51
23528	30946	1612	Salmon River Mountains, Idaho..	Aug. 19, 1890	♀ im.	257	82	48.5
23647	31041	1638	...do	Aug. 23, 1890	♀.....	328	142	50
23648	31042	1672	...do	Aug. 26, 1890	♀.....	342	140	51
23649	31043	1676	...do .....	...do	♂ ad.	345	130	51
23646	31040	1683	...do .....	...do	♂.....	319	124	51
23793	31193	1707	...do	Aug. 27, 1890	♂.....	352	148	51
23795	31195	1729	...do	Aug. 30, 1890	♂ ad.	325	124	52
23794	31194	1730	...do .....	...do	♂ ad.	330	126	51
23797	31197	1774	...do	Sept. 5, 1890	♂.....	350	146	52
23796	31196	1775	...do .....	...do	♂.....	340	130	52
23529	30947	170	...do	Aug. 18, 1890	♂.....	291	113	47
23530	30948	171	...do .....	...do	♀.....	308	123	50
23642	31036	178	...do	Aug. 22, 1890	♂.....	313	124	47
23645	31039	179	...do .....	...do	♂.....	326	127	48
23644	31038	180	...do .....	...do	♀.....	326	136	47
23643	31037	181	...do .....	...do	♀.....	211	128	47
23902	31306	1785	Pahsimeroi Mountains, Idaho....	Sept. 14, 1890	♂.....	320	128	49
23901	31305	1797	...do	Sept. 15, 1890	♀.....	335	144	51
24053	31469	1798	...do .....	...do	♂ ad.	335	125	54
24052	31468	1799	...do .....	...do	♀.....	334	130	52
24054	31470	1800	...do .....	...do	♀.....	325	133	51
24055	31471	1844	Head of Big Lost River, Idaho..	Sept. 22, 1890	♀.....	335	137	53
24051	31467	1855	Head of Wood River, Idaho.....	Sept. 25, 1890	♂ ad.	340	130	51
24242	31646	1862	Saw Tooth Lake, Idaho	Sept. 26, 1890	♀ im.	318	123	51
24246	31650	1863	...do .....	...do	♀ im.	315	126	51
24243	31647	1864	...do .....	...do	♀ ad.	330	136	51
24247	31651	1881	...do	Sept. 27, 1890	♂ ad.	342	138	53
24245	31649	1882	...do	Sept. 28, 1890	♂ ad.	335	130	53
24244	31648	1895	...do .....	...do	♀ ad.	335	130	51

Sciuropterus volans sabrinus (Shaw). Hudsonian Flying Squirrel.

Sciurus sabrinus Shaw, Gen. Zoölogy, Mammalia, vol. II, part I, 1801, p. 157.

These large and handsome Flying Squirrels are common in the Salmon River and Saw Tooth Mountains and probably throughout the coniferous forests of Idaho. At Saw Tooth Lake Mr. Basil Hicks Dutcher caught three in traps set for marten (baited with birds and chipmunks). One moonlight night in early October I heard one gnawing something in a pine over our camp, and after nearly breaking my neck to secure a shot finally fired and brought down—not the squirrel, but a large hard biscuit he had stolen from our tent.

Record of specimens collected of Sciuropterus volans sabrinus.

U. S. National Museum No.		Original No.	Locality.	Date.	Sex.	Total length.	Tail vertebrae.	Hind foot.
Skin.	Skull.							
24271	31675	1883	Saw Tooth Lake, Idaho.....	Sept. 28, 1890	♀ ad..	340	150	46
24270	31674	1901	...do	Sept. 29, 1890	♂	310	138	41
24378	31784	1913	...do	Sept. 30, 1890	♀ im .	325	145	43

Castor canadensis Kuhl. Beaver.

Beavers are common in suitable places throughout Idaho. We found them on Timber Creek in the Salmon River Mountains, on the headwaters of the Pahsimeroi, and in the Saw Tooth Mountains. Fresh cuttings were observed also in Snake River Cañon near Shoshone Falls.

In 1872 several specimens were trapped in Teton Basin (skulls 12403 and 12404, U. S. Nat. Mus.).

Onychomys leucogaster brevicaudus subsp. nov. Idaho Grasshopper Mouse.

This new subspecies of Grasshopper Mouse is common in most parts of the Upper Sonoran zone of Idaho. It may be known by the following description:

ONYCHOMYS LEUCOGASTER BREVICAUDUS subsp. nov.

Type No. 33033♂ ♂ ad. U. S. National Museum (Department of Agriculture collection). From Blackfoot, Idaho, July 15, 1890. Collected by Vernon Bailey and Basil Hicks Dutcher (original number 1442).

Measurements (taken in flesh).—Total length, 139; tail vertebrae, 38; hind foot, 19.5. Ear from crown, 12 (in dry skin).

General characters.—Similar to *O. leucogaster*, but smaller, with shorter tail and much larger ears. In the type specimen the ears are not quite so large as in all the other specimens from the same region.

Color.—Upper parts drab-gray, washed with pale cinnamon tawny, especially over the rump and flanks. Under parts and fore legs pure white, the white reaching well up on the sides, as usual in *Onychomys*. Tail whitish, with an ill-defined dark stripe on proximal two-thirds of upper surface. In immature, though full-grown, individuals the upper parts are mouse-gray, inclining to drab-gray, without the tawny wash.

Cranial and Dental characters.—Compared with *O. leucogaster* the skull is much smaller, the rostral part is both actually and relatively shorter, and the zygomatic arches are shorter and more spreading, particularly anteriorly, giving the postrostral part of the skull a squarish appearance. The last upper molar is smaller than in *leucogaster* and is a cylindrical peg.

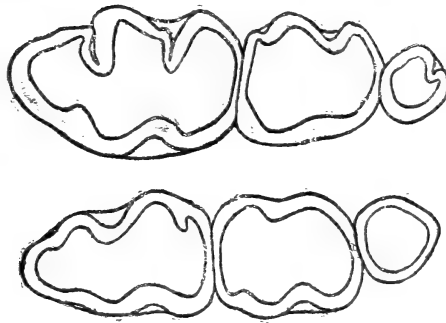


FIG. 2.—Teeth of *Onychomys brevicaudus* (type).
Very much worn. × 15.

Record of specimens collected of Onychomys leucogaster brevicaudus.

U. S. National Museum No.		Original No.	Locality.	Date.	Sex.	Total length.	Tail vertebrae.	Hind foot.
Skin.	Skull.							
23107	30552	1422	Blackfoot, Idaho	July 11, 1890	♂	136	41	20
23115	30560	1434	....do	July 13, 1890	♀	139	39	20
23086	30532	1442	....do	July 15, 1890	♂	139	38	19.5
23085	30531	1466	Big Lost River, Idaho	July 22, 1890	♂	135	41	19
22997	30443	7	Blackfoot, Idaho.....	July 11, 1890	♀	134	34	18
22996	30442	13	....do	July 12, 1890	♂	130	36	19.5
23069	30515	30	....do	July 15, 1890	♂	132	37	19

Hesperomys crinitus sp. nov. Cañon Mouse.

This new species of *Hesperomys* belongs to the silky-haired *eremicus* group of the Sonoran Province, the range of which is thus carried about 500 miles north of its previously known limit. The present species is an abundant inhabitant of the lava cañons of Snake River, where eighteen specimens were captured in a single night among the cliffs and masses of basalt at Shoshone Falls. Most of them were taken in traps baited with rolled oatmeal. The species may be known from the following description :

HESPEROMYS CRINITUS sp. nov.

Type No. ~~31255~~ 31255 ♂ ad. U. S. National Museum (Department of Agriculture collection). From Shoshone Falls, Snake River, Idaho, October 10, 1890. Collected by C. Hart Merriam and Vernon Bailey (original number 1945).

Measurements (taken in flesh).—Total length, 175; tail vertebrae, 97; hind foot, 21; ear from notch, 21. In dry skin, ear from crown, 16.5; from notch, 18.5.

General characters.—Similar to *H. eremicus* in the peculiar silky texture of the pelage, but coloration much darker; hind feet and tail

shorter; tail densely haired, with hairs of distal third much elongated. In true *eremicus* the tail is nearly naked. Soles haired on posterior third instead of entirely naked as in *eremicus*. Ears large. There is a patch of pale fulvous on the breast between the fore legs as in several of the subtropical forms of the genus. This patch is sometimes divided in the middle.

Color.—Upper parts pale olive-brown, heavily lined with black on the back and rump, and strongly suffused with ochraceous buff on the sides. Under parts pure white, except the anal region and a patch between the fore legs, which are ochraceous buff. Tail sharply bicolor, dusky above, whitish below. In immature individuals the pale fulvous pectoral and anal patches are indistinct, and in the very young they are absent.

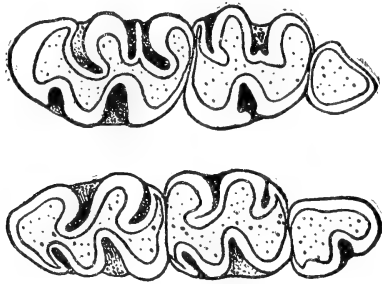


FIG. 3.—Teeth of *Hesperomys crinitus* ♂ old (type). × 15.

Record of specimens collected of Hesperomys crinitus.

U. S. National Museum No.		Original No.	Locality.	Date.	Sex.	Total length.	Tail vertebrae.	Hind foot.
Skin.	Skull.							
24248	31652	1944	Shoshone Falls, Idaho	Oct. 10, 1890	♂ ad..	184	97	21
24255	31659	*1945	...do .....	...do	♂ ad..	175	97	21
24251	31655	1946	...do .....	...do	♂ ad..	173	95	21
24260	31664	1947	...do .....	...do	♂ ad..	172	94	21
24254	31658	1949	...do .....	...do	♂ ad..	174	93	21
24261	31665	1949	...do .....	...do	♂	167	90	21
24250	31654	1950	...do .....	...do	♂	172	95	21
24258	31662	1950	...do .....	...do	♂ im..	152	74	21
24253	31657	1952	...do .....	...do	♀ ad..	180	97	21
24249	31653	1953	...do .....	...do	♀	175	92	20
24252	31656	1954	...do .....	...do	♀	180	97	21
24257	31661	1955	...do .....	...do	♀ im..	165	88	21
24256	31660	1956	...do .....	...do	♀ im..	163	85	21

* Type.

Hesperomys leucopus (Rafinesque). White-footed Mouse.

Abundant throughout the region traversed, occurring in equal numbers from the Snake Plains to or above timber line on the mountains. This species is one of the greatest nuisances the mammal collector has to deal with, as it is forever getting into traps set for more valuable species. It inhabits all sorts of situations, and in most places far outnumbers all other mammals together. When camped on Salmon River, in Round Valley, the latter part of September, we saw dozens of them every night climbing about among the willows, and heard them rushing to and fro among the dead leaves, making almost as much noise as rabbits.

The large series of specimens here referred to this species may be found eventually to merit separation into two or three subspecies. The largest and handsomest form is the one from the Saw Tooth Mountains, which is nearly identical with that from the Salmon River Mountains. In these the tail is sharply bicolor, blackish above and pure white below. Specimens from the sage plains and valleys have the tail indistinctly bicolor. Those from the cañon of Snake River are smaller and differ somewhat in coloration.

Record of specimens collected of Hesperomys leucopus.

U. S. National Museum No.		Original No.	Locality.	Date.	Sex.	Total length.	Tail vertebrae.	Hind foot.
Skin.	Skull.							
23117	30562	1	Blackfoot, Idaho.....	July 10, 1890	♀.....	175	75	21
23116	30561	2	...do.....	...do.....	♀.....	160	68	19.5
23119	30564	1417	...do.....	...do.....	♀.....	177	74	19
23109	30554	1418	...do.....	...do.....	♀.....	170	77	19.5
23113	30558	8	...do.....	July 11, 1890	♀.....	169	70	20
23105	30550	9	...do.....	...do.....	♂.....	168	74	20
23112	30557	10	...do.....	...do.....	♀.....	130	57	19.5
23002	30448	11	...do.....	...do.....	♂.....	129	57	19
23110	30555	1421	...do.....	...do.....	♂.....	147	68	20
23111	30556	12	...do.....	July 12, 1890	♀.....	113	48	18
23118	30563	1428	...do.....	...do.....	♀.....	178	81	20
23106	30551	1429	...do.....	...do.....	♀.....	171	80	20
23114	30559	1430	...do.....	...do.....	♂.....	165	80	20
23108	30553	18	...do.....	July 13, 1890	♀.....	180	81	20
23205	.....	19	...do.....	...do.....	♂.....	150	67	19
23077	30523	31	...do.....	July 15, 1890	♂.....	151	69	19
23071	30517	1453	Big Butte, Idaho.....	July 19, 1890	♀ ad..	182	80	20.5
23078	30524	1454	...do.....	...do.....	♀ im..	117	51	19
23076	30522	45	Big Lost River, Idaho.....	July 22, 1890	♂.....	168	75	21
23081	30527	1468	...do.....	...do.....	♀.....	166	67	20
23079	30525	1469	...do.....	...do.....	♀.....	173	76	20
23073	30519	1470	...do.....	...do.....	♀.....	177	80	20
23082	30528	1471	...do.....	...do.....	♀.....	170	74	21
23074	30520	1472	...do.....	...do.....	♀.....	179	80	21
23070	30516	1473	...do.....	...do.....	♀.....	158	72	20
23083	30529	1474	...do.....	...do.....	♀.....	162	71	21.5

Record of specimens collected of *Hesperomys leucopus*—Continued.

U. S. National Museum No.		Original No.	Locality.	Date.	Sex.	Total length.	Tail vertebrae.	Hind foot.
Skin.	Skull.							
23914	31319	1475	Big Lost River, Idaho	July 22, 1890	♀.....	153	70	21
23072	30518	1476	.. do .....	.. do	♀.....	168	78	21
23080	30526	1477	.. do .....	.. do	♂.....	162	72	20. 5
23084	30530	1478	.. do .....	.. do	♂.....	151	68	19
23068	30514	1479	.. do .....	.. do	♂.....	160	73	20
23075	30521	52	.. do	July 23, 1890	♂.....	165	73	20
23913	31318	1488	.. do	July 24, 1890	♀.....	184	89	20
23912	31317	56	.. do .....	.. do	♀.....	174	72	21
23247	30704	1492	Arco, Idaho	July 26, 1890	♀ ad ..	176	76	20
23338	30797	1550	Birch Creek, Idaho	Aug. 7, 1890	♀.....	165	72	20. 5
23335	30794	1557	.. do .....	.. do	♂.....	155	62	20
23339	30798	1558	.. do .....	.. do	♂.....	180	85	20
23341	30800	1566	.. do .....	.. do	♀.....	170	78	21
23343	30802	1567	.. do	Aug. 8, 1890	♀.....	188	88	21
23342	30801	1568	.. do .....	.. do	♀.....	169	76	20
23555	30973	1571	.. do	Aug. 9, 1890	♀.....	156	66	19. 5
23554	30972	1572	.. do .....	.. do	♂.....	151	68	21
23337	30796	132	.. do .....	.. do	♂.....	160	73	21
23336	30795	133	.. do .....	.. do	♀.....	154	70	20
23340	30799	134	.. do .....	.. do	♀.....	140	60	20
23345	30804	135	.. do .....	.. do	♂.....	116	55	18
23344	30803	1579	.. do	Aug. 10, 1890	♀.....	133	61	21
		1635	Salmon River Mountains, Idaho ..	Aug. 23, 1890	♂.....	173	80	22
23549	30967	1636	.. do .....	.. do	♂.....	147	62	21
23551	30969	1644	.. do .....	.. do	♂.....	152	68	20
23679	31073	1658	.. do	Aug. 25, 1890	♀.....	170	75	20
23553	31971	1659	.. do .....	.. do	♂.....	162	72	20
23548	30966	1660	.. do .....	.. do	♀.....	174	77	20
23552	30970	1661	.. do .....	.. do	♀.....	150	67	19. 5
23678	31072	1662	.. do .....	.. do	♂ im ..	150	63	20
23556	30974	1673	.. do	Aug. 26, 1890	♀ ad ..	160	68	19. 5
23828	31228	1702	.. do	Aug. 27, 1890	♀ ad ..	170	79	19. 5
23830	31230	1715	.. do	Aug. 29, 1890	♀ ad ..	165	73	20
23829	31229	1716	.. do .....	.. do	♀ im ..	131	57	19. 5
23827	31227	1717	.. do .....	.. do	♀ ad ..	160	75	21
23833	31233	1726	.. do	Aug. 30, 1890	♂ im ..	148	66	20
23831	31231	1727	.. do .....	.. do	♂.....	158	66	20
23832	31232	1728	.. do .....	.. do	♂ im ..	131	59	18
23825	31225	1749	Lemhi Indian Agency, Idaho	Sept. 2, 1890	♂.....	170	79	21
23824	31224	1750	.. do .....	.. do	♂.....	170	80	21
23820	31220	1751	.. do .....	.. do	♂.....	158	71	20
23823	31223	1752	.. do .....	.. do	♂.....	165	74	21
24303	31707	1753	.. do .....	.. do	♂.....	151	70	20
23821	31221	1754	.. do .....	.. do	♀.....	163	75	20
23822	31222	1767	.. do	Sept. 3, 1890	♂.....	175	83	21
23826	31226	1768	.. do .....	.. do	♂.....	166	76	22
23911	31315	1794	Pabsimeroi Mountains, Idaho	Sept. 15, 1890	♂.....	156	72	20
23910	31314	1795	.. do .....	.. do	♀.....	166	77	20
25073	.....	1874	Saw Tooth Lake, Idaho	Sept. 27, 1890	♂.....	180	88	21
24043	31459	1875	.. do .....	.. do	♀.....	187	85	21
24042	31458	1886	.. do	Sept. 28, 1890	♀.....	172	79	22

Record of specimens collected of *Hesperomys leucopus*—Continued.

U. S. National Museum No.		Original No.	Locality.	Date.	Sex.	Total length.	Tail vertebrae.	Hind foot.
Skin.	Skull.							
24041	31457	1887	Saw Tooth Lake, Idaho	Sept. 28, 1890	♀ ...	165	78	20
24044	31460	1888	...do .....	...do	♂	155	67	20.5
24040	31456	1908	...do	Sept. 29, 1890	♂ im ..	144	62	21
24388	31794	1922	...do	Oct. 2, 1890	♂ ad..	178	84	22
24389	31795	1923	...do .....	...do	♂	175	85	22.5
24387	31793	1924	...do .....	...do	♂	175	89	22.5
24385	31791	1925	...do .....	...do	♀	173	84	22.5
24390	31796	1926	...do .....	...do	♀	185	89	22
24259	31663	1940	...do	Oct. 4, 1890	♂ ad..	176	88	22.5
24266	31670	1957	Shoshone Falls, Idaho	Oct. 10, 1890	♂ ad..	157	71	20
24264	31668	1958	...do .....	...do	♀	156	65	19
24265	31669	1959	...do .....	...do	♂	150	70	20.5
24263	31667	1960	...do .....	...do	♀ im ..	145	65	19
24262	31666	1961	...do .....	...do	♂ im ..	144	62	19

Neotoma cinerea (Ord). Bushy-tailed Wood Rat.

"*Mus cinereus* Ord, Guthrie's Geography, 2d Am. Ed. II, 1815, 292" (Based on the description of Lewis and Clark, Paul Allen ed., 1814, vol. I, pp. 289-290; type from Great Falls, Montana).

Common in the cliffs of Birch Creek Valley and in a cañon in the Lost River Mountains. One was caught on a *Lagomys* slide at timber line in the Pahsimeroi Mountains, September 16, in a trap set on a stack of *Lagomys* hay.

Record of specimens collected of *Neotoma cinerea*.

U. S. National Museum No.		Original No.	Locality.	Date.	Sex.	Total length.	Tail vertebrae.	Hind foot.
Skin.	Skull.							
23670	31064	163	Birch Creek, Idaho	Aug. 14, 1890	♂	400	175	47
23668	31062	1603	...do	Aug. 16, 1890	♀	380	163	40
23666	31060	1600	...do	Aug. 15, 1890	♂	382	163	42
23669	31063	164	...do	Aug. 14, 1890	♂	365	155	46
23557	30975	1597	...do .....	...do	♂	378	165	47
23667	31061	1601	...do	Aug. 15, 1890	♀	317	142	39
23558	30976	1602	...do .....	...do	♀	327	144	39
23320	30779	1526	Lost River Mountains, Idaho	Aug. 1, 1890	♀	405	182	45
23321	30780	1525	...do .....	...do	♂	397	176	48
23322	30781	1524	...do .....	...do	♂	370	165	45
23319	30778	1504	...do	July 30, 1890	♂	332	145	44
23318	30777	1527	...do	Aug. 1, 1890	♀	306	136	42
24050	31466	1815	Pahsimeroi Mountains, Idaho	Sept. 16, 1890	♀	315	100	43

Neotoma cinerea occidentalis Baird. Dusky Wood Rat.

Neotoma occidentalis (Cooper MS.) Baird, Proc. Acad. Nat. Sci. Phila., 1855, 335 (type from Shoalwater Bay, Washington).

Abundant in the black lava cañon of Snake River and in the lava beds throughout the Snake Plains. The darkest individuals were caught at Big Butte and Shoshone Falls and are considerably blacker than the type of *occidentalis* from the Pacific Coast. Specimens from lava cliffs on the Lemhi Indian Agency are referable to this form and probably came by way of Salmon River and the lower Lemhi.

The ranges of the light (*cinerea*) and dark (*occidentalis*) Bushy-tailed Wood Rats meet in Idaho, the former occupying the higher levels and extending eastward throughout the Rocky Mountain region to the Black Hills of South Dakota; the latter inhabiting the Snake Plains and reaching westward to the Pacific.

Record of specimens collected of Neotoma cinerea occidentalis.

U. S. National Museum No.		Original No.	Locality.	Date.	Sex.	Total length.	Tail vertebre.	Hind foot.
Skin.	Skull.							
24557	31952	1967	Shoshone Falls, Idaho	Oct. 11, 1890	♀	355	152	43
23920	31325	1455	Big Butte, Idaho	July 19, 1890	♂	390	170	46
23919	31324	1458	.....do	July 20, 1890	♀ im ..	295	98	39
23323	30782	1493	Arco, Idaho	July 26, 1890	♂ ad ..	386	176	48
24049	31465	1758	Lemhi Indian Agency, Idaho	Sept. 3, 1890	♂	397	164	43
24048	31464	1756	.....do .....	.....do	♂	404	178	45
23803	31203	1757	.....do .....	.....do	♀	353	150	42
23905	31309	1739	.....do	Sept. 2, 1890	♀	337	147	40
23904	31308	1748	.....do .....	.....do	♀	350	156	42
24272	31676	1841	Challis, Idaho	Sept. 20, 1890	♂	380	160	45
.....	31709	1759	Lemhi Indian Agency, Idaho	Sept. 3, 1890	♀ .....	.....	.....	.....

Arvicola riparius Ord. Common Arvicola.

In Idaho this species is common in wet meadows in the Neutral and Douglas fir zones, where 40 specimens were collected. It was found in greatest abundance in Birch Creek and Lemhi Valley, Round or Challis Valley, and along the base of the Salmon River and Lost River Mountains. The species seems to be identical with typical *A. riparius* of the Atlantic States, and the postero-internal prism of the middle upper molar is as strongly developed as in the eastern animal (see Plate II, Fig. 1).

Two specimens (Nos. 24014, from Saw Tooth Lake, and 24020, from Salmon River near Challis) included in the following table are not true *riparius* and may belong to some other species.

Record of specimens collected of *Arvicola riparius*.

U. S. National Museum No.		Original No.	Locality.	Date.	Sex.	Total length.	Tail vertebræ.	Hind foot.
Skin.	Skull.							
23375	30835	91	Birch Creek, Idaho	Aug. 4, 1890	♂.....	174	49	20
23373	30833	92	do	do	♂.....	172	42	21
23374	30834	93	do	do	♀.....	162	45	20
23386	30846	94	do	do	♂.....	139	38	20.5
23385	30845	95	do	do	♀.....	128	33	19
23384	30844	97	do	do	♂.....	140	42	20
23380	30840	103	do	Aug. 5, 1890	♂.....	132	42	26
23363	30822	105	do	do	♂.....	124	31	18
23376	30836	108	do	do .....	♂.....	.....	.....	.....
23361	30841	1538	do	do	♂.....	184	51	20.5
23383	30843	1539	do	do	♀.....	156	41.5	19.5
23377	30837	118	do	Aug. 6, 1890	♂.....	170	42	19.5
23387	30847	119	do	do	♂.....	139	37	18.5
23379	30839	123	do	do	♂.....	148	35	21
23362	30821	127	do	Aug. 8, 1890	♀.....	132	35	19
23378	30838	128	do	do	♂.....	136	35	19
23511	30929	1632	Salmon River Mountains, Idaho ..	Aug. 23, 1890	♂.....	160	48	21
23513	30931	1649	do	Aug. 24, 1890	♀.....	131	33	18
23382	30842	1552	Birch Creek, Idaho	Aug. 8, 1890	♀.....	146	42	19
23884	31288	1764	Lemhi Indian Agency, Idaho	Sept. 3, 1890	♂.....	154	36	21.5
24021	31437	1836	Challis, Idaho	Sept. 20, 1890	♂ ad.	158	43	21.5
24018	31434	1837	do	do	♀ ad.	174	49	21
24017	31433	1835	do	do	♂ ad.	154	42	21
23246	30703	84	Lost River Mountains, Idaho	July 31, 1890	♂ im.	128	35	19
23358	30817	96	Birch Creek, Idaho	Aug. 4, 1890	♂ im.	116	32	19
23360	30819	1578	do	Aug. 10, 1890	♂ im.	114	34	18
23359	30818	120	do	Aug. 6, 1890	♂ im.	116	29	18.5
23372	30832	124	do	Aug. 8, 1890	♂ im.	137	37	19.5
23364	30823	125	do	do	♂ im.	133	30	18
23361	30820	126	do	do	♀ im.	116	31	18
23388	30848	104	do	Aug. 5, 1890	♂.....	142	40	20
24031	31447	1830	Salmon River, Idaho	Sept. 19, 1890	♂.....	132	38	20
24020	31436	1829	Challis, Idaho	do	♀ ad.	160	37	19
24014	31430	1891	Saw Tooth Lake, Idaho	Sept. 28, 1890	♂.....	174	45	21
24027	31443	1833	Challis, Idaho	Sept. 19, 1890	♂ juv.	118	32	19
24028	31444	1832	do	do	♀ juv.	116	29	18.5
24029	31445	1838	do	Sept. 20, 1890	♂ juv.	120	32	19
24030	31446	1834	do	Sept. 19, 1890	♀ juv.	116	30	18.5
24032	31448	1831	do	do	♂ juv.	120	32	19
24034	31450	1839	do	Sept. 20, 1890	♂ juv.	122	32	18

***Arvicola macropus* sp. nov.** Big-footed Arvicola.

This new *Arvicola* is the largest species thus far known from North America with the single exception of *Arvicola (Neofiber) alleni* from Florida. It is abundant in the Salmon River, Saw Tooth, and Pahsimeroi Mountains and probably throughout the mountain regions of central and northern Idaho, inhabiting wet meadows and springy places

in the higher parks from timber line down to the bottom of the Canadian or Douglas fir zone. Its only near relative is *A. townsendi* from the Pacific coast region, with which it may be found to intergrade in the forests north of the Plains of the Columbia. It may be known from the following description:

ARVICOLA (MYNOMES) MACROPUS sp. nov.

