

**MAMMALS**  
of the  
**GRAND CANYON REGION**  
by

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Retired Chief Field Naturalist  
U. S. Biological Survey



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# MAMMALS of the GRAND CANYON REGION

By Vernon Bailey  
Retired Chief Field Naturalist,  
U. S. Biological Survey.

## INTRODUCTION

THE present list with brief annotations includes the mammals of the Grand Canyon National Park, the Grand Canyon National Monument and closely associated areas that naturally go with the Grand Canyon of Arizona.

In this list the sequence of species is used as in various recent publications of the Biological Survey. The use of parentheses around the names of authors of species and subspecies indicates a change from the genus in which the species was originally placed. This is in accord with the International Code of Nomenclature as adopted by the American Ornithologists' Union and most of the mammalogists of this country.

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### Order ARTIODACTYLA: Animals with parted hoofs.

#### Family BOVIDAE: Cattle, Sheep and Goats.

BUFFALO: AMERICAN BISON; Bison bison bison (Linnaeus), 1757.

Type locality - Mexico where captive animals were found by Cortez in 1521.

General characters - About the size of domestic cattle but with high humped backs, short horns, small tails and curly brown coats.

Buffalo were not native nearer to the Grand Canyon than the mountains of central Colorado and New Mexico, but from

1905 to 1907, about 125 were brought to the Kaibab Plateau by C. J. Jones, better known as Buffalo Jones. They soon broke out of their pasture and moved down into Houserock Valley where about 130 remain and may be seen by visitors.

\* \* \* \* \*



E. Ensor

Desert Mtn. Sheep (ewe) near Bright  
Angel Trail, 2000 ft. Below So. Rim

DESERT MOUNTAIN SHEEP; NELSON SHEEP; Ovis canadensis nelsoni  
Merriam, 1897.

Type - Collected in the Grapevine Mountains on the  
Nevada and California Line by E. W. Nelson in 1891.

General characters - Slightly smaller and paler than  
Ovis canadensis canadensis of the northern Rocky Mountains.

with slender skulls and lighter dentition.

These desert bighorns were once common throughout the Grand Canyon and are still found along both sides, mainly on the middle and upper slopes south of the Colorado River. Individuals or small groups are occasionally seen from the trails or from the rim above. Their tracks and trails follow the most difficult and dangerous slopes where few enemies except the great cats dare to hunt them and where food is ample.

\* \* \* \* \*

### Family ANTILOCAPRIDAE: Pronghorn.

PRONGHORN; AMERICAN ANTELOPE; Antilocapra americana americana (Ord), 1815.

Type locality - Plains and Highlands of the Missouri River.

General characters - Size of a small deer, very slender, graceful and swift. Horns deciduous with recurved tips and each with a flattened prong midway in front; tail, a mere rudiment; color buff, and white and black with large white rump patch.

Native antelope are still found occasionally near the canyon on the south side and are fairly numerous farther south towards Flagstaff and Williams.

\* \* \* \* \*

OREGON ANTELOPE; Antilocapra americana oregona Bailey, 1932.

Type - Collected at Hart Mountain, Oregon by Luther J. Goldman in 1914.

General characters - Size about as in americana with relatively larger feet, longer horns, and paler coloration.

In 1924 a dozen young antelope of this subspecies were brought from northwestern Nevada and placed in an enclosure on Hermit Creek, half way down the Canyon slope where the Tonto Plateau or shelf extends along the south side of the inner gorge.

Here they grew up under care and protection, were given the freedom of the Tonto Plateau from which there was no escape, and extended their range to Indian Gardens where a part of the little herd found congenial quarters and good

friends. They bred and increased slowly though, in the hot, arid Lower Sonoran Zone where food and climate were new and strange to them. In 1933 the annual census showed a total of 28 animals, but the number has since decreased to 21. The experiment has been highly educational if not very successful.

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Fred Harvey Photo

Oregon Antelope living near Indian  
Gardens on the Tonto.

\* \* \* \* \*

**Family CERVIDAE: Deer with deciduous antlers.**

ROCKY MOUNTAIN MULE DEER: Odocoileus hemionus macrotis Say, 1823.

Type locality - Mora River near the town of Mora, New Mexico.

General characters - Size largest of our North American deer of this genus, antlers forked or twice forked, ears very

large, tails small, white with black tips. Colors dark gray in winter with white on lower parts and a large white rump patch. In summer reddish brown, the fawns spotted.

These splendid deer are still numerous on the North side of the Canyon and a few brought over to the South rim in addition to some that were native there, have increased until the very limited area on this side is now well stocked. On both sides of the canyon a few go down the trails to the river and even cross over, but their main summer range is above the rims on both sides. In summer they occasionally come around the hotels and camps in a friendly search for choice foods which tourists delight in providing for them. They are delightful pets but in the mating season in November, when the old bucks with long and sharp antlers are in fighting mood, they are dangerous and should be carefully avoided.

\* \* \* \* \*

## Order LAGOMORPHA: Rabbit and rabbit-like animals.

### Family LEPORIDAE: Hares and Rabbits.

DESERT JACK RABBIT; Lepus californicus deserticola Mearns.

Type - Collected on western edge of Colorado Desert, Imperial County, California, by Frank X. Holzner in 1894.

General characters - A large rabbit with very long ears and legs, light buffy gray in color with tips of ears and top of tail black.

These large hares are found in the open valleys and among the junipers and nut pines along both sides of the Grand Canyon but do not occur in the canyon and rarely among the yellow pines. Although keenly alert and exceedingly swift they are much preyed upon by coyotes, bobcats and eagles. Generally they are not considered valuable as game animals but are sometimes eaten by Indians and the people of the country. Well-cooked, they are wholesome and palatable.

\* \* \* \* \*

BLACK HILLS COTTONTAIL; Sylvilagus nuttallii grangeri (Allen).

Type - Collected near Hill City, Custer Co., South Dakota by W. W. Granger in 1894.

General characters - A medium sized cottontail with short wide ears, rather short legs and short, puffy tail. In color brownish gray with clear gray rump, brownish neck and legs. Throat, belly, bottom of tail and top of feet white.

These are the common cottontails from North Dakota to California and south to the north rim of the Grand Canyon, mainly among the junipers and nut pines but occasionally found among the yellow pines and Gambel's oaks. They are brush rabbits but often live in rock piles or broken ledges where they find safe retreats from a host of enemies.

\* \* \* \* \*

ROCKY MOUNTAIN COTTONTAIL; Sylvilagus nuttallii pinetus (Allen).

Type - Collected in the White Mountains, Apache Co., Arizona, by B. C. Condit in 1894.

General characters - Similar to grangeri but slightly larger and darker with more brown on feet.

These are the common cottontails of the mountains of southern Arizona and New Mexico in Upper Sonoran and Transition Zones and are often seen along the south rim of the canyon and even in the village of Grand Canyon. Where unmolested they become very tame and often feed with the chipmunks and birds around camps and houses where food is put out for them.

\* \* \* \* \*

## Order RODENTIA

### Family SCIURIDAE: Squirrels, Ground squirrels and Chipmunks.

ABERT SQUIRREL; TUFTED EARED SQUIRREL; Sciurus aberti aberti Woodhouse.

Type - Collected at San Francisco Mountain, Arizona by S. W. Woodhouse in 1851.

General characters - A large squirrel with large bushy tail, dense fur and long ears with long terminal tufts in winter. In summer fur short and harsh and ear tufts wanting. Color dark gray with chestnut brown on back, ear tufts and stripe along each side black; lower parts and lower surface

of tail white.

These beautiful squirrels are generally common in the yellow pines over the plateau region of Arizona south of the Grand Canyon and extend into western New Mexico. They feed largely on pine seeds but, when these are not available, eat the tender bark of pine twigs. The four young are usually born in April in big leafy nests in the pine branches and in May or June come out as half grown squirrels.



G. Grant  
Abert Squirrel Descending  
A Dinyon Pine, South Rim.

J. Dixon  
Kaibab Squirrel - Unique to  
the North Rim Area

KAIBAB SQUIRREL: Sciurus kaibabensis Merriam.

