Guide to the Mammals of Colorado

HUGO G. RODECK

"Scientific knowledge almost daily advances . . . Yet educated folk become more and more ignorant of it . . . Scientists write for other scientists . . . Yet many of the greatest from Galileo and Copernicus to Darwin and Galton wrote largely for the public." (Warden, Comp. Psych., p. ii)

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GUIDE TO THE MAMMALS OF COLORADO

HUGO G. RODECK

(Second Printing)

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GUIDE TO THE MAMMALS OF COLORADO

The mammals are among our most interesting wildlife to both layman and expert alike. They are less well known than the birds, principally because for the most part they are more timid, and many of them are active only at night, hiding away during the daylight hours.

For these reasons there are numerous species of mammals which, while actually numerous, are almost unknown to most of us. Few have ever observed a pocket gopher, and most persons who see a shrew suppose it to be a mouse.

At the same time the mammals are considerably easier to learn than the birds. There are about 250 genera of birds known from Colorado, but only about 65 genera of mammals. This Guide deals mainly with mammal genera (with some exceptions) because of the fact that we see many mammals only in glimpses which make the recognition of species impossible. In a few instances we can be fairly sure about the species since in any locality there is often only one species of a particular kind of mammal. There are a great many differences between closely related mammals which are not mentioned in this Guide because they are not apt to be seen by the average observer. It will be necessary to refer to more complete works for these, and for this purpose a short list of useful books is to be found at the end of this Guide.

Newcomers to Colorado who know the mammalian wildlife of other areas may look in vain for some mention of Flying Squirrels or some other kind of mammal which they know from another region. Let it be understood here that if a mammalian genus, or larger group, is not mentioned in this Guide, it has not been found in Colorado.

Acknowledgements

I should like to thank all those who have given so generously of their time and suggestions in helping to make this little book more

valuable to those for whom it is written. My colleagues and students have read and criticized most meticulously and most of their suggestions have been incorporated here. My family has been very helpful. I am particularly grateful to those members of the state game department who have given information from their first-hand knowledge. To all these and others I offer my thanks, and the hope that they may find some reward in a simple source of general information about mammals for the citizens of Colorado and for our visitors.

I should like particularly to acknowledge the work of the artists who made the illustrations, Jane French and Dominick D'Ostilio, whose pens have contributed perhaps the most valuable part of this book. If a picture is not actually worth ten thousand words, at least the pictures in this pamphlet will be consulted ten times as often as the text.

What is a Mammal?

Before proceeding any further, it is perhaps necessary to stop long enough to define what is meant by the term "mammal."

Mammals are the creatures commonly referred to as "animals," as contrasted to "birds." Actually, birds are animals, as are all living things except plants. Snakes, frogs, insects, worms, are all *animals.*

Animals can be separated into two great divisions, depending upon whether they have a backbone (and bony internal skeleton) or whether (like the insects, spiders, snails, worms and many others) they either have the hard supporting parts on the outside, like the insects, or have no hard parts at all, like the worms.

The Vertebrates, which is the name given to those animals with a backbone composed of *vertebrae,* are as follows:

Pisces—the fishes
Amphibia—the frogs, toads, and salamanders
Reptilia—the crocodiles, alligators, turtles, lizards, and snakes
Aves—the birds
Mammalia—the mammals

Of these classes of vertebrates, the first three (fishes, amphibians and reptiles) are cold-blooded, which means that their body temperature changes more or less with the temperature of the air or water in which they live. The two latter (birds and mammals) are warm-blooded—that is, their body temperature is more or less constant regardless of the temperature of their surroundings.

In the same way that we can say that birds are animals with feathers (no other animals have them!) we can say that mammals are animals with hair. If an animal has hair or fur, it is a mammal.

Mammals also have another peculiarity which distinguishes them from the birds (and from all other animals). The females of all mammals have mammary glands which secrete milk for the feeding of the young. This is the reason for the name, Mammalia.

There are a great many other features which are possessed by mammals and not by other animals, but it is only necessary for us to remember that *mammals are warm-blooded animals with hair or fur, which nourish their young with milk.* On this basis we then can understand why whales and bats, which seem so different from the average, are nevertheless included with the other mammals. Likewise, since human beings have these peculiarities, we also are mammals.

Hibernation

Many mammals escape the discomforts of winter by means of a period of inactivity called hibernation. This is particularly true of many of the rodents, but also of many carnivores, bats, etc. The depth of this winter "sleep" varies a great deal. Some rodents sleep so deeply as to be aroused only with difficulty, and their breathing and pulse rates reach a very low point. Bears, on the other hand, illustrate a very light sleep from which they may easily be aroused. A large proportion of our mammals do not hibernate but are active all winter, whether underground or in the open. Big game animals often descend to lower altitudes to escape the dangerous winters in the high mountains. Many, perhaps most, of our bats migrate to other climates and so escape our winters, but some of them sleep lightly in caves and mine tunnels. There are all degrees of inactivity among the mammals of any locality, and even the same (or closely related) species may hibernate or become inactive in one place, but remain active in a milder climate.

Economic Importance of Mammals

Among all the living things mammals are the most immediately important to mankind, with the possible exception of disease organisms. We eat their flesh, drink their milk, and use their hair and skin for clothing, shoes, and a multitude of other things. Primitive man used their bones for weapons, utensils, decoration, and for making jewelry and games. Their teeth were utilized for necklaces and charms. He made tents of their skins. It has been said in jest that modern packing houses use everything of a pig but its squeal, but the statement is literally true of mammals in general at some time or place in human history. In modern medicine even their hormones

are collected, and mammals are indispensable in the production of vaccines and other preventive organic remedies.

Distribution of Mammals

Colorado varies greatly in altitude, from about 3500 feet where the Arkansas River leaves the state in the southeast, to over 14,000 feet at the summits of the highest peaks. Such a great range in altitude brings about a correspondingly great range in climate, roughly equivalent to the climatic difference between the Mexican border and the arctic tundra north of the tree line.

These altitudinal climatic zones have been named after the corresponding latitudinal localities, so that in Colorado there are five so-called Life Zones, most readily recognized by their characteristic plant covers, roughly as follows:

Zone	Altitude	Plant Cover
Arctic-Alpine Zone (Above timberline)	Above 12,000 feet	Alpine Tundra
Hudsonian Zone	10,000 to 12,000	Spruce and Fir
Canadian Zone	8,000 to 10,000	Lodgepole Pine
Transition Zone (Foothills)	6,000 to 8,000	Ponderosa Pine
Upper Sonoran Zone (Plains)	3,500 to 6,000	Grasslands

Such wide differences in climate and in plant life often bring about quite different faunas in the various zones, so that when traveling over the plains of eastern Colorado one sees for the most part a different list of mammals, birds, and reptiles than if one were on a high mountain pass, or in the wide valleys of western Colorado. In the forest one sees forest animals, and on the plains one sees plains animals.