Type No. ~~212887~~ ²¹²⁸⁸⁷ ♀ ad. U. S. National Museum (Department of Agriculture collection). From Pahsimeroi Mountains, Idaho, September 16, 1890. Collected by C. Hart Merriam and Vernon Bailey. (Original number 1803.)

Measurements (taken in flesh).—Total length, 220; tail vertebræ, 71; pencil, 7; hind foot, 26. (Dry skin) Ear from crown, 8; from notch, 12.

General characters.—Largest *Arvicola* known from North America except *A. (Neofiber) alleni* from Florida. Similar to *A. townsendi*, but larger with larger hind feet, much longer hallux, and upper incisors much more prominent. In *A. townsendi*, as pointed out by Baird, the tip of the claw of the first toe of the hind foot barely reaches the notch between the second and third toes, while in *A. macropus* the first toe without the claw reaches the same point. Fur very long, soft, and almost woolly. Ears large, showing above fur.

Color.—Upper parts grayish bister, lined with black-tipped hairs, and palest on the sides. Under parts pale ash gray, the plumbeous basal fur showing through. Tail, bicolor without sharp line of demarkation: dusky above, whitish below. Ankles blackish. Feet dusky (hind toes sometimes much lighter than rest of foot). The white around the mouth is not so pronounced as in *A. townsendi*.

Cranial and Dental characters as in most of the western members of the subgenus or section *Mynomnes*—the western species, as is well known, usually lacking the postero-internal lobe or spur of the middle upper molar. Not having a perfect skull of *A. townsendi* before me I am unable to point out cranial differences.

Record of specimens collected of Arvicola macropus.

U. S. National Museum No.		Original No.	Locality.	Date.	Sex.	Total length.	Tail vertebræ.	Hind foot.
Skin.	Skull.							
23681	31075	1627	Salmon River Mountains, Idaho..	Aug. 23, 1890	♀	184	55	25.5
23682	31076	1628	...do .....	...do	♂	205	67	28
23686	31080	1629	...do .....	...do	♂	185	61	26
23684	31078	1630	...do .....	...do	♂	188	60	26
23685	31079	1631	...do .....	...do	♀	170	52	25
23680	31074	1650	...do	Aug. 24, 1890	♀	162	49	25
23688	31082	1666	...do	Aug. 25, 1890	♀ im..	165	51	24
23687	31081	1667	...do .....	...do	♂	174	54	26
23689	31083	1668	...do .....	...do	♂	165	60	25
23683	31077	1669	...do	Aug. 26, 1890	♂ ad..	173	57	26
23857	31257	1719	...do	Aug. 29, 1890	♂ ad..	176	55	26

Record of specimens collected of *Arvicola macropus*—Continued.

U. S. National Museum No.		Original No.	Locality.	Date.	Sex.	Total length.	Tail vertebræ.	Hind foot.
Skin.	Skull.							
23888	31292	1781	Pahsimeroi Mountains, Idaho.....	Sept. 14, 1890	♂.....	195	65	28
23885	31289	1802	.....do.....	Sept. 15, 1890	♂.....	180	60	27
23887	31291	*1803	.....do.....	Sept. 16, 1890	♀ ad..	220	71	26
23886	31290	1804	.....do.....	.....do.....	♀.....	180	57	25
23891	31295	1805	.....do.....	.....do.....	♀.....	178	57	25
23889	31293	1806	.....do.....	.....do.....	♀.....	178	55	24.5
24628	32023	1807	.....do.....	.....do.....	♂ ad..	202	68	28
23890	31294	1808	.....do.....	.....do.....	♀.....	186	58	26
24232	31636	1849	Summit, Alturas County, Idaho...	Sept. 23, 1890	♂.....	190	64	26
24235	31639	1856	Head of Wood River, Idaho.....	Sept. 25, 1890	♀ ad..	245	73	26
24226	31630	1857	.....do.....	.....do.....	♂.....	200	63	26
24035	31451	1876	Saw Tooth Lake, Idaho.....	Sept. 27, 1890	♀ ad..	242	79	26
24228	31632	1877	.....do.....	.....do.....	♀ im..	168	51	26
24238	31642	1878	.....do.....	.....do.....	♂ im..	128	40	23
24015	31431	1879	.....do.....	.....do.....	♂ im..	132	38	23
24023	31439	1880	.....do.....	.....do.....	♂ im..	142	42	24
24227	31631	1884	.....do.....	Sept. 28, 1890	♂ ad..	205	70	27
24016	31432	1885	.....do.....	.....do.....	♀.....	162	58	21
24229	31633	1896	.....do.....	.....do.....	♂.....	174	53	26
24225	31629	1899	.....do.....	Sept. 29, 1890	♂ ad..	195	68	26
24230	31634	1900	.....do.....	.....do.....	♀ im..	190	63	26
24401	31807	1911	.....do.....	Sept. 30, 1890	♀.....	185	63	27
24399	31805	1921	.....do.....	Oct. 2, 1890	♀.....	184	62	27

* Type.

***Arvicola mordax* sp. nov.** Cantankerous *Arvicola*.

This new *Arvicola* is common in the marshes bordering the inlet of Saw Tooth or Alturas Lake at the east foot of the Saw Tooth Mountains, and specimens were collected also in the Lemhi Indian Agency, Salmon River Mountains, Lost River Mountains, and at the north foot of the Brunneau Mountains. Thirty-five specimens were secured.

Its nearest relative seems to be *A. longicaudus* of the Black Hills of Dakota, but it differs from *longicaudus* in having a still longer tail, larger hind feet, and much smaller ears, and also in cranial characters and coloration. It may be known from the following description:

ARVICOLA (MYNOMES) MORDAX sp. nov.

Type No. $\frac{31233}{31233}$ ♂ ad. U. S. National Museum (Department of Agriculture collection). From Saw Tooth or Alturas Lake, east foot of Saw Tooth Mountains, Idaho, September 29, 1890. Collected by C. Hart Merriam and Vernon Bailey (original number 1903).

Measurements (taken in flesh).—Total length, 200; tail vertebræ, 77; hairs, 6; hind foot, 22; ear (in dry skin) from crown, 10; from notch, 13.

General characters.—Similar to *A. longicaudus* but larger, with larger hind feet, longer tail, and smaller ears; color of upper parts paler; feet and under sides of tail whitish instead of dusky; ears nearly naked,

slightly overtopping the fur; hind legs naked for some distance above ankles.

Color.—Upper parts pale grayish bister, conspicuously lined with black-tipped hairs, and becoming almost clear gray on the sides. Under parts and feet whitish, the plumbeous basal fur showing through slightly. Tail bicolor; dark above, whitish below. The gray of the sides fades gradually into the white of the belly. Some specimens have a rusty tinge on the back. This is most pronounced in No. 23371 from the Lost River Mountains.

Cranial and Dental characters.—Skull similar to that of *A. longicaudus* but with processes and ridges more strongly developed; nasal bones longer and less depressed anteriorly, and audital bullæ more inflated. The condyloid ramus of the jaw is longer and more vertical than in *longicaudus*, and the angular process is longer. The teeth are as in *A. longicaudus* (see Plate II, Figs. 3, 4).

Record of specimens collected of Arvicola mordax.

U. S. National Museum No.		Original No.	Locality.	Date.	Sex.	Total length.	Tail vertebrae.	Hind foot.
Skin.	Skull.							
26240	31644	1890	Saw Tooth Lake, Idaho.	Sept. 28, 1890	♂.....	180	67	23
24241	31645	1893	....do.....	....do.....	♂.....	182	65	22
24024	31440	1894	....do.....	....do.....	♂ im..	156	55	21
24025	31441	1897	....do.....	....do.....	♂ im..	152	53	21
24231	31635	*1903	....do.....	Sept. 29, 1890	♂ ad..	200	77	22
24613	31429	1904	....do.....	....do.....	♂.....	180	63	22
24012	31428	1905	....do.....	....do.....	♀ ad..	181	63	22
24019	31435	1906	....do.....	....do.....	♂ im..	156	56	21
24033	31449	1910	....do.....	....do.....	♂.....	160	60	21
24398	31804	1916	....do.....	Sept. 30, 1890	♀ ad..	174	63	21
24237	31641	1935	....do.....	Oct. 4, 1890	♂.....	160	55	22
24234	31638	1938	....do.....	....do.....	♀ ad..	174	62	22.5
24233	31637	1939	....do.....	....do.....	♀.....	154	55	22
24554	31949	1970	Three Creek, Idaho.....	Oct. 14, 1890	♂.....	178	60	21
23245	30702	1519	Lost River Mountains, Idaho....	July 31, 1890	♂.....	180	69	21
23371	30831	1623	....do.....	Aug. 1, 1890	♂.....	162	61	20.5
23860	31260	1740	Lemhi Indian Agency, Idaho.....	Sept. 2, 1890	♀.....	168	58	21
23861	31261	1769	....do.....	Sept. 4, 1890	♂ ad..	180	63	20.5
24026	31442	1907	Saw Tooth Lake, Idaho.....	Sept. 29, 1890	♀ juv.	136	46	20
24236	31640	1934	....do.....	Oct. 3, 1890	♀ juv.	144	45	21
24239	31643	1937	....do.....	Oct. 4, 1890	♀ juv.	145	49	22
23512	30930	1633	Salmon River Mountains, Idaho..	Aug. 23, 1890	♀ juv.	146	51	21
23859	31259	1741	Lemhi Indian Agency, Idaho.....	Sept. 2, 1890	♂ juv.	121	40	19
23858	31258	1765	....do.....	Sept. 3, 1890	♂ juv.	149	49	20.5
24022	31438	1892	Saw Tooth Lake, Idaho.....	Sept. 28, 1890	♂ juv.	114	38	19

* Type.

Arvicola nanus sp. nov. Dwarf *Arvicola*.

A dozen specimens of this new *Arvicola* were trapped on a grassy hillside in the Pahsimeroi Mountains at an elevation of about 2,850 meters (9,350 feet). The species was not met with elsewhere.

ARVICOLA (MYNOMES) NANUS sp. nov.

Type No. ~~31253~~ 31253 ♂ ad. U. S. National Museum (Department of Agriculture collection). From Pahsimeroi Mountains, Idaho (altitude 2,850 meters or 9,350 feet), September 16, 1890. Collected by C. Hart Merriam and Vernon Bailey (original number 1809).

Measurements (taken in flesh).—Total length, 151; tail vertebrae, 41; hairs, 7.5; hind foot, 18. Ear (in dry skin) from crown, 4; from notch, 9.5.

General characters.—Size, small; one of the smallest species known from North America. Ears, small, suborbicular, with large antitragus and large fossa innominata; upper margin incurved; posterior margin sparsely haired. Whiskers short, barely reaching meatus. Hind feet short. Tail slightly more than one-third the length of head and body; well haired, and penicillate.

Color.—Upper parts pale grizzled bister, conspicuously mixed with black-tipped hairs, and becoming ash gray on the sides. Under parts grayish white. Tail bicolor; above dusky, below whitish. Feet dusky.

Cranial and Dental characters.—Skull very small; basilar length of Hensel, 22; zygomatic breadth, 14. Muscular impressions strongly developed; brain case narrow and high; jugal bones parallel; parietals sub-truncate anteriorly; nasals ending about on plane of nasal branch of premaxillary; length of incisive foramina less than twice the premaxillary symphyses. Teeth as usual in western *Mynomes*, normally lacking the postero-internal loop or spur of middle upper molar (in one specimen out of the twelve there is an attempt at this loop).

Record of specimens collected of Arvicola nanus.

U. S. National Museum No.		Original No.	Locality.	Date.	Sex.	Total length.	Tail vertebrae.	Hind foot.
Skin.	Skull.							
23881	31285	1782	Pahsimeroi Mountains, Idaho	Sept. 14, 1890	♀	135	35	18
23883	31287	1783	do	do	♂	140	37	19
23880	31284	1784	do	do	♀ im.	115	32	18
23882	31286	1789	do	Sept. 15, 1890	♂	144	38	19
23853	31253	*1809	do	Sept. 16, 1890	♀	151	41	18
23852	31252	1810	do	do	♂	130	35	18
23851	31251	1811	do	do	♀	130	32	18
23854	31254	1812	do	do	♀	125	32	18
23879	31283	1790	do	Sept. 15, 1890	♂ juv.	97	23	17
23876	31280	1791	do	do	♂ juv.	105	31	17
23878	31282	1792	do	do	♂ juv.	98	24	16.5
23877	31281	1793	do	do	♀ juv.	104	27	17
23855	31255	1813	do	Sept. 16, 1890	♀ juv.	118	29	17
24555	31950	1968	Three Creek, Idaho	Oct. 13, 1890	♂	142	40	21
24553	31948	1969	do	do	♂	150	43	20
24556	31951	1971	do	Oct. 14, 1890	♂ im.	138	39	19

* Type.

Arvicola pauperrimus Cooper. Pallid Lemming Mouse.

Arvicola pauperrima Cooper, American Naturalist, vol. II, Dec., 1868, p. 535 (type from Plains of the Columbia near Snake River, Washington).

?*Arvicola curtata* Cope, Proc. Acad. Nat. Sci. Phil., Jan., 1868, p. 2 (type from Pigeon Spring, Mt. Magruder, Nevada, near the boundary between Inyo County, California, and Esmeralda County, Nevada).

This small *Arvicola*, which may be readily recognized by its whitish color, inhabits the barren hills of the Canadian Zone of the Salmon River Mountains and may occur in the Neutral Zone also. A female and five young were trapped in a dry park on a mountain side at an altitude of about 2745 meters (9,000 feet).

This species was named by Cooper but was not described, though its measurements as taken in the flesh were given in a foot-note. Cooper's type specimen is still in the U. S. National Museum (No. $\frac{10268}{35071}$ ad.) but is in very poor condition, consisting of an overstuffed skin, badly torn, containing the remains of the skull. Fortunately, however, the teeth are still preserved, and the feet and tail are attached to the skin. I have compared this specimen with those from Idaho and can not find any differences of importance. The measurements of the tail and hind foot are essentially the same in both, and Cooper's measurements taken in the flesh show that the total length was the same.*

In order to put the characters of this species on record a good specimen is here described :

No. $\frac{23848}{31248}$ ♀ ad. U. S. National Museum (Department of Agriculture collection). From Salmon River Mountains, Idaho, August 27, 1890. Altitude 2,745 metres (9,000 feet). Collected by C. Hart Merriam and Vernon Bailey. (Original number 1695.)

Measurements (taken in flesh).—Total length, 116; tail vertebræ, 20; pencil, 7; hind foot, 16. Ear from crown, 5; from notch, 8 (in dry skin).

General characters.—Size small, considerably smaller than its nearest relative, *Arvicola curtatus*;† ears small, covered with long hairs and nearly concealed by the fur; anterior border incurved. Feet broad, short, and densely covered with hair; hairs of toes extending beyond tips of claws. Tail very short and well haired. Whiskers short, reaching tips of ears.

Color.—Upper parts clear gray with a faint tinge of buffy, and finely lined with black-tipped hairs. Under parts whitish, changing gradually into color of sides. Tail indistinctly bicolor, its upper and lower surfaces concolor with corresponding surfaces of body. Feet whitish.

* On the back of the original label Cooper gives the length of head and body as 3.87 inches; tail vertebræ .75 inch, making a total of 4.62 inches, or 117 mm., which is just 1 mm. more than in the Idaho specimen.

† It is possible that *Arvicola pauperrima* Cooper may prove to be a subspecies of, or even identical with, *A. curtata* Cope from Pigeon Spring, Nevada (Proc. Acad. Nat. Sci. Phila., Jan., 1868, p. 2). The latter was described from a very young individual (*epiphyses* not yet ankylosed) and its characters are uncertain. That it is closely related to the present species is unquestionable.

Cranial and Dental characters.—Skull small, broad, flat, and depressed interorbitally; postorbital processes well developed; brain case squarish. In many respects the skull resembles that of *Phenacomys orophilus*, though it lacks the broadly expanded zygomata and other generic characters of that animal. Each zygomatic arch presents three angles and four planes; the maxillary root stands out at right angles to the axis of the skull, or is even directed a little forward, then bends obliquely backward, outward, and downward; then becomes horizontal and parallel to the axis of the skull and is overlapped by the short malar or jugal which meets the squamosal root of the arch at a sharp obtuse angle. The nasals are very short. The incisive foramina reach a little beyond the anterior plane of the first molars. The teeth present no noteworthy differences from those of *Arvicola pallidus* from North Dakota, the number and relations of the prisms agreeing with those of the subgenus *Chilotus*. The characters of their crowns are shown in Plate III, Figs. 1, 2.

Record of specimens collected of Arvicola pauperrimus.

U. S. National Museum No.		Original No.	Locality.	Date.	Sex.	Total length.	Tail vertebrae.	Hind foot.
Skin.	Skull.							
23848	31248	1695	Salmon River Mountains, Idaho	Aug. 27, 1890	♀ ad.	116	20	16
23847	31247	1696	do	do	♂ im.	92	18	15
23843	31243	1697	do	do	♂ im.	90	16	14.5
23845	31245	1698	do	do	♂ im.	86	14	14.5
23844	31244	1714	do	Aug. 29, 1890	♀ im.	88	17	14
23846	31246	1725	do	Aug. 30, 1890	♂ im.	92	18	14

***Phenacomys orophilus* sp. nov.** Mountain Lemming Mouse.

This interesting animal, which has heretofore escaped observation, inhabits the higher parts of the mountains of central Idaho. Specimens were procured in a moist meadow at timber line in the Salmon River Mountains, and one was taken from the stomach of a Great Horned Owl in the Saw Tooth Mountains. In the former locality it lives in dense beds of *Bryanthus taxifolia* and *Salix reticulata* which border the small rippling brooks that come from melting snow banks at an altitude of about 3,350 meters (11,000 feet). Like *Lagomys*, which lives in adjacent rock slides, it feeds on *Geum rossii* and doubtless other alpine plants also.

In my original description of the genus *Phenacomys* I ventured the prediction that it would be found in "Idaho, Washington, and perhaps Montana also." Since the publication of that paper Mr. F. W. True has described a species from Oregon,* and I now have the pleasure of adding one from Idaho, making in all six species of the genus thus far described.

**Phenacomys longicaudus* True, Proc. U. S. National Museum, XIII, No. 826, pp. 303-304. Author's separates issued November 15, 1890.

PHENACOMYS OROPHILUS sp. nov.

Type No. 33356 ♀ ad. U. S. National Museum (Department of Agriculture collection). From Salmon River Mountains, Idaho (near head of Timber Creek, altitude 3,200 meters or 10,500 feet), August 23, 1890. Collected by C. Hart Merriam and Vernon Bailey. (Original number 1710.)

Measurements (taken in flesh).—Total length, 146; tail vertebræ, 38; pencil, 3; hind foot, 19. Ear from crown, 10; from notch, 13 (in dry skin).

General characters.—Size a little larger than *Phenacomys intermedius*; ears large and conspicuous; tail small and cylindrical. Whiskers short, hardly reaching to ears. Ground color gray as in *Arvicola pallidus*, but darker along the back.

Color.—Upper parts gray, tinged with buffy and heavily lined with black-tipped hairs, particularly along the middle of the back. Under parts whitish, the plumbeous basal fur showing through. Tail bicolor, its upper and lower surfaces concolor with the corresponding surfaces of the body.

Cranial and Dental characters.—Skull low, broad, and flat, apparently much as in *P. intermedius*. Frontal sulcus shallow. Interparietal narrowly pentagonal as in *P. latimanus* (very different from that of *P. celatus*). Teeth only half-rooted, growing from persistent pulps except (probably) in extreme old age.* The general pattern of the crowns of the teeth is similar to that in *P. celatus* except that the outer loops of the last upper molar are very much reduced, and the posterior loop of the last lower molar is smaller, making this tooth of approximately equal breadth at both ends (see Plate III, Figs. 3, 4).

Record of specimens collected of Phenacomys orophilus.

U. S. National Museum No.		Original No.	Locality.	Date.	Sex.	Total length.	Tail vertebræ.	Hind foot.
Skin.	Skull.							
23850	31250	1684	Salmon River Mountains, Idaho ..	Aug. 27, 1890	♀ ad..	.....	30	17
23856	31256	1710	...do	Aug. 28, 1890	♀ ad..	146	38	19
23842	31242	1713	...do	Aug. 29, 1890	♂	112	25	17
23849	31249	1772	...do	Sept. 5, 1890	♂ ad..	120	28	18
.....	31947	.....	Saw Tooth Mountains, Idaho	Sept. 30, 1890	.....	.....	.....	.....

***Evotomys idahoensis* sp. nov.** Idaho Red-backed Mouse.

Red-backed mice of the genus *Evotomys* are common in the coniferous forests of the Boreal zone in Idaho. Six specimens were secured, three in the Salmon River Mountains and three in the Saw Tooth Mountains. They were usually caught in traps set under rotten logs in dry pine or spruce woods, though Mr. Bailey caught one in his hands

* This is the case also in *P. longicaudus*, the type specimen of which I have had the privilege of examining, through the courtesy of Mr. True.

in the daytime as it was drinking at the margin of Saw Tooth Lake, October 3 (No. 24282). There was snow on the ground at the time.

While agreeing in a general way, those from the Salmon River Mountains are smaller, have shorter feet and tails, relatively longer ears, and very much larger antitragus than those from the Saw Tooth Mountains, and the nasal bones are noticeably shorter. Should these differences prove constant the two forms will require separation. The Saw Tooth Mountain animal is the one here described.

EVOTOMYS IDAHOENSIS sp. nov.

(Teeth, Plate III, Figs. 5, 6.)

Type No. ~~31283~~ 31283 ♀ ad. U. S. National Museum (Department of Agriculture collection). From Saw Tooth or Alturas Lake, east foot of Saw Tooth Mountains, Idaho, October 4, 1890. Collected by C. Hart Merriam and Vernon Bailey (Original number 1936).

Measurements (taken in flesh).—Total length, 153; tail vertebræ, 48; pencil, 6.5; hind foot, 20. Ear from crown, 10; from notch, 12.5 (in dry skin).

General characters.—Size and proportions about as in *E. galei* from the mountains of Boulder County, Colorado; smaller than *E. californicus*; coloration unique, a well-defined, pale hazel dorsal area as in *galei*, with ash gray sides as in *californicus*.

Color.—Dorsal area hazel, well defined, darker than in *galei* but not so bright as in *gapperi*; rest of upper parts dark ash gray tinged with bister as in *californicus*, not suffused with ochraceous buff as in *gapperi* and *galei*. Under parts soiled whitish, the plumbeous basal color of the fur showing through. Tail indistinctly bicolor, dusky above, much paler below.

Cranial and Dental characters.—Skull rather narrow, as in *gapperi* and *occidentalis*, with the nasals less strongly deflexed and the frontals narrower interorbitally. The last upper molar has three deep reëntrant angles and four salient angles or loops on each side with a tendency to form a fifth on the outer side. The first lower molar has five projecting loops and four deep reëntrant angles on the inner side and four projecting loops and three deep reëntrant angles on the outside. The last lower molar is slightly broader anteriorly than posteriorly.

Record of specimens collected of *Evotomys idahoensis*.

U. S. National Museum No.		Original No.	Locality.	Date.	Sex.	Total length.	Tail vertebræ.	Hind foot.
Skin.	Skull.							
24283	31687	*1936	Saw Tooth Lake, Idaho.....	Oct. 4, 1890	♀ ad..	153	48	20
24282	31686	1931	....do	Oct. 3, 1890	♂.....	138	42	20
24392	31798	1920	....do	Oct. 2, 1890	♀ im..	128	38	19
23840	31240	1732	Salmon River Mountains, Idaho.	Aug. 31, 1890	♂ im..	115	32	18.5
23841	31241	1712	....do	Aug. 29, 1890	♀ ad..	145	40	19
23909	31313	1701	....do	Aug. 27, 1890	♀ ad..	142	37	19

*Type.

Fiber zibethicus (Linnæus). Muskrat.