Type - Collected at head of Kaibab Trail by John T. Stewart in 1904.

General characters - Size as in Sciurus aberti but color pattern strikingly different. Upperparts dark gray with large chestnut patch on back, lower parts all black; tail usually all white except grayish line along top.

These striking squirrels are generally common among the yellow pines over the Kaibab Plateau where completely isolated by the surrounding low desert country and the Grand Canyon.

They do not extend out among the nut pines and junipers to any considerable distance from the yellow pines which furnish most of their food of seeds and bark. They live in large nests of twigs and leaves on the yellow pine branches.

\* \* \* \* \*

SPRUCE SQUIRREL; FREMONT CHICKAREE; Sciurus fremonti fremonti  
Audubon and Bachman.

Type locality - Rocky Mountains, probably central Colorado.

General characters - Size about as in the eastern red squirrel to which group they belong; ears short and furry tipped in winter; tail wide and flat; color olive gray with a rusty tinge on legs and feet; nose, face and tip of tail dusky.

This little squirrel is common over the Kaibab Plateau, especially among the spruces and firs but also down over the edges of the canyon where cold slopes carry the firs below the rim. Its bulky nests of grass and twigs and shredded bark are often seen in the branches overhead and the lively chatter of the bright little foresters is a welcome part of the mountain music.

Sciurus fremonti mogollonensis Mearns, of San Francisco Mountains and the White Mountains of Arizona is a closely related subspecies, scarcely distinguishable from fremonti and grading into it around through northern New Mexico and southern Colorado.

\* \* \* \* \*

COLORADO ROCK SQUIRREL: Citellus grammurus grammurus (Say).

Type locality - Purgatory River, Las Animas Co., Colorado.

General characters - A large, bushy-tailed ground squirrel with conspicuous ears and coarse gray fur. Upper-parts rusty gray with fine wavy crosslines of blackish; tail gray with two or three concealed lines of dusky around edges; lower parts and eyelids whitish.

These big ground squirrels are usually seen on or near the rocks where they make their homes. They use cracks and crevices and safe retreats up and down the sides of the Grand Canyon and out over the open country. They inhabit much of

Arizona, New Mexico and Colorado.

\* \* \* \* \*

UTAH ROCK SQUIRREL: Citellus grammurus utah Merriam.

Type - Collected near Ogden, Utah by Vernon Bailey in 1888.

General characters - Very similar to grammurus but slightly smaller and more rusty in coloration.

This squirrel is common in rocky situations from central Utah south to the Grand Canyon. A careful study of a large series of specimens will be necessary to determine whether or not the Colorado River actually separates the two subspecies in northern Arizona.

\* \* \* \* \*

BROWN MANTLED GROUND SQUIRREL: Callospermophilus lateralis lateralis (Say).

Type locality - On the Arkansas River 26 miles below Canyon City, Colorado.

General characters - Larger than the chipmunks, of heavier build, with lower, more rounded ears and stripes along sides only. Color in summer: upperparts grayish brown with bright hazel brown over head and shoulders; one black and one buff stripe along each side; top of tail dark gray, bottom clear buff or buffy gray.

These little squirrels, often called big chipmunks, are common in Transition Zone over much of Colorado, Utah and on the Kaibab Plateau of northern Arizona. They do not range below the yellow pines.

\* \* \* \* \*

ARIZONA MANTLED GROUND SQUIRREL: Callospermophilus lateralis arizonensis Bailey.

Type - Collected at north base of San Francisco Mountain, Arizona by C. Hart Merriam and Vernon Bailey in 1889.

General characters - Closely similar to C. lateralis but varying slightly in color, tail dark gray above and below at all seasons.

This is the common form in the Transition Zone south of the Grand Canyon.

CINNAMON ANTELOPE SQUIRREL: Ammospermophilus leucurus cinnamoneus (Merriam).

Type - Collected at Moa Ave, Painted Desert, Arizona, by C. Hart Merriam and Vernon Bailey in 1889.

General characters - A plump little chipmunk-like ground squirrel with very short ears and short, wide tail carried curled up over the back showing white lower surface; color cinnamon gray with one white stripe along each side; eyelids and lower parts white.

These little sand squirrels are common over the Painted Desert, Houserock Valley, in Kanab Wash and down through the Grand Canyon on the south side of the Colorado River in Lower Sonoran Zone. They are typical desert dwellers and feed much on cactus fruit and seeds. They seem to be quite independent of drinking water, other than that supplied by their food.

\* \* \* \* \*

DESERT ANTELOPE SQUIRREL: Ammospermophilus leucurus leucurus (Merriam).

Type - Collected in San Geronio Pass, Riverside Co., California by Frank Stephens in 1885.

General characters - Like A. l. cinnamoneus but less rusty in color. Upperparts frosty gray brown with a white stripe along each side; lower parts and lower surface of tail silvery white.

This species is common in Virgin River Valley and Grand Wash and may come into the western part of Grand Canyon National Monument.

\* \* \* \* \*

HUALPAI ANTELOPE SQUIRREL: Ammospermophilus leucurus tersus Goldman.

Type - Collected at lower end of Prospect Valley, Hualpai Indian Reservation, Arizona, by E. A. Goldman in 1913.

General characters - Much like A. l. cinnamoneus but smaller and darker colored and with lighter dentition. Darker colored than typical leucurus.

This subspecies is known only from the type locality but antelope squirrels seen and not collected in Havasu Canyon may be of this form.



E. W. Count

Gila Chipmunk - Common On  
The South Rim.

CLIFF CHIPMUNK: GILA CHIPMUNK: Eutamias dorsalis dorsalis  
(Baird).

Type - Collected at old Fort Webster, the Copper Mines of the Mimbres, near present site of Santa Rita, New Mexico by J. H. Clark in 1853.

General characters - A medium size chipmunk with rather long ears and long bushy tail. Colors rusty gray, the light and dark side stripes much obscured by gray.

These gray chipmunks are common in Upper Sonoran Zone over southern New Mexico and Arizona, south of the Grand Canyon. They are the common chipmunks around the hotels and houses along the South Rim and halfway down inside of the Canyon and are occasionally seen near Indian Gardens. They run over the rocks and cliffs, climb trees and live in holes in the ground. They are attracted by grain or almost any kind of food and soon become tame and friendly.

\* \* \* \* \*

UTAH CLIFF CHIPMUNK: Eutamias dorsalis utahensis Merriam.

Type - Collected in the foothills back of Ogden, Utah, by Vernon Bailey in 1888.

General characters - Slightly smaller and paler than E. dorsalis.

These chipmunks are common in Upper Sonoran Zone north of the Grand Canyon and in Utah, southern Idaho and Wyoming. They range from the top of the North Rim half way down the

canyon and a few have been seen near Phantom Ranch. In habits they are very similar to the Gila Chipmunk.

\* \* \* \* \*

WASATCH CHIPMUNK: Eutamias minimus consobrinus (Allen).

Type - Collected in Parley Canyon, near Barclay, Utah, 18 miles east of Salt Lake City, by Vernon Bailey in 1888.

General characters - One of the very small chipmunks with small ears and nine narrow stripes along back and sides.

These chipmunks are common in the mountains of Utah, western Wyoming and Colorado, and in northern Arizona on the Kaibab Plateau. They occur mainly in Transition Zone but also in Canadian. They climb trees and bushes but live chiefly in burrows. They seem always to be in rapid motion and their sharp little chipper is often heard.

\* \* \* \* \*

BEAVER MOUNTAIN CHIPMUNK: Eutamias adsitus Allen.

Type - Collected in Beaver Mountains, Utah, by George P. Engelhardt in 1904.

General characters - In size conspicuously larger than consobrinus, with larger ears, broader stripes on the back and a pure white belly.

These chipmunks are common over the top of the Kaibab Plateau in both Canadian and Transition Zones and in the mountains of central Utah. Found mainly in forests among the trees and logs, they are good climbers but live mostly in holes in the ground. They are as bright and pretty as any of their tribe and add delightful life and chatter to the forest.