Certain mammals are closely associated with a particular feature of their environment. Kangaroo Rats, for example, are always found in sandy soils, Black-footed Ferrets where there are Prairie-dogs, and Tuft-eared Squirrels only with Ponderosa Pines. Beavers live only where there are trees and water, while Porcupines live principally in pine forests. Pikas are found only at the highest altitudes in Colorado.

On the other hand, there is a considerable list of mammals and other animals which apparently pays little or no attention to such matters, so that one will find coyotes or house mice anywhere that the conditions are not impossible for the species. Marmots are seen with Pikas above timberline, but the Marmots also occur in the lowest foothills.

Size Measurements of Mammals

In the descriptions and discussions which follow, the size of the mammals being discussed is sometimes given as "small" "medium," or "large," and sometimes in actual inches or feet. In each instance that method has been selected which will give the reader the most direct and simple understanding of the size of the mammal in question. The terms "small," "medium," etc., are used in the ordinary sense and, if interpreted loosely should be useful for our purpose.

It is recognized that users of this Guide will not ordinarily be in a position to measure the mammals observed and consequently any measurements given here will have to be applied in a rather carefree manner. As an additional aid we have devised a method of indicating the approximate size of each of the mammals illustrated in this Guide by including in each illustration a circle or a portion of a circle, often disguised but always present. *In every illustration the circle represents a tennis ball drawn to the same scale as the mammal.* Consequently, if the circle is larger than the mammal in the picture, then the mammal is smaller than a tennis ball (diameter 2½ inches). If you have not played tennis recently you may recall that a tennis ball just comfortably fills the ordinary-sized hand.

The term "length" as applied in mammal measurement always means *total* length—the distance from the tip of the nose to the tip of the tail when the animal is lying on its back with head and tail outstretched in a straight line. In other words, the length of the tail must always be subtracted from the "length" measurement if you wish to know the length of the head and body *without* the tail. There are other measurements in which the professional mammalogist is interested but in this Guide our greatest interest is in simplifying the generic identification of mammals.

FINDING TABLE FOR COLORADO MAMMALS

HOOFED MAMMALS
Order Artiodactyla

Mammals with hoofs are of two general kinds. The horse (which once lived in Colorado but which disappeared before the first men arrived in North America) represents one type in which the number of hoofs on any one foot is an odd number (1, 3, or 5). The horse, of course, has only one hoof on each foot, but the tapirs and rhinoceroses have more.

The present-day native hoofed mammals of Colorado are all even-toed, that is, they have two hoofs in contact with the ground on each foot, and may be called cloven-hoofed. Most of the cloven-hoofed mammals of the world have some kind of outgrowths on the head for protection or for fighting, in one or both sexes. These may be horns, like those of bison or cattle, or antlers, like those of deer.

Horns and Antlers

Horns, carried generally by oxen, sheep and goats, are composed of a material somewhat like our fingernails and, like fingernails, they go on growing indefinitely. Inside of this hollow, trumpet-shaped covering there is a conical extension of the bone of the skull, with a supply of nerves and blood vessels. The longer the animal lives the larger its horns become, so that the oldest bighorn sheep or bison has the largest horns. In most of the horned mammals the females also have horns, but they are invariably smaller and lighter than those of the males.

Antlers, borne by members of the deer family, are quite different. In the first place, antlers, unlike horns, are shed or discarded every year, and a new pair grows to take their place. Consequently it is not necessarily the oldest animals which have the finest and largest antlers, but the most vigorous and healthy. Very old animals may have freak antlers, or small, light ones like the young. Antlers are composed of real bone which grows out from the skull. For a time during the summer they are covered with a furry skin called the "velvet," which is supplied with blood vessels and nerves. During this time the antlers are tender and are carefully protected from injury by the animal. Injuries to antlers "in the velvet" frequently lead to the development of an extra prong at that point, and extensive injury may produce the freak "brush heads" which are so highly prized by some sportsmen.

In the fall, just before the breeding season, a ridge, called the "burr," develops around the base of the antler, cutting off the blood

and nerve supply from the velvet which consequently dies and is rubbed off on trees and brush by the animal. The antlers emerge as naked bone, ready for battle with rival males or for protection against enemies. In most antlered mammals only the males have antlers but in some, like the caribou of our arctic regions, the females have antlers which are less impressive than those of the males.

The Pronghorn, or American "antelope," has true horns, hollow and with a bony inside core, but they differ from the horns of every other horned mammal in two respects. First, the Pronghorn is the only hollow-horned mammal in the world with branched horns. Secondly, it is the only hollow-horned mammal which sheds its horns every year and grows a new pair. Only the hollow outer covering is shed, however, and the bony core is retained.

The Deer Family
Cervidae

Mule Deer — *Odocoileus hemionus*

This is the common deer (Figure 1) which exists in increasing numbers nearly everywhere in the state, even far out onto the eastern plains. It is yellowish-brown, sometimes distinctly reddish, in the summer, but the winter color is gray. It has a whitish patch on the rump. The tail is short and slender, with a black tip. There is considerable black on the face and about the muzzle. The ears are very large and, with the mule-like tail, give the animal its common name.

Figure 1. Mule Deer.

Young fawns are profusely spotted with white during their first summer, and are very difficult to see as they lie perfectly still and allow one almost to step on them.

Large bucks may weigh up to 300 or more pounds, but regardless of the size of the animal, the normal antlers have but five prongs on each side (see Figure 2, right). There is usually a very short prong near the base of each antler, after which the main beam divides evenly into two, each of which again divides equally into two prongs. Any less than this number suggests that the animal is either younger than about three years, or is diseased, or is so old that his vigor has declined. Any more than five points on either antler indicates injury, or damage by parasites, while in the velvet.

The Mule Deer is Colorado's greatest big game resource, over 71,000 having been shot by deer hunters in the 1949 season. It has increased so greatly in numbers that an active big game hunting season is necessary to keep it from becoming too great a competitor of the agricultural and grazing industries of the state. Furthermore, in the interests of maintaining our deer in vigorous good health it is necessary that the two sexes be harvested in proportionate numbers, and it is to be hoped that misguided humanitarians will not let their well-meant chivalry toward the female deer obscure the fact that a heavy preponderance of does will inevitably result in the deterioration of our deer.