Musk rats are common in Lemhi River and in most of the streams and beaver ponds of Idaho. We found them particularly abundant at Saw Tooth or Alturas Lake, at the east foot of the Saw Tooth Mountains.

Record of specimens collected of Fiber zibethicus.

U. S. National Museum No.		Original No.	Locality.	Date.	Sex.	Total length.	Tail vertebrae.	Hind foot.
Skin.	Skull.							
23868	31268	1766	Lemhi, Idaho	Sept. 3, 1890	♂	580	258	78
24559	31954	1873	Saw Tooth Lake, Idaho	Sept. 26, 1890	♀ ad..	580	260	83
24558	31953	1902	...do	Sept. 29, 1890	♂ im .	540	242	84
24431	31837	1912	...do	Sept. 30, 1890	♀ im .	506	240	84
.....	31480	1927	...do	Oct. 2, 1890	♀ im .	.....	.....	.....
.....	31479	1928	...do	Oct. 2, 1890	♂ im .	.....	.....	.....

Thomomys clusius Coes. Pale Pocket Gopher.

Thomomys clusius Coes, Proc. Acad. Nat. Sci. Phila., 1875, 138 (type from Bridger Pass, Wyoming).

The common Pocket Gopher of the Snake Plains and the valleys of Big Lost River and Birch Creek is here referred provisionally to this species. Specimens from the foothills east of Blackfoot show a tendency to run into the dark form inhabiting the mountains. It may be well to state in connection with the name here adopted that Bachman's types of *borealis* and *townsendi* (now in the museum of the Philadelphia Academy of Sciences) have been compared with the present species and found to be not the same.

Lewis and Clark noticed hills of the Pocket Gopher along the Clear-water in Idaho in May, 1806, and described them thus:

"In many parts of the plain the earth is thrown up into little mounds by some animal whose habits most resemble those of the Salamander [*Geomys tuza* Ord]; but although these tracks are scattered over all the plains from the Mississippi to the Pacific, we have never yet been able to obtain a sight of the animal itself" (Lewis and Clark's Travels, Paul Allen Ed., vol. II, 1814, p. 273).

Thousands of persons spend their entire lives in the midst of colonies of Pocket Gophers without ever seeing a specimen. At the same time the animals are easily caught when one has learned how, as may be inferred from the accompanying table, and it may be added that several times the number here enumerated could have been captured had we so desired.

Record of specimens collected of *Thomomys clusius*.

U. S. National Museum No.		Original No.	Locality.	Date.	Sex.	Total length.	Tail vertebreg.	Hind foot.
Skin.	Skull.							
23141	30586	38	Big Butte, Idaho.....	July 19, 1890	♂.....	195	73	23
23148	30593	1457	...do.....	July 20, 1890	♂.....	187	54	23
23918	31323	1467	Big Lost River, Idaho.....	July 22, 1890	♂.....	168	54	22
24305	.....	1484	...do.....	July 23, 1890	♀.....	173	55	22
23917	31322	1485	...do.....	...do.....	♀.....	179	56	24
23317	30776	1531	Birch Creek, Idaho.....	Aug. 4, 1890	♂.....	162	52	22
23314	30773	1532	...do.....	...do.....	♂.....	164	48	21.5
23315	30774	1533	...do.....	...do.....	♀ im.	150	48	21.5
23313	30772	1536	...do.....	Aug. 5, 1890	♂.....	164	50	22
23316	30775	1562	...do.....	Aug. 7, 1890	♂ im.	187	60	24
23312	30771	1563	...do.....	...do.....	♂ im.	172	53	22
23534	30952	1574	...do.....	Aug. 9, 1890	♂.....	188	56	24
23483	30901	1575	...do.....	...do.....	♀.....	188	60	23.5
23535	30953	1577	...do.....	Aug. 10, 1890	♂.....	174	56	22
23392	30852	98	...do.....	Aug. 4, 1890	♂.....	171	53	23
23391	30851	99	...do.....	...do.....	♀.....	155	45	21
23389	30844	100	...do.....	Aug. 5, 1890	♀.....	159	45	21.5
23481	30899	101	...do.....	...do.....	♀.....	160	43	21
23390	30850	102	...do.....	...do.....	♂.....	160	45	22
23393	30853	106	...do.....	...do.....	♂.....	158	42	22
23394	30854	108	...do.....	...do.....	♀.....	172	57	23
23480	30898	109	...do.....	...do.....	♂.....	177	52	23
23482	30900	129	...do.....	Aug. 8, 1890	♂.....	179	47	23
23478	30896	137	...do.....	Aug. 9, 1890	♀.....	161	50	22
23533	30951	138	...do.....	...do.....	♂.....	164	50	22
23532	30950	139	...do.....	Aug. 10, 1890	♀.....	161	42	22.5
23479	30897	140	...do.....	...do.....	♀.....	165	48	23
23477	30895	141	...do.....	...do.....	♂.....	162	44	22
23140	30585	1441	Blackfoot, Idaho.....	July 15, 1890	♂.....	189	53	23
23138	30583	21	...do.....	July 14, 1890	♀.....	176	52	22
23137	30582	23	...do.....	...do.....	♀.....	177	53	24
23143	30588	24	...do.....	July 15, 1890	♀.....	175	50	23
23146	30591	25	...do.....	...do.....	♀.....	174	49	23.5
23149	30594	26	...do.....	...do.....	♀.....	171	49	23
23147	30592	27	...do.....	...do.....	♀.....	178	53	24
23144	30589	32	...do.....	...do.....	♂ ad.	194	54	25
23145	30590	34	...do.....	July 16, 1890	♀.....	183	59	25
23151	.....	35	...do.....	...do.....	♀.....	180	54	21
23139	30584	36	...do.....	...do.....	♂.....	170	52	24

***Thomomys clusius fuscus* subsp. nov.** Mountain Pocket Gopher.

The Pocket Gophers inhabiting the mountains of Idaho are very different from those of the sage plains and valleys, being larger and wholly different in color. *T. clusius* from the Snake Plains is whitish, washed with pale buffy ochraceous, while the mountain animal is dull chestnut. In 40 specimens of the former the hind foot measures from 21 to 24^{mm}; in 23 of the latter it varies from 25 to 31^{mm}. Where the ranges of the

two forms meet there is a tendency to intergrade. This is particularly noticeable in specimens from the foothills east of Blackfoot.

At Saw Tooth Lake fresh hills were thrown up after snowfall in early October.

In 1872 I secured a specimen in Teton Cañon (No. $\frac{314267}{124200}$, ♀, U. S. Nat. Mus.).

THOMOMYS CLUSIUS FUSCUS subsp. nov.

Type No. $\frac{314267}{31071}$, ♀ ad., U. S. National Museum (Department of Agriculture collection). From mountains at head of Big Lost River, Idaho, September 23, 1890. Collected by Basil Hicks Dutcher (Original number, 1847).

Measurements (taken in flesh).—Total length, 215; tail vertebræ, 72; hind foot, 27. Ear from crown, 3 (in dry skin).

General characters.—Similar to *T. clusius*, but larger and very much darker in coloration, the upper parts being dull chestnut instead of buffy whitish. This Pocket Gopher needs no comparison with either *T. talpoides* from Dakota or *T. fulvus* from Arizona, the small size of its fore feet being sufficient to distinguish it at a glance from these species.

Color.—Upper parts uniform dull chestnut; circle around ear blackish; tail and feet soiled whitish; under parts plumbeous, strongly washed with fulvous.

Record of specimens collected of Thomomys clusius fuscus.

U. S. National Museum No.		Original No.	Locality.	Date.	Sex.	Total length.	Tail vertebræ.	Hind foot.
Skin.	Skull.							
23673	31067	1613	Salmon River Mountains, Idaho..	Aug. 20, 1890	♂.....	200	70	26
24304	31708	1614	.....do.....	.....do.....	♀.....	162	37	26
23674	31068	1615	.....do.....	Aug. 21, 1890	♂.....	200	70	26.5
23537	30955	1616	.....do.....	.....do.....	♀.....	197	68	25
23671	31065	1617	.....do.....	.....do.....	♀.....	194	67	25
23536	30954	1618	.....do.....	.....do.....	♀.....	192	63	25
23675	31069	1619	.....do.....	.....do.....	♀.....	178	60	24
23672	31066	1626	.....do.....	Aug. 23, 1890	♀.....	188	63	25
23817	31217	1656	.....do.....	Aug. 25, 1890	♀.....	208	70	26
23816	31216	1657	.....do.....	.....do.....	♀.....	178	42	24
23815	31215	1711	.....do.....	.....do.....	♀ im..	148	45	21.5
23818	31218	1762	Lemhi, Idaho.....	Sept. 3, 1890	♀.....	192	61	25
23819	31219	1763	.....do.....	.....do.....	♂.....	191	54	25
24267	31671	*1847	Mountains at Head of Big Lost River, Idaho.	Sept. 23, 1890	♀.....	215	72	27
24268	31672	1848	.....do.....	.....do.....	♀.....	205	71	29
24269	31673	1930	Saw Tooth Lake, Idaho.....	Oct. 3, 1890	♀ im..	192	70	26
23243	30700	85	Lost River Mountains, Idaho.....	July 31, 1890	♂.....	188	60	26
23244	30701	86	.....do.....	.....do.....	♀.....	191	66	28
23241	30698	87	.....do.....	.....do.....	♀.....	200	69	26
23242	30699	88	.....do.....	.....do.....	♀.....	186	63	26
23240	30697	89	.....do.....	Aug. 1, 1890	♀.....	185	65	26
23150	30595	1448	Blackfoot, Idaho.....	July 16, 1890	♂.....	232	75	31
23142	30587	1452	.....do.....	July 17, 1890	♂ im..	194	66	26

* Type.

Dipodops ordii Woodhouse. Ord's Kangaroo Rat.

A Kangaroo Rat provisionally referred to this species is common throughout the Sonoran zone of Idaho, inhabiting sandy places in the Snake Plains and its northward prolongations between the mountains. It was noticed in Birch Creek and Lemhi Valleys, and in Big Lost, Little Lost, Pahsimeroi, Round or Challis, and Antelope Valleys.

Record of specimens collected of Dipodops ordii.

U. S. National Museum No.		Original No.	Locality,	Date.	Sex.	Total length.	Tail vertebrae.	Hind foot.
Skin.	Skull.							
23103	30548	1416	Blackfoot, Idaho.....	July 10, 1890	♂.....	221	128	39
23099	30544	1423	..do.....	July 11, 1890	♂.....	237	144	40
23102	30547	1424	..do.....	..do.....	♀.....	242	136	42
23088	30534	1425	..do.....	July 12, 1890	♂.....	223	132	39
23089	30535	1426	..do.....	..do.....	♂.....	197	110	39
23104	30549	1427	..do.....	..do.....	♂.....	188	105	38
23098	30543	1431	..do.....	July 13, 1890	♂.....	192	108	39
23101	30546	1432	..do.....	..do.....	♂.....	188	102	39
23100	30545	1433	..do.....	..do.....	♀.....	233	137	40.5
23092	30538	1443	..do.....	July 15, 1890	♀.....	236	139	40
23093	30539	1444	..do.....	..do.....	♀.....	198	111	39
23091	30537	1450	..do.....	July 16, 1890	♂ juv	184	104	36
23090	30536	22	..do.....	July 14, 1890	♂.....	246	137	39
23087	30533	28	..do.....	July 15, 1890	♂.....	242	140	39
23369	30829	1561	Birch Creek, Idaho.....	Aug. 7, 1890	♀ ad..	259	148	40
23370	30830	1565	..do.....	..do.....	♀.....	252	143	42
24036	31452	1840	Challis, Idaho.....	Sept. 20, 1890	♀ ad..	255	139	40
24037	31453	1842	..do.....	Sept. 21, 1890	♀.....	250	138	40.5

Perognathus olivaceus Merriam. Pocket Mouse.

Perognathus olivaceus Merriam, N. Am. Fauna, No. 1, October, 1889, pp. 15-16 (type from Kelton, Utah).

Common throughout the Sonoran zone in Idaho, living in small colonies in burrows in the gravel benches. Specimens were captured in Lemhi Valley near the Indian Agency and near Junction, and in Birch Creek Valley at Johnston's ranch 16 kilometers (10 miles) south of Nicholia. Several were trapped in the Pahsimeroi Valley, and others at Blackfoot and Big Butte on the Snake Plains.

All of the Idaho specimens are a little smaller than true *P. olivaceus* from northern Utah.

Record of specimens collected of Perognathus olivaceus.

U. S. National Museum No.		Original No.	Locality.	Date.	Sex.	Total length.	Tail vertebrae.	Hind foot.
Skin.	Skull.							
22994	30440	17	Blackfoot, Idaho	July 13, 1890	♂	147	74	20
23097	30542	29	...do	July 15, 1890	♂	167	63	23
23096	30541	37	Big Butte, Idaho	July 19, 1890	♀	169	64	22.5
23476	30894	1569	Birch Creek, Idaho	Aug. 9, 1890	♂	161	85	21.5
23547	30965	1598	...do	Aug. 14, 1890	♂ im	150	80.5	22
23546	30964	1599	...do .....	...do	♀	151	86	22
23834	31234	1742	Lembi Indian Agency, Idaho	Sept. 2, 1890	♀ ad	166	90	21
23837	31237	1780	Pahsimeroi Valley, Idaho	Sept. 13, 1890	♂	174	95	22
23836	31236	1822	...do	Sept. 17, 1890	♂	174	95	23
23835	31235	1823	...do .....	...do	♀ im	160	85	21.5

Erethizon epixanthus Brandt. Yellow-haired Porcupine.

Common throughout the mountains of central Idaho. In Saw Tooth Mountains their gnawings were most frequently noticed on *Pinus mur-rayana*, and rather low down. In a cañon in the Lost River Mountains Mr. Basil Hicks Dutcher encountered a Porcupine sitting in a shady nook under a rocky cliff screened by undergrowth. The specimen was preserved. A dead Porcupine was found in the sage brush near the sink of Birch Creek. Tracks were seen in the cañon of Snake River near Shoshone Falls, and on the Brunneau Mountains between Idaho and Nevada.

August 10, 1872, I killed a female Porcupine at Henry Lake (skull No. 12405, U. S. Nat. Mus.).

Record of specimens collected of Erethizon epixanthus.

U. S. National Museum No.		Original No.	Locality.	Date.	Sex.	Total length.	Tail vertebrae.	Hind foot.
Skin.	Skull.							
23713	31107	1518	Lost River Mountains, Idaho	July 30, 1890	♀	740	187	89
.....	30625	1489	Big Lost River, Idaho	July 22, 1890	.....	.....	.....	.....

Zapus hudsonius (Zimmermann). Jumping Mouse.

Common in moist places along the lower part of the Canadian or Douglas fir zone of the Salmon River Mountains, and probably throughout the coniferous forests of Idaho. Several were caught in traps set for shrews in a marsh bordering a beaver pond. This form differs from the common Jumping Mouse of the eastern United States in having the skull broader and shorter, and the brain case more highly inflated. The buffy ochraceous color of the sides is somewhat paler than in eastern specimens and very much paler than in those from the Pacific coast region.

Record of specimens collected of *Zapus hudsonius*.

U. S. National Museum No.		Original No.	Locality.	Date.	Sex.	Total length.	Tail vertebrae.	Hind foot.
Skin.	Skull.							
23538	30956	1634	Salmon River Mountains, Idaho...	Aug. 23, 1890	♀	231	140	31
23539	30957	1665	.....do	Aug. 25, 1890	♀	222	134	29
23540	30958	1675	.....do	Aug. 26, 1890	♂	222	135	32
23799	31199	1718	.....do	Aug. 29, 1890	♂ ad..	232	140	32
23800	31200	1733	.....do	Aug. 31, 1890	?	246	152	33

Lagomys princeps Richardson. Rocky Mountain Pika.

The Rocky Mountain Pika is common in the rock slides of the Boreal Province in Idaho. In the Salmon River, Pahsimeroi, and Saw Tooth Mountains we found it ranging from the Canadian zone to within a short distance of the summits of the highest peaks. It was encountered most abundantly in the neighborhood of timber line, between the altitudes of 3,050 and 3,350 meters (10,000 and 11,000 feet), perhaps because suitable rock slides are most frequent at this elevation. The lowest colony discovered in the Salmon River Mountains inhabited a mass of volcanic slide rock surrounded by Douglas fir and Murray pine on the east slope of the range at about 2,620 meters (8,600 feet). In a narrow part of the valley of Big Wood River, near its headwaters, a few individuals were found in slides as low as 2,255 meters (7,400 feet). It was observed also in the mountains between the headwaters of Big Lost River and Trail Creek.

Pikas are noisy little creatures and are not likely to let anyone pass near by without making their presence known. Their cry has been described as a 'bleat' resembling that of a young lamb, but the simile is strained. Their ordinary note is *eh-eh*, spasmodically ejaculated and several times repeated. Sometimes it is shriller and more like *ee-ee*, uttered many times in rapid succession.

They are active, nimble little bodies, springing lightly from rock to rock, and running swiftly to and from their feeding grounds, often several hundred feet away.

Their chief food-plant is a pretty little Arctic-alpine species (*Geum rossii*) which forms mats of green among the rocks and bears conspicuous yellow flowers. This is their 'hay,' and they lay up large quantities of it for winter use, depositing it in little heaps in the spaces between the rocks. These storehouses average about the size of a bushel measure and contain, in addition to the leaves and flowers of *Geum rossii*, a few heads of purple *Aster* and a golden *Senecio*.

The Pikas are very industrious. In early autumn they are constantly engaged in carrying hay to their storehouses except when interrupted by intruders, at whom they stare and scold before plunging out of sight among the rocks. Soon after silence is restored they reappear, and

their cry may be heard from a hundred points. They crawl out upon the rocks and sit motionless for awhile, and if undisturbed soon return to their task of laying up food for winter. I have watched them by the hour while thus engaged, running rapidly to the side of the slide, gathering a mouthful of leaves, and returning as swiftly to deposit it in the usual place. For such short-legged animals their speed is surprising, as well as the long leaps they make from rock to rock, never losing their footing. Their movements are not attended by any noise, which circumstance is due in part to the lightness of their bodies and in part to the dense pad of fur which covers the soles of their feet.

The Pika probably remains active throughout the winter, during which period the great depth of snow covering its home keeps out the cold winds and prevents the temperature from falling very low. That it does not hibernate is evident from two facts: (1) It lays up large storehouses of food for winter use; (2) it does not become fat as winter approaches.

One afternoon, about the 1st of September, Mr. Vernon Bailey and I carried our blankets up to a *Lagomys* slide above timber-line on the Salmon River Mountains and spent the night there. As darkness fell upon the mountains a storm set in. The wind blew a furious gale and rain began falling. Soon the rain changed to hail and sleet, and finally to snow. Much to our surprise we heard the unmistakable cry of the Pikas at frequent intervals throughout the night. Whether they are usually nocturnal as well as diurnal, or whether the storm set them at work to move their storehouses to safer places, we have no means of knowing.

In 1872 I collected this species in Teton Cañon near the boundary between Idaho and Wyoming (No. $\frac{11114}{12430}$ U. S. Nat. Mus.).

Record of specimens collected of Lagomys princeps.

U. S. National Museum No.		Original No.	Locality.	Date.	Sex.	Total length.	Hind foot.
Skin.	Skull.						
23488	30906	1585	Salmon River Mountains, Idaho.....	Aug. 11, 1890	♂.....	177	28
23366	30826	121	do.....	Aug. 6, 1890	♂.....	176	29
23487	30905	146	do.....	Aug. 11, 1890	♀ ad..	169	28
23484	30902	147	do.....	do.....	♀ ad..	183	29.5
23485	30903	148	do.....	do.....	♂ ad..	190	27
23663	31057	1679	do.....	Aug. 26, 1890	♂.....	185	30
23664	31058	1680	do.....	do.....	♀.....	180	31
23665	31059	1681	do.....	do.....	♂.....	182	31
23807	31207	1685	do.....	Aug. 27, 1890	♂.....	175	31
23808	31208	1686	do.....	do.....	♂.....	180	30
23806	31206	1687	do.....	do.....	♂.....	170	30
23804	31204	1688	do.....	do.....	♂.....	180	31
23812	31212	1689	do.....	do.....	♀ (?)..	178	30
23810	31210	1690	do.....	do.....	♂.....	180	31

Record of specimens collected of *Lagomys princeps*—Continued.

U. S. National Museum No.		Original No.	Locality.	Date.	Sex.	Total length.	Hind foot.
Skin.	Skull.						
23813	31213	1691	Salmon River Mountains, Idaho.....	Aug. 27, 1890	♂.....	180	31
23811	31211	1692	do.....	do.....	♀.....	182	30
23809	31209	1693	do.....	do.....	♂.....	180	30
23805	31205	1694	do.....	do.....	♂.....	190	31
23814	31214	1731	do.....	Aug. 30, 1890	♀ ad.	180	30
23543	30961	174	do.....	Aug. 19, 1890	♀.....	180	28
23486	30904	175	do.....	do.....	♀.....	176	29
23544	30962	176	do.....	do.....	♀.....	159	29
23545	30963	177	do.....	do.....	♂ (?).....	166	28.5
24039	31455	1854	Head of Wood River, Idaho.....	Sept. 25, 1890	♀.....	175	30
24381	31787	1941	do.....	Oct. 5, 1890	♀ ad.	170	29
24379	31785	1942	do.....	do.....	♂ ad.	172	30
24380	31786	1943	do.....	do.....	♂ ad.	170	30
.....	30990	.....	Salmon River Mountains, Idaho.....	Aug. 27, 1890	.....	.....	.....

Lepus idahoensis sp. nov. Idaho Pygmy Rabbit.

When I first saw this little Rabbit in the field the idea occurred to me that it might be *Lepus nuttalli* of Bachman, described in 1837 from a specimen collected on the Snake Plains by Townsend, and believed at that time to be "the most diminutive of any species of true hare yet discovered." But on returning to the East and examining the type of *L. nuttalli*, which is still in the Museum of the Academy of Natural Sciences of Philadelphia, I find the latter to be a young Cotton-tail, with a "rather long, full tail," pure white beneath, as pointed out by Baird and Allen, and I wholly concur in the opinion that it is the young of the species afterward described by Bachman (in 1839) as *L. artemisia*. The type locality of *L. artemisia* is the Plains of the Columbia near Walla Walla, a direct continuation of the Snake Plains.

Geographic Distribution.—*Lepus idahoensis* inhabits the Sage Plains bordering Snake River, in Idaho, and the northward extensions of these plains in the Birch Creek and Lemhi Valleys, Little Lost River Valley, Pahsimeroi Valley, and Big Lost River Valley. To the south it ranges into northern Nevada, and to the west probably into eastern Oregon and Washington.

Habits.—That but half a dozen specimens of this little rabbit were secured during more than two months spent in the very center of its abundance seemed very strange to us until we learned, near the close of the trip, two important facts concerning its habits, namely, that it is almost exclusively nocturnal and that it makes its home in deserted holes of the Badger (*Taxidea americana*). The only individual I succeeded in shooting was killed at the mouth of a Badger hole just at daylight, and the specimens trapped were caught at the mouths of old

Badger holes which had been partly filled with earth. Had we learned these facts earlier we could easily have captured many more. Two or three others were caught but were eaten in the traps by Coyotes.

This Rabbit has very short legs, and in running keeps close to the ground, not leaping, as most rabbits do. It was never found away from the plains and valleys covered with sage (*Artemisia tridentata*) and *Tetradymia canescens*.

LEPUS IDAHOENSIS, sp. nov.

Type No. 2444♂ ♂ ad. From Pahsimeroi Valley, Idaho, September 16, 1890. Collected by Basil Hicks Dutcher (Original No. 1816).

Measurements (taken in flesh by C. H. M.)—Total length, 290; tail, 15; hind foot, 71. Ear (measured in dry skin) from notch, 42, from anterior base, 58.

General characters.—Size smallest of North American Rabbits, with the possible exception of *L. cinerascens* recently described from southern California by Dr. J. A. Allen. Ears short and broadly rounded. Hind legs and feet rather short. Tail rudimentary.

Color.—The material at hand (five specimens) indicates that there are two very distinct color phases in this Rabbit, a summer pelage (which is also that of the young) somewhat resembling *L. sylvaticus*, and a winter pelage of clear drab-gray, which is unique among Rabbits so far as I am aware.

Winter pelage.—The type specimen (No. 24045, Pahsimeroi Valley, Idaho, Sept. 16, 1890) and another taken at the same time and place (No. 24047) are in winter pelage except on the head and neck, which parts are changing or still in summer pelage. Another specimen (24046 ♀ ad.), taken near the head of the valley of Big Lost River a week later (September 22), has nearly completed the change, the old fur remaining on the cheeks and sides of the neck only. In these specimens, with the exceptions indicated, the color of the head, body, and thighs is a uniform pure drab-gray entirely free from any tinge of fulvous, and somewhat mixed with black-tipped hairs on the back. The nape spot is small, dull ochraceous buff in color, and wholly concealed when the ears are laid back. The fore and hind feet are pale, dull ochraceous buff. The drab-gray of the upper parts extends well down on the sides and encroaches on the under parts, leaving but a narrow strip of whitish along the median line of the belly. The pectoral band is grayish buff. The ears are pale buff inside; dull buffy-ochraceous outside, mixed with gray and black-tipped hairs anteriorly and bordered in front with a blackish line.