\* \* \* \* \*

HOPSI CHIPMUNK: Eutamias quadrivittatus hopiensis Merriam.

Type - Collected at Keams Canyon, Navaho Co., Arizona, in 1894 by A. K. Fisher.

General characters - A rather large chipmunk with distinct striping, pale gray and golden colors and rich orange under surface of tail.

This chipmunk is common among the nut pines and junipers around the edges of the Painted Desert from northwestern New Mexico to the eastern edge of the Grand Canyon.

GRAY COLLARED CHIPMUNK: Eutamias cinereicollis cinereicollis (Allen).

Type - Collected at Little Spring, northwest base of San Francisco Mountains, Arizona, by C. Hart Merriam and Vernon Bailey in 1889.

General characters - A medium sized chipmunk with five dark and four light stripes; head, neck and rump light buffy gray, belly white.

This is the common chipmunk of the San Francisco Mountains, White Mountains and Bill Williams but has not yet been taken nearer to Grand Canyon, where they should occur in the yellow pines. Their nearest relative is adsitus on the Kaibab Plateau from which they are separated by the Grand Canyon.

\* \* \* \* \*

SPECKLED GROUND SQUIRREL: Citellus spilosoma pratensis (Merriam).

Type - Collected at north base of the San Francisco Mountains in a grassy park near edge of yellow pines by C. Hart Merriam and Vernon Bailey in 1889.

General characters - A small, short eared, slender tailed little squirrel with rusty brown back, thickly speckled with white dots.

These squirrels are common in grassy parks among the junipers and nut pines over the San Francisco Mountains Plateau and a few have been taken near the edges of Grand Canyon National Park in Trash Wash and Pasture Wash. They are so shy and protectively colored as to be rarely seen. They live in little well-concealed burrows under the grass and sage brush.

\* \* \* \* \*

PAINTED DESERT GROUND SQUIRREL: Citellus spilosoma cryptos-pilotus (Merriam).

Type - Collected in Tenebito Wash between Moencopie and the Little Colorado River, Arizona, by C. Hart Merriam in 1889.

General characters - A little, yellow sand-colored ground squirrel with very short ears and faintly speckled back.

These desert squirrels live in the sandy bottoms of the Painted Desert and may come into some of the washes leading

into Marble Canyon from the east. They are merely a pale desert form of the spilosoma group, perfectly adapted to their setting by matching the color of sand on which they live.

\* \* \* \* \*

ZUNI PRAIRIE DOG: Cynomys gunnisoni zuniensis Hollister.

Type - Collected at Fort Wingate, New Mexico, by N. Hollister in 1916.

General characters - A rather small prairie dog with short ears, short tail, short legs and plump buffy gray body; nose and spots over eyes dusky; tip of tail whitish.

This species of Prairie Dog is common in colonies or dog towns over the plateau country of New Mexico and Arizona, south of the Grand Canyon, mainly in Upper Sonoran Zone. It comes into the Park at Pasture Wash, in the vicinity of Trash Tank and at other places along the south boundary. No prairie dogs occur immediately north of the canyon but a smaller form of the leucurus group (Cynomys parvidens) is found in central Utah.

\* \* \* \* \*

### Family CRICETIDAE: Woodrats, Woodmice etc.

COLORADO BUSHY-TAILED WOODRAT: Neotoma cinerea orolestes Merriam.

Type - Collected in Saguache Valley, 20 miles west of Saguache, Colorado, by J. Alden Loring in 1892.

General characters - Size large, tail bushy, wide and flat, moustaches very long, ears large, fur full and soft. Color rich buffy ochraceous above, pure white below including feet and lower surface of tail.

This woodrat is common in Transition Zone over the Kaibab Plateau wherever there are rocks, cliffs, old logs or cabins to afford shelter. Not found south of the canyon. Sometimes troublesome in camps and cabins but generally harmless and interesting denizens of the rocks and caves where they often build houses to protect their nests.

\* \* \* \* \*



G. C. Collins.

Colorado Bushy-tailed Woodrat found on  
Bright Angel Point, North Rim.

ARIZONA BUSHY TAILED WOODRAT: Neotoma cinerea arizonae  
Merriam.

Type - Collected at Keams Canyon, Arizona, by J. Sullivan  
in 1888.

General characters - Like orelestes but smaller, paler  
and brighter colored.

This species is found in the Upper Sonoran Zone of the  
Painted Desert country. Specimens from Walpai and Lees Ferry  
suggest its probable occurrence in the Grand Canyon in Upper  
Sonoran Zone along the south side and eastern edge.

\* \* \* \* \*

WHITE THROATED WOODRAT: Neotoma albigula albigula Hartley.

Type - Collected at Fort Lowell, Arizona, by W. W. Price  
and R. L. Wilbur in 1893.

General characters - Size large for the round-tailed  
group, tail cylindrical or slightly tapering, short haired,  
sharply bicolor; upperparts dark buffy gray, lower parts and  
feet white, throat and breast white to base of hairs.

This species is common in Upper and Lower Sonoran Zones over southern Arizona, New Mexico and into Mexico, reaching its northern limits along the south side of the Grand Canyon, half way down the slope to the Tonto Platform and in Havasu Canyon. It lives among rocks and builds big stick houses among the junipers or out in the cactus patches.

\* \* \* \* \*

YELLOW PINE WOODRAT: Neotoma mexicana pinetorum Merriam.

Type - Collected at Little Springs at north base of the San Francisco Mountains, Arizona, by Vernon Bailey in 1889.

General characters - About the size of alibigula but darker gray above and washed with white below. Not white to base of hairs, top of tail blackish.

This is the common woodrat of the yellow pine forest of central Arizona, reaching its northern limit along the south rim of the Grand Canyon. It generally lives among the rocks and does not build large houses.

\* \* \* \* \*

PAINTED DESERT WOODRAT: Neotoma lepida devia Goldman.

Type - Collected at Tanner's Tank at 5200 feet altitude by E. A. Goldman in 1917.

General characters - A small, fuzzy-tailed woodrat, light buffy gray above, whitish below, top of tail blackish.

This is a Lower Sonoran desert woodrat of the lower part of the Little Colorado Valley and down through the Grand Canyon at Tanner's Crossing, Pipe Springs, Indian Gardens, Bass Camp, Supai and Walpai.

It lives among the rocks, cactus beds and thorn bushes or in any other safe cover where food is available.

\* \* \* \* \*

CANYON DESERT WOODRAT: Neotoma lepida monstrabilis Goldman.

Type - Collected at Ryan, west of Kaibab Plateau at 6000 feet altitude by E. A. Goldman in 1922.

General characters - A small silky woodrat; above rich buffy gray, most of belly buffy, top of tail dark gray. Found in Lower Sonoran Zone through the canyon on north side

of river, from Lees Ferry and Houserock Valley to Phantom Ranch, Shinumo Creek and Kanab Wash. Of the same habits and differing but slightly from devia, just across the river.

\* \* \* \* \*



H.E. Stork

House of Stephens Woodrat among the  
Junipers, South Rim, Grand Canyon.

STEPHENS WOODRAT: Neotoma stephensi stephensi Goldman.

Type - Collected in the Hualpai Mountains at 6300 feet by Frank Stephens in 1902.

General characters - Size rather small, fur long and silky, tail unusually hairy; upperparts buffy brown, belly rich buff or salmon, tail blackish above, dark gray below.

This woodrat is common in Upper Sonoran Zone among the nut pines and junipers over western New Mexico and central Arizona south of the Grand Canyon. Specimens have been taken at El Tovar, Yaki Point, Bass Camp and north of Red Butte. They build large stick houses over hollow logs, against hollow trees, in cactus and yucca patches and live inside or under them in nests of soft bark fiber.

ROWLEY WHITE-FOOTED MOUSE: Peromyscus boylei rowleyi (Allen).

Type - Collected at Nolans Ranch on the San Juan River in San Juan County, Utah, by Charles P. Rowley in 1892.

General characters - Size of a rather large mouse; ears medium, tail long and not very hairy; soles hairy at heels, color dull buffy brown, feet and lower parts white.