Figure 2. Antlers of Deer; left, White-tailed Deer; right, Mule Deer.

Western White-tailed Deer *Odocoileus virginianus macrourus*

The White-tailed, or Virginia Deer is distinguishable from the Mule Deer by several characteristics. Most conspicuously, its antlers, instead of being evenly twice-forked, are composed of a main beam on each side which proceeds upward and forward, from which 3 to 5 prongs extend upward along its length (see Figure 2, left). Its tail is broad and triangular, and when the animal is alarmed the tail is raised, exposing its broad, white under-surface. Its coat color is similar to that of the Mule Deer, but is inclined to be redder in summer and less blue-gray in winter. The young fawns are spotted like those of the Mule Deer. White-tailed Deer are smaller on the average than Mule Deer; a large buck weighs about 250 pounds.

The Western White-tailed Deer originally was found in the river-bottom thickets along the streams of eastern Colorado and in other localities but, according to a recent survey, it is now found only in the mountains of southern Colorado where a few individuals wander in seasonally from New Mexico.

Figure 3. Elk or Wapiti.

American Elk, Wapiti *Cervus canadensis*

The Elk is a large deer, as big as a horse (Figure 3). It can be distinguished at a distance by its three-colored appearance. The head and neck are deep chocolate brown, the body is tan, and there is a very large, nearly white area all over the rump. The neck sags

slightly just in front of the shoulders to give the effect of a hump on the shoulders.

The antlers of the bull elk are distinguished from those of the deer by their great size and length, and by the heavy, backward-ranging beam with long, unbranched prongs which are directed upward and forward, the lower ones overhanging the face.

The Elk formerly ranged all over the plains and mountains of Colorado, but the persecutions of man have pushed it into the higher parts of the mountains, and from there it ranges above timberline in the summer.

The Elk is second only in importance to the Mule Deer as a big game resource in Colorado, and in the 1949 season over 8,000 were brought home by sportsmen.

Moose *Alces americana shirasi*

The moose is the giant of all the deer (Figure 4). A large bull may weigh up to 1400 pounds and stand over six feet at the shoulder. Its color is very dark brown, nearly black, with lighter-colored legs.

Figure 4. Moose.

The bull is distinguished by its very peculiar flat, palmate antlers, like a shovel extending outward on either side of the head. Its large size combined with its high fore-quarters, its down-curved muzzle, and the long, pendant "bell" under the neck of the male makes up a grotesque combination which, once seen, can never be mistaken.

The Moose is not a conspicuous member of the Colorado fauna, since it commonly is not expected south of northwestern Wyoming. But it apparently does wander into Colorado from Wyoming and it may become established here, even if it is not introduced by man. There is a record of a moose being shot in Estes Park in the 1860's. One was reported in Routt County in 1933. More recently, a young bull was killed about 6 miles southeast of Steamboat Springs in November, 1941, and a 600-pound cow was killed in the same general area in 1950. About 1951 a resentful young bull charged a young man who was practicing yodeling near Hahns Peak, in Routt County. In February, 1952 a cow moose was definitely identified on Fortification Creek, 11 miles north of Craig in Moffat County, and another moose was reported about 10 miles north of Maybell, in the same area.

The Ox Family
Bovidae

Bison *Bison bison*

The prominence of the Bison in American history, and its excellent representation on the so-called "buffalo" nickel has made it

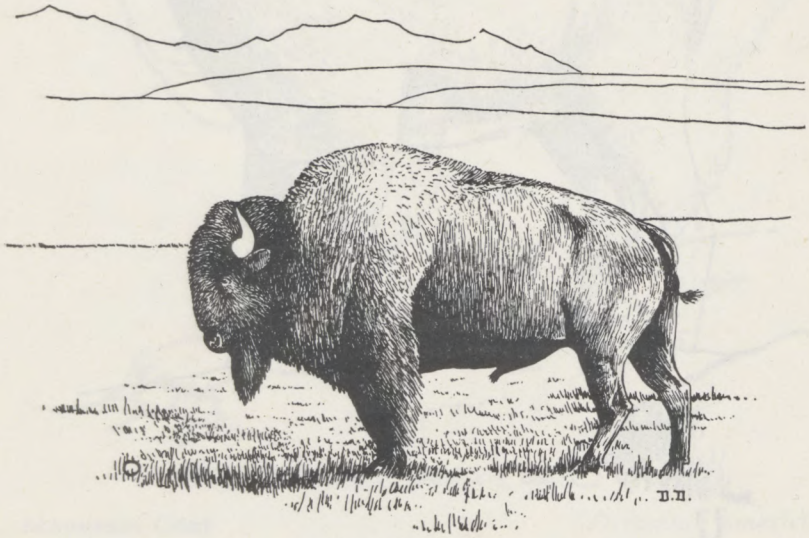

Figure 5. Bison.

well known to everyone (Figure 5). It is the bulkiest game animal of North America and it is reported that a large bull may weigh more than a ton, and stand about 6 feet high at the humped shoulders. Its undependable disposition makes a bison dangerous to approach on foot.

The Bison was once very abundant on the plains, extending to or even above timberline in Colorado in the summer. There are no more wild bison in the United States but there are still several semi-wild or confined herds. There are, or have recently been, semi-wild herds near Sterling, Hudson, and Flagler, in eastern Colorado; in Daniels Park south of Denver and on Lookout Mountain, west of Golden, both of these controlled by the city of Denver; in the Colorado National Monument near Grand Junction in far western Colorado, and along Ute Creek near Fort Garland, in the San Luis Valley.

Figure 6. Bighorn or Mountain Sheep.

Bighorn, Mountain Sheep *Ovis canadensis*

The Rocky Mountain Bighorn Sheep is light brown in color with a nearly white rump, and stands about 40 inches high at the shoulder. Both sexes are equipped with curved horns. The horns of full-grown rams, or males, are very heavy and spiraled (Figure 6) while those of young males and females are smaller, more slender and only slightly curved. The Bighorn, unlike the domestic sheep, has very short hair and must not be confused with the shaggy, pure white Mountain Goat which has recently been introduced into Colorado.

Bighorns typically are found in the very high country in the summer, even above timberline. In winter they come down into the forests. Formerly much more widespread in Colorado, there are still several places where they may now be seen, including the Ouray district, the Tarryall Mountains, along the Poudre River near Zimmerman's Ranch, near Georgetown, near Glenwood Springs, and in the Rocky Mountain National Park.