Summer and immature pelage.—Similar to the winter pelage but with the drab-gray of the upper parts replaced by gray more or less strongly suffused with buff and everywhere intimately mixed with black. The two pelages really differ much more than indicated by the description. The only fully adult specimen procured in complete summer pelage was accidentally destroyed. It was killed near Big Butte, Idaho, about July 20, 1890. An immature male (No. 23542) taken in Birch Creek

Valley, Idaho, August 12, 1890, is nearly full grown and is conspicuous for the abundance of black-tipped hairs on the back and sides. The sides of the belly are strongly suffused with pale buffy ochraceous. A still younger individual (No. 23541 ♀ juv.) collected in the upper Lemhi Valley (near Junction) Idaho, August 16, 1890, is very much paler above (the black-tipped hairs being inconspicuous) and the under parts are washed with buffy. The texture of the pelage is soft and woolly as usual in young rabbits.

Cranial characters.—The skull of *Lepus idahoensis*, aside from its small size, is remarkable for its breadth, shortness, and the flatness of the parietal region. The ratio of zygomatic breadth to basilar length of Hensel is 73.8 against 65 millimeters in an average specimen of *L. sylvaticus nuttalli* from the same locality, and the corresponding ratios of breadth of brain case to basilar length are 58.5 and 52. The depression of the brain case is best seen from behind, though it is very apparent from the side also. The foreshortening of the skull is brought about chiefly at the expense of the facial portion. The nasal bones are conspicuously short, the ratio of their length to basilar length being 48.4 against 60 in *L. sylvaticus nuttalli*.

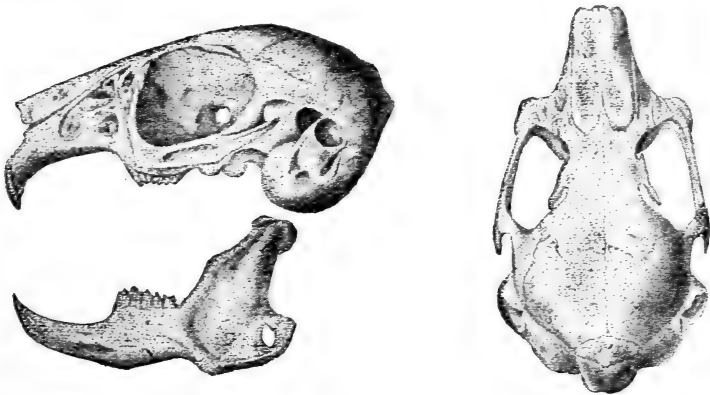


FIG. 4.—Skull of *Lepus idahoensis* type (nat. size).

The auditory bullæ are enormously inflated, being actually as large as in *L. sylvaticus nuttalli* from the same region. The supraorbital processes are small, slender, and are not in contact with the side of the skull posteriorly; anteriorly they fail altogether or exist as little more than spicules. The sulcus on the outer face of the zygomatic arch is very shallow and is not fenestrated. The under surface of the basi-occipital is deeply grooved longitudinally. The palatal bridge extends from the plane of the interspace between the first and second lateral teeth to the plane of the fourth, or the interspace between the fourth and fifth.

General remarks.—*Lepus idahoensis* requires comparison with no other Rabbit, its small size, short head, apparent absence of tail, and peculiar coloration serving to distinguish it at a glance from all previously known species.

Record of specimens collected of Lepus idahoensis.

U. S. National Museum No.		Original No.	Locality.	Date.	Sex.	Total length.	Tail vertebrae.	Hind foot.
Skin.	Skull							
24045	31461	* 1816	Pahsimeroi Valley, Idaho.....	Sept. 16, 1890	♂ ad..	290	15	71
24047	31463	1821	.....do	Sept. 17, 1890	— ad..	300	18	74
24046	31462	1843	Big Lost River Valley, Idaho.....	Sept. 22, 1890	♀ ad..	270	16	72
23542	30960	1592	Birch Creek, Idaho	Aug. 12, 1890	♂ im..	250	12	63
23541	30959	1604	Junction, Idaho	Aug. 16, 1890	♀ im..	212	14	55

* Type.

Lepus campestris Bachman. White-tailed Jack Rabbit.

Tolerably common throughout the greater part of the sage plains, extending north throughout the valley of Birch Creek and Lemhi River to Salmon City, and through the Little Lost and Pahsimeroi Valleys to Salmon River and Round or Challis Valleys. Found also in the valley of Big Lost River.

Record of specimen collected of Lepus campestris.

U. S. National Museum No.		Original No.	Locality.	Date.	Sex.	Total length.	Tail vertebrae.	Hind foot.
Skin.	Skull.							
23715	31109	169	Head of Lemhi River, Idaho.....	Aug. 16, 1890	♀ ..	604	105	149

Lepus texianus Woodhouse. Black-tailed Jack Rabbit.

Common in most parts of the sage plains and valleys. This species was observed in the valley of Birch Creek and Lemhi River, in Little Lost River Valley, the Pahsimeroi Valley, Round or Challis Valley, Big Lost River and Thousand Spring Valley, and was more common than *Lepus campestris*.

In September, 1854, Dr. George Suckley found this species "exceedingly abundant on the left bank of the Boise River." He says: "They are so numerous that our command of 60 men subsisted on them for nearly a week. In a short ride of an hour's duration to see 30 near to the trail was nothing remarkable. The natives (Diggers) make garments by sewing many of their skins together. This hare breeds in great numbers on the vast sage plains to the south of Boise River, between it and Snake River." (Pacific R. R. Reports, Vol. XII, Book II, 1860, Chap. II, p. 105.) His subsequent remark that "they are said to turn white in winter" evidently refers to the following species (*L. campestris*), which is the only Jack Rabbit known to undergo this seasonal change of color. That his previous remarks refer to *L. texianus* is shown by the description, which states that the upper surface of the tail and central line of the rump are black.

Record of specimens collected of Lepus texianus.

U. S. National Museum No.		Original No.	Locality.	Date.	Sex.	Total length.	Tail vertebrae.	Hind foot.	Ear from crown.
Skin.	Skull.								
23922	31327	1415	Blackfoot, Idaho	July 9, 1890	♀ ad..	560	94	134	163
23365	30825	1494	Arco, Idaho.....	July 26, 1890	♂ im..	240	39	65	77

Lepus sylvaticus nuttallii Bachman. Sage Cotton-tail.

Common throughout the sage plains and particularly abundant in thickets of willows bordering streams.

Record of specimens collected of Lepus s. nuttallii.

U. S. National Museum No.		Original No.	Locality.	Date.	Sex.	Total length.	Tail vertebrae.	Hind foot.	Ear from crown.
Skin.	Skull.								
23906	31310	1736	Lemhi Indian Agency, Idaho	Sept. 1, 1890	♂.....	385	52	95	85
23802	31202	1737	.....do.....	.....do.....	♂.....	312	35	86	70
23801	31201	1738	.....do.....	.....do.....	♀.....	345	47	90	71
	31167	1773	Lemhi Valley, Idaho.....	Sept. 5, 1890	♀ ad..	.....	.....	.....	.....
23060	30506	20	Blackfoot, Idaho	July 13, 1890	♀.....	.....	.....	.....	.....
23714	31108	57	Big Lost River, Idaho.....	July 24, 1890	♀ ad..	370	50	94	.....
23249	30705	68	Lost River Mountains, Idaho	July 29, 1890	♀.....	295	35	78	.....
.....	31166	1755	Lemhi Indian Agency, Idaho	Sept. 2, 1890	♀.....	.....	.....	.....	.....

Lepus bairdii Hayden. Snow-shoe Rabbit.

Common in thickets in the Salmon River and Saw Tooth Mountains. The first specimen secured was shot by Mr. Bailey on the high divide between Trail Creek and the headwaters of Big Lost River September 22. Several others were secured at Saw Tooth or Alturas Lake in October. The latter were beginning to change from summer to winter pelage.

Record of specimens collected of Lepus bairdii.

U. S. National Museum No.		Original No.	Locality.	Date.	Sex.	Total length.	Tail vertebrae.	Hind foot.	Ear from crown.
Skin.	Skull.								
24430	31836	1846	Big Lost River Valley, Idaho	Sept. 22, 1890	♂	405	28	130	102
24065	31475	1932	Saw Tooth Lake, Idaho	Oct. 3, 1890	♂	450	35	142	100
24066	31476	1933	.....do.....	.....do.....	♀	445	37	145	98

Alce americanus Jardine. Moose.

Occurs in the Salmon River Mountains, but is not common anywhere. July 26, 1872, an old cow Moose and two large calves were killed in Teton Cañon, near the boundary between Idaho and Wyoming, by the

Hayden Survey, and I worked all night long to prepare their skulls so that they could be sent out to Fort Hall on pack mules the next day (Nos. 12399 and 12400, U. S. Nat. Mus.).

Cervus canadensis Erxleben. Wapiti; Elk.

Common in the Saw Tooth and Pahsimeroi Mountains, and not rare in the Salmon River Mountains; occurs also in the Brunneau and Elk Mountains in extreme southern Idaho, and is said to inhabit the Black-foot Mountains.

In 1872 we found Elk in abundance in the region about Henry Lake.

Cariacus macrotis (Say). Black-tail Deer; Mule Deer.

Common throughout the mountains of Idaho, and in the Brunneau Mountains between Idaho and Nevada. In winter it is common in the cañon of Snake River, where a hunter killed 11 early in October (near Shoshone Falls).

Cariacus virginianus macrourus (Rafinesque). Western White-tailed Deer.

Not observed by our party. Said to be common in some of the willow bottoms of southern Idaho and in the forests of northern Idaho.

Rangifer caribou (Kerr). Woodland Caribou.

Capt. Charles E. Bendire informs me that Caribou are common in northern Idaho and that they occur as far south as the neighborhood of Elk City, in Idaho County. A hunter named N. C. Linsley states that he and his partner killed 25 Caribou on Pend d'Oreille River during the winter of 1888-'89 (Forest and Stream, October 10, 1889, p. 227).

Antilocapra americana Ord. Antelope.

Tolerably common on the Snake Plains and found also in considerable numbers at the head of Little Lost River (where 32 were seen in one herd and many in small bunches), and about the headwaters of the Pahsimeroi, in September. A drove of more than 40 individuals was seen at the head of Cañon Creek, which empties into Salmon Falls Creek, in northern Nevada, October 15.

In 1872 many herds of Antelope were met with along the route of the Hayden Survey in eastern Idaho, and hundreds were seen in Teton Basin. The following year (1873) an epidemic disease broke out among them and the species has never regained its former abundance. Specimens were collected by me in 1872 on Middle Fork of Snake River (August 5), and on Cañon Creek (October 4—Skulls Nos. 12401 and 12402, U. S. Nat. Mus.).

Record of specimen collected of Antilocapra americana.

U. S. National Museum No.		Original No.	Locality.	Date.	Sex.	Total length.	Tail vertebre.	Hind foot.
Skin.	Skull.							
.....	31278	1827	Pahsimeroi River, Idaho	Sept. 15, 1890	♀ im.	.....	.....	.....

Mazama montana Rafinesque. Mountain Goat.

Common on the higher peaks of the Saw Tooth and Salmon River Mountains, and said to be common on the Seven Devils. Seven were killed in the Saw Tooth Mountains west of Saw Tooth or Alturas Lake during our stay in early October, and fourteen were seen one day by a hunter named F. C. Parks.

Ovis canadensis Shaw. Mountain Sheep.

Common in the Salmon River and and Pahsimeroi Mountains, and occurring, though in smaller numbers, in the Saw Tooth Mountains. Said to be common in northern Idaho.

Bison bison (Linnæus). Buffalo.

Bos bison Linnæus, Syst. Nat., x, 1758, p. 72.

Bos americanus Gmelin, Syst. Nat., xiii, 1788, p. 204.

Bison americanus Smith, Griffith's Cuvier, Vol. v, 1827, p. 374 (name first used in this form by Catesby, "Nat. Hist. Carolina, II, 1754, App., 20, xxviii"); Allen, American Bisons, 1876, 36 (*et auctorum plurimorum*).

Skulls and skeletons of Buffalo were found in the valley of Birch Creek and Lemhi River, in Little Lost River Valley, and in the upper part of Pahsimeroi Valley, but the species is now extinct in Idaho, except when stragglers from the Yellowstone Park wander into the adjacent mountains near the boundary line between Idaho and Montana.

John K. Townsend, during his overland journey from St. Louis to Oregon in 1834, frequently met with small herds of buffalo in southeastern Idaho and along Snake River. Many were killed for food and several calves were captured alive, but proved too unruly for pets. Under date of July 21, when near the site of old Fort Hall, he states: "The buffalo appear even more numerous than when we came, and much less suspicious than common. The bulls frequently pass slowly along within a hundred yards of us, and toss their shaggy and frightful looking heads as though to warn us against attacking or approaching them." Two days later four or five Indian hunters connected with the expedition killed sixty buffalo for the meat, which was dried for the journey. A few were found along the northern border of the Snake Plains in south central Idaho (Townsend's Narrative, 1839, p. 96 +. For other interesting records see *ibid.*, pp. 82, 87, 90, 93, 95, 96-97, 115).

Felis concolor Linnæus. Panther; Mountain Lion.

Occurs locally throughout Idaho. One was shot in Lemhi Valley in 1889, while feeding on the carcass of a cow.

Lynx baileyi Merriam. Plateau Wild Cat or Lynx.

Common in places; particularly abundant in the lava cañon of Snake River, where a fine specimen was caught in a trap baited with a duck's head and wings. Lynx tracks were seen in the Salmon River and Saw Tooth Mountains, but whether of this species is not known,

Record of specimens collected of Lynx baileyi.

U. S. National Museum No.		Original No.	Locality.	Date.	Sex.	Total length.	Tail vertebre.	Hind feet.	Ear from crown.
Skin.	Skull.								
24215	31628	1966	Shoshone Falls, Idaho	Oct. 10, 1890	♀	930	180	187	88
.....	31555	1962	...do .....	...do .....	.....	.....	.....	.....	.....
.....	31554	1963	...do .....	...do .....	.....	.....	.....	.....	.....
.....	30729	1595	Birch Creek, Idaho	Aug. 12, 1890	.....	.....	.....	.....	.....

Vulpes macrourus Baird. Great-tailed Fox.

Mr. Bailey saw a skin of a Red Fox at a ranch on the lower part of Birch Creek, where it was caught. It was in winter pelage and bright yellowish in color without trace of cross marks.

Tracks of foxes were seen in the lower part of Birch Creek Valley and in the Saw Tooth Mountains.

Canis nubilus Say. Timber Wolf.

Said to be common in northern Idaho. A trapper named N. C. Linsley states that he and his partner killed forty wolves near Pend d'Oreille River during the winter of 1888-'89 (Forest and Stream, October 10, 1889, p. 227).

Canis latrans Say. Coyote; Prairie Wolf.

Abundant throughout the sage plains; heard howling nearly every night, and frequently seen in the daytime, particularly in early morning, skulking among the sage brush or behind clumps of willows bordering streams.

Record of specimens collected of Canis latrans.

U. S. National Museum No.		Original No.	Locality.	Date.	Sex.	Total length.	Tail vertebre.	Hind foot.
Skin.	Skull.							
.....	30726	1594	Birch Creek, Idaho	Aug. 12, 1890	.....	.....	.....	.....
.....	31556	1964	Shoshone Falls, Idaho	Oct. 10, 1890	.....	.....	.....	.....
.....	31557	1965	...do .....	...do .....	.....	.....	.....	.....

Lutra hudsonica (Lacépède). Otter.

Common along most of the streams and lakes of Idaho, and in the cañons of Snake River. A female and young were captured on Birch Creek. The female weighed about 8½ kilograms (19 pounds avoirdupois) and the young about 4½ kilograms (10 pounds avoirdupois). Both were fat. The stomach of the mother contained the head of a Mallard Duck (*Anas boschas*) and parts of small fish that swarm in the

creek. The Otter excrement found along the bank consisted almost entirely of fish scales and bones.

Record of specimens collected of Lutra hudsonica.

U. S. National Museum No.		Original No.	Locality.	Date.	Sex.	Total length.	Tail vertebrae.	Hind foot.	Ear from crown
Skin.	Skull.								
24068	31478	1596	Birch Creek, Idaho.....	Aug. 14, 1890	♀ ad..	1,150	463	137	21
24067	31477	167	...do.....	...do.....	♀ im..	985	386	113	.....

Lutreola vison (Schreber). Mink.

Common along most of the streams. Four were caught on Birch Creek.

Record of specimens collected of Lutreola vison.

U. S. National Museum No.		Original No.	Locality.	Date.	Sex.	Total length.	Tail vertebrae.	Hind foot.	Ear from crown
Skin.	Skull.								
23710	31104	1540	Birch Creek, Idaho.....	Aug. 5, 1890	♂	520	170	65	14
23709	31103	1551	...do.....	Aug. 8, 1890	♂	508	167	36	12
23707	31101	1535	...do.....	Aug. 5, 1890	♀	510	171	61	14
23708	31102	1547	...do.....	Aug. 7, 1890	♀	470	138	59	13

Putorius longicauda Bonaparte. Long-tailed Weasel.

Weasels, provisionally referred to this species, are common in the Saw Tooth, Pahsimeroi, and Salmon River Mountains and tracks were seen in the Brunneau Mountains. Three were shot in the daytime and several were caught in marten traps baited with birds, chipmunks, and red squirrels. I met one high up in the Salmon River Mountains, September 5. He was in pursuit of a Richardson's Squirrel in a damp, moss-covered place in a dark spruce forest and stood bolt upright when he saw me. I wounded him with my auxiliary and he immediately emitted his powerful stench and disappeared in a hole at the root of a spruce.

July 22, 1872, I collected a young Weasel in Teton Basin, Idaho (No. $\frac{11102}{12416}$ U. S. Nat. Mus.).

Record of specimens collected of Putorius longicauda.

U. S. National Museum No.		Original No.	Locality.	Date.	Sex.	Total length.	Tail vertebrae.	Hind foot.
Skin.	Skull.							
23493	30911	122	Lost River Mountains, Idaho.....	Aug. 6, 1890	♂ im .	318	114	39
23676	31070	168	.....do.....	Aug. 16, 1890	♂.....	352	117	39
23559	30977	1606	Salmon River Mountains, Idaho..	Aug. 19, 1890	♂.....	380	144	43
23677	31071	1620	.....do.....	Aug. 21, 1890	♂.....	375	136	43
23790	31190	1720	.....do.....	Aug. 30, 1890	♂ im .	354	128	41
23792	31192	1721	.....do.....	.....do.....	♂ ad .	387	137	43.5
23791	31191	1724	.....do.....	.....do.....	♀.....	362	132	39
23903	31307	1814	Pahsimeroi Mountains, Idaho....	Sept. 16, 1890	♀.....	330	113	36
.....	30620	.....	Big Butte, Idaho.....	July 21, 1890	.....	.....	.....	.....

Mustela americana Turton. Marten.

Common in the Salmon River and Saw Tooth Mountains. I caught one near Timber Creek in a trap baited with birds. Prospectors in the Saw Tooth Mountains complain of the depredations of Marten in carrying off their meat.

Record of specimen collected of Mustela americana.

U. S. National Museum No.		Original No.	Locality.	Date.	Sex.	Total length.	Tail vertebrae.	Hind foot.	Ear from crown
Skin.	Skull.								
23907	31311	1700	Salmon River Mountains, Idaho.....	Aug. 27, 1890	♂ im .	585	182	88	38

Mustela pennanti Erxleben. Fisher.

Rare. A very handsome adult male Fisher was caught near Saw Tooth or Alturas Lake by Basil Hicks Dutcher, October 1, in a Marten trap baited with Chipmunks (*Tamias quadrivittatus*). It weighed 4,592 grams (10 pounds 2 ounces avoirdupois).

Record of specimen collected of Mustela pennanti.

U. S. National Museum No.		Original No.	Locality.	Date.	Sex.	Total length.	Tail vertebrae.	Hind foot.	Ear from crown
Skin.	Skull.								
24112	31531	1914	Saw Tooth Lake, Idaho....	Sept. 30, 1890	♂ ad .	1,013	395	128	41

Spilogale saxatilis Merriam. Little Striped Skunk.

A Little Striped Skunk believed to be this species is common in the cañons of Snake River.

In 1872 I secured a skin at Marsh Valley, in southern Idaho (No. 11136 U. S. Nat. Mus).

Mephitis sp. —? Skunk.

Apparently not common in the region traversed. A dead Skunk was found in the Salmon River Mountains but no specimens were caught. One was killed by a dog near Saw Tooth Lake in September.

Taxidea americana (Boddaert). Badger.

Abundant throughout the Snake River Plains and sage-covered valleys, sometimes ranging up the mountains as high as timber line. Badgers were found in unusual numbers about Timber Creek on the headwaters of the Lemhi, and also near the head of the Pahsimeroi, and many were observed in the daytime. An old female shot in Birch Creek Valley, August 5, by Mr. Bailey, had in her stomach a number of bumble bees with their comb and young bees, and also a Pocket Gopher (*Thomomys*). Badgers dig out Spermophiles, Chipmunks, Pocket Gophers, and Mice.

Record of specimens collected of Taxidea americana.

U. S. National Museum No.		Original No.	Locality.	Date.	Sex.	Total length.	Tail vertebrae.	Hind foot.	Ear from crown.
Skin.	Skull.								
23712	31106	1522	Lost River Mountains, Idaho.	July 31, 1890	♀	730	139	110	35
23,11	31105	1555	Birch Creek, Idaho.....	Aug. 5, 1890	♀ ad..	770	143	118	44
.....	31279	1828	Pahsimeroi River, Idaho ...	Sept. 15, 1890	.....	.....	.....	.....	.....

Gulo luscus (Linnaeus). Wolverine.

The dead body of a Wolverine was found near Timber Creek in the Salmon River Mountains by Basil Hicks Dutcher. The species was tolerably common in the Saw Tooth Mountains, where a trapper caught five last winter. One was killed on Blackfoot Mountains a few years ago, on what has been since known as Wolverine Creek.

Record of specimen collected of Gulo luscus.

U. S. National Museum No.		Original No.	Locality.	Date.	Sex.	Total length.	Tail vertebrae.	Hind foot.
Skin.	Skull.							
.....	30912	1605	Salmon River Mountains, Idaho....	Aug. 19, 1890	.....	.....	.....	.....

Procyon lotor (Linnæus). Raccoon.

Raccoons are common in the cañons of Snake River, where they feed largely on crayfish (*Astacus gambelii*).

Ursus horribilis, Ord. Grizzly Bear.

The Grizzly Bear is common in the Salmon River and Saw Tooth Mountains, and is said to occur in the Blackfoot Mountains also. One was killed near our camp on Timber Creek in August.

In 1872 several were seen in Teton Basin and an old female was killed in Teton Cañon, July 24 (skull No. 12397, U. S. Nat. Mus.). Grizzly Bears are said to be common in northern Idaho.

John K. Townsend, in the narrative of his overland journey to Oregon in 1834, frequently speaks of Grizzly Bears and states that three were killed and several others seen in one day (July 10, 1834) near Blackfoot River. One of those killed had claws "seven inches in length," and "the spread of the foot, laterally, was ten inches." They were abundant and bold along Snake River, and several were killed.

Lewis and Clark make frequent mention of Bears in the account of their memorable expedition across the continent. During the return journey they crossed Idaho along the course of the Kooskooskie (or Clearwater) in May and June, 1806. Under date of May 31, when encamped on the lower Clearwater, they made the following important entry concerning the Bears of the region :

"Two men visited the Indian village, where they purchased a dressed bear skin of a uniform pale reddish-brown color, which the Indians called yackah in contradistinction to hohhost, or the white bear. This remark induced us to inquire more particularly into their opinions as to the several species of bears ; and we therefore produced all the skins of that animal which we had killed at this place, and also one very nearly white, which we had purchased. The natives immediately classed the white, the deep and the pale grizzly red, the grizzly dark brown, in short, all those with the extremities of the hair of a white or frosty color, without regard to the color of the ground of the foil, under the name of hohhost. They assured us that they were all of the same species with the white bear ; that they associated together, had longer nails than the others, and never climbed trees. On the other hand, the black skins, those which were black with a number of entire white hairs intermixed, or with a white breast, the uniform bay, the brown, and light reddish brown, were ranged under the class yackah, and were said to resemble each other in being smaller, and having shorter nails than the white bear, in climbing trees, and being so little vicious that they could be pursued with safety. This distinction of the Indians seems to be well founded, and we are inclined to believe—

"First. That the white or grizzly bear of this neighborhood form a distinct species, which moreover is the same with those of the same color on the upper part of the Missouri, where the other species are not found.

“Second. That the black and reddish brown, etc., is a second species, equally distinct from the white bear of this country as from the black bear of the Atlantic and Pacific oceans, which two last seem to form only one species. The common black bear are indeed unknown in this country, for the bear of which we are speaking, though in most respects similar, differs from it in having much finer, thicker, and longer hair, with a greater proportion of fur mixed with it, and also in having a variety of colours, while the common black bear has no intermixture or change of colour, but is of a uniform black.” (Lewis and Clark Expd., Paul Allen Ed., II, 1814, 303-304.)

Record of specimen collected of Ursus horribilis.

U. S. National Museum No.		Original No.	Locality.	Date.	Sex.	Total length.	Tail vertebrae.	Hind foot.
Skin.	Skull.							
.....	31276	1677	Salmon River Mountains, Idaho.....	Aug. 24, 1890	♂...	1570	100	.....

Ursus americanus Pallas. Black Bear.

Common throughout most parts of Idaho. A large ‘Cinnamon’ Bear was killed near Timber Creek, Salmon River Mountains, while feeding on the carcass of a steer. Black Bears are common in the Salmon River and Saw Tooth Mountains, where we saw many fresh tracks. In 1872 a male was killed at Henry Lake by the Hayden Survey (skull No. 12398, U. S. Nat. Mus.).

Lewis and Clark’s remarks on the Black Bear are quoted under the preceding species.

Record of specimens collected of Ursus americanus.