Found in Upper Sonoran Zone from California to Colorado and through the Grand Canyon on both inner slopes from top to bottom. They live among rocks, are good climbers and very pretty little animals of nocturnal habits.

\* \* \* \* \*

BIG-EARED MOUSE: Peromyscus truei truei (Shufeldt).

Type - Collected at Fort Wingate, New Mexico, by R. W. Shufeldt in 1890.

General characters - Size large, ears very large and nearly naked, tail long and hairy, color dark rich buffy brown, feet and lower parts white.

These are among the most beautiful and spectacular of the white-footed mice. They range from eastern California to Colorado and all through the Grand Canyon country, mainly in Upper Sonoran Zone. They have been taken along the south side of the canyon just below the rim and back from the canyon on both sides. They are cliff dwellers and like all of their group strictly nocturnal and rarely seen.

\* \* \* \* \*

STEPHENS CANYON MOUSE: Peromyscus crinitus stephensi Mearns.

Type - Collected 3 miles east of Mountain Spring, Imperial Co., California, by E. A. Mearns in 1894.

General characters - size rather small and slender, tail long, hairy at tip, ears medium, fur silky, of a pinkish buff color, feet and lower parts white.

This species is common over the Colorado and Mohave Deserts on the west and up through the Grand Canyon in the Lower Sonoran Zone on the north side of the river. There are specimens from Phantom Ranch, Shinumo Creek and farther west but their full range has not been traced out. They live in cliffs and among rocks.

\* \* \* \* \*

GOLDEN CANYON MOUSE: Peromyscus crinitus auripectus (Allen).

Type - Collected at Bluff City, southeastern Utah, by C. P. Rowley, in 1892.

General characters - Very similar to stephensi but brighter, more golden colored and, where typical, with a golden spot on breast.

This subspecies is found in the Painted Desert, House-rock Valley and in the lower part of the Grand Canyon south of the river in Lower Sonoran Zone. Specimens from Pipe Creek, Bright Angel Trail, Bass Camp and Havasu Canyon are referred to this form, though not typical and grading toward stephensi across the river. In habits it is the same as stephensi, dwelling in cliffs and canyon walls.

\* \* \* \* \*

DESERT WHITE-FOOTED MOUSE: Peromyscus eremicus eremicus (Baird).

Type - Collected at Old Fort Yuma, Imperial Co., California by G. H. Thomas in 1853.

General characters - Size medium, soles of hind feet naked to tip of heels, tail long, slender and thinly haired, ears large and nearly naked, color of upper parts pale buffy gray, lower parts white.

These mice are common in Lower Sonoran Zone of the Colorado and Rio Grande Valleys and up through the bottom of the Grand Canyon on both sides of the river, living among rocks, brush, or under any cover that will protect them from daytime heat. They work only at night and are among the most typical of desert mammals. They are able to live without drinking water, and are a harmless and interesting form of desert life.

\* \* \* \* \*

TAWNY WHITE-FOOTED MOUSE: Peromyscus maniculatus rufinus (Merriam).

Type - Collected at 9000 feet, north base of San Francisco Mountains, Arizona, by C. Hart Merriam and Vernon Bailey in 1889.

General characters - Size small, tail short, ears small and hairy, soles mostly hairy, color tawny or dark ochraceous, white below.

This White-Footed Mouse is common in Transition Zone but

extends into Canadian and Upper Sonoran Zones in Arizona, New Mexico, Colorado and Utah. Specimens in the yellow pines on both sides of the Grand Canyon are typical but those from the juniper belt are shading toward sonoriensis which lives inside of the canyon rims. Generally this is the commonest mouse in the region among rocks, logs, trees or bushes.

\* \* \* \* \*

SONORA WHITE-FOOTED MOUSE: Peromyscus maniculatus sonoriensis (Le Conte).

Type - Collected at Santa Cruz, Sonora, Mexico, by J. H. Clark in 1851.

General characters - Size small, tail short, ears small and hairy, soles mostly hairy, colors light or dark buffy gray or pale ochraceous.

This mouse is common in Upper and Lower Sonoran Zones of the deserts of Arizona, Utah, Nevada and southern California. It inhabits the Painted Desert, Houserock Valley and at least the eastern part of the Grand Canyon.

\* \* \* \* \*

SOOTY GRASSHOPPER MOUSE: Onychomys leucogaster fuliginosus Merriam.

Type - Collected at Black Tank lava beds northeast of San Francisco Mountains, Arizona, by C. Hart Merriam and Vernon Bailey in 1889.

General characters - A sturdy little mouse with short tail, short legs, rather-small ears and soft fur. Colors of upper parts dark plumbeous or russet brown, tip of tail and lower parts pure white.

These little insectivorous rodents are found around the base of the San Francisco Mountains Plateau and probably along the south rim of the Grand Canyon, as indicated by specimens from Trash Wash near the southeast corner of the park. Two or possibly three other subspecies may come in or near the park area but few specimens are available. They are obscure little hunters among the sagebrush and desert shrubs and so are rarely taken. They feed upon grasshoppers, scorpions, beetles and a great variety of insects and small animals.

\* \* \* \* \*

DESERT HARVEST MOUSE: Reithrodontomys megalotus megalotus (Baird).

Type - Collected near San Louis Spring in the northwestern corner of Chihuahua, Mexico by C. B. Kennerley in 1855.

General characters - Size smaller than the house mouse, ears and tail medium, upper incisors grooved. Upper parts dull buffy brown, lower parts whitish.

This species is found in Upper and Lower Sonoran Zones from Mexico to Oregon. In the Grand Canyon it has been found at Phantom Ranch and Indian Gardens. It lives in moist and grassy situations under cover of dense vegetation.

\* \* \* \* \*

### Family MICROTINAE: Meadow Mice, Voles and Lemmings.

ROCKY MOUNTAIN MEADOW MOUSE: Microtus mordax mordax Merriam.

Type - Collected at Alturas Lake, central Idaho, by C. Hart Merriam and Vernon Bailey in 1891.

General characters - A large, long-tailed meadow mouse with small eyes, short legs, short ears, and long fur. Color dark olive-gray above and light gray below.

These Canadian Zone mountain voles of the Rocky Mountain region are common at Greenland Spring, V. T. Park and Dry Park on the Kaibab Plateau where they reach their southern limit of range. A closely related form, Microtus monticolus, occupies the Canadian Zone of the San Francisco Mountains where probably isolated since glacial times. They are water-loving animals with no relish for desert or hot weather.

\* \* \* \* \*

MOGOLLON MEADOW MOUSE: Microtus mexicanus mogollonensis (Mearns).

Type - Collected at Bakers Butte, Mogollon Mountains, Yavapai Co., Arizona, by E. A. Mearns in 1887.

General Characters - A short tailed, short legged and short eared little mouse with small eyes and rough brown fur. Upper parts dark cinnamon brown, lower parts grayish or pale cinnamon.

These ground mice range over the table land of central Arizona and western New Mexico with their northern limit

along the south rim of the Grand Canyon. They are found mostly in Transition Zone but a few were taken at Indian Gardens, far below their usual range. They live mainly on grass and green vegetation.

\* \* \* \* \*

### Family HETEROMYIDAE: Pocket Mice and Kangaroo Rats.

DUSKY POCKET MOUSE: Perognathus flavus fuliginosus Merriam.

Type - Collected in the juniper belt at 6500 feet at the northeast base of San Francisco Mountains, Arizona, by Vernon Bailey in 1889.

General characters - Very small, silky pocket mice with small ears, fur lined pockets and slender tails. Color rich buffy yellow, heavily washed with black above.

These pocket mice are found in the cedar belt around the base of the San Francisco Mountains and north of the Painted Desert. They have not been taken in Grand Canyon National Park but undoubtedly come into the eastern part and should be looked for around Cedar Mountain and in the southeastern corner among the desert shrubs.

\* \* \* \* \*

HOPI POCKET MOUSE: Perognathus apache apache Merriam.

Type - Collected at Keams Canyon, Apache Co., Arizona, by J. Sullivan in 1888.