Figure 7. Mountain Goat.

Mountain Goat *Oreamnos americanus*

The Mountain Goat is a shaggy, *nearly pure white animal,* char-

acterized by the long bearded face, the hairy "pants" on the front legs, and a pair of curved, slender, coal-black horns in both sexes, but larger in the males (Figure 7). Old males may weigh nearly 300 pounds and stand nearly 3½ feet high at the shoulder.

The Mountain Goat is a relative of the Chamois of the Old World and is like it in being unbelievably sure-footed and agile in making its way over almost impassably rough and steep mountain peaks, where it seldom is found below timberline. It is a very recent addition to the Colorado fauna, 15 animals having been brought from Montana and released on Mts. Shavano and Harvard northwest of Salida. It remains to be seen whether they will adapt themselves to this extension of their range, but there is no reason to think they will not do so.

The Pronghorn Family
Antilocapridae

Pronghorn, American "Antelope' *Antilocapra americana*

The Pronghorn is the only animal of its kind in existence, which fact has been recognized by putting it in a separate family of its own. It is not related to the true antelopes of the Old World.

The Pronghorn is light reddish brown, with a very conspicuous white rump, white underparts, and broad white bars around the front of the neck, (cover figure). A large specimen is about 3 feet high at the shoulders and may weigh over 100 pounds. Its greatest peculiarity is its horns, the yearly loss and replacement of which has been described near the beginning of this Guide. The horns are upright, nearly straight with a sharp backward curve at the tip, and with a short "prong" pointed forward about half way up from the head. Both sexes have horns, but those of the female are smaller and more slender than those of the male.

The Pronghorn was formerly widespread over the plains and plateaus of the western United States. It is said that when the first white men saw the game herds of the Great Plains, the Pronghorn equalled or even exceeded the Bison in numbers, although it occurred in small bands and so was less conspicuous. Some years ago the Pronghorn was nearly extinct in Colorado, but better protection and wise management has allowed it to increase to the point where limited hunting is now possible. During the 1949 hunting season nearly 1,900 animals were harvested by hunters, which constitutes a very considerable contribution to our food supply. At the same time protection will preserve this beautiful and unusual creature in sufficient numbers to permit non-hunters to enjoy the sight of it in its ancient prairie and foothills range. The best locality to see wild Pronghorns in Colorado seems to be in the Limon and Hugo area east of Denver.

THE GNAWING MAMMALS
Rabbits and Rodents

Although the big-game mammals are the most conspicuous and generally-observed in Colorado, the gnawing mammals are by all odds the most abundant. It can safely be said that they outnumber all the other kinds of mammals put together. At the same time most of them are small, and usually active only at night, and so are much less well-known and much less easily observed. This makes them doubly interesting when we are fortunate enough to catch a glimpse of them.

They are extremely important to us because their food is usually something we value and these animals occasionally become so numerous as to constitute a threat to man's food supply and to his pocketbook. At one time or another they may destroy our trees, eat our grass, give us diseases, defile our food, damage our houses, puncture our reservoirs and irrigation ditches, flood our pastures, damage our gardens, or pierce our skins with painful spines. Some of them, however, have no habits which make them undesirable from the human point of view.

THE HARES, RABBITS AND PIKAS
Order Lagomorpha

These mostly well-known mammals are similar in some ways to the true gnawers, or rodents, but are actually not at all closely related to them. Their most outstanding likeness is in the front teeth. Like the rodents, they have a pair of enlarged, chisel-shaped, cutting teeth in the front of both the upper and lower jaws, separated by a wide space on either side from the cheek teeth which are used to grind up the food after it has been gnawed off by the chisel-like cutting teeth. But, unlike the rodents, the rabbits have a second tiny pair of teeth directly behind the upper cutting teeth. These are too small and in the wrong position to be of any use to the animal, but are powerful evidence that they are not relatives of the rodents.

There are, in Colorado, several types of lagomorphs which may be outlined as follows:

Ears long; hind legs longer than the front legs; tail furry (Family Leporidae)

Ears very long; hind legs very long.

Tail white on upper as well as lower side; animal may be nearly white in winter---------- **White-tailed Jackrabbit**

Tail black on upper surface, white beneath; animal gray or tan at all seasons ---------- **Black-tailed Jackrabbit**

Ears shorter; hind legs not so long.

Animal large; hind feet very broad; animal white in winter, bluish-gray in summer ---------- **Snowshoe Hare**

Animal smaller; reddish-brown or grayish at all seasons ---------- **Cottontail Rabbit**

Ears large but short; front and hind legs about the same size; no tail (Family Ochotonidae) ---------- **Pika**

The Rabbit Family
Leporidae

The Jackrabbits and Snowshoe are true hares, which means that they live in nests on the surface of the ground (called forms), and that their young are born furred and able to flee danger at a very early age. On the other hand our Cottontails are true rabbits which live in burrows beneath the ground, and whose young are born blind and naked and unable to protect themselves for some time after birth.

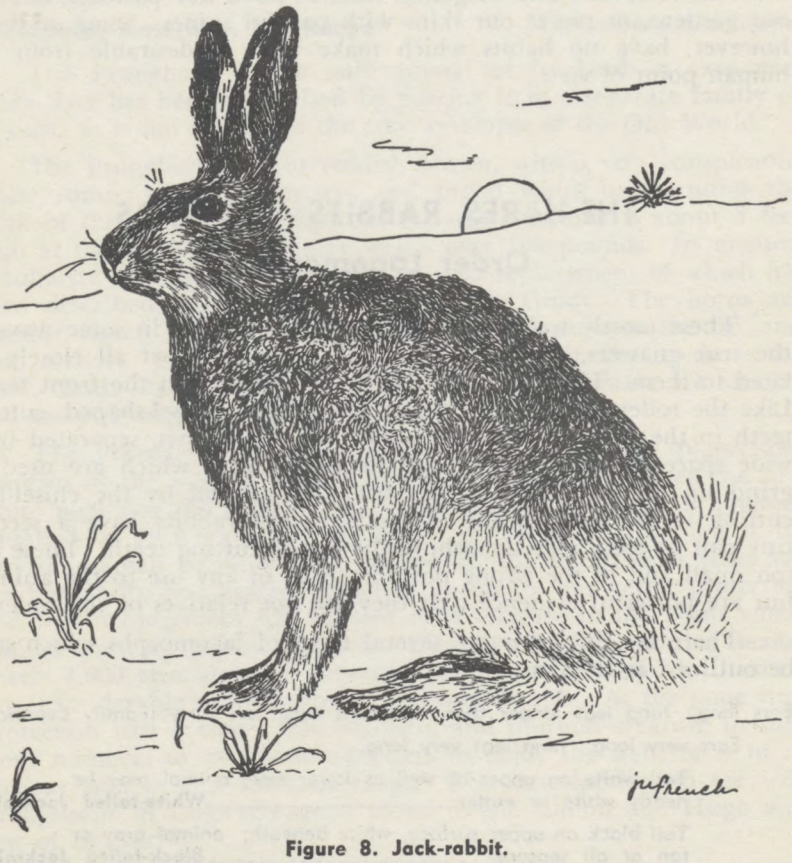

Figure 8. Jack-rabbit.