U. S. National Museum No.		Original No.	Locality.	Date.	Sex.	Total length.	Tail vertebrae.	Hind foot.
Skin.	Skull.							
.....	30728	1593	Lost River Mountains, Idaho.....	Aug. 1, 1890	.....	.....	.....	.....
.....	31277	1678	Salmon River Mountains, Idaho....	Aug. 24, 1890	.....	.....	.....	.....



ANNOTATED LIST OF BIRDS OBSERVED IN IDAHO DURING THE SUMMER AND FALL OF 1890, WITH NOTES ON SPECIES PREVIOUSLY RECORDED FROM THE STATE.

[The nomenclature adopted is that of the American Ornithologists' Union.]

Colymbus auritus. Horned Grebe.

Abundant on Saw Tooth Lake during the latter part of September and early October, moving about the lake in pairs, small companies, and large flocks. At least 100 were seen October 1. They were unusually free from suspicion, coming so near shore as to be easily killed, and 60 were counted from camp at one time.

Urinator imber. Loon.

One seen on Saw Tooth Lake, October 2. It seemed inquisitive about our camp fire and several times came within easy gunshot range.

Larus (californicus?). Gull.

I saw a Gull, believed to be this species, on Salmon River, near Challis, September 20.

Sterna forsteri. Forster's Tern.

Not observed by our party. In 1872 I secured a pair of Forster's Terns on Marsh Creek, in southern Idaho, June 30.

Phalacrocorax dilophus cincinatus. White-crested Cormorant.

Several Cormorants, probably this form, were seen at Lewis Ferry, on Snake River, October 11.

Pelecanus erythrorhynchos. White Pelican.

Not seen by our party. Found at Henry Lake in 1872 by the Hayden Survey, and on Bear River in 1834 by Townsend (Townsend's Narrative, 1839, p. 82). The name 'Pelican Lake,' near the southeastern corner of the map of Idaho, implies the presence of this species at that point.

Merganser serrator. Red-breasted Merganser.

Several small flocks seen on Saw Tooth Lake.

Anas boschas. Mallard.

Breeds commonly on Birch Creek, where young unable to fly were killed the first week in August. Tolerably common on most of the streams visited during the latter part of August and throughout September. Several were shot on Birch Creek and Lemhi River in early

Septemoer, and six on Saw Tooth or Alturas Lake October 4. There were large flocks of ducks on the lake at the time, but we could not be sure of the species.

In 1872 I obtained young Mallards on Henry Fork of Snake River the middle of July. Townsend recorded the Black Duck (*Anas obscura*) from southeastern Idaho in 1834, but undoubtedly mistook the female Mallard for that species.

Anas strepera. Gadwall.

Not found by our party. In 1872 I found the Gadwall at Marsh Creek and Market Lake, and procured its eggs at the former locality in June.

Anas americana. Baldpate.

One shot and several others seen on Lemhi River August 31, and two shot on Saw Tooth or Alturas Lake October 2. Three were killed on some warm springs in the cañon of Snake River, near Shoshone Falls, October 9.

Anas carolinensis. Green-winged Teal.

Abundant in small flocks along most of the streams in the valleys of Birch Creek and Lemhi, Big and Little Lost Rivers, the Pahsimeroi, Big Wood, and Salmon Rivers. The Green-winged Teal breeds in the small streams in the mountains and moves down into the valleys during the latter part of the summer. Fifteen were shot in a few minutes on Bullberg Creek, at the head of Pahsimeroi Valley, September 12. When wounded they dive among the roots of the willows bordering the streams and are hard to find. Three were killed in the cañon of Snake River, October 10, in a small flock of Blue-winged Teal.

Anas discors. Blue-winged Teal.

One was killed near the sink of Little Lost River, July 27. Two were shot and others seen on Saw Tooth Lake about October 1, and several were shot on the warm springs in the lava cañon of Snake River, near Shoshone Falls, October 9-11.

Anas cyanoptera. Cinnamon Teal.

Not obtained by our party. June 29, 1872, I collected a nest containing nine eggs of this species at Marsh Creek, in southeastern Idaho.

Spatula clypeata. Shoveller.

Not observed by us, but recorded by Townsend from Bear River, in southeastern Idaho, more than half a century ago (Townsend's Narrative, 1838, p. 82).

Aythya americana. Redhead.

One shot on Saw Tooth Lake, September 27.

Branta canadensis. Canada Goose.

Not observed by our party. In July 1834, J. K. Townsend found this species near Snake River, in eastern Idaho (Townsend's Narrative, 1839, 99). Geese are common in northern Idaho.

Olor buccinator. Trumpeter Swan.

Capt. Charles E. Bendire informs me that he found the Trumpeter Swan breeding on Henry Lake, Idaho, in 1877. In August of that year, during the Nez Percé campaign, he observed several broods of young on the lake and shot two.

In 1872, when on the Hayden Survey, I procured two Trumpeter Swans near Jackson Lake, on Snake River, in Western Wyoming, September 23 (Nos. 62367 and 62368, U. S. National Museum).

Ardea herodias. Great Blue Heron.

Common on Snake River in July and August. Several were seen on Birch Creek in August, one on Salmon River, near Challis, September 20, and another on Snake River in October.

Grus mexicana. Sandhill Crane.

Several Sandhill Cranes were heard on a large meadow near the lower end of Saw Tooth Lake, September 26.

In 1872 the species was common along Henry Fork of Snake River early in August. Lewis and Clark found it along the Clearwater in May, 1806. Capt. Charles E. Bendire informs me that the Sandhill Crane breeds on Craig's Mountains, near Fort Lapwai, Idaho, where he found young in June, 1871; and that he found eggs on an island in Snake River, near Old's Ferry, in May, 1877.

Townsend stated in the narrative of his overland journey to Oregon in 1834 that he found the Whooping Crane on Bear River in southeastern Idaho, but I do not feel justified in inserting the species without additional authority.

Porzana carolina. Sora.

One seen and others heard in a marsh on Big Lost River, about 8 miles above Arco, July 26.

Fulica americana. Coot.

Two shot on Saw Tooth Lake, October 2.

Phalaropus lobatus. Northern Phalarope.

One shot and another seen by Mr. Basil Hicks Dutcher on a small alpine lake at timber line in the Salmon River Mountains, September 5.

Phalaropus tricolor. Wilson's Phalarope.

Not observed by our party. In 1872 I shot a Wilson's Phalarope in Marsh Valley, southeastern Idaho, June 30.

Recurvirostra americana. Avocet.

Mr. Dutcher saw a bird on Saw Tooth Lake the latter part of September which he believed to be an Avocet.

In 1872 I found the species on Henry Fork of Snake River in July.

Himantopus mexicanus. Black-necked Stilt.

Capt. Chas. E. Bendire tells me he found this species on Snake River, near Old's Ferry, in July, 1877.

Gallinago delicata. Wilson's Snipe.

One shot and others seen on Salmon River, near Challis, September 20.

Ereunetes occidentalis. Western Sandpiper.

A flock of fifteen seen and several killed on Big Lost River, near Arco, July 25.

Totanus solitarius. Solitary Sandpiper.

A few were seen on Lemhi River and Birch Creek, and one on the muddy bank of a beaver pond in the Salmon River Mountains.

Symphemia semipalmata inornata. Western Willet.

In 1872 I shot a Willet on Henry Fork of Snake River, July 16. It breeds abundantly at Great Salt Lake.

Actitis macularia. Spotted Sandpiper.

Tolerably common on Birch Creek and Lemhi River. Captain Bendire found it breeding near Fort Lapwai, Idaho (Proc. Bost. Soc. Nat. Hist. XIX, 1877, 141).

Numenius longirostris. Long-billed Curlew.

About the middle of July Mr. Bailey saw three adults and a half-fledged young near the point where the Blackfoot River emerges from the mountains. He says that the young was half covered with feathers and half down, that it looked like a small ostrich, and ran very fast.

In 1872 I found the Long-billed Curlew common in places on the Sage Plains from southern Idaho to Henry Fork of Snake River. Captain Bendire records it as breeding near Fort Lapwai "on the high and dry prairies several miles from the nearest water." (Proc. Bost. Soc. Nat. Hist., XIX, 1877, p. 141.)

Ægialitis vocifera. Killdeer.

Common along Snake and Blackfoot Rivers and in Lemhi and Birch Creek valleys, and also in the valley of Big Wood or Malade River. Several were seen about the warm springs in the lava cañon of Snake River, near Shoshone Falls, October 9-11.

Colinus virginianus. Bob-white.

The Eastern Quail or Bob-white has been introduced successfully near Bois  City, Idaho. In the Auk for July, 1885 (p. 315), Dr. Timothy E. Wilcox, Assistant Surgeon, U. S. Army, published the following:

"The Bob White (*Ortyx virginianus*) has been successfully introduced to the Bois  Valley, Idaho. Three years since, I found a covey on the west side of the Snake River, fifty miles below Bois  City, where they were first liberated. I never saw coveys so large or numerous as I found them about Bois . Cover and food, as well as climate, are all favorable."

In the American Field of February 16, 1889, p. 148, Mr. Newton Hibbs, of Bois  City, states:

"Twelve years ago the business men of Bois  valley secured a coop

of the little beauties from the East and gave them the liberty of the brushy borders of the wheat fields and the willows along the creeks and rivers. They have increased till now they are found in every suitable ground for fifty miles around. The meadows and grainfields are bordered by the finest kind of cover. There is no heavy timber in this valley; only cottonwoods and balsams on the water courses, with a very jungle of briarberry bushes on every hand."

Dendragapus obscurus richardsonii. Richardson's Grouse; Blue Grouse.

Abundant in the coniferous forests of the Saw Tooth, Pahsimeroi, and Salmon River Mountains. It was usually found in small flocks, in which young birds predominated. This Grouse feeds extensively on a yellowish-red currant or gooseberry, and was sometimes found on open hill-tops engaged in catching grasshoppers. The crops of those killed contained grasshoppers and a few other insects, berries of *Arctostaphylos uva-ursi* and *Ribes cereum*, besides green leaves of the willow and other bushes.

In 1872 I found this Grouse common along the upper part of Henry Fork of Snake River in early August.

Capt. Charles E. Bendire informs me that the Pacific coast form of this Grouse (*Dendragapus o. fuliginosus*) occurs in the Boisé Mountains and in the foothills of the Wiser Valley Mountains, and that specimens from the mountains near Fort Lapwai may be referred to the same form.

Dendragapus franklini. Franklin's Grouse.

Said to occur in the Saw Tooth Mountains, where it is known as the 'Fool Hen,' and to be common in northern Idaho.

Bonasa umbellus togata. Canadian Ruffed Grouse.

Several Ruffed Grouse were killed in the Salmon River Mountains, near Eight-Mile Cañon, September 4. The species was not seen elsewhere.

Pediocætes phasianellus columbianus. Columbian Sharp-tailed Grouse.

The only Sharp-tailed Grouse seen during the entire season was killed in a flock of Sage Hens near the Lemhi Indian Agency, August 31.

In 1872 I found it near Fort Hall and on Portneuf and Snake Rivers. Captain Bendire states: "In the winter I have seen flocks of from one to two hundred in the vicinity of Fort Lapwai, Idaho." (Proc. Bost. Soc. Nat. Hist., XIX, 1877, p. 139.)

Centrocercus urophasianus. Sage Grouse.

Abundant throughout the sage plains and valleys, usually occurring in flocks of a dozen or more. This species furnished us with fresh meat during the greater part of the trip. While the flesh of the adults was usually more or less flavored with sage, the young, as a rule, were free from this taste.

In 1872 I found Sage Hens common in Teton Basin, along Henry Fork of Snake River, and at Henry Lake.

Zenaidura macroura. Mourning Dove.

Common everywhere until October; afterward rarely seen. Three nests containing two eggs each were found on the ground near Blackfoot about the middle of July.

Cathartes aura. Turkey Vulture.

Common along Snake River in July; three seen on Big Lost River, near Arco, July 25; common about the sink of Birch Creek during the early part of August; a few seen at the Lemhi Indian Agency, several in the Pahsimeroi and Challis Valleys, and others along Snake River, and thence south into Nevada.

Mr. Ridgway records this species from 'City of Rocks,' southern Idaho, October 3, 1868 (Bull. Essex Inst., vol. VII, 1875, p. 24).

Circus hudsonius. Marsh Hawk.

Common along the Lemhi and Birch Creek Valleys, and in the valleys of Little Lost, Pahsimeroi, Salmon, and Snake Rivers. An immature male shot in Lemhi Valley September 6 was more than half blue. Its stomach contained a Chipmunk (*Tamias minimus pictus*). Other stomachs examined contained remains of *Spermophilus townsendi* and *Neosorex*. One was seen at Saw Tooth Lake about October 1.

Capt. Charles E. Bendire found the eggs of this species near Fort Lapwai, June 15, 1871 (Proc. Bost. Soc. Nat. Hist., vol. XIX, 1877, p. 134).

Accipiter velox. Sharp-shinned Hawk.

Tolerably common in the wooded regions. A young male shot in the Salmon River Mountains, August 28, contained a Black-capped Warbler (*Sylvania pusilla pileolata*). One was seen as late as October 10 at Shoshone Falls on Snake River.

Accipiter cooperi. Cooper's Hawk.

A few seen in the mountains and in the valley of Birch Creek and the Lemhi. Captain Bendire states that he has found it breeding about Fort Lapwai, Idaho (Proc. Bost. Soc. Nat. Hist., XIX, 1877, 135).

Accipiter atricapillus. Goshawk.

Common in the Salmon River and Saw Tooth Mountains, where several were killed. One was caught at Saw Tooth Lake in a marten trap baited with a Richardson's Squirrel, and one was shot in Birch Creek Valley in the act of chasing chickens.

Buteo borealis calurus. Western Red-tail.

Common along Big Lost River below Arco the latter part of July. A number of empty nests were seen in the cottonwoods bordering the river, and young of the year were flying about. The stomach of one contained a *Spermophilus townsendi*. Rather rare elsewhere.

Buteo swainsoni. Swainson's Hawk.

Rather rare; one was killed 15 miles below Arco, July 22; a pair of old birds and a young just out of the nest were found on Birch Creek

during the early part of August; an adult was observed catching grasshoppers on a bluff near Fort Lemhi in September, and still another near the head of the Pahsimeroi.

In 1872 I found a nest of Swainson's Hawk near Fort Hall, July 9. It was in a scrub cedar, and contained one young bird and one egg.

Aquila chrysaetos. Golden Eagle.

Two or three Golden Eagles were observed at different times in the Salmon River Mountains and in Lemhi and Birch Creek Valleys.

Haliaeetus leucocephalus. Bald Eagle.

An adult White-headed Eagle was seen at Saw Tooth Lake, October 1, and another at Shoshone Falls on Snake River, October 10.

Falco mexicanus. Prairie Falcon.

Mr. Bailey found this species breeding in cliffs in the Blackfoot Mountains the early part of July, and shot one in the act of chasing a chicken in the lower part of Birch Creek August 7; its stomach contained a Horned Lark (*Otocoris*). A hawk supposed to be this species was seen in the upper part of the Pahsimeroi Valley, September 12. Several were seen on the lower part of Big Lost River about July 22.

In Birch Creek Valley they breed on lava cliffs, and were often seen chasing Teal up and down the creek.

Falco sparverius. Sparrow Hawk.

Common everywhere, feeding chiefly on grasshoppers. During the last week in July these hawks were observed feeding their young in the Lost River Mountains.

Pandion haliaetus carolinensis. Fish Hawk; Osprey.

Two or three Fish Hawks were seen flying south along the valley of Birch Creek the latter part of August; several were noticed on Salmon River between Challis and the mouth of the Pahsimeroi September 18-20; and the species was observed several times at Saw Tooth Lake the last week in September. There is a Fish Hawk's nest at Shoshone Falls on Snake River. It occupies the summit of a pinnacle of black basalt that rises from the water close to the top of the fall, on the south side. We were told that the nest was used the past season.

In 1872 I found a nest of this species on Henry Fork of Snake River, and Capt. Charles E. Bendire found a nest near Fort Lapwai in 1870 (Proc. Bost. Soc. Nat. Hist., XIX, 1877, 134).

Asio wilsonianus. Long-eared Owl.

Mr. Clark P. Streator killed a female Long-eared Owl as she flew from a cave in the lava beds west of Blackfoot, July 17.

In 1872 I shot a female on Devil Creek, June 28. Capt. Charles E. Bendire says that this owl at Fort Lapwai, Idaho, occupies old nests of Crows, and also breeds in hollow cottonwood trees (Proc. Bost. Soc. Nat. Hist., vol. XIX, 1877, p. 131).

Asio accipitrinus. Short-eared Owl.

Not observed by us. Capt. Charles E. Bendire says of the Short-eared Owl: "This species breeds about Fort Lapwai, Idaho, where I took two of their nests on May 1 and 6, 1871. Both were found in swampy places, and constructed of dry grasses and a few feathers" (Proc. Bost. Soc. Nat. Hist., vol. XIX, 1877, p. 131).

Megascops flammeolus idahoensis subsp. nov. Dwarf Screech Owl.

The only specimen procured of this new owl was shot on a mountain on the west side of Big Wood River, only a few miles north of Ketchum, September 22. It may be distinguished from the Flammulated Owl by the following description:

MEGASCOPS FLAMMEOLUS IDAHOENSIS subsp. nov.

(Plate I, colored.)

Type No. 119654 ♂ ad. U. S. National Museum (Department of Agriculture collection). From Ketchum, Idaho, September 22, 1890. Collected by C. Hart Merriam and Vernon Bailey.

Similar to *M. flammeolus*, but smaller and paler. Wing, 125 mm; tail, 62 mm (measured from insertion of middle feathers). The back is only slightly paler than in *flammeolus*; the under parts are very much paler, the ground color being white and the vermiculations distant; the black markings are everywhere restricted. The facial ring is bright tawny ochraceous, and spreads out above so as to completely encircle the eyes; the cheeks are ash-gray and the chin white. The dusky spots in the facial ring are inconspicuous; in true *flammeolus* they are strongly developed, sometimes forming a black ring which is merely tinged with tawny. The black spots on the sides are very much reduced in size, and seem to be arranged in a single row.

Bubo virginianus subarcticus. Western Horned Owl.

Capt. Charles E. Bendire tells me that he shot this subspecies in 1871 at Fort Lapwai, Idaho, where it breeds, and also at Fort Sherman, Cœur d'Alene Lake, in 1880.

Bubo virginianus saturatus. Dusky Horned Owl.

Common in the Salmon River and Saw Tooth Mountains. One was caught in a steel trap baited with ducks' heads and wings at Saw Tooth Lake, September 30. It could not have been very hungry when it got into the trap for its stomach contained two Pocket Gophers (*Thomomys*), one White-footed Mouse (*Hesperomys*), one Field Mouse or Vole (*Arvicola*), and a new species of *Phenacomys*.

Nyctea nyctea. Snowy Owl.

A mounted specimen of the Snowy Owl was seen at the post-office at Birch Creek, and another in a ranch near by. We were informed that they were killed there in winter.

The Hawk Owl (*Surnia ulula caparoch*) unquestionably breeds in northern Idaho. August 11, 1872, I shot one on Madison River, Montana, only a few miles from the Idaho boundary.

Speotyto cunicularia hypogæa. Burrowing Owl.

Rare. A few were seen near Blackfoot in July, sitting at the mouths of old badger holes; and one was killed at Big Butte, July 18. Its stomach contained insects and several small scorpions.

In 1872 I collected specimens of this owl in Malade Valley and Portneuf Cañon, and at Fort Hall. Capt. Charles E. Bendire states that they are abundant at Fort Lapwai, Idaho, where he obtained a number of their eggs. (Proc. Bost. Soc. Nat. Hist., vol. XIX, 1877, p. 132.)

Ceryle alcyon. Belted Kingfisher.

Common along Snake River and most of the streams visited, and also about some of the beaver ponds and the lakes at the east foot of the Saw Tooth Mountains.

Dryobates villosus hyloscopus. Cabanis's Woodpecker.

Tolerably common in the spruce and fir forests of the Salmon River and Saw Tooth Mountains, and in the upper part of Wood River Valley; a few were seen among the trees along Birch Creek.

Dryobates pubescens. Downy Woodpecker.

One seen in some burnt timber in the upper part of Wood River Valley.

Xenopicus albolarvatus. White-headed Woodpecker.

I am informed by the Rev. Leroy T. Weeks that this handsome woodpecker is a common breeder at Grangeville, near Mount Idaho, not far from the western border of Idaho. Captain Bendire has recorded the species as breeding in the pine forests of the Blue Mountains in eastern Oregon, a locality not far distant from Grangeville, Idaho.

Picoides arcticus. Arctic Three-toed Woodpecker.

A male was shot at Saw Tooth Lake, October 3, by Basil Hicks Dutcher.

Picoides americanus dorsalis. Alpine Three-toed Woodpecker.

One was shot and several others seen in the Salmon River Mountains.

Ceophlœus pileatus. Pileated Woodpecker.

Rare. A fine male Pileated Woodpecker was shot by Mr. Bailey in the Salmon River Mountains, near Birch Creek, August 19. No others were seen. Rev. Leroy T. Weeks writes me that the species occurs near Mount Idaho, but is rare.

Melanerpes torquatus. Lewis's Woodpecker.

Not observed during the present season. In 1872 I found it common on Henry Fork of Snake River about the middle of July and secured three specimens. J. K. Townsend found this species along Bear River in extreme southeastern Idaho in July, 1834 (Townsend's Narrative, 1839, p. 82). Capt. Charles E. Bendire tells me that it breeds commonly about Fort Lapwai, Idaho.

Colaptes cafer. Red-shafted Flicker.

A few were seen along Snake River, near Blackfoot, in July, and at Big Butte, several along the lower part of Big Lost River, and many in the Lost River Mountains. A few were seen afterward in the Salmon River and Saw Tooth Mountains, the latter as late as the first week in October. Several were seen in the lava cañon of Snake River, near Shoshone Falls, October 9-11.

Phalænoptilus nuttalli. Poor-will.

One was killed on the lava beds west of Blackfoot, July 17, by Mr. Basil Hicks Dutcher; and the species was heard in a cañon in the Lost River Mountains the last week in July. A single individual was seen in Birch Creek Valley early in August.

The first eggs of this species ever discovered were collected by me in the western foothills of the Wahsatch Mountains, June 12, 1872.

Chordeiles virginianus henryi. Western Nighthawk.

Tolerably common on the sage plains and valleys. Mr. Dutcher found a set of eggs near Blackfoot, July 14, and a downy young was taken at Arco, July 25.

Trochilus platycercus. Broad-tailed Hummingbird.

A female was killed at Big Butte, July 19.

Trochilus sp.

A large Hummer, showing much rufous in flying, was seen several times along the lower part of Big Lost River and in Lemhi and Birch Creek Valleys.

Tyrannus tyrannus. Kingbird.

Common in July along Snake River, near Blackfoot, along Cedar Creek in the Blackfoot Mountains, and along the lower part of Big Lost River. Common along Birch Creek about the middle of August (several seen August 21).

In 1872 Kingbirds were common at Fort Hall and along Snake River and Henry Fork. I found a nest containing nearly fledged young on Blackfoot River, July 12, and one containing three fresh eggs on Snake River two days later.

Tyrannus verticalis. Arkansas Kingbird.

One seen at Big Butte and several along Big Lost River in July.

In 1872 I found it common along Devil Creek, in southeastern Idaho, and secured two nests containing eggs June 28.

Capt. Charles E. Bendire says of this flycatcher:

"At Fort Lapwai, Idaho, this species was very familiar and tame, several pairs breeding about the buildings of the post. One pair placed its nest on the sill of one of the attic windows of my quarters" (Proc. Bost. Soc. Nat. Hist., vol. XIX, 1877, p. 127).

Sayornis saya. Say's Phoebe.

Common in the lower Lemhi Valley. Capt. Charles E. Bendire says of Say's Pewee:

"At Fort Lapwai, Idaho, I found several of their nests about the

buildings in the post, in fissures of rocks, and in old Cliff Swallows' nests. I have taken their eggs as early as April 17, 1871, containing then small embryos" (Proc. Bost. Soc. Nat. Hist., XIX, 1877, p. 127).

Contopus borealis. Olive-sided Flycatcher.

Not observed by our party. In 1872 I shot two Olive-sided Flycatchers in Teton Cañon, near the boundary between Idaho and Wyoming, July 27.

Contopus richardsoni. Western Wood Pewee.

Found in the Salmon River Mountains during the early part of August. Not seen after the middle of the month. This species was collected by me in Teton Cañon, in eastern Idaho, July 27, 1872.

Empidonax pusillus. Little Flycatcher.

One was killed along the lower part of Big Lost River in July, and two on Birch Creek in August (August 4, ♂; August 15, ♀). In 1872 I shot one of these flycatchers on Devil Creek, June 28.

Empidonax wrightii. Wright's Flycatcher.

One was killed on Birch Creek, August 4.

Otocoris alpestris arenicola. Desert Horned Lark.

Abundant throughout the sage plains and valleys. Adult males killed in July and August closely resemble the eastern subspecies, *praticola*, but the immature and spotted young are widely different, being very pale, while those of *praticola* are very dark.

Pica pica hudsonica. Magpie.

One of the most abundant and conspicuous birds of Idaho, occurring throughout the sage plains and valleys and extending up into the lower part of the Douglas fir zone. A dozen or more were often seen together and it was not unusual to count 20 or even 25 in sight at one time. Magpies were common at Saw Tooth Lake after snowfall in October, and undoubtedly winter in the neighborhood. Four were caught in our marten traps. They feed on carrion when other food is scarce, if not by preference. Half a dozen were seen perched on the body of a dead salmon in shallow water in Salmon River, near the mouth of the Pahsimeroi, September 18. They were hard at work tearing off and devouring the flesh. Several were seen in the cañon of Snake River at Shoshone Falls, October 9-11, and thence south to the East Humboldt River, Nevada, every day until October 17, when the expedition disbanded.