General characters - A beautiful little mouse with silky fur, slender tail, small ears and cheek pouches. Color clear buffy yellow, above, white below.

This pocket mouse is common around the edges of the Painted Desert and may come to the eastern edge of the Grand Canyon north of the Little Colorado River.

\* \* \* \* \*

LITTLE YELLOW POCKET MOUSE: Perognathus longimembris arizonensis Goldman.

Type - Collected in Houserock Valley by E. A. Goldman in 1931.

General characters - Size of fuliginosus with slightly longer tail, and pale buffy yellowish color.

This pocket mouse is known only from Houserock Valley, Arizona, and Kanab, Utah, but may come into the Marble Canyon corner of the Park.

\* \* \* \* \*

INTERMEDIATE POCKET MOUSE: Perognathus intermedius intermedius Merriam.

Type - Collected at Mud Spring (6 miles west of Mineral) Mohave Co., Arizona, by Vernon Bailey in 1889.

General characters - A large, long-tailed pocket mouse with bushy tipped tail, fur-lined cheek pockets, small pointed ears and coarse but silky hair. Color of upper parts dark buffy gray, lower parts buffy or whitish.

These pocket mice are common in Lower Sonoran Zone in the Grand Canyon, south of the river. From the deserts of southern and western Arizona they extend up through the Grand Canyon and out over the lower levels of the Painted Desert and to the head of Marble Canyon, but they have not been taken north of the river. They live in burrows usually near the rocks.

\* \* \* \* \*

PLUME TAILED POCKET MOUSE: Perognathus formosus Merriam.

Type - Collected at St. George, Utah, by Vernon Bailey in 1889.

General characters - Slightly larger than intermedius with longer ears and more plummy tail, colors brighter, more buffy gray above, lower parts whitish.

These bushy-tailed pocket mice are common in Houserock Valley and specimens were taken near Fredonia, in Kanab Wash and farther west where they abound over the Colorado Desert and in the Death Valley country. They have not been taken in the Grand Canyon but undoubtedly occur in places along the north side of the river in Lower Sonoran Zone.

\* \* \* \* \*

MOKI KANGAROO RAT: Perodipus ordii longipes Merriam.

Type - Collected at base of Echo Cliffs near Moa Ave, Painted Desert, Arizona, by C. Hart Merriam in 1889.

General characters - A medium sized kangaroo rat with five-toed hind feet, long tufted tail, large head, short ears

and fur-lined cheek pockets. Color of upper parts cinnamon buff with white markings, sides of tail and lower parts white.

This subspecies is common in Upper Sonoran Zone over the Painted Desert and northwestern New Mexico. Specimens taken in Trash Wash near the southeastern corner of Grand Canyon National Park, show their range to extend in close proximity if not actually into the Park. They are replaced in Houserock Valley by a smaller form.

\* \* \* \* \*

KAIBAB KANGAROO RAT: Perodipus ordii cupidensis Goldman.

Type - Collected in Kanab Wash, southern edge of Kaibab Indian Reservation, Arizona, by E. A. Goldman in 1922.

General characters - A rather small, brightly colored kangaroo rat of the five-toed group.

These kangaroo rats are found in Houserock Valley, Kanab Wash and near Mount Trumbull, possibly coming into the canyon at both ends on the north side of the Colorado River. They are sand loving animals so could be expected only in very restricted areas on the middle inner slopes of the canyon. They inhabit the Upper Sonoran belt.

\* \* \* \* \*

VIRGIN VALLEY KANGAROO RAT: Perodipus microps celsus Goldman.

Type - Collected 6 miles north of Wolf Hole, about 25 miles east of Mount Bangs, Arizona, at 3500 feet altitude by E. A. Goldman in 1922.

General characters - Larger than P. microps, color darker with more black on feet. Much larger than ordii cupidensis.

Specimens from the type locality, upper part of Kanab Wash in Arizona and St. George, Utah, would indicate their probable presence in the Grand Canyon National Monument if not in the National Park area. Like all of the kangaroo rats they inhabit sandy soil and are local and irregular in range mainly in Upper Sonoran Zone, north of the Colorado River.

\* \* \* \* \*

HOUSEROCK VALLEY KANGAROO RAT: Perodipus microps leucotis Goldman.

Type - Collected in Houserock Valley, six miles west of the Colorado River Bridge by E. A. Goldman in 1931.

General characters - A pale form of Perodipus microps with white lining of ears, smaller mastoids and wider basioccipital. Smaller than P. m. excelsis and with distinctive skull characters.

These kangaroo rats have been taken only at the type locality in Houserock Valley but may well extend into the northeastern corner of the Grand Canyon National Park where no collecting has ever been done.

\* \* \* \* \*

#### Family GEOMYIDAE: Pocket Gophers.

FULVOUS POCKET GOPHER: Thomomys fulvus fulvus (Woodhouse).

Type - Collected at San Francisco Mountains, Arizona, by S. W. Woodhouse in 1852.

General characters - A medium sized gopher with small ears, small eyes, large cheek pouches, large claws for digging and rich fulvous brown fur.

These sturdy little rodents live mainly under ground and throw up hundreds of gopher hills in the mellow soil of the plateau and mountains of central Arizona and New Mexico. They are found in Transition Zone. They reach their northern limit along the south rim of the Grand Canyon except for a local subspecies in the Trumbull Mountains.

\* \* \* \* \*

TRUMBULL MOUNTAIN POCKET GOPHER: Thomomys fulvus trumbullensis Hall and Davis.

Type - Collected in the Trumbull Mountains, at the northwest corner of the Grand Canyon National Monument by Seth B. Benson.

General characters - Similar in appearance to typical Thomomys fulvus of San Francisco Mountains, but slightly smaller.

There are several specimens from Mt. Trumbull and

from Mt. Logan that are scarcely distinguishable from fulvus. The question of how they became stranded on this little island of peaks with all of their near relatives on the south side of the Canyon will be left to the geologists.

\* \* \* \* \*

PAINTED DESERT POCKET GOPHER: Thomomys latirostris Merriam.

Type - Collected at Tanners Crossing of the Little Colorado River, about 10 miles above the present town of Cameron, Arizona, by C. Hart Merriam and Vernon Bailey in 1889.

General characters - About the size of Thomomys fulvus but very much paler and with different skull characters. Color of upper parts light sandy yellow, lower parts whitish.

These pale, sandy, desert pocket gophers have been collected on the Little Colorado River and near Tuba in mellow sandy soil. Gopher hills noted in other parts of the Painted Desert are probably made by the same species. More collecting may show that their range extends into the eastern edge of the Grand Canyon National Park or even into the canyon bottom.

\* \* \* \* \*

HOUSEROCK VALLEY GOPHER: Thomomys perpallidus absonus Goldman.

Type - Collected at Jacobs Pools, bottom of Houserock Valley, Arizona, at 4000 feet by E. A. Goldman in 1931.

General characters - Of medium size and buffy gray coloration, pale buffy or whitish below. Paler than Thomomys perpallidus aureus of the San Juan River Valley, its nearest relative.

Specimens of this gopher have been taken only at Jacobs Pool in Houserock Valley but they are probably scattered over the whole valley wherever the soil is suitable. Possibly also their range extends into Marble Canyon and the upper part of Grand Canyon, where no collecting has been done.

\* \* \* \* \*

COLORADO POCKET GOPHER: Thomomys fossor Allen.

Type - Collected at Florida in La Plata Co., Colorado, at 7200 feet by Charles P. Rowley in 1892.

General characters - Size about the same as in T. fulvus

but larger ears and lighter claws, slenderer skull and duller more dusky coloration.

These are the common gophers of Transition and Canadian Zones in Colorado, Utah, northern New Mexico and Arizona, reaching their southern limit on the Kaibab Plateau at the rim of the Grand Canyon. They burrow in the mellowest soil they can find in woods, meadows and mountain parks where they are abundant but rarely seen.

\* \* \* \* \*

**Family ERETHIZONTIDAE: Porcupines.**



D. H. McKee

Arizona Porcupine near Grandview Pt., So. Rim.

YELLOW HAIRIED PORCUPINE: Erethizon epixanthum epixanthum (Brandt).