Jackrabbits *Lepus* spp.

The Jackrabbits of Colorado (Figure 8) are of two quite different kinds because the ranges of the northern White-tailed Jackrabbit and the southern Black-tailed Jackrabbit overlap approximately in this area. The two may readily be distinguished by the color of the upper surface of the tail, as their names suggest.

The White-tailed Jackrabbit, *Lepus townsendi,* like its Canadian relatives, is large and heavy-bodied, tan-gray in summer, and becomes lighter-colored (often nearly white) in the winter. It also shows its northern hardihood by invading the open areas of the higher mountains, and it is the only Jack found in our mountain parks.

The more southern Black-tailed Jackrabbit, *Lepus californicus,* is somewhat more slender than the White-tailed and its color becomes very little, if at all, lighter in the winter. Within historic times it has extended its range northward until it now is found all over the eastern Colorado plains.

Jackrabbits frequently appear in very great numbers and may become a serious threat to crops and pastures. At such times large hunting parties often kill them in huge quantities.

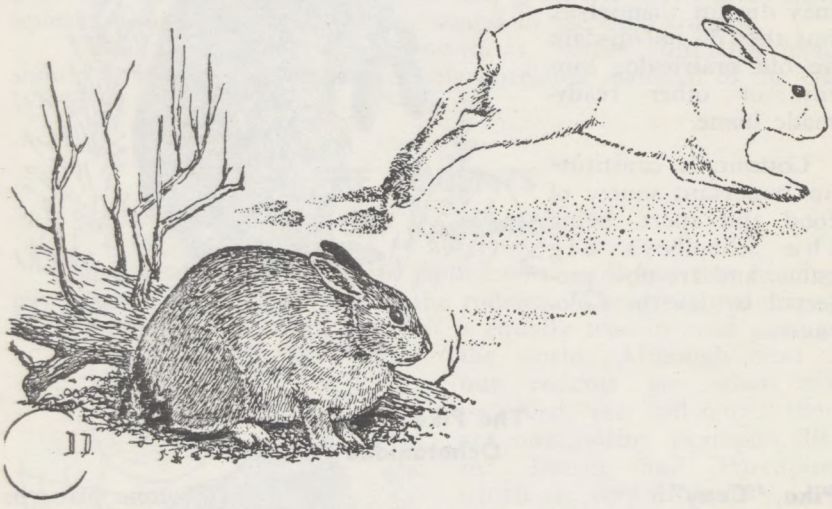

Figure 9. Snowshoe Hare; summer pelage lower left, winter at upper right.

Snowshoe Hare *Lepus bairdi*

The Snowshoe Hare (Figure 9) is a shorter-eared relative of the Jackrabbits. It makes its home in the coniferous forests of our mountains where it extends upward to timberline. In this region of heavy snowfall its enormous hind feet spread out like snowshoes to enable it to move swiftly even in the deepest snow.

The Snowshoe is one of the Varying Hares, and shows a great change in coat color with the changing seasons. In summer it is grayish-brown with somewhat of a bluish cast, while in winter it is all white except for black tips on the ears. In the far North its relatives often become very numerous, but in Colorado it seems to exist in rather small numbers only.

Cottontails *Sylvilagus* spp.

There are several species of Cottontails in Colorado but it requires prepared specimens as well as expert knowledge to tell them apart. They are all fairly small, brown or grayish in color, with rather short ears and a conspicuous cottony tail (Figure 10). When alarmed they scurry for the shelter of brushy or weedy thickets. They do not change color in the winter. They live in burrows which they may dig for themselves, but they do not disdain an old prairie-dog burrow or other ready-made home.

Cottontails constitute an important source of food and sport, being the schoolboy's big game, and are now protected by law in Colorado.

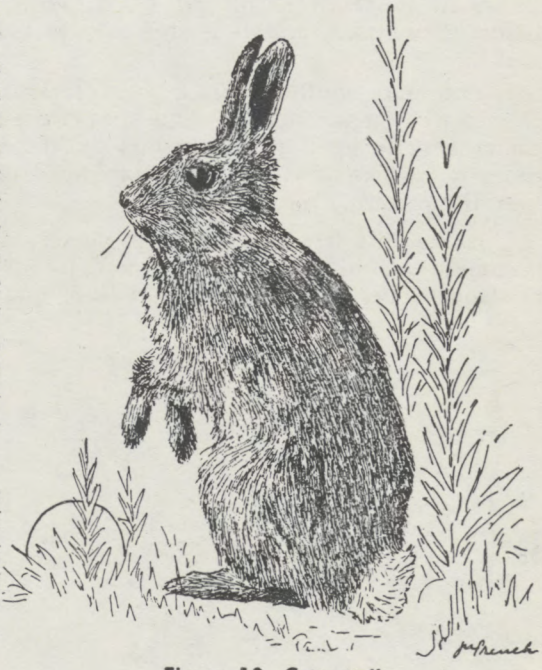

Figure 10. Cottontail

The Pika Family
Ochotonidae

Pika, "Cony" *Ochotona princeps*

One must go to the highest peaks in Colorado to see the Pika (Figure 11) as it seldom descends far below timberline. While it is closely related to the rabbits and hares, its large round ears, short hind legs, small size, and complete absence of a tail make it no great crime to mistake it for a rodent. Its gray color blends well into the gray rocks among which it lives.

There are several kinds found in Colorado but all look much alike, and are alike in living among the rocks, and in their habit

Figure 11. Pika

of gathering and storing bundles of mountain grasses and other mountain plants which are left in piles to dry in the sun before being taken into the burrow for winter food.