In 1872 I found Magpies common in Portneuf Cañon, at Pocatello, at Fort Hall, and on Snake River.

Cyanocitta stelleri annectens. Long-crested Jay.

Very rare. One was seen in the Salmon River Mountains, one near the Lemhi Indian Agency, one in the upper part of Wood River Valley, and three were seen and two secured near Saw Tooth Lake.

In 1872 I found this jay common in the Teton Basin, near the boundary line between Idaho and Wyoming.

Aphelocoma woodhousei. Woodhouse's Jay.

Not met with by our expedition. Recorded by Mr. Ridgway as abundant in cedar and piñon at 'City of Rocks,' in extreme southern Idaho, October 3, 1868 (Bull. Essex. Inst., vol. VII, No. 1, January, 1875, p. 24).

Perisoreus canadensis capitalis. Rocky Mountain Jay.

Tolerably common in the spruce and fir belt of the Salmon River Mountains, and also about the divide between Big Lost River and Trail Creek. Half a dozen were caught in marten traps in the Saw Tooth Mountains.

In July, 1872, I found this jay in numbers in Teton Cañon.

Corvus corax sinuatus. Raven.

Common along the lava cañon of Snake River, and seen occasionally on the Snake Plains and in Birch Creek Valley and the valleys of the Pahsimeroi and Salmon Rivers. Two were seen at Castle Rock, on the plains south of Snake River, and a number along the north base of the Brunneau and Elk Mountains near the boundary between Idaho and Nevada. A flock of about 40 Ravens was seen at Humboldt Wells, Nevada, October 17.

Mr. Ridgway found Ravens common at 'City of Rocks,' near the southern border of Idaho, October 3, 1868 (Bull. Essex. Inst., VII, 1875, p. 24).

Corvus americanus. Crow.

Common in Lemhi Valley, particularly at a point a few miles north of Junction, in August and early in September. A few were seen at Saw Tooth Lake the last week in September. Capt. Charles E. Bendire tells me that Crows breed commonly in the neighborhood of Fort Lapwai, Idaho.

Picicorvus columbianus. Clark's Nutcracker.

Common in the spruce belt on all the mountains visited. Several were caught in marten traps baited with meat. J. K. Townsend met with this species in the mountains near Bear River, in the southeastern corner of Idaho, in July, 1834. (Townsend's Narrative, 1839, p. 82.)

Cyanocephalus cyanocephalus. Piñon Jay.

Not found by our party. Mr. Ridgway records the Piñon Jay as abundant among cedar and piñon at 'City of Rocks' in extreme southern Idaho, October 3, 1868. (Bull. Essex Inst., vol. VII, No. 1, January 1875, p. 24.)

Dolichonyx oryzivorus albinucha. Western Bobolink,

One seen in an oat field in Lemhi Valley August 31. It was in fall plumage.

Molothrus ater. Cowbird.

A few seen on Big Lost River and Birch Creek, and one at Big Butte. Captain Bendire has found it breeding near the Palouse River in north-western Idaho.

Xanthocephalus xanthocephalus. Yellow-headed Blackbird.

A few Yellow-headed Blackbirds were observed near the sinks of Big Lost River late in July, and again September 10—on the latter date in flocks of Brewer's Blackbird.

In 1872 I found it breeding in Marsh Valley in southeastern Idaho, and secured a nest containing four nearly fresh eggs June 29. The nest was in a clump of rushes $1\frac{1}{2}$ meters (about 5 feet) above the water. It was composed of dry swamp grass without lining, and presented the same appearance inside as out. (Merriam, Hayden's Report for 1872, 1873, p. 686.)

Agelaius phoeniceus. Red-winged Blackbird.

Two were seen by Mr. Bailey July 12 on Cedar Creek in the foothills of the Blackfoot Mountains, and a few late in July on Big Lost River, above Arco.

Sturnella neglecta. Western Meadowlark.

Common throughout the sage plains and valleys, remaining in considerable numbers until after snowfall in October. Usually heard singing in the early morning.

Icterus bullocki. Bullock's Oriole.

A pair seen on Snake River, near Blackfoot, about the middle of July, and many in the trees bordering Big Lost River, both above and below Arco, the latter part of the same month.

In 1872 I found Bullock's Oriole breeding abundantly along Devil Creek in southeastern Idaho. Captain Bendire records it as an abundant breeder at Fort Lapwai, where he has seen "as many as five occupied nests on a single small birch tree." (Proc. Bost. Soc. Nat. Hist., Vol. XIX, 1877, p. 122.)

Scolecophagus cyanocephalus. Brewer's Blackbird.

Abundant everywhere along the streams and about ranches and mining camps. Immense flocks, some containing fully a thousand birds, were seen in Lemhi Valley early in September.

Brewer's Blackbird takes the place of the English Sparrow in the West, where it is almost invariably found in barnyards and towns, picking crumbs in the streets and dooryards with the utmost familiarity.

Coccothraustes vespertina montana Ridgway. Evening Grosbeak.

Capt. Charles E. Bendire informs me that he found Evening Grosbeaks about the lakes at the headwaters of the Payette River, in the mountains of central Idaho, in July, 1877. He saw the old birds carrying food up into the tall pines.

Pinicola enucleator. Pine Grosbeak.

Breeds in the Salmon River Mountains and doubtless in most of the other high mountains of Idaho. An immature bird was shot and another seen near Timber Creek, in the Salmon River Mountains, the last week in August; and a red male was shot and six others seen September 5, near Eight-Mile Cañon, in the same range.

Carpodacus cassinii. Cassin's Purple Finch.

One shot at timber line on the Salmon River Mountains August 29. It was in company with a small flock of *Leucostictes*. Others were seen near the same place.

Large flocks of a species of *Carpodacus* were seen feeding on seeds of wild sunflowers near the mouth of Little Lost River, September 10.

Leucosticte atrata. Black Leucosticte.

Common high up on the Salmon River Mountains. I shot two immature birds above timber line August 29, and saw several small flocks of young and adults at various times.

Spinus tristis. Goldfinch.

A few seen in July about the foothills of the Blackfoot Mountains. Common along Birch Creek about the middle of August.

In 1872 I found this species common at Fort Hall in October.

Spinus pinus. Pine Siskin.

A few were found in the Salmon River Mountains and at Saw Tooth Lake.

In 1872 I found Pine Siskins in numbers at First Cottonwood Creek, in Teton Basin, in July, and about Henry Lake early in August.

Rhynchophanes mccownii. McCown's Longspur.

An immature female was killed at the sink of Birch Creek August 6, by Mr. Bailey.

Passer domesticus. English Sparrow.

Mr. Clark P. Streater observed English Sparrows in the railroad town of Pocatello early in July. They undoubtedly followed the Utah Northern Railway from the valley of Great Salt Lake, where a large colony has been established for many years.

Pooecetes gramineus confinis. Western Vesper Sparrow.

Common in the sage brush along Snake River, in Birch Creek and Lemhi Valleys, and in the Pahsimeroi Valley; seen also in the valley at the head of Salmon River, near Saw Tooth or Alturas Lake, about the end of September.

Ammodramus sandwichensis alaudinus. Western Savanna Sparrow.

Probably breeds in Birch Creek Valley, where three were killed August 4 and August 15. A few were seen in Lemhi Valley late in August and in early September.

In 1872 I saw a flock of these sparrows, and shot one, on a small gravel island in Snake River, October 8.

Chondestes grammacus strigatus. Western Lark Sparrow.

Not common anywhere. A few were observed near the mouth of Little Lost River during the latter part of July, and again September 10.

Zonotrichia leucophrys. White-crowned Sparrow.

Rather common in the Pahsimeroi Mountains the middle of September; adults in full plumage were killed.

Zonotrichia intermedia. Intermediate Sparrow.

Common during fall migration. Dozens were shot at Saw Tooth or Alturas Lake for marten bait the last week in September and first few days of October. Many were seen in the lava cañon of Snake River at Shoshone Falls, October 9-11.

In 1872 I killed a specimen at Fort Hall, October 13.

Spizella socialis arizonæ. Western Chipping Sparrow.

Tolerably common about the foothills of the Salmon River Mountains. Shot one at the head of Saw Tooth Lake, October 2; it was in a small flock of Juncos and Zonotrichias.

In 1872 this species was found on Conant Creek and at Fort Hall, in July.

Spizella breweri. Brewer's Sparrow.

Common in the sage brush along the Snake Plains, and in Birch Creek and Lemhi Valleys.

In 1872 I found a nest of Brewer's Sparrow in a sage brush on Conant Creek, Idaho, July 21. It contained three nearly fresh eggs.

Junco hyemalis shufeldti. Rocky Mountain Junco.

Common in the mountains during migration; several seen in the cañon of Snake River near Shoshone Falls, October 9-11.

Junco annectens. Pink-sided Junco.

Spotted young were killed high up in the Salmon River Mountains about the middle of August, and adults in fall plumage were found low down in the Salmon River and Saw Tooth Mountains later in the season.

Amphispiza belli nevadensis. Sage Sparrow.

Breeds abundantly throughout the sage plains and in the valleys of Birch Creek and Lemhi River, and Big and Little Lost Rivers. It was particularly numerous along Snake River in October.

Melospiza lincolni. Lincoln's Sparrow.

One shot at an altitude of 2,960 meters (9,700 feet) in the Pahsimeroi Mountains, September 16, and one caught in a small trap set for field mice (*Arvicola*) in marsh grass near the head of Saw Tooth Lake, September 28.

Melospiza fasciata montana. Mountain Song Sparrow.

Common on Cedar Creek in the foothills of the Blackfoot Mountains, and a few seen along Snake River about the middle of July. Common in the willows along the streams in Lemhi and Birch Creek Valleys in August and early September; several seen and one shot in the lava cañon of Snake River at Shoshone Falls, October 9-11.

In 1872 I found this Song Sparrow breeding along Henry Fork of Snake River, and secured several specimens at Fort Hall, October 12-14.

Pipilo chlorurus. Green-tailed Towhee.

Found in the mountains north of Arco and common in the cañons of the Lost River Mountains.

In 1872 I found it breeding on Conant Creek, Henry Fork of Snake River, and in Teton Basin.

Habia melanocephala. Black-headed Grosbeak.

A few pairs were found breeding in the willows along Snake River near Blackfoot, and on the lower part of Big Lost River.

In 1872 I found it breeding along First Cottonwood Creek in Teton Basin, and took a nest there containing two fresh eggs, July 22. Captain Bendire reports it as breeding at Fort Lapwai, Idaho (Proc. Bost. Soc. Nat. Hist., XIX, 1877, 121).

Passerina amcena. Lazuli Bunting.

Not observed by our party during the present season. In 1872 I found it common in the undergrowth bordering some of the streams in Teton Basin in July. Capt. Charles E. Bendire states that "in the vicinity of Fort Lapwai, Idaho, it is one of the most common species breeding there" (Proc. Bost. Soc. Nat. Hist., XIX, 1877, 121).

Calamospiza melanocorys. Lark Bunting.

Half a dozen were seen in the sage plains west of Blackfoot, July 17, and three between Big Butte and Big Lost River, July 21.

Piranga ludoviciana. Louisiana Tanager.

Two were seen in the Lost River Mountains the last week in July.

In 1872 I shot a male on Middle Fork of Snake River, August 4, and found the species common in Teton Cañon in July.

Petrochelidon lunifrons. Cliff Swallow.

Found breeding on the basaltic walls of the cañon of Blackfoot River about the middle of July. Also nests on the lava cliffs about 16 kilometers (10 miles) south of Nicholia, in Birch Creek Valley, and was observed at several other places before the middle of August.

In July, 1872, I found this species in numbers at Fort Hall, and secured a nest containing two fresh eggs on Ross Fork, July 3. The nest was made of mud, and was fastened to the bank of the stream 2½ meters (about 8 feet) above the water.

Chelidon erythrogaster. Barn Swallow.

Mr. Bailey saw one near the foot of the Blackfoot Mountains July 12, and found a pair breeding at the ranch at Big Butte. A few were seen nearly every day in August in Birch Creek and Lemhi Valleys. They breed at Scott's ranch, near Nicholia, and at the Lemhi Indian Agency.

During the early part of July, 1872, I found Barn Swallows in numbers at Fort Hall.

Tachycineta thalassina. Violet-green Swallow.

Abundant along Snake River and Big Lost River in July. Common in Birch Creek Valley until the middle of August; a few seen afterward.

Clivicola riparia. Bank Swallow.

Not noted by our party. In July, 1872, I found a colony of Bank Swallows breeding on Henry Fork of Snake River.

Ampelis garrulus. Bohemian Waxwing.

Mr. Dwight J. Kenney, of Fort Lemhi, Idaho, states that the Bohemian Waxwing is common in winter in Lemhi Valley, and reminded me

of the circumstance that he sent me a specimen for identification several years ago, which fact I well remember.

Ampelis cedrorum. Cedar Waxwing.

Capt. Charles E. Bendire tells me that in 1871 he found the Cedar Waxwing breeding commonly about Fort Lapwai, Idaho, where he collected two of their nests June 19, and another June 26.

Lanius borealis. Northern Shrike.

The Great Northern Shrike was first seen October 16 near Mary River, in northern Nevada. Three individuals were observed on this day, and another near Humboldt Wells the day following. The latter was in pursuit of a small bird.

October 12, 1872, I shot a Shrike of this species at Fort Hall, the only one seen during the season.

Lanius ludovicianus excubitorides. White-rumped Shrike.

Rather common along Snake River, near Blackfoot, in July; a few seen near Big Butte, along Big Lost River, and at the actual sink of Birch Creek. Rare elsewhere. One seen near Eagle Rock, August 21; one in Little Lost River Valley September 11, and another in the Pahsimeroi Valley September 17.

October 13, 1872, I shot a White-rumped Shrike at Fort Hall.

Vireo gilvus swainsoni. Western Warbling Vireo.

Common in the Lost River Mountains the last week of July, at which time the young were just out of the nest. Two were killed near the lower edge of the Douglas fir zone in the Salmon River Mountains in August.

Vireo solitarius cassini. Cassin's Vireo.

Capt. Charles E. Bendire informs me that he found Cassin's Vireo breeding at Fort Lapwai, Idaho, in June, 1871.

Helminthophila celata. Orange-crowned Warbler.

Mr. Clark P. Streater killed one in the Salmon River Mountains, August 22, and I think I saw several others near the same place.

Dendroica æstiva. Yellow Warbler.

Common along Snake River near Blackfoot, and along Big Lost River in July; and in willows along Birch Creek and Lemhi River in August.

Dendroica auduboni. Audubon's Warbler.

Breeds abundantly throughout the Salmon River and Saw Tooth Mountains, coming down into the valleys in September. Two were seen in the cañon of Snake River near Shoshone Falls, October 9-11.

Geothlypis macgillivrayi. Macgillivray's Warbler.

Common and breeding in the Lost River Mountains in July; and common in Birch Creek Valley about the middle of August.

Geothlypis trichas occidentalis. Western Yellowthroat.

Captain Bendire informs me that the Western Yellowthroat breeds at Fort Lapwai, Idaho, where he took a nest with 4 eggs June 18, and one with 5 eggs June 23, 1871.

Icteria virens longicauda. Long-tailed Chat.

Common in cañon of Cedar Creek in the foothills of the Blackfoot Mountains about the middle of July, and called Mockingbird by the ranchmen (Bailey).

In 1872 I shot a male on Devil's Creek, June 28. Capt. Charles E. Bendire informs me that the Long-tailed Chat breeds commonly in the neighborhood of Fort Lapwai, Idaho.

Sylvania pusilla pileolata. Pileolated Warbler.

Abundant in the willows along Birch Creek and Lemhi Valley, and in the undergrowth in the mountains during the latter part of August.

Anthus pensilvanicus. Titlark; Pipit.

Breeds on the Salmon River Mountains and doubtless also on the other high mountains of Idaho. During the latter half of September and early October it was the most abundant species on the sage plains, on many days outnumbering all other species together.

Cinclus mexicanus. Dipper; Water Ouzel.

Found on many of the mountain streams in the Pahsimeroi and Saw Tooth Mountains, and seen also in the lava cañon of Snake River in October. Several were seen on Trail Creek and on Wood River—one within $1\frac{1}{2}$ kilometers (about a mile) of the town of Ketchum. The species was not observed by our party in the Salmon River Mountains, though it was said to occur there and to winter along Birch Creek and the Lemhi River. It was common on the west Fork of the Pahsimeroi, where I found a beautiful nest in a niche in the face of a rock cliff at the side of a series of cascades. The nest was a sub globular mass of moss with the entrance fronting the stream, and could not be reached from any direction. While lunching on Trail Creek one day during the latter part of September, an Ouzel was observed wading and diving in the rapids. I dipped a cupful of water and tossed it in the air; as it fell splashing on the stream he immediately flew to the spot and seemed disappointed that the commotion was so soon over. At Saw Tooth Lake an Ouzel surprised us by running around the head of the lake on the sand beach.

Oroscoptes montanus. Sage Thrasher.

Common throughout the sage-covered plains and valleys. Killed as far north as Junction, in Lemhi Valley, and as late as September 7 in Birch Creek Valley.

Galeoscoptes carolinensis. Catbird.

A few were seen along Snake River near Blackfoot, and in Cedar Creek Cañon in the foothills of the Blackfoot Mountains, during the early part of July (and two specimens were preserved). One was seen on Big Lost River about 24 kilometers (15 miles) below Arco the latter part of July.

Salpinctes obsoletus. Rock Wren.

Common on the rocky summits of most of the mountains visited, and occurring lower down wherever suitable rocky places were found. Seen in Snake River Cañon in October.

Catherpes mexicanus conspersus. Cañon Wren.

Observed in the lava cañon of Snake River, near Shoshone Falls, early in October.

Troglodytes aëdon aztecus. Western House Wren.

A nest containing full grown young was found in the bridge over Snake River at Blackfoot about July 10. Specimens were obtained also on Big Lost River.

In July, 1872, I found this species common on Henry Fork of Snake River, and on Middle Fork, and found its nest in the latter locality July 20. "It was in the hollow of a small tree that had broken off about 3 meters (10 feet) high and still rested against its stump. The nest contained five young birds." (Merriam, Sixth Annual Report, Hayden Survey, 1873, 673-674.)

Troglodytes hiemalis. Winter Wren.

One seen in the Saw Tooth Mountains, October 1.

Cistothorus palustris. Long-billed Marsh Wren.

Common in a patch of cat-tails in the cañon of Snake River at Shoshone Falls early in October; not seen elsewhere.

October 14, 1872, I shot one of these wrens and saw several others in a small marsh near Fort Hall.

Certhia familiaris montana. Rocky Mountain Creeper.

One shot and several others seen at Saw Tooth Lake.

Sitta carolinensis aculeata. Slender-billed Nuthatch.

One shot at Saw Tooth Lake, and a few seen in the Salmon River and Lost River Mountains.

Sitta canadensis. Red-breasted Nuthatch.

One shot and two others seen in the Salmon River Mountains near Junction.

Parus atricapillus septentrionalis. Long-tailed Chickadee.

Common among the willows bordering the small streams in Lemhi and Birch Creek Valleys. Captain Bendire tells me that this Chickadee breeds commonly about Fort Lapwai, Idaho.

Parus gambeli. Mountain Chickadee.

Abundant in the Salmon River and Saw Tooth Mountains.

Regulus satrapa. Golden-crowned Kinglet.

An adult male was shot and others seen in the Salmon River Mountains in August. Common among the willows along the lower part of the coniferous forest belt of the Salmon River Mountains in Lemhi and Birch Creek Valleys during the early part of September; and a few were seen in the Pahsimeroi Mountains the middle of September, and several in the Saw Tooth Mountains about the 1st of October.

Regulus calendula. Ruby-crowned Kinglet.

Common in the Pahsimeroi and Salmon River Mountains during fall migration. Probably breeds. A few were seen in the Saw Tooth Mountains about October 1, and a few in the cañon of Snake River, near Shoshone Falls, October 9 to 11.

Myadestes townsendii. Townsend's Solitaire.

Common in the Pahsimeroi Mountains September 12 to 16, where at least a dozen were seen in one day. One was seen in the lava cañon of Snake River near Shoshone Falls October 10.

Turdus ustulatus swainsonii. Olive-backed Thrush.

Not noted by our party. In 1872 I found a nest containing two fresh eggs of this species in Teton Basin, July 21.

Turdus aonalaschkæ auduboni. Audubon's Hermit Thrush.

Not found common anywhere. A few were seen in the spruce forests of the Salmon River Mountains in August, and one in the lava cañon of Snake River October 9.

Merula migratoria propinqua. Western Robin.

Tolerably common in July along Snake River, near Blackfoot, in the Lost River Mountains, and on Big Lost River. In August and September a few were seen from time to time in Lemhi and Birch Creek Valleys and in the upper part of Wood River Valley, but it was nowhere common. A flock remained for several days about the head of Saw Tooth or Alturas Lake the last week of September.

Sialia arctica. Mountain Bluebird.

Common along the lower edge of the Douglas fir zone and in scattered cottonwoods along the Salmon River, Lost River, Pahsimeroi, and Saw Tooth Mountains, and in the Lemhi and Birch Creek Valleys. A few were seen in the Snake River cañon at Shoshone Falls, October 9-11. Mr. Bailey saw a flock of 10 at Big Butte about the middle of July, and a few along Big Lost River the latter part of the month. Young were seen with their parents in Birch Creek Valley August 6.

ANNOTATED LIST OF REPTILES AND BATRACHIANS COLLECTED BY
DR. C. HART MERRIAM AND PARTY IN IDAHO, 1890.

By LEONHARD STEJNEGER.

A.—REPTILIA.

Sceloporus graciosus B. & G.

Two typical males from Blackfoot and Big Lost River and one identical with these in every respect from the Lemhi Indian Agency were collected.

This species, easily recognizable by its slender form and the smallness of its scales, is characteristic of the region in question.

The material at hand is not sufficient to settle beyond a doubt the question whether *S. graciosus* and *gracilis* are absolutely identical.

The specimens collected are all males. In No. 310 there is hardly a trace of blue on the throat, while in No. 314 the whole under side of the head is evenly marbled with pale blue; No. 328 is intermediate both in the extent and in the intensity of the blue color.

List of specimens.

U. S. National Museum No.	Collector and No.	Sex.	Locality.	Date.	Total length.	Length of head.	Length of tail.	Scales in head length.	Remarks.
16768	B. & D., 310.	♂	Blackfoot, Idaho	July 16, 1890	130	11	76	13	
16769	D., 314.....	♂	Big Lost River, Idaho	July 21, 1890	122	11	74	13	
16770	B. & D., 328.	♂	Lemhi Indian Agency, Idaho.	Sept. 3, 1890	102	10	66	13	"5,400 feet."

Phrynosoma douglasii (Bell).

As might be expected, the Horned-toads belong to the typical form, that is, the northwestern race which has been called *Ph. pygmaea* (see N. Am. Fauna, No. 3, p. 112). The larger of these specimens collected are no pigmies, as the dimensions below show, although not reaching the size of *Ph. ornatissimum*, their nearest ally. They are all of the characteristic gray pepper-and-salt color usually found in the typical form.

List of specimens.

U. S. National Museum No.	Collector and No.	Sex.	Locality.	Date.	Total length.	Length of head.	Length of tail.	Width of head.	Remarks.
16771	B. & D., 309	♀	Blackfoot, Idaho	July 13, 1890	97	17	29	19	On black lava sand.
16772	B. & D., 312	♀	Big Butte, Idaho.....	July 19, 1890	96	17	30	20	On black lava rock.
16773	B. & D., 313	♀	.....do.....	.....do.....	72	14	20	16	On sand in valley.
16774	B. & D., 319	♀	Big Lost River, Idaho...	July 21, 1890	71	14	23	16	On sand.
16775	B. & D., 320	♀	.....do.....	.....do.....	73	15	22	17	On lava rock.

Pituophis catenifer (Blainv.).

The two Bull-snakes collected are provisionally enumerated under the above name, as the status of the various forms has not yet been definitely settled. Unfortunately, our large series of these snakes is inaccessible to me at the present writing. I can, therefore, only remark that these two specimens have a remarkably short cranium and that the dorsal blotches average 55 in front of the anus; all the scale keels of the light spaces are blackish. (U. S. Nat. Mus. No. 16776; Bailey and Dutcher, No. 316, Big Butte, Idaho, July 18, 1890; No. 16777; Bailey, No. 315 Arco, Idaho, July 25, 1890.)

Bascanion vetustus B. & G.

A single specimen was collected at Big Butte, Idaho, July 19, 1890. Seven upper labials, fourth and fifth in contact with lower postorbital. (U. S. Nat. Mus. No. 16778; B. & D. No. 318.)

Eutania vagrans B. & G.

The seven Garter-snakes collected all belong to this widely distributed species and are comparatively uniform both in scale formula and coloration. Nos. 322 and 325 have a somewhat darker ground color above, but No. 334 is scarcely lighter and has, moreover, the whole upper surface of the head nearly black.

List of specimens.

U. S. National Museum No.	Collector and No.	Locality.	Date.	Scale rows.	Supra labials.	Remarks.
16779	M. & B., 322.	Salmon River Mountains, Idaho	Aug. 20, 1890	21	8	"8,000 feet."
16780	M. & B., 325.	.....do.....	Aug. 22, 1890	21	8	Do. "
16781	B. & D., 321	Birch Creek, Idaho	Aug. 4, 1890	21	7-8	
16782	B. & D., 329.	.....do.....	Sept. 8, 1890	21	8	"5,800 feet."
16783	B. & D., 333.	Challis Valley, Idaho	Sept. 18, 1890	21	8	"5,300 feet; caught in brook."
16784	B. & D., 332.	.. do	Sept. 20, 1890	21	8	
16785	B. & D., 334.	Trail Creek, Idaho.....	Sept. 22, 1890	21	8.	