Type locality - California.

General characters - A heavy bodied rodent with short legs, a stout muscular tail, small eyes, small ears and a

dense coat of barbed quills over whole upper parts. Color of fur mainly black, overlaid with long, yellow-tipped hairs, quills white with black tips; lower parts dusky or sooty gray. Weight of adult 20 to 30 pounds.

These porcupines are found in the Rocky Mountain and Sierra Nevada regions north to Alaska and south on the Kaibab Plateau to the north rim of the Grand Canyon. They feed on green vegetation and bark of trees, occasionally doing slight damage to the forests.

\* \* \* \* \*

ARIZONA PORCUPINE: Erethizon epixanthum couesi Mearns.

Type - Collected at Ft. Whipple, Yavapai Co., Arizona, by Elliott Coues in or before 1865.

General characters - Smaller and paler colored than typical epixanthum; fur more sooty or slaty gray and long yellow hairs paler. Adults weigh about 16 to 20 pounds.

These porcupines are common in places over the central plateau country of New Mexico and Arizona south of the Grand Canyon, but the limits of their range are not well determined. They are found mainly in the forested areas from the nut pine and yellow pine zones up to timberline on San Francisco Mountains. They are very interesting animals and in moderate numbers quite harmless.

\* \* \* \* \*

### Family CASTORIDAE: Beavers.

GRAND CANYON BEAVER: Castor canadensis repentinus Goldman.

Type - Collected in Bright Angel Creek at 4000 feet altitude in the Grand Canyon of the Colorado by Clarence Birdseye in 1909.

General characters - Very similar to Castor canadensis frondator Mearns, of the San Pedro and Gila drainage in southern Arizona but said to be slightly paler and with longer, narrow nasal bones. Color of upper parts yellowish cinnamon brown, size about as in canadensis.

There have long been a few beaver in Bright Angel Creek



G. Grant

Cottonwood Trees cut by Grand Canyon  
Deaver - Cottonwood Camp on Bright Angel Ck.

and they have been reported from Garden Creek, Chuar Creek, Kwagunt Creek and at several places along the Colorado River both above and below the Grand Canyon. There are few suitable places for them and little suitable food but they are of great interest where they occur.

\* \* \* \* \*

## Order CARNIVORA: Flesh Eaters.

### Family FELIDAE: Cats.

KAIBAB MOUNTAIN LION: Felis concolor kaibabensis Nelson and Goldman.

Type - Collected on Powell Plateau in the Grand Canyon by J. T. Owens in 1911.

General characters - One of the largest of the plain colored long-tailed cats of the puma or panther group, occupying much of North and South America. Slenderer than a real lion, without mane and with short smooth hair of a dark tawny

color; lower parts paler; tip of tail, face and ear markings dusky. A very large male taken in Arizona by Musgrave weighed 276 pounds.

These mountain lions were formerly numerous and are still common over the Kaibab Plateau, along the rim of the Grand Canyon and down into the canyon in places where the deer winter. Whether or not they cross the river is not known. They feed mainly upon deer and mountain sheep but may kill domestic stock.

\* \* \* \* \*

GRAY MOUNTAIN LION: Felis concolor azteca Merriam.

Type - Collected at Colonia Garcia, Chihuahua, Mexico, by H. A. Cluff in 1899.

General characters - Slightly smaller and much grayer than kaibabensis or hippolestes and generally with a range in lower more open country.

This species is found over southern Arizona, New Mexico and west Texas and may reach its northern limit on the south side of the Grand Canyon where a few still occur. One skin that I have seen from the south rim of the Canyon seems to be of this gray form and Nelson and Goldman refer specimens from near Flagstaff and Prescott to azteca.

\* \* \* \* \*

JAGUAR: El Tigra of the Mexicans; Felis hernandesii hernandesii Gray.

Type locality - Mazatlan, Sinaloa, Mexico.

General characters - Having much the appearance of an African Leopard, the Jaguar is of heavier build, has a shorter tail and apparently is a more powerful animal. Color; upper parts dull orange; lower parts white, heavily spotted all over with black. On the sides and back the spots are in groups or circles somewhat like cat tracks.

These great cats from Mexico have a scattered range over west Texas, southern New Mexico, Arizona and California. One of the northern-most records is of one killed by Indians near the railroad some four miles south of the Grand Canyon rim about 1907. It had killed and eaten a colt. Generally Jaguars kill cattle more often than horses.

PLATEAU BOBCAT: Lynx rufus baileyi Merriam.

Type - Collected at Moccasin Spring, west of Fredonia, Arizona, by Vernon Bailey in 1888.

General characters - About the size of the eastern bobcat or wildcat, with the same short tail, tasseled ears and throat ruff; colors much brighter, more yellowish and more conspicuously spotted with black.

This is the common bobcat of Arizona and New Mexico mainly in Upper Sonoran and Transition Zones but not restricted to any zones. It is found throughout the Grand Canyon and on both sides.

\* \* \* \* \*

### Family CANIDAE: Wolves, Dogs and Foxes.

PLAINS WOLF: GRAY WOLF: Canis lycaon nubilus Say.

Type locality - Engineer Cantonment near the present town of Blair, Nebraska.

General characters - Size of a very large dog with heavier teeth, erect ears, long shoulder mane and drooping bushy tail. Color light gray from black tipped hairs over white or buffy underfur, lower parts whitish, tip of tail black.

These large wolves of the Great Plains and Rocky Mountain regions range through Colorado and parts of Utah and are assumed to be the form once common and now scarce on the Kaibab Plateau. No specimens from there have ever been saved.

\* \* \* \* \*

MEXICAN WOLF: Canis lycaon baileyi Nelson and Goldman.

Type - Collected at Colonia Garcia, Chihuahua, Mexico, by E. W. Nelson and E. A. Goldman, in 1899.

General characters - Similar to C. l. nubilus but smaller and darker colored with more black overlaying the more ochraceous underfur; lower parts buffy, ears and nose tawny.

These wolves are found in northern Mexico and southern New Mexico and Arizona. Their range extends as far north as the San Francisco Mountains and Kendrick Peak, and supposedly to the south rim of the Grand Canyon where wolves were re-

ported by Goldman in 1913. They are now very scarce, if they occur at all, in the Canyon country.

\* \* \* \* \*

MOUNTAIN COYOTE: Canis latrans lestes Merriam.

Type - Collected in the Toyabe Mountains north of Cloverdale, Nevada, by Vernon Bailey in 1890.

General characters - Size large for a coyote with heavy skull and teeth, large ears and bushy tail. Color of upper parts dark buffy gray with gray throat and tawny lower surface of tail.

These large, dark gray coyotes range in the timbered mountains of the whole Rocky Mountain region south to the Kaibab Plateau and Trumbull Mountains. They kill deer, especially fawns and does.

\* \* \* \* \*

PAINTED DESERT COYOTE: Canis latrans estor Merriam.

Type - Collected at Nolans Ranch on the San Juan River in San Juan Co., Utah, by J. Alden Loring in 1893.

General characters - A small, slender coyote with very light dentition and pale colors. Upper parts pale buffy gray with not much black over back or tail; sides and legs and lower surface of tail buffy.

These little Upper Sonoran desert coyotes range from northwestern New Mexico, northeastern Arizona, southern Utah and Nevada across to southern California. They inhabit the Painted Desert, Houserock Valley and the area surrounding the Kaibab Plateau. Specimens have been collected on both sides of the Plateau and coyote tracks seen at the mouth of Chuar Creek in the bottom of the Canyon may have been of this desert form or of lestes. Coyotes occur on both sides of the Colorado River and probably cross the river in some places.

\* \* \* \* \*

MEARNS COYOTE: Canis latrans mearnsi Merriam.

Type - Collected at Quitobaquito, Pima County, Arizona, by E. A. Mearns and F. X. Holzner in 1894.

General characters - Size rather small, teeth light, ears erect and pointed, fur full and soft in winter, thin and harsh in summer. Colors rich fulvous gray with much black on

back and tail; bright fulvous on head, legs, sides and lower surface of tail.