Pikas have favorite sunning spots, usually on top of a pointed rock, and from these vantage points they greet the visitor with shrill squeaks, which are a characteristic sound in the high country.

These animals are widely known as "conies" but this name should be reserved for the completely unrelated mammal of the Old World which is mentioned in Scripture.

THE RODENTS
Order Rodentia

Anyone who wishes to know the mammals will find that he must pay a great deal of attention to the rodents. The great majority of our mammals are rodents, and this is equally true in most parts of the world. Although most of our rodents are what may be called "rats and mice," there are outstanding examples, like the Beaver and Porcupine, which are very distinctive.

Likewise, lest the term "rats and mice" create an unfair prejudice against them, it should be made clear at the outset that, if we mean the imported house mouse and rat which are such dangerous pests in our cities, our native rats and mice are by comparison

beautiful creatures with winning ways and comparatively harmless habits.

It is true that the rodents are economically our most harmful mammals. As man has taken over more and more of the home territory of our native rodents, they in turn have learned to consume the new products of the land and to live in and about man's buildings. It is this great adaptability to changed conditions which accounts for their success in the face of human inhospitality to their kind.

In addition, it is unfortunately true that some of our rodents carry disease organisms in their bodies which may be carried to man by fleas and other carriers, or which may enter the human system by contact with the mammals themselves. This danger should be kept constantly in mind but it should not cause panic or even undue fear. Not every contact by any means will lead to disease, and when disease is transmitted the newer medical developments are reducing the danger almost daily.

Rodents, which are predominantly plant feeders, are an extremely important element in the balance of nature. In incalculable numbers they turn plants into fertilizers which are returned to the soil, and the rodents themselves are the pasturage of countless predators, including other mammals, birds of prey, snakes, lizards, fishes, and even man. Some rodents eat large numbers of grasshoppers and other harmful insects. If rodents eat our crops, they also aerate the soil with their burrows and fertilize it with their excrement and their own dead bodies. If beavers cut our trees and flood our stream bottoms, yet their ponds accumulate and deposit rich soil where none existed before.

Outline of Colorado Rodents

The Porcupine Family
Erethizontidae

Porcupine *Erethizon epixanthum*

The Porcupine (Figure 12) is quite different from any other of our rodents and understandably so, since its relatives all live in South America or the Old World. As everyone knows, the animal is

Figure 12. Porcupine

thickly covered with sharp, painfully barbed quills which are half-hidden in long, yellowish hair. It is a fair-sized, dull-witted, tree-living animal which moves about slowly and deliberately, apparently conscious of its spiny protection. But let an unwary dog or human hand approach too closely and the animal becomes a coiled spring ready to deliver a tail-slap which will fill the offender with burning quills. Contrary to widespread opinion, it cannot "shoot" its quills, but when the point has pierced the skin of an enemy it is more firmly attached there than it is to the Porcupine!

The Porcupine lives in the coniferous forests where it eats a wide variety of plants. In winter when other foods are not available it feeds preferably on the inner bark of pines, but it occasionally samples the bark of broad-leaved trees. Where Porcupines are too abundant they may do serious harm to the forest by girdling and thus killing many trees. For some unknown reason Porcupines occasionally turn their backs to the forest and start resolutely east, where they have been recorded far out on the plains.

The Jumping Mice Family
Zapodidae

Jumping Mouse *Zapus* spp.

This is a genus of small, mouse-like animals (Figure 13) probably rather widespread in Colorado but not well known because of

Figure 13. Jumping Mice

secretive nocturnal habits and a fondness for shrubby wet meadows. The Jumping Mouse is built somewhat like a tiny kangaroo, with long hind legs for jumping and a very long tail for balancing. Its total length is about 9 inches, and the tail occupies about 5 or 6 inches of that! The color is very dark on top, buffy brown on the sides, white underneath, and the two-colored effect includes the tail.

There are two species in Colorado, which are very similar in appearance. These should not be confused with the Kangaroo Rats and Pocket Mice, which are described elsewhere in this Guide (see page 34). The latter have fur-lined pouches on the cheeks which the Jumping Mice do not have.

Imported Rats and Mice
Muridae

It is important that farmers, householders, and others be able to distinguish between the House Mouse and Introduced Rat on the one hand (Figure 14) and the native rats and mice on the other. Both of the immigrants are short-haired, with a naked, scaly tail (more pronounced in the Rat), and neither has white underparts. The native mammals with which they are likely to be confused have softer and longer hair, have at least a somewhat hairy tail, and have the underparts considerably lighter than the back. The Meadow

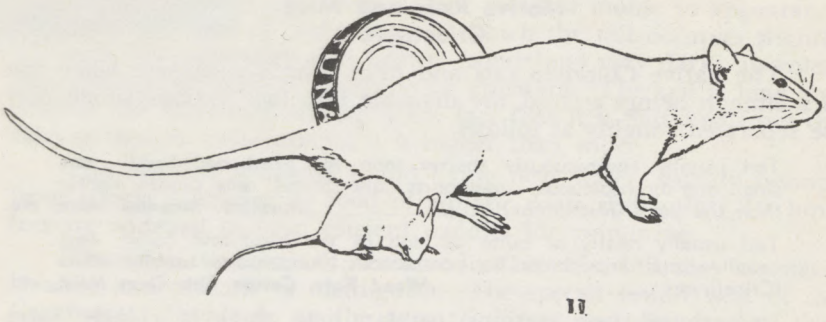

Figure 14. Introduced Rat, above, and House Mouse, lower.

Mouse and its allies have dark underparts but their tails are so short and their bodies so heavy that they can hardly be mistaken.

The House Rat (*Rattus norvegicus*) is about a foot long, of which about one-half is naked, scaly tail (Figure 14, upper). It is usually grayish brown on the back and dirty grayish beneath although partly-white or all-black rats are fairly common. Its ears are small and its fur short and coarse.

The House Mouse (*Mus musculus*) is about 6 inches long, of which the tail occupies about half (Figure 14, lower). It is gray above with grayish underparts. It occasionally occurs in a light creamy-tan color phase, but this is rare.

The introduced House Mouse and so-called "Norway" Rat have accompanied man in his travels until there is today no known place in the world, fit for habitation, where they are not to be found. They have become so completely domesticated (even if unwanted) that they are seldom (in the United States) found away from human habitations, although on occasion they have been known to live independent lives.