Crotalus lucifer B. & G.

This Rattlesnake, which is characteristic of northern California and Nevada, Oregon and Washington, is represented by four specimens obtained in the desert, two at Big Butte and two at Little Lost River.

These specimens are in every way typical and can not be mistaken for the following species, of which a specimen was secured at Lemhi Indian Agency, the more rounded outline of the head and the numerous granules between and adjoining the superciliary scales being quite characteristic.

The specimens are all young, except No. 311, which has quite a respectable size for this species, the head being about 40^{mm} long (only head and forepart of body preserved).

List of specimens.

U. S. National Museum No.	Collector and No.	Locality.	Date.	Remarks.
16786	B. & D., 311, 338..	Big Butte, Idaho.....	July 19, 1890	Anterior half and rat- tle only.
16787	B. & D., 317.....	.....do	July 18, 1890
16788	B. & D., 330.....	Little Lost River, Idaho	Sept. 9, 1890	
16789	B. & D., 331.....	Little Lost River (mouth of), Idaho.....do .....	.....do

Crotalus confluentus Say.

The occurrence of a typical example of this species in Idaho is highly interesting, and it is quite suggestive that it was obtained in Lemhi Valley near the Indian agency, between which locality and Montana, where *C. confluentus* is the characteristic species, there is only a low divide, as Dr. Merriam informs me, over which the range of the species may be continuous, while to the south there is a divide separating it from the range of *C. confluentus*.

The present specimen belongs to the typical group of the species, the original of which came from the plains of northeastern Colorado near the Arkansas River. I have compared numerous specimens from Montana and Nebraska, as well as the Idaho specimen here referred to, with individuals from the type locality and find them to be in every way identical, and entitled to the name bestowed upon the species by Say. (U. S. Nat. Mus. No. 16791; Bailey and Dutcher coll., No. 327; Lemhi Indian Agency, Idaho, 5,400 feet altitude; September 3, 1890.)

B.—BATRACHIA.

?? **Ambystoma** * *epixanthum* Cope.

I refer a young specimen (No. 337) collected by Dr. Merriam and Mr. Bailey a little above Saw Tooth Lake on October 1 to this species with

*The generic name should be written as above, not *Amblystoma*. The latter is a late and very doubtful emendation by Agassiz; and *Amblystomus* as the name of a

considerable hesitation, as I have had no opportunity to examine the unique type specimen. It differs considerably both in coloration and proportions, but these differences may possibly be attributable to the youth of the specimen, or to individual variation. The vomero-palatine teeth can not be made out clearly, but they seem to form one uninterrupted series on each side with the anterior ends well forward, in fact, anterior to the line through the choanæ, or exactly as in the figure of *A. epixanthum* (Cope, *Batr. N. Am.*, p. 98). The head is comparatively broader than in *A. macrodactylum*, and so is the interorbital space, both characters which, according to Cope, separate *A. macrodactylum* and *epixanthum*.

The tongue of the present specimen is remarkably small, a feature which has caused me more doubt than any other and which has tempted me to describe it as a new species, as Professor Cope in the diagnosis of his *A. epixanthum* expressly says "tongue large." But if the figure which he presents (*op. cit.*, p. 98) is only approximately correct, the tongue of the latter species is certainly much smaller than in *A. macrodactylum*, which is correctly figured on page 96.

From the measurements given below it will be seen that the tail is considerably shorter in the present specimen than in either *A. macrodactylum* or *epixanthum*, but by measuring a full-grown and a smaller *A. macrodactylum* I find that the latter has the tail shorter in about the same proportions as between Cope's measurements and my own.

The color of the present species is dull and apparently more like *A. macrodactylum*, but it remains yet to be seen how constant and diagnostic is the bright coloring attributed to *A. epixanthum*.

It may not be out of place to remark that the type of the latter species was collected on the south side of the Saw Tooth Mountains, and the present specimen on the northern slope of the same mountains.

The dimensions in millimeters are as follows: Total length, 52; length to axilla, 14; to groin, 30; to gular fold, 10; width of head, 7; of tongue, 3; length of anterior limb, 11; of anterior foot, 3.5; of posterior limb, 12; of posterior foot, 4.5. (U. S. Nat. Mus. No. 16792.)

Rana pretiosa B. & G.

Five specimens from Saw Tooth Lake, the Lemhi Indian Agency, and the Salmon River Mountains. The specimens are typical and the localities within the known range of the species.

coleopterous insect, moreover, antedates *Ambystoma*, which invalidates the use of the emended form according to the A. O. U. code of nomenclature. In Tschudi's original paper, which was edited by Agassiz, *Ambystoma* occurs four times, but it was not until several years later that the latter offered the amended spelling (cautiously adding a "?," however), as there is apparently no good derivation of Tschudi's word. But in this respect it is no worse than many other generic names both of ancient and modern times.

List of specimens.

U. S. National Museum No.	Collector and No.	Locality.	Altitude.	Date.
16793	Merriam & Bailey, 323.	Salmon River Mountains, Idaho.....	8,000 ft.	Aug. 20, 1890
16794	Bailey & Dutcher, 324..	.....do		Do.
16795	Bailey & Dutcher, 326..	Lemhi Indian Agency, Idaho	5,400 ft.	Sept. 3, 1890
16796	Bailey & Dutcher, 335..	Saw Tooth Lake, Idaho	7,200 ft.	Sept. 28, 1890
16797	Bailey & Dutcher, 336..	.....do		Do.

26789—No. 5—8

DESCRIPTION OF A NEW GENUS AND SPECIES OF DWARF KANGAROO
RAT FROM NEVADA (MICRODIPODOPS MEGACEPHALUS).

By Dr. C. HART MERRIAM.

One of the most remarkable of the many new and interesting mammals that have been discovered in North America during the past few years is the subject of the present article. In external appearance it looks like a heavy, thickset pocket mouse of the *Perognathus olivaceus* type, with a hydrocephalic head and abnormally large, furry hind feet. Its skull, on the other hand, does not suggest *Perognathus* at all, but resembles the skull of *Dipodops*, and has the tympanic and mastoid regions inflated to a degree surpassing even the extreme condition presented by *Dipodomys deserti*, which species exhibits the maximum of inflation heretofore known among mammals. It lacks the large cylindrical, crested-penicillate, four-striped tail of *Dipodomys* and *Dipodops*. In short, *Microdipodops* may be described as a *Perognathus* of the *olivaceus* type, with the skull of a *Dipodops*; but it is not simply intermediate between these two genera, for the skull surpasses that of *Dipodops* in the chief peculiarity by which the latter differs from *Perognathus*.

Six specimens of this remarkable rodent were collected in Nevada by Mr. Bailey in October and November, 1890. The precise localities are Halleck and Reese River.

MICRODIPODOPS gen. nov.

Similar to *Dipodops*, but with tympano-mastoid inflation carried to a still greater extreme. Shelf of palate produced posteriorly to foramen ovale, as in *Perognathus*, instead of ending at plane of last molars with a deep fossa on each side, as in *Dipodomys* and *Dipodops*. Lateral borders of parietals excavated to receive the deeply notched squamosals, each of which appears on the upper surface of the skull in the form of a narrow strip of bone bent in the shape of a V. Zygomatic process of maxillary as in *Perognathus*—not expanded in front of orbit as in *Dipodomys* and *Dipodops*.

The mandible lacks the post-molar pit of *Dipodomys* and *Dipodops*; the angular process is truncated and thickened instead of ending in a

sharp point, and is much shorter than in *Perognathus*, *Dipodomys*, or *Dipodops*.

The enormously inflated mastoids nearly meet along the median line, leaving a narrow spicule of bone between them, and project posteriorly much further than in *Dipodomys* or *Dipodops*. The length of the tympano-mastoid inflation in the type specimen is more than 80 per cent. of the basilar length of the skull, and the breadth across the inflated mastoids is much greater than the basilar length (115 per cent.). This great development of the mastoids takes place at the expense of the supraoccipital, interparietal, and parietals, which are very much reduced.

Viewed from below, the audital bullæ meet in a symphysis, and the tympanic capsules project anteriorly far beyond the plane of this symphysis and beyond the plane of the fronto-parietal suture, extending along the outer side of the malar bone half way to the end of the zygomatic process of the maxillary. The molars are rootless, as in *Dipodomys* and *Dipodops*. The upper premolar has an anterior prism, as in *Perognathus*. The tail is simple, as in *Perognathus*; not greatly elongated, as in *Dipodomys* and *Dipodops*, and lacks the four longitudinal stripes always present in the latter genera. There is no trace of the conspicuous white band which crosses the thighs to the base of the tail in every species of *Dipodomys* and *Dipodops*.

MICRODIPODOPS MEGACEPHALUS gen. et sp. nov.

Type No. $\frac{2}{3} \frac{1}{4} \frac{1}{2} \frac{1}{7}$. ♂. ad. U. S. National Museum (Department of Agriculture collection). From Halleck, Nevada, October 23, 1890. Collected by Vernon Bailey. (Original number, 2005.)

Measurements (from dry skin).—Total length, about 150; tail vertebrae, about 80; hind foot, 24; ear from crown, 6; from anterior base, 9.

General characters.—Size very much smaller than the smallest known species of *Dipodomys* or *Dipodops*, and only a trifle larger than *Perognathus olivaceus*. Tail not crested-penicillate as in *Dipodomys*, *Dipodops*, and *Chaetodipus*, but simple, as in *Perognathus* proper. The tail is bicolor, as in *Perognathus*, lacking the four stripes of *Dipodomys* and *Dipodops*. Its length only slightly exceeds that of the head and body. The ears are completely covered with soft fur. The hind feet are long and densely furred on both sides to the very tips of the toes. The hallux without the claw reaches the metatarso-phalangeal articulation of the other toes. The fur of the back and sides is long, soft, and silky, as in *Hesperomys eremicus*.

Color.—Upper parts yellowish brown or clay color, finely mixed with black-tipped hairs and slightly tinged with olive; sides from nose to thighs suffused with pale ochraceous. Under parts white; the fur plumbeous at base and washed with pale ochraceous, except on throat and breast, which are white throughout. Feet soiled white, tinged with buffy. Tail bicolor; upper part like back, except terminal third,

which is blackish; under side pale buffy ochraceous. There is a blackish crescent on each side of the face at base of whiskers, and a buffy patch behind each ear involving the lower base of the ear.

Cranial characters.—The cranial and dental characters have been given so fully in the description of the genus that it is unnecessary to repeat them here. The skull is much arched, both antero-posteriorly and laterally. The basioccipital is wedge-shaped, and is not cut away or emarginate on the sides.

DESCRIPTION OF A NEW EVOTOMYS FROM THE BLACK HILLS OF
SOUTH DAKOTA.

By Dr. C. HART MERRIAM.

Two specimens of a Red-backed Mouse were collected in the Black Hills, South Dakota, in July, 1888, by Vernon Bailey. One was caught under a log in a thicket; the other by a log in the pine timber on top of the mountain. Both are adult males and differ from *E. gapperi* in having much shorter tails (in this respect resembling *E. dawsoni** from the sources of the Liard River, N. W. T.), and in other particulars pointed out below.

EVOTOMYS GAPPERI BREVICAUDUS subsp. nov.

Type No. $\frac{4597}{1142}$ ♂ ad. Merriam Collection. From Custer, Black Hills, South Dakota, July 21, 1888. Collected by Vernon Bailey. (Original number 111.)

Measurements (taken in flesh).—Total length, 125; tail vertebræ, 31; hairs, 4; hind foot, 19. Ear from crown, 8.5; from notch, 10.5 (in dry skin). Another specimen taken at the same locality July 18, 1888 (No. $\frac{4596}{1141}$ ♂ ad.), measures: Total length, 130; tail vertebræ, 32; hairs, 3; hind foot, 20. Ear from crown, 9; from notch, 12.

General characters.—Similar to *E. gapperi*, but with larger ears and shorter tail. The hazel of the dorsal area is not so bright as in *gapperi*; the sides are the same golden brown.

Color.—Dorsal area dull hazel, lined with black-tipped hairs; rest of upper parts pale bister strongly suffused with ochraceous buff on the sides; face between the eyes and nose heavily lined with black-tipped hairs; under parts white, the plumbeous basal part of the fur hardly showing through; tail bicolor, above like the back except the tip, which is dusky; below gray.

Cranial and Dental characters.—Much as in *E. gapperi*.

* *Evotomys dawsoni* Merriam, Am. Nat., July, 1888, 649-651.

INDEX.

- Abies subalpina*, 11, 14, 17, 21, 22, 23, 25, 26, 27, 48.
Accipiter atricapillus, 11, 18, 19, 23, 94.
 cooperi, 94.
 velox, 19, 94.
Acipenser transmontanus, 8.
 Acknowledgments, 3-4.
Actinella grandiflora, 10, 22.
Actitis macularia, 92.
Ægialitis vocifera, 92.
Agelaius phœniceus, 101.
Agrostis varians, 22.
Alce americanus, 4, 12, 24, 32, 79-80.
Amblystomus, 111.
Ambystoma epixanthum, 111-112.
 macroductylum, 112.
Amelanchier alnifolia, 18.
Ammodramus sandwichensis claudinus, 102.
Ampelis cedrorum, 105.
 garrulus, 104.
Amphispiza belli nevadensis, 7, 9, 25, 103.
Anas americana, 19, 90.
 boschas, 19, 82, 89-90.
 carolinensis, 13, 90.
 cyanoptera, 90.
 discors, 19, 90.
 obscura, 90.
 strepera, 90.
Anemone baldensis, 10, 22.
Anisonyx brachiura, 39.
Antelope, 7, 14, 32, 80.
 Antelope Valley, description of, 15.
Anthus pensilvanicus, 10, 11, 15, 17, 20, 22, 106.
Antilocapra americana, 7, 14, 32, 80.
Aphelocoma woodhousei, 100.
Aplopappus lyellii, 11, 22.
 suffruticosus, 11, 22.
Aquila chrysaetos, 95.
Arctomys brachyura, 39.
 columbianus, 39, 40, 41.
 sp. ?, 10, 14, 18, 22, 31, 36.
 (*Spermophilus*) *parryi*, 39.
 erythrogluteia, 40.
Arctostaphylos uva-ursi, 11, 23, 93.
Ardea herodias, 15, 91.
Arenaria biflora carnulosa, 11, 22.
 congesta subcongesta, 11, 22.
Arvicola, Big-footed, 59-61.
 Cantankerous, 18, 24, 32, 61-62.
 Common, 24, 32, 58-59.
 Dwarf, 62-63.
Arvicola (genus), 31.
Arvicola alleni, 14, 59, 60.
 curtatus, 64.
 longicaudus, 61, 62.
 macropus, 14, 22, 24, 32, 59-61, 62.
 mordax, 18, 24, 32, 61-62.
 nanus, 14, 24, 32, 62-63.
 pallidus, 65.
 pauperrimus, 24, 32, 64-65.
 riparius, 24, 32, 58-59.
 townsendi, 60.
Artemisia pedatifida, 7.
 tridentata, 7, 9, 13, 15, 24, 46, 76.
 trifida, 7, 9, 12, 24.
Asio accipitrinus, 96.
 wilsonianus, 95.
 Aspen, 11, 13, 14, 16, 21, 23, 25, 27.
Astacus gambellii, 6, 86.
Aster kingii, 22.
Aster, Purple, 73.
Astragalus kentrophyta, 11, 23.
Atriplex canescens, 25.
 confertifolia, 7, 9, 13, 15, 25.
 nuttalli, 7, 25.
 Avocet, 91.
Aythya americana, 19, 90.
 Badger, 7, 13, 18, 32, 75, 76, 85.
 Baldpate, 19, 90.
Bascanion vetustum, 8, 110.
 Bat, California, 31, 36.
Batrachia, species collected, 111-113.
 Bear, Black, 24, 32, 87.
 Cinnamon, 87.
 Grizzly, 24, 32, 86-87
 Beaver, 14, 18, 31, 52.
Betula occidentalis, 25.
 Big Lost River Valley, Description of, 15-16.
Bigelovia douglassii, 25.
 graveolens, 9, 24.
 latifolia, 25.
 stenophylla, 25.
 tortifolia, 25.
 Bighorn (see Mountain Sheep).
 Birch Creek, Description of, 8-9.
 Birch, Western, 25.
 Birds of Idaho, 89-108.
 Birds of Saw Tooth Mountains, 19-20.
Bison americanus, 81.
 bison, 4, 14, 20, 32, 81.
 Blackbird, Brewer's, 13, 101.
 Red-winged, 101.
 Yellow-headed, 101.

- Bluebird, Mountain, 12, 20, 23, 108.
 Bobolink, Western, 100.
 Bob-white, 92-93.
 Bonasa unbellus togata, 12, 23, 93.
 Bos americanus, 81.
 bison, 81.
 Bovidae, 31.
 Branta canadensis, 90.
 Branneau Mountains, Description of, 21.
 Bryanthus taxifolius, 10, 22, 65.
 Bubo virginianus saturatus, 12, 18, 19, 23, 96.
 subarcticus, 96.
 Buffalo, 4, 14, 28, 32, 81.
 Bullfinch, Pine, 11, 101.
 Bull-snake, 8, 110.
 Bunting, Lark, 104.
 Lazuli, 104.
 Buteo borealis calurus, 94.
 swainsoni, 94-95.
 Buzzard, Turkey, 4, 5, 15, 94.
 Buzzards, 4.
 Cactus, 25.
 Calamospiza melanocorys, 104.
 Calochortus gunnisoni, 11, 23.
 nitidus, 11, 23.
 Canidae, 31.
 Canis latrans, 7, 13, 32, 76, 82.
 nubilus, 32, 82.
 Carex festiva, 22.
 Cariacus macrotis, 7, 12, 14, 18, 24, 32, 80.
 virginianus macrourus, 32, 80.
 Caribou, Woodland, 32, 80.
 Carpodacus cassini, 102.
 Castor canadensis, 14, 18, 31, 52.
 Castoridae, 31.
 Catbird, 106.
 Cathartes aura, 4, 5, 15, 94.
 Catherpes mexicanus conspersus, 7, 107.
 Ceanothus velutinus, 21.
 Centrocreus urophasianus, 7, 13, 17, 24, 93.
 Ceophloeus pileatus, 97.
 Cercocarpus ledifolius, 14, 21, 24.
 Certhia familiaris montana, 20, 107.
 Cervidae, 31.
 Cervus canadensis, 4, 5, 14, 18, 21, 32, 80.
 Ceryle alcyon, 13, 15, 19, 97.
 Chaenactis douglassi alpina, 11, 22.
 Chaetodipus and Microdipodops compared, 116.
 Challis Valley, Description of, 15.
 Chat, Long-tailed, 106.
 Check-list of Mammals, 31-32.
 Chelidon erythrogaster, 104.
 Chickadee, Long-tailed, 9, 107.
 Mountain, 12, 20, 23, 107.
 Chilotus, 65.
 Chipmunk, Great Basin, 7, 9, 13, 17, 24, 25, 31, 46-48.
 Klamath, 14, 22, 24, 31, 44-46.
 Sage, 7, 9, 13, 17, 24, 25, 31, 46-48.
 Chondestes grammacus strigatus, 102.
 Chordeiles virginianus henryi, 98.
 Cinclus mexicanus, 14, 20, 106.
 Circus hudsonius, 13, 19, 94.
 Cistothorus palustris, 107.
 Clivicola riparia, 104.
 Coccythraustes vespertina montana, 23, 101.
 Colaptes cafer, 20, 98.
 Colinus virginianus, 92-93.
 Colymbus auritus, 19, 89.
 Contopus borealis, 99.
 richardsoni, 99.
 Coot, 19, 91.
 Cormorant, White-crested, 89.
 Corvus americanus, 15, 20, 95, 100.
 corax sinuatus, 7, 100.
 Cottontail, Sage, 7, 9, 13, 32, 75, 77, 79.
 Cottonwood, 16, 25, 27.
 Cowbird, 100.
 Coyote, 7, 13, 32, 76, 82.
 Crane, Sandhill, 4, 19, 41, 91.
 Whooping, 91.
 Crayfish, 6, 86.
 Creeper, Rocky Mountain, 20, 107.
 Cricket, Mole, 8.
 Crotalus confluentus, 111.
 lucifer, 8, 9, 111.
 Crow, Clark's, 11, 15, 16, 18, 20, 23, 100.
 Common, 15, 20, 95, 100.
 Curlew, Long-billed, 92.
 Currant, 18.
 Cyanocephalus cyanocephalus, 100.
 Cyanocitta stelleri annectens, 12, 20, 23, 99.
 Cynomys columbianus, 40.
 gunnisoni, 40.
 Deer, Black-tail, 7, 12, 14, 18, 24, 32, 80.
 Mule, 7, 12, 14, 18, 24, 32, 80.
 Western White-tailed, 32, 80.
 Delphinium andersoni, 22.
 menziessii, 11, 22.
 Dendragapus franklini, 19, 23, 93.
 obscurus fuliginosus, 93.
 richardsoni, 12, 14-15, 19,
 23, 93.
 Dendroica aestiva, 105.
 auduboni, 12, 20, 23, 105.
 Devil, Idaho, 8.
 Dipodomys compared with Microdipodops, 115,
 116.
 Dipodomys deserti compared with Microdipodops
 megacephalus, 115.
 Dipodops and Microdipodops compared, 115-116.
 ordii, 7, 25, 32, 71.
 Dipper, 14, 20, 106.
 Dolichonyx oryzivorus albinucha, 100.
 Dove, Mourning, 13, 94.
 Draba alpina, 10, 22.
 Dryobates pubescens, 97.
 villosus hyloscopus, 19, 97.
 Duck, Baldpate, 19, 90.
 Black, 90.
 Blue-winged Teal, 19, 90
 Cinnamon Teal, 90.
 Gadwall, 90.
 Green-winged Teal, 90.
 Mallard, 19, 82, 89-90.
 Redhead, 19, 90.
 Shoveller, 90.
 Eagle, Bald, 18, 19, 95.
 Golden, 95.
 White-headed, 18, 19, 95.
 Eagles, 4.
 Elk, 4, 5, 14, 18, 21, 80.
 Empidonax pusillus, 99.

- Empidonax wrightii*, 99.
Erethizon epixanthus, 7, 12, 18, 21, 22, 24, 32, 72.
Ereunetes occidentalis, 92.
Erigeron compositus trifidus, 11, 23.
Eriogonum, Yellow, 18.
Eriogonum cernuum tenue, 7, 25.
 ovalifolium, 11, 23.
Eurotia lanata, 7, 15, 25.
Euntainia vagrans, 12, 15, 110.
Evotomys, 12.
 californicus, 67.
 dawsoni, 119.
 galei, 67.
 gapperi, 67, 119.
 brevicaudus, 119.
 idahoensis, 18, 24, 32, 66-67.
 occidentalis, 67.
Falco mexicanus, 95.
 sparverius, 13, 95.
Falcon, Prairie, 95.
Felidae, 31.
Felis concolor, 32, 81.
Fiber zibethicus, 15, 18, 32, 68.
Finch, Cassin's Purple, 102.
 Rosy, 10, 22, 102.
Fir, Alpine, 11, 14, 17, 21, 22, 23, 25, 26, 27, 48.
 Douglas, 11, 13, 14, 16, 17, 23, 25, 26, 27, 48.
 Sub-alpine, 11, 14, 17, 21, 22, 23, 25, 26, 27.
Fisher, 12, 18, 24, 32, 84.
Flicker, Red-shafted, 20, 98.
Fluminicola nuttalliana, 6, 27.
Flycatcher, Little, 99.
 Olive-sided, 99.
 Wright's, 99.
Fool Hen, 19, 23, 93.
Forest Trees of Mountains of Idaho, 25-27.
Fox, 18.
 Great-tailed, 32, 82.
 Red, 82.
Frasera speciosa, 14, 23, 24.
Frog, 11, 18, 112-113.
Fulica americana, 19, 91.
Gadwall, 90.
Galeoscoptes carolinensis, 106.
Gallinago delicata, 92.
Gaultheria myrsinites, 11, 23.
Gentian, Blue, 18.
Gentiana affinis, 18.
Geomyidae, 31.
Geomys tuza, 68.
Geothlypis macgillivrayi, 105.
 trichas occidentalis, 105.
Geom rossii, 65, 73.
 humile, 10, 22.
Gilia aggregata (?), 18.
Goat, Mountain, 10, 11, 18, 22, 32, 81.
Goldfinch, 102.
Goose, Canada, 90.
Gooseberries, 43.
Gopher, Mountain Pocket, 32, 69-70.
 Pale Pocket, 32, 68-69, 70.
 Pocket, 18, 19, 68, 70, 85, 96.
Goshawk, 11, 18, 19, 23, 94.
Greasewood, 7, 9, 13, 15, 25, 46-47.
Grebe, Horned, 19, 89.
Grosbeak, Black-headed, 104.
 Evening, 23, 101.
 Pine, 11, 101.
Grouse, Blue, 12, 14-15, 19, 93.
 Canadian Ruffed, 12, 23, 93.
 Columbian Sharp-tailed, 7, 24, 93.
 Franklin's, 19, 23, 93.
 Richardson's, 12, 14-15, 19, 23, 93.
 Sage, 7, 13, 17, 24, 93.
Grus americana, 91.
 mexicana, 4, 19, 41, 91.
Gull, 15, 89.
Gulo luscus, 12, 18, 24, 32, 85.
Habia melanocephala, 104.
Halieetus leucocephalus, 18, 19, 95.
Hawk, Cooper's, 94.
 Fish, 15, 19, 95.
 Marsh, 13, 19, 94.
 Sharp-shinned, 19, 94.
 Sparrow, 13, 95.
 Swainson's, 94-95.
 Western Red-tail, 94.
Hawks, 4.
Helix (*Patula*) *hemphilli*, 27.
Helminthophila celata, 105.
Hen, Sage, 7, 13, 17, 24, 93.
Heron, Great Blue, 15, 91.
Hesperomys erinitus, 7, 31, 53-54.
 eremicus, 53-54, 116.
 leucopus, 15, 18, 19, 22, 32, 55-57, 96.
Heuchera hallii, 11, 22.
 parvifolia, 11, 23.
Himantopus mexicanus, 91.
Hummingbird, Broad-tailed, 98.
 Sp. ♀, 98.
Hystricidae, 31.
Icteria virens longicauda, 106.
Icterus bullocki, 101.
Idaho, Birds of, 89-108.
 Forest Trees of, 25-27.
 Life Zones of, 21-25.
 Mammals of, 31-87.
 Molluscs of, 27.
 Reptiles and Batrachians of, 109-113.
Idaho Devil, 8.
Introduction, 4-5.
Itinerary, 1-3.
Iva axillaris, 7, 25.
Jay, Black-headed, 12, 20, 23, 99.
 Canada, 16.
 Long-crested, 12, 20, 23, 99.
 Piñon, 106.
 Rocky Mountain, 12, 18, 20, 23, 100.
 Woodhouse's, 100.
Junco annectens, 11, 20, 23, 103.
 hyemalis shufeldti, 20, 103.
Junco, Pink-sided, 11, 20, 23, 103.
 Rocky Mountain, 20, 103.
Juniper, 25.
Juniperus communis, 22.
 virginiana, 25.
Killdeer, 92.
Kingbird, 98.
 Arkansas, 98.
Kingfisher, Belted, 13, 15, 19, 97.
Kinglet, Golden-crowned, 15, 20, 107.
 Ruby-crowned, 12, 15, 20, 23, 107.