The range of these Lower and Upper Sonoran Zone coyotes of southern Arizona apparently extends north to the South Rim of Grand Canyon where they are still common.

\* \* \* \* \*

ARIZONA GRAY FOX: Urocyon cinereoargenteus scottii Mearns.

Type - Collected near Oracle, Pinal County, Arizona, by W. E. D. Scott, in 1884.

General characters - About the size of the red fox but with shorter legs and heavier build; tail laterally compressed with black crest and tip; color coarse pepper and salt gray, with rich buffy yellow on sides, legs and lower parts; some white on throat and belly.

This yellow gray fox of the arid southwest lives mainly in Upper Sonoran Zone but ranges frequently into lower and higher zones. It occupies the whole of the Grand Canyon on both sides of the river and may be seen along the trails.

\* \* \* \* \*

### Family BASSARISCIDAE: Ringtails.

NEVADA RINGTAIL: Bassariscus astutus nevadensis Miller.

Type - Collected at Eldorado, Clark County, Nevada, by Maximilian Weiss in 1912.

General characters - Size of a small house cat with slenderer body and longer tail; feet small and cat-like, tail flattened and marked with 7 or 8 broad black bands or cross bars. Color buffy gray, lower parts whitish and face with light spots above and below eyes.

Specimens from both sides of the Grand Canyon are referred to this small desert form of the ringtail which occupies Upper and Lower Sonoran Zones of the Colorado Desert region. These animals are cave and cliff dwellers and find ideal homes from top to bottom of the canyon walls.

\* \* \* \* \*

### Family PROCYONIDAE: Raccoons.

DESERT RACCOON: Procyon lotor pallidus Merriam.

Type - Collected at New River, Imperial Co., California, by Frank Stephens in 1899.

General characters - A fully plantigrade carnivore with round furry tail and pointed nose. General color, silvery gray with brownish underfur, a black band across face and 6 or 7 black rings around tail. Weight about 20 pounds.

This raccoon is common along Havasu Creek and has been reported from Tapeats, Clear and Chuar Creeks in the canyon and both above and below the Grand Canyon in suitable places where food and clear water are available and hollows in cliffs afford dens.

\* \* \* \* \*

### Family URSIDAE: Bears.

ARIZONA BLACK BEAR: Euarctos americanus amblyceps (Baird).

Type locality - Old Fort Webster, near Copper Mines, New Mexico.

General characters - Size and general appearance of the eastern black bear but skull short and wide with light dentition, claws short and curved. Color generally black all over except brown nose, but occasionally light or dark brown all over.

There are a few old records of the black bear from the Kaibab Plateau and a few of more recent date from the South Rim of the canyon but it is not a resident animal nearer than San Francisco and Kendrick Mountains on the south and central Utah on the north. There are no specimens from this region and the subspecies can be only assumed.

\* \* \* \* \*

UTAH GRIZZLY BEAR: Ursus utahensis Merriam.

Type - Collected on North Fork Salina Creek, south of Mayfield, Utah, by Mart Martenson in 1914.

General characters - Size large, front claws long, skull

high and narrow. Color dark brown with silvery tipped hairs over back and sides.

There are specimens of this bear from the mountains of central Utah and from the Pine Valley Mountains of southwestern Utah. An old record of a grizzly bear killed by an Indian boy in South Canyon of the Kaibab Plateau some 65 or 75 years ago probably should be referred to this form. This bear may have wandered from farther north.

An important record in Nature Notes for November, 1933, tells of a grizzly bear encountered by Charles D. Walcott while studying the Algonkian rocks in the eastern part of the Grand Canyon in the early eighties. This may have been in the Nankowep Valley but the location is somewhat indefinite and the species of bear can be only inferred.

\* \* \* \* \*

ARIZONA GRIZZLY BEAR: Ursus arizonae Merriam.

Type - Collected in the Escadillo Mountains, Apache Co., Arizona, by C. H. Shinn in 1916.

General characters - Size large, skull long and narrow with broad rostrum and narrow frontal shield. Color dull brown with yellow tips to the long hairs. Weight estimated at 1000 pounds.

This name can probably be used for the grizzly bears which were common on San Francisco, Sitgreaves and Bill Williams Mountains from 1851 up to 1889 and later. They have not been recorded from the south rim of Grand Canyon but undoubtedly wandered there at times. Whether or not they ever crossed the canyon will never be known but they were mountain and forest dwellers and not at home in the deserts or far from water.

\* \* \* \* \*

### Family MUSTELIDAE: Weasels, Skunks and Badgers.

ARIZONA WEASEL: Mustela longicauda arizonensis Mearns.

Type - Collected near Flagstaff, Arizona, by E. A. Mearns in 1886.

General characters - A medium sized weasel with long slender body and long tail with terminal pencil of long hairs.

Color light brown with yellow belly and toes, and black tip to tail. In winter pure white all over except black tip of tail.

These weasels are never common but are scattered over Transition and Canadian Zones of the whole Rocky Mountain region from Arizona to Canada and both sides of the Grand Canyon. They are great hunters, living mainly on the smaller rodents.

\* \* \* \* \*

LITTLE SPOTTED SKUNK: Spilogale gracilis gracilis Merriam.

Type - Collected on the old Hance Trail in the Grand Canyon of the Colorado at 4000 feet altitude by C. Hart Merriam and Vernon Bailey in 1889.

General characters - A slender, much striped and spotted little skunk with unmistakable skunk odor. Color black with six white stripes on back and sides, white spots on forehead, cheeks and rump and white tip to plummy tail.

These beautiful little skunks are common throughout the Grand Canyon on both sides of the river in Upper and Lower Sonoran Zones where they live in caves and cracks in the cliffs and under cactus or any dense cover, subsisting largely on rodents, insects and cactus fruit. They are gentle and make interesting pets.

\* \* \* \* \*

ARIZONA SKUNK: Mephitis estor Merriam.

Type - Collected at Little Springs, north base of the San Francisco Mountains, Arizona, by C. Hart Merriam and Vernon Bailey in 1889.

General characters - Size medium, tail long and bushy, soles naked, large musk glands around anus. Color black and white, a narrow white line down face, white nape, side stripes and tip of tail.

This species is common in Transition Zone over Arizona, western New Mexico and northern Mexico. Not found in the Grand Canyon but common on both sides.

\* \* \* \* \*

COLORADO BADGER: Taxidea taxus phippsi Figgins.

Type - Collected northeast of Chromo, Archuleta County, Colorado, by L. R. Hersey in 1913.

General characters - Larger and darker colored than the Texas badger, long, low and heavy bodied with long front claws for rapid digging. Color dark brown with frosting of white tipped hairs over upper parts, a white stripe from face over head to shoulders and white on cheeks; face, tips of ears and tail strongly marked with dusky; lower parts buffy brown. Weight 20 to 25 pounds.

The Colorado Badger is common in all zones in southwestern Colorado, Utah and Arizona and on both sides of the Grand Canyon but not in it, although one was found dead in the river at the mouth of Chuar Creek. It lives mainly on Prairie dogs, gophers and other rodents.

\* \* \* \* \*

ARIZONA OTTER: Lutra canadensis sonora Rhoads.

Type - Collected in Beaver Creek near Montezuma Well, Arizona, by E. A. Mearns in 1898.

General characters - Low, long bodied animals with long, tapering furry tails, fully webbed feet, short glossy fur. Well fitted for aquatic life. Color dark reddish brown, more grayish brown on head and neck and lower parts. Weight of type 19 pounds and 7 ounces.

Otters range along the Colorado and Gila Rivers. Their tracks have been found by several biologists of the Biological Survey in the Grand Canyon on sandy shores of the river.

\* \* \* \* \*

## Order INSECTIVORA: Moles and Shrews.

### Family SORICIDAE: Shrews.

DESERT EARED SHREW: Notiosorex crawfordi crawfordi Baird.

Type - Collected near old Fort Bliss about two miles above El Paso, Texas, by S. W. Crawford in 1857.

General characters - A small, short tailed shrew with long sharp nose, very small eyes and prominent ears. Color slaty gray or plumbeous all over.