Their attachment to man means that they live on man's foodstuffs. What they do not eat they frequently make so filthy that it is not fit for human food, and the property they destroy in getting at the food is often as valuable as what they eat. To make matters worse, they are known to be carriers of disease and so are a constant menace to the very lives of the human beings among whom they live.

But, supporting the contention that things are seldom all bad, even these insidious foreigners have contributed to our well-being. Albino rats and mice, the so-called White Rats and White Mice, have been widely used as experimental laboratory animals in medical and food research. Their use in the study of disease and in testing the value of foods has been a major contribution to our high medical and nutritional standards.

Native Rats and Mice
Cricetidae

The native Colorado rats and mice, which were here when the first human beings arrived, are divisible into two sections which may be separated roughly as follows:

Tail usually conspicuously shorter than the head and body; ears small and inconspicuous; underparts dark-colored, only slightly lighter than the back (Microtinae)_____**Muskrat, Meadow Mice, etc.**

Tail usually nearly or quite as long as the head and body; ears usually large enough to be conspicuous; underparts usually white (Cricetinae) _____**Wood Rats, Cotton Rat, Deer Mice, etc.**

In each of these sections (subfamilies) there is a large form (Muskrat) or forms (Cotton Rat, Wood Rat), the remaining species being definitely small and mouse-size. In each section, moreover, the mouse-size forms include one common and abundant genus (Deer Mice and Meadow Mice respectively) and two uncommon or rare genera. Consequently the identification of the genera is not extremely difficult, and the beginner had best be satisfied to let matters rest there. The identification of the species of Deer Mice is probably the most difficult problem in the study of mammals, and some of the other genera are not much easier.

Muskrat, Meadow Mouse, etc.
Subfamily Microtinae

Muskrat *Ondatra zibethica*

The common and well-known Muskrat is very similar in Colo-

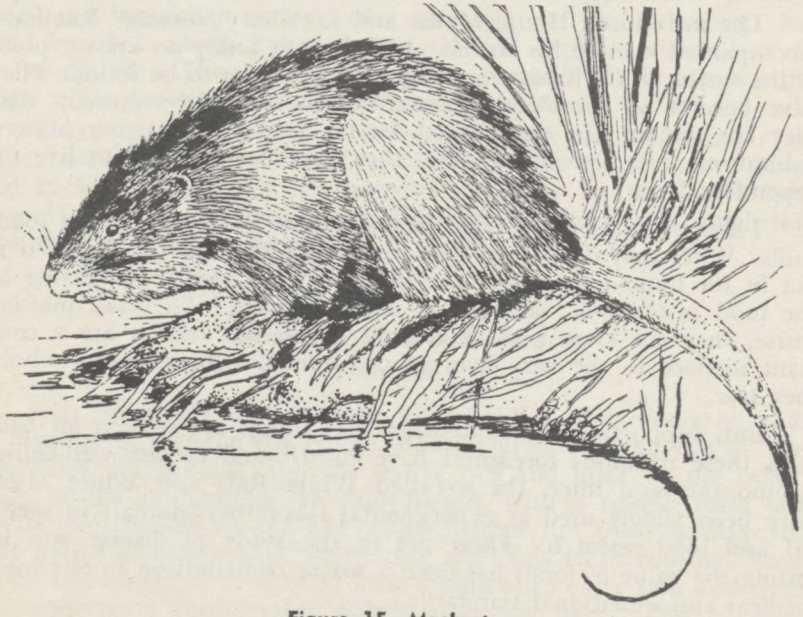

Figure 15. Muskrat

rado to the eastern form. It is a giant meadow mouse in appearance (Figure 15) about 20 inches long of which the tail occupies slightly less than half, and deep rich brown (sometimes very dark) in color. The ears are so small as hardly to be apparent. The tail is long and slender, but most outstanding is the fact that it is flattened from the sides so that, in cross section, it is higher than wide.

The Muskrat is always found living near water, usually swamps from which it obtains its food of aquatic roots and bulbs. Its hind feet are widened to form efficient paddles for swimming.

There are two kinds of Muskrat in Colorado, but they are nearly alike and difficult to distinguish. The species found west of the Continental Divide is, on the average, larger and darker than that found east of the mountains. Muskrat skins always find a ready market and a great many boys find them a handy source of extra income.

Figure 16. Meadow Mouse or Vole

Meadow Mouse, Voles *Microtus* and allies

The Meadow Mouse, of which several species are known to occur in Colorado, is a small heavy-bodied animal, from 5 to 7 inches in total length, of which the tail occupies not much more than a third, often less (Figure 16). The fur is rather long and loose, nearly hiding the small ears and the tiny eyes. The animal is dark brownish gray in color with grayish feet and underparts.

Typically found in and about grassy wet meadows in all parts

of the state, it makes runways through the grasses and sedges which are in effect little game trails, used by other small mammals as well. In some parts of the country Meadow Mice occasionally become very numerous and may for a time constitute a plague. In our state this apparently does not occur.

A relative of the Meadow Mouse is the Red-backed Mouse, *Clethrionomys gapperi galei,* whose common name gives a clue to its appearance. The definitely reddish color on part or all of the back is the only easy way to distinguish it from the Meadow Mouse. Its habitat, however, is different for it seems to prefer damp forests in the mountains, and builds nests around and under fallen logs. It is rather rare, and not much is known about it in Colorado.

Even rarer is the Lemming Mouse, or so-called Tree Mouse, *Phenacomys intermedius,* which has been found only at high altitudes in this state. It can be recognized by its extremely short tail, which is sharply dark above and whitish beneath. It appears to live in grassy meadows, and makes runways like those of the Meadow Mouse.

Wood Rat, Deer Mouse, etc.
Subfamily Cricetinae

Wood Rats *Neotoma* spp.

As the Muskrat is a giant among the Meadow Mouse group, so is the Wood Rat, often called Pack Rat, among its more mouse-

Figure 17. Wood Rat or Pack Rat

like relatives. Wood Rats (Figure 17) of which there are two types and about 10 different species in Colorado, are about 12 to 15 inches long, of which the tail constitutes nearly half. They are slender-bodied, gray or tan above and pure white beneath. One type, the Bushy-tailed Wood Rat (shown in our illustration) has a hairy tail rather like that of a squirrel. The other general type has very little hair on the tail and is known as the Round-tailed Wood Rat.