- Lagomyidæ, 31.
 Lagomys, 10, 11, 14, 16, 18, 57, 65, 74-75.
 princeps, 10, 11, 14, 18, 22, 23, 32, 73-74.
 Lanius borealis, 105.
 ludovicianus excubitorides, 13, 25, 105.
 Lark, Desert Horned, 13, 17, 25, 95, 99.
 Larus (californicus?), 15, 89.
 Lemhi Valley, description of, 8-9.
 Leporidae, 31.
 Lepus (genus), 31.
 artemisia, 75.
 bairdi, 12, 13, 14, 16, 18, 24, 32, 79.
 campestris, 7, 9, 13, 15, 32, 78.
 cinerascens, 76.
 idahoensis, 7, 9, 13, 25, 32, 75-78.
 sylvaticus, 76.
 nuttalli, 7, 9, 13, 32, 75, 77, 79.
 texianus, 7, 9, 13, 15, 25, 32, 78-79.
 Leucosticte atrata, 10, 22, 102.
 Leucosticte, Black, 102.
 Life Zones of Idaho, 21-25.
 Arctic Alpine, 22.
 Canadian or Douglas Fir, 23.
 Hudsonian or Spruce, 23.
 Neutral or Transition, 24.
 Sub-Alpine or Timber-line, 22.
 Upper Sonoran, 25.
 Limnæa adelinae, 27.
 lepida, 27.
 palustris, 27.
 Lion, Mountain, 32, 81.
 Little Lost River Valley, description of, 12.
 Lizards, 8, 109.
 Longspur, McCown's, 102.
 Loon, 19, 89.
 Lutra hudsonica, 18, 32, 82-83.
 Lutreola vison, 18, 32, 83.
 Lynx, 7, 18.
 baileyi, 7, 32, 81-82.
 Lynx Plateau, 7, 32, 81-82.
 Magpie, 7, 13, 15, 18, 20, 99.
 Mahogany, Mountain, 14, 21, 24.
 Mallard, 19, 82, 89-90.
 Malvastrum, 7, 15, 25.
 Mammals of Idaho, 31-87.
 Saw Tooth Mountains, 18.
 Mammals, new species described :
 Arvicola macropus, 59-61.
 mordax, 61-62.
 nanus, 62-63.
 Eutamias gapperi breviceaudus, 119.
 idahoensis, 66-67.
 Hesperomys crinitus, 53-54.
 Lepus idahoensis, 75-78.
 Microdipodops megacephalus, 115-117.
 Onychomys leucogaster breviceaudus, 52-53.
 Phenacomys orophilus, 65-66.
 Sorex dobsoni, 33-34.
 idahoensis, 32-33.
 vagrans similis, 34-35.
 Thomomys clusius fuscus, 69-70.
 Market Lake, origin of name, 28-29.
 Marmot, 10, 14, 18, 36.
 Marten, 12, 24, 32, 84.
 Mazama montana, 10, 11, 18, 22, 32, 81.
 Meadowlark, Western, 13, 17, 101.
 Megascops flammeolus, 96.
 idahoensis, 96 (Pl. Frontis-piece).
 Melanerpes torquatus, 97.
 Melospiza fasciata montana, 103.
 lincolni, 15, 20, 103.
 Mephitis, sp. ? 32, 85.
 Merganser, Red-breasted, 19, 89.
 Merganser serrator, 19, 89.
 Merula migratoria propinqua, 18, 20, 108.
 Microdipodops (new genus defined), 115-116.
 megacephalus, 116-117.
 Mink, 18, 32, 83.
 Mole Cricket, 8.
 Molluscs of south-central Idaho, 27.
 Molothrus ater, 100.
 Moose, 4, 12, 24, 32, 79-89.
 Moose Bird, 16.
 Mouse, Cañon, 7, 53-54.
 Cliff, 7, 53-54.
 Field, 96.
 Grasshopper, 7, 25, 52.
 Idaho Grasshopper, 52-53.
 Idaho Red-backed, 66-67.
 Jumping, 12, 24, 32, 72-73.
 Lemming, 11, 18, 19, 22, 23, 32, 65-66.
 Mountain Lemming, 65-66.
 Pallid Lemming, 24, 32, 64-65.
 Pocket, 7, 8, 9, 13, 15, 25, 32, 71-72.
 Red-backed, 18, 119.
 White-footed, 15, 18, 19, 55-57, 96.
 Mud-hen, 19, 91.
 Muridæ, 31.
 Mus cinereus, 22, 24, 32, 57.
 Muskrat, 15, 18, 32, 68.
 Mustela americana, 12, 24, 32, 84.
 pennanti, 12, 18, 24, 32, 84.
 Mustelidæ, 31.
 Myadestes townsendi, 15, 23, 108.
 Mynomes (*Arvicola*) macropus, 59-61.
 mordax, 61-62.
 nanus, 62-63.
 Neofiber (*Arvicola*) alleni, 60.
 Neosorex, 12, 16, 35, 36, 94.
 palustris, 18, 24.
 Neotoma cinerea, 22, 24, 32, 57.
 occidentalis, 7, 32, 58.
 Nighthawk, Western, 98.
 Numenius longirostris, 92.
 Nutcracker, Clark's, 11, 16, 18, 20, 100.
 Nuthatch, Red-breasted, 12, 23, 107.
 Slender-billed, 20, 107.
 Nyctea nyctea, 96.
 Olor buccinator, 91.
 Oncorhynchus chouicha, 8, 13, 14.
 nerka, 17.
 Onychomys leucogaster, 7, 25, 52.
 breviceaudus, 7, 25, 31, 52-53.
 Opuntia, 13.
 Oriole, Bullock's, 101.
 Oreoscoptes montanus, 7, 9, 25, 106.
 Ortyx virginianus, 92-93.
 Oryzopsis cuspidata, 25.
 Osprey, 15, 19, 95.

- Otocoris, 95.
 alpestris arenicola, 13, 17, 25, 95, 99.
 praticola, 99.
- Otter, 18, 32, 82-83.
- Ouzel, Water, 14, 20, 106.
- Ovis canadensis, 10, 11, 14, 18, 22, 32, 81.
- Owl, Burrowing, 7, 25, 97.
 Dusky Horned, 12, 18, 19, 23, 96.
 Dwarf Screech, 96.
 Hawk, 96.
 Long-eared, 95.
 Short-eared, 96.
 Snowy, 96.
 Western Horned, 96.
- Oxyria digyna, 10, 22.
- Pahsimeroi Mountains, 14-15.
 Valley, 12-14.
- Pandion haliaetus carolinensis, 15, 19, 95.
- Panther, 32, 81.
- Parus atricapillus septentrionalis, 9, 107.
 gambeli, 12, 20, 23, 107.
- Passer domesticus, 102.
- Passerina amoena, 104.
- Pediocates phasianellus columbianus, 7, 24, 93.
- Pelecanus erythrorhynchos, 5, 89.
- Pelican, White, 5, 89.
- Pentstemon kingii, 18, 23.
 menziessii, 11, 22.
- Perisoreus canadensis capitalis, 12, 18, 20, 23, 100.
- Perognathus, compared with Microdipodops, 116.
 olivaceus, 7, 8, 9, 13, 15, 25, 32, 71-72.
- Personnel of Expedition, 3.
- Petrochelidon lunifrons, 104.
- Pewee, Western Wood, 99.
- Phalacrocorax dilophus cincinnatus, 89.
- Phalænoptilus nuttalli, 98.
- Phalarope, Northern, 91.
 Wilson's, 91.
- Phalaropus lobatus, 91.
 tricolor, 91.
- Pheasants, 4.
- Phenacomys (Genus), 65.
- Phenacomys celatus, 66.
 intermedius, 66.
 latimanus, 66.
 longicaudus, 65, 66.
 orophilus, 11, 18, 19, 22, 23, 32, 65-66.
- Phleum alpinum, 11, 22.
- Phœbe, Say's, 98-99.
- Phrynosoma douglasii, 8, 9, 109-110.
 ornatissimum, 109.
 pygmæa, 109.
- Physa heterostropha, 27.
- Pica pica hudsonica, 7, 13, 15, 18, 20, 99.
- Picea alba, 11, 14, 16, 17, 23, 25, 27, 48.
 engelmanni, 11, 17, 22, 23, 25, 26, 27.
- Picicorvus columbianus, 11, 15, 18, 20, 23, 100.
- Picket Pin, 38.
- Picoides americanus dorsalis, 97.
 arcticus, 19, 97.
- Pika, Rocky Mountain, 10, 11, 14, 16, 18, 22, 23, 32,
 57, 65, 73-75.
- Pine, Black, 11, 14, 16, 17, 23, 25, 26, 44.
 Murray, 11, 14, 16, 17, 25, 26, 48.
 White, 14, 26.
 White bark, 10, 11, 14, 17, 22, 23, 25, 26, 27, 48-49.
- Pinicola enucleator, 11, 101.
- Pinus albicaulis, 10, 11, 14, 17, 22, 23, 25, 26, 27, 48-49.
 Fig. of cone, 49.
 flexilis, 14, 26.
 murrayana, 11, 14, 16, 17, 23, 25, 26, 44.
- Pipilo chlorurus, 103.
- Pipit, 10, 11, 15, 17, 20, 22, 106.
- Piranga ludoviciana, 104.
- Pituophis catenifer, 8, 110.
- Planorbis trivolvis, 27.
- Polemonium confertum, 10, 22.
- Pooecetes gramineus confinis, 13, 102.
- Poor-will, 98.
- Poplar, 16.
 Balsam, 16, 25, 27.
- Popple, 27.
- Populus balsamifera, 16, 25, 27.
 tremuloides, 11, 13, 14, 16, 21, 23, 25, 27.
- Porcupine, 7, 12, 18, 21, 22, 24, 32, 72.
 Yellow-haired, 72.
- Porzana carolina, 91.
- Potentilla fruticosa, 11, 14, 18, 23, 24,
 nivea dissecta, 11, 22.
- Prairie dog, 40, 41.
 Plateau, 40.
- Procyon lotor, 6, 7, 32, 86.
- Procyonidæ, 31.
- Pseudotsuga douglasii, 11, 13, 14, 16, 17, 23, 25, 26,
 27, 48.
- Purshia tridentata, 7.
- Putorius longicauda, 22, 24, 32, 83-84.
- Pyrola secunda, 11, 23.
- Quail, Eastern, 92-93.
- Quakenasp, 27.
- Rabbit, Black-tailed Jack, 7, 9, 13, 15, 25, 32, 78-79.
 Great Basin Cotton-tail, 7, 9, 13, 32, 75, 77, 79.
 Idaho Pygmy, 7, 9, 13, 25, 32, 75-78.
 Sage Cotton-tail, 7, 9, 13, 32, 75, 77, 79.
 Snow-shoe, 12, 14, 16, 18, 24, 32, 79.
 White-tailed Jack, 7, 9, 13, 15, 32, 78.
- Raccoon, 6, 7, 32, 86.
- Rana pretiosa, 11, 18, 112-113.
- Rangifer caribou, 32, 80.
- Rat, Bushy-tailed Wood, 22, 24, 32, 57.
 Dusky Wood, 7, 32, 58.
 Kangaroo, 7, 9, 15, 25, new genus described
 115-117.
 Ord's Kangaroo, 7, 25, 32, 71.
 Wood, 15.
- Rattlesnake, 8, 9, 111.
- Raven, 7, 100.
- Recurvirostra americana, 91.
- Redhead, 19, 90.
- Regulus calendula, 12, 15, 20, 23, 107.
 satrapa, 15, 20, 107.
- Reptiles collected, 109-111.
- Reptilia, 109-111.
- Rhynchophanes mccownii, 102.
- Ribes, 18.
 cereum, 11, 23, 93.
 floricum, 11, 23.
 irriguum, 11, 23.
- Robin, Western, 18, 20, 108.
- Round Valley, description of, 15.
- Rubus nutkanus, 11, 18, 23.
 strigosus, 11, 23.

- Saccomyida*, 31.
 Sage, 7, 9, 13, 15, 24, 46, 76.
 Sage Hen, 7, 13, 17, 24, 93.
 Salamander, 68.
Salix reticulata, 10, 22, 44, 65.
 Salmon, 8, 13, 14.
 Nerka, 17.
 Salmon River Mountains, description of, 9-12.
 life zones of, 10-12.
Salpinctes obsoletus, 106.
 Sandpiper, Solitary, 92.
 Spotted, 92.
 Western, 92.
Sarcobatus vermiculatus, 7, 9, 13, 15, 25, 46-47.
 Saw Tooth Mountains, description of, 17-20.
 birds of, 19-20.
 mammals of, 18.
Saxifraga bronchialis, 11, 23.
Sayornis saya, 98-99.
Sceloporus graciosus, 8, 109.
 Sciuridae, 31.
Sciuropterus volans sabrinus, 12, 18, 24, 31, 51-52.
Sciurus hudsonicus, 49.
 richardsoni, 12, 14, 16, 24, 26, 31, 48-51, 83,
 94.
 sabrinus, 12, 18, 24, 31, 51-52.
Scolecophagus cyanocephalus, 13, 101.
Sedum debile, 11, 22.
Selaginella rupestris, 22.
Senecio, 73.
 aureus compactus, 11, 22.
 canus, 11, 23.
 Service Berry, 18.
 Seven Sleepers, 40.
 Sheep, Mountain, 4, 10, 14, 18, 22, 32, 81.
 Shoveller, 90.
 Shrew, Dobson's, 33-34.
 Idaho, 18, 24, 31, 32-33.
 Marsh, 31, 35.
 Water, 18, 24.
 Shrews, 12, 14, 18, 34-35.
 Shrike, Great Northern, 105.
 White-rumped, 13, 25, 105.
Sialia arctica, 12, 20, 23, 108.
Sibbaldia procumbens, 10, 22.
Silene acaulis, 10, 22.
 douglassi, 11, 22.
Siskin, Pine, 12, 20, 23, 102.
Sitta canadensis, 12, 23, 107.
 carolinensis aculeata, 20, 107.
 Skunk, 32, 85.
 Little Striped, 7, 32, 84-85.
 Snake, Bull, 8, 110.
 Garter, 12, 15, 110.
 Snake Plains, general description of, 5-8.
 Snipe, Jack, 15.
 Wilson's, 92.
Solidago virgaurea alpina, 11, 22.
 Solitaire, Townsend's, 15, 23, 108.
 Sora, 91.
Sorex (genus), 16, 31.
 dobsoni, 18, 24, 31, 33-34.
 idahoensis, 18, 24, 31, 32-33.
 palustris, 31, 35.
 personatus, 32, 33, 34.
 platyrhinus, 32, 33.
Sorex vagrans, 32, 34.
 similis, 14, 24, 31, 34-35.
 Soricidae, 31.
 Sparrow, Brewer's, 7, 25, 103.
 English, 102.
 Intermediate, 20, 103.
 Lincoln's, 15, 20, 103.
 Mountain Song, 103.
 Sage, 7, 9, 25, 103.
 Western Chipping, 20, 103.
 Western Lark, 102.
 Western Savanna, 102.
 Western Vesper, 13, 102.
 White-crowned, 102.
Spatula clypeata, 90.
Speotyto cunicularia hypogaea, 7, 25, 97.
 Spermophile, Gray, 39.
 Kennicott's, 24, 31, 36, 37, 39.
 Mountain, 31, 36, 38.
 Parry's, 41.
 Townsend's, 7, 25, 36-38.
 Spermophiles, burrows of, 14, 18.
Spermophilus (genus), 31.
 armatus, 31, 36, 38.
 columbianus, 31, 36, 39-42.
 elegans, 24, 31, 36, 37, 39.
 empetra erythroglutæus, 39, 40, 41.
 grammurus, 24.
 mollis, 36, 37.
 elegans, 36.
 parryi erythrogluteia, 39.
 richardsoni, 37, 39.
 townsendi, 39.
 townsendi, 25, 31, 36-38, 39, 94.
Spilogale saxatilis, 7, 32, 84-85.
Spinus pinus, 12, 20, 23, 102.
 tristis, 102.
Spiræa (*Eriogynia*) *cæspitosa*, 23.
Spizella breweri, 7, 25, 103.
 socialis arizonæ, 20, 103.
 Spruce, Engelman's, 11, 17, 22, 23, 25, 26, 27.
 White, 11, 14, 16, 17, 23, 25, 27, 48.
 Squirrel, Burrowing, 4, 39-42.
 Eastern Red, 49, 50.
 Gray Ground, 12, 16, 18, 42-44.
 Ground, 40, 41.
 Hudsonian Flying, 12, 18, 24, 31, 51-52.
 Richardson's, 12, 14, 16, 18, 24, 26, 31, 48-
 51, 83, 94.
Stenopalmatus fasciatus, 8.
Sterna forsteri, 89.
 Stilt, Black-necked, 91.
 Sturgeon, 8.
Sturnella neglecta, 13, 17, 101.
Surnia ulula caparoch, 96.
 Swallow, Bank, 104.
 Barn, 104.
 Cliff, 104.
 Violet-green, 104.
 Swan, Trumpeter, 91.
Sylvania pusilla pileolata, 94, 106.
Symphemia semipalmata inornata, 92.
Tachycineta thalassina, 104.
Tamias (genus), 31.
 amœnus, 44-45.
 cinereus, 16, 22, 24, 31, 42-44.

- Tamias minimus melanurus* 46.
 pictus, 7, 9, 13, 17, 24, 25, 31, 46-48,
 94.
 quadrivittatus amoenus, 14, 22, 24, 31, 44-46.
 luteiventris, 44-45.
- Tanager, Louisiana, 104.
- Taxidea americana*, 7, 13, 18, 32, 75, 76, 85.
- Teal, Blue-winged, 19, 90.
 Cinnamon, 90.
 Green-winged, 13, 90.
- Tern, Forster's, 89.
- Tetradymia canescens*, 7, 9, 13, 25, 76.
- Thomomys borealis*, 68.
 clusius, 32, 68-69, 70.
 fuscus, 32, 69-70.
 fulvus, 70.
 talpoides, 70.
 townsendi, 68.
- Thrasher, Sage, 7, 9, 25, 106.
- Thrush, Audubon's Hermit, 12, 23, 108.
 Olive-backed, 108.
- Titlark, 10, 11, 15, 17, 20, 22, 106.
- Toad, Horned, 8, 9, 109-110.
- Totanus solitarius*, 92.
- Towhee, Green-tailed, 103.
- Trees of mountain forests, 25-27.
- Trochilus platycercus*, 98.
 sp. ? 98.
- Troglodytes aëdon aztecus*, 107.
 hiemalis, 20, 107.
- Turdus aonalaschkæ auduboni*, 12, 23, 108.
 ustulatus swainsonii, 108.
- Tyrannus tyrannus*, 98.
 verticalis, 98.
- Urinator imber*, 19, 89.
- Ursidæ, 31.
- Ursus americanus*, 24, 32, 87.
 horribilis, 24, 32, 86-87.
- Vaccinium microphyllum*, 11, 23.
- Valley at Head of Salmon River, 17.
- Valley of Big Wood River, 16-17.
- Vespertilio nitidus*, 31, 36.
- Vespertilionidæ, 31.
- Vireo*, Cassin's, 105.
 Western Warbler, 105.
 gilvus swainsoni, 105.
- Vireo solitarius cassini*, 105.
- Vole 96 (see *Arvicola*).
- Vulpes macrourus*, 32, 82.
- Vulture, Turkey, 13, 94.
- Wapiti, 80 (see Elk).
- Warbler, Audubon's, 12, 20, 23, 105.
 Black-capped, 94, 106.
 Macgillivray's, 105.
 Orange-crowned, 105.
 Pileolated, 106.
 Yellow, 105.
- Water Courses, effects on distribution of species, 28.
- Waxwing, Bohemian, 104-105.
 Cedar, 105.
- Weasel, Long-tailed, 22, 24, 32, 83-84.
- Weasels, 12, 18, 21.
- Wildcat, Plateau, 7, 32, 81-82.
- Willet, Western, 92.
- Willow, Dwarf, 10, 22, 44, 65.
- Wolf, Prairie, 7, 13, 32, 76, 82.
 Timber, 32, 82.
- Wolverine*, 12, 18, 24, 32, 85.
- Woodpecker*, Alpine Three-toed, 97.
 Arctic Three-toed, 19, 97.
 Cabanis's, 19, 97.
 Downy, 97.
 Lewis's, 97.
 Pileated, 97.
 Red-shafted, 20, 98.
 White-headed, 97.
- Wren*, Cañon, 7, 107.
 Long-billed Marsh, 107.
 Rock, 106.
 Western House, 107.
 Winter, 20, 107.
- Xanthocephalus xanthocephalus*, 101.
- Xenopicus albolarvatus*, 97.
- Yellow-throat, Western, 105.
- Zaphrentis*, 10.
- Zapodidæ*, 31.
- Zapus hudsonius*, 12, 24, 32, 72-73.
- Zenaidura macroura*, 94.
- Zonotrichia intermedia*, 20, 103.
 leucophrys, 15, 102.

PLATE II.

(All magnified about 10 diameters.)

- 1, 2. *Arvicola riparius* Ord, ♂ ad. (No. $\frac{30835}{3378}$). Birch Creek, Idaho.
1. Upper molar series.
2. Lower molar series.
- 3, 4. *Arvicola mordax* sp. nov. ♂ ad. (No. $\frac{31535}{4231}$). Saw Tooth Mountains, Idaho. Type.
3. Upper molar series.
4. Lower molar series.
- 5, 6. *Arvicola nanus* sp. nov. ♀ ad. (No. $\frac{31253}{3383}$). Pahsimeroi Mountains, Idaho. Type.
5. Upper molar series.
6. Lower molar series.
- 7, 8. *Arvicola macropus* sp. nov. ♀ ad. (No. $\frac{31291}{23887}$). Pahsimeroi Mountains, Idaho.
Type.
7. Upper molar series.
8. Lower molar series.



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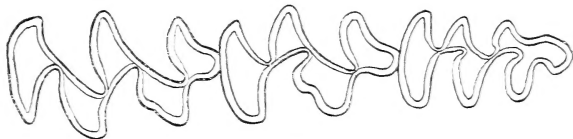
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8

1, 2. *Arvicola riparius* Ord.
3, 4. *A. mordax* sp. nov.

5, 6. *A. nanus* sp. nov.
7, 8. *A. macropus* sp. nov.

PLATE III.

(All magnified about 15 diameters.)

- 1, 2. *Arvicola pauperrimus* Cooper, ♀ ad. (No. $\frac{31248}{33848}$). Salmon River Mountains, Idaho.
1. Upper molar series.
2. Lower molar series.
- 3, 4. *Phenacomys orophilus* sp. nov. ♀ ad. (No. $\frac{31256}{23856}$). Salmon River Mountains, Idaho. Type.
3. Upper molar series.
4. Lower molar series.
- 5, 6. *Evotomys idahoensis* sp. nov. ♀ ad. (No. $\frac{31687}{24283}$). Saw Tooth Mountains, Idaho. Type.
5. Upper molar series.
6. Lower molar series.
- 7, 8. *Evotomys brevicaudus* sp. nov. ♂ ad. (No. $\frac{5142}{4307}$). Black Hills, Dakota. Type.
7. Upper molar series.
8. Lower molar series.



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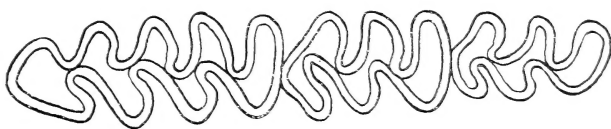
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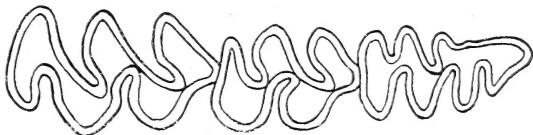
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8

1, 2. *Arvicola pauperrimus* Cooper.
3, 4. *Phenacomys orophilus* sp. nov.

5, 6. *Eratomys idahoensis* sp. nov.
7, 8. *Eratomys brevicaudus* sp. nov.