One of these little desert shrews reported in Nature Notes for December, 1932, was caught on the lower part of Bright Angel Trail by Lloyd Davis on October 1, 1932. This species seems to have a wide range over the Lower Sonoran Zone of the desert region but is rarely seen or collected.

\* \* \* \* \*

## Order CHIROPTERA: Bats.

### Family MOLOSSIDAE: Free-tailed Bats.

MEXICAN FREE-TAILED BAT: Tadarida mexicana mexicana (Saussure).

Type - From Ameca, Jalisco, Mexico.

General characters - Size medium; ears short and wide; tail projecting three-quarters of an inch beyond the membrane, fur short and oily; a strong musky odor. Color dull sooty or brownish black; nose, ears, feet and naked membranes black.

Common in Lower Sonoran Zone from Texas to California and Nevada; found in the bottom of the Grand Canyon, in Houserock Valley and Painted Desert. They winter in caves in great numbers.

\* \* \* \* \*

### Family VESPERTILIONIDAE: Common Bats.

LITTLE PALE BAT: Myotis californicus pallidus Stephens.

Type - Collected at Vallecito, San Diego Co., California, by Frank Stephens in 1895.

General characters - A pale desert race of the little California bat, ears pointed with slender straight tragus. Color pale yellowish buff, ears blackish, naked membranes pale brownish.

This bat is common in Upper and Lower Sonoran Zones of the desert region. It is especially abundant in the Grand Canyon and all the side canyons on both sides of the Colorado River. Around Phantom Ranch and in Havasu Canyon it was found fairly swarming from early dusk until dark and again

\* \* \* \* \*

before daylight. It lives in clefts and cracks of the canyon walls.

\* \* \* \* \*

YUMA BAT: Myotis yumanensis yumanensis (H. Allen).

Type - Collected at old Fort Yuma, Imperial County, California, by George H. Thomas in 1855.

General characters - Size larger than M. c. pallidus, fur less glossy, colors slightly paler, tail membranes usually edged with white.

This species is abundant in the Lower Sonoran Zone of the desert region. It occurs throughout the Grand Canyon, Havasu Canyon and in Houserock Valley.

On the wing it is indistinguishable from other little pale bats of the region and not easily recognized without comparison of specimens. It lives in cliffs and rock walls.

\* \* \* \* \*

FRINGED BAT: Myotis thysanoides thysanoides Miller.

Type - Collected at Old Fort Tejon, Kern Co., California, by Theodore S. Palmer in 1891.

General characters - Size larger than yumanensis, ears long, reaching beyond tip of nose; edges of tail membranes fringed with short, stiff hairs. Color of upper parts rich warm buff, lower parts buffy white.

This species is widely distributed in the Upper Sonoran Zone of the arid interior from Washington to Mexico, but usually it is not abundant. There are two records of specimens taken on the South Rim of the Grand Canyon.

\* \* \* \* \*

LITTLE LONG-EARED BAT: Myotis evotis chrysonotus J.A. Allen.

Type - Collected at Kinney Ranch, Sweetwater County, Wyoming, by W. W. Granger in 1895.

General characters - A small bat with relatively large ears that reach well beyond the tip of the nose; color golden brown, lower parts buffy; ears and membranes blackish.

These wide ranging bats are found from the Rocky Mountains to the Pacific and south into Mexico. There is one

record from the South Rim of the Grand Canyon, and specimens from Williams and San Francisco Mountains. They seem never to be common.

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HOLLISTER BAT: Myotis occultus Hollister.

Type - Collected ten miles above Needles on the California side of the Colorado River, by Ned Hollister in 1905.

General characters - A medium sized bat with one or two of the upper premolars lacking; ears small; color glossy brown above, yellowish buff below; ears and membranes dark brown or blackish.

These richly colored bats are found over New Mexico, Arizona and southeastern California. There is one record for the South Rim of the Grand Canyon and others from the San Francisco Mountains and Montezuma Well in central Arizona.

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WESTERN LITTLE BROWN BAT: Myotis volans interior Miller.

Type - Collected in the Taos Mountains near Twining, New Mexico, at 11,300 feet altitude, by Vernon Bailey in 1904.

General characters - A rather small bat with small ears and rich chestnut brown fur, dusky ears and membranes.

This western form of the eastern Little Brown Bat is widely distributed in the Rocky Mountain region, mainly in Transition and Canadian Zones. A single specimen secured on the South Rim of the Grand Canyon by R. K. Grater on September 24, 1934, adds it to the Canyon list. It had previously been collected on San Francisco Mountains and at Keams Canyon and should be found on the Kaibab.

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LARGE BROWN BAT: Eptesicus fuscus fuscus (Beauvois).

Type locality - Philadelphia, Pennsylvania.

General characters - A rather large, robust bat with triangular ears, and low, wide skull with only 32 teeth. Color light chestnut or hazel brown with black nose, ears, feet and membranes.

These are common eastern bats, ranging west to the Rocky Mountains in the north. Almost typical specimens have been

taken on San Francisco Mountains and at the Grand Canyon. Most of the specimens however, are rather pale and could better be referred to the Colorado form, Eptesicus fuscus pallidus. They breed mainly in the Transition Zone.

\* \* \* \* \*

LARGE PALE BROWN BAT: Eptesicus fuscus pallidus Young.

Type - Collected at Boulder, Boulder County, Colorado, by R. T. Young in 1903.

General characters - Size and general characters of E. fuscus but paler in coloration, upper parts more nearly wood brown or dull ochraceous, lower parts still paler brownish.

These pale brown bats are found throughout the southern Rocky Mountain and Great Basin regions and often are in company with the darker eastern form. The actual breeding ranges are not well known. Both have been identified in the canyon country but more specimens are needed for study.

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LITTLE CANYON BAT: Pipistrellus hesperus hesperus H. Allen.

Type locality - Old Fort Yuma, Imperial Co., California. Described in 1864.

General characters - Size, smallest of our North American bats; teeth 34; ears short and rounded with short blunt tragus. Color, pale grayish buff; ears and membranes black.

This bat is common in canyons and cliffs from west Texas to California and north to Oregon, mainly in Lower Sonoran Zone. It is abundant in the lower parts of the Grand Canyon and Havasu Canyon and is found in the Painted Desert and in Houserock Valley. It lives in cracks and holes in the cliffs and canyon walls and often comes out in daylight.

\* \* \* \* \*

SILVER-HAIRED BAT: Lasiorycterus noctivagans Le Conte.

Type locality - Eastern United States. Described in 1831.

General characters - Size medium; fur long and woolly, covering top of tail membranes; ears short; teeth 36 in number. Color dark sooty brown or black all over with silvery frosting on back; ears and membranes black.

This bat is distributed widely across the continent, breeding in the Transition Zone and migrating south in winter. One specimen collected by G. E. Sturdevant on the South Rim of the Grand Canyon in 1928 seems to be the only definite record from this locality but the species is common on San Francisco Mountains and over most of the yellow pine country.

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LARGE PALE BAT: Antrozous pallidus pallidus Le Conte.

Type - Collected at El Paso, Texas, by J. E. Clark in 1851.

General characters - Size large, ears over an inch long; teeth 28 in number. Color pale buffy brown, lower parts whitish, ears and membranes grayish brown.

These large pale bats range from western Texas to California and Nevada in Lower Sonoran Zone desert country. Several specimens have been taken on the South Rim of the Grand Canyon and many were seen in Havasu Canyon where easily recognized on the wing. They generally live in caves or buildings and are inclined to be colonial in habits.

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### BATS THAT SHOULD BE AT THE GRAND CANYON BUT HAVE NOT BEEN COLLECTED

Myotis lucifugus phasma - Found in Colorado and southern California.

Myotis velifer velifer - Taken at Montezuma Well in Arizona.

Myotis subulatus melanorhinus - Type from Little Springs, north base of the San Francisco Mountains.

Lasiurus cinereus - A wide ranging migratory species found on all sides of the canyon.

Corynorhinus rafinesquii pallescens - Taken at Keams Canyon and Fort Verde in Arizona and in Nevada.