The ears are large and conspicuous and the whole appearance handsome and vivacious. These animals suffer from the implications of the name "rat," being generally much more prepossessing and interesting than the imported rat. However, in an unoccupied mountain cabin they can and do make unmitigated nuisances of themselves by the untidiness of their personal habits as well as by hauling things about. The names "Pack Rat" and "Trade Rat" come from their habit of stealing, or at least moving, small objects which catch their fancy. Tradition is that they always leave something in exchange for what they take, as a pine twig for a silver spoon, but the truth is probably that they always have something in tow which they are forced to drop if they find something else which they prefer.

There are Wood Rats on the Colorado plains as well as in the mountains. There they may build their nests in thick clumps of cactus.

Cotton Rat *Sigmodon hispidus alfredi*

Our Cotton Rat is grizzled buff and blackish on top, with white underparts and feet, and with the ears edged with whitish. The ears are small and nearly hidden in the fur, and in other respects the animal resembles a giant meadow mouse, although related to the Wood Rats and Deer Mice. The fur is coarse and fairly long, the tail scaly and without much hair. It is about 9½ inches long overall, of which the round tail occupies about 3½ inches.

Cotton Rats are ordinarily found far south of Colorado, from southern Texas through Mexico to Peru, but this sub-species, named for Alfred M. Bailey of the Denver Museum, was discovered in Baca County in extreme southwestern Colorado. It might be considered another example of an invading mammal extending its range if it were not for the fact that it is quite different from its closest relatives to the south, as if it had lived separately for a long time. It has not yet been found anywhere else in Colorado.

These native rats feed on grasses and other plants in meadow areas where they make trails through the vegetation like meadow mice. They may do harm to cultivated crops if they become too abundant.

Deer Mice, White-footed Mice *Peromyscus* and allies

Deer Mice are the most abundant mammals in North America

Figure 18. Deer Mouse or White-footed Mouse

and there is probably not an unmodified square mile in the United States that does not have some of these sprightly inhabitants.

Another name for these attractive rodents is White-footed Mice (Figure 18). They might be described as mouse-sized, mouse-colored mice with pure white feet and underparts, and large (or very large) ears. They have long tails which are sharply darker above and white beneath. Young specimens are bluish in color, not so white beneath, and may be confusing on this account.

The very-large-eared species seem to prefer to live among rocks, while the others are found everywhere. On farms and in small towns they may attempt to move into dwellings in the fall, but a prompt trapping session will usually get rid of them in a short time.

The Harvest Mouse, *Reithrodontomys,* is so much like a Deer Mouse that it is necessary to look at its upper gnawing teeth, which are grooved lengthwise, to distinguish it. There are several species in Colorado, all of which seem to prefer open grassy or weedy places, and are apparently never found in the forested mountains.

The Grasshopper Mouse, *Onychomys,* is a heavy-set mouse, at once recognizable by its very short tail which is only half the length of the body. The underparts are white, very sharply separated from the darker color of the back. This mouse, too, seems to avoid the forested mountains. It appears to be abundant in certain areas in eastern Colorado. It prefers insects, spiders, scorpions, lizards, and small mammals as food.

The Beaver Family
Castoridae

Beaver *Castor canadensis*

The Beaver, along with the Bison, has had such a profound influence on the history and development of our country that it

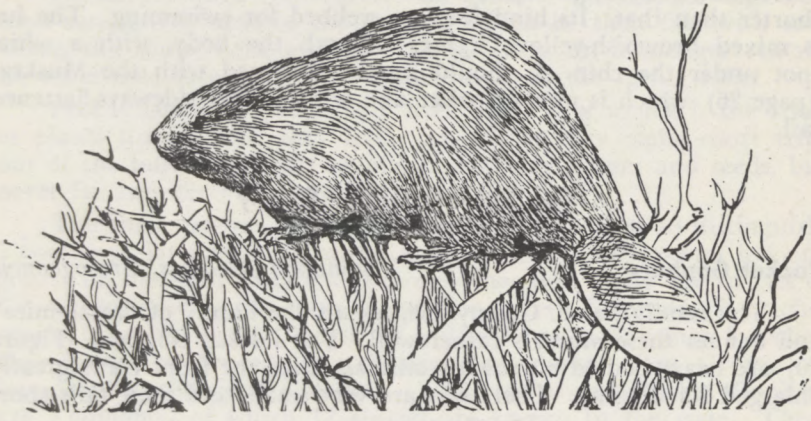

Figure 19. Beaver

would be well-known to all of us even if its remarkable dam-building habits did not attract our attention.

The Beaver is a medium-large animal up to 3½ feet long including the broad, flattened tail (Figure 19). A large specimen may weigh 40 or more pounds. The color is a rich dark brown, appearing nearly black when wet. It may be found almost all over Colorado where its requirements of water and suitable trees for food and dam building are present.

The Beaver lives in a house which it builds of sticks and mud piled in a heap, or in a burrow in a bank. The entrance to either of these types of nest is under the surface of the water, probably for the protection thus afforded. Its dam is built to guarantee that in winter the water will be deep enough to permit an ice-free entrance to the living quarters.

The Beaver is closely protected by Colorado law and is becoming restablished over most of its former range. There are few mammals with such interesting habits, and a great many books have been written about it.

The Nutria Family
Capromyidae

Nutria, Coypu *Myocastor coypu*

This water-dwelling, beaver-size mammal from South America has been imported to be reared for its fur. Nutria fur is quite

valuable, but commercial rearing does not seem to pay, and the animals are often released by their owners. It is reported to have been introduced along the Rio Grande in the San Luis Valley and in the South Platte river near Fort Morgan.

The Nutria is a heavily-built animal like a giant muskrat, with a head-and-body length up to 2 feet and a slender round tail somewhat shorter than that. Its hind feet are webbed for swimming. The fur is mixed brownish-yellow, lighter beneath the body, with a white spot under the chin. It should not be confused with the Muskrat (page 26) which is much smaller and which has a sideways-flattened tail.

The Pocket Gopher Family
Geomyidae

Pocket Gophers *Thomomys, Geomys, Cratogeomys*

The family name, Geomyidae, means the family of "earth-mice" and defines these animals rather well. The Pocket Gophers (Figure 20) are heavy-bodied burrowing animals, with the front claws greatly enlarged for digging. Their ears are very small, and their tails short

Figure 20. Pocket Gopher

and rather plump. Gophers are usually brown or tan in color, occasionally with one or more white spots which seem to be distributed more or less at random, usually on the head. The "pocket" mentioned in their common name refers to the fur-lined pouch on each cheek, which opens outside of the mouth and which is used for the temporary storage and transportation of food.

Pocket Gophers are very highly adapted to underground life and are seldom seen on the surface. The usual indication of their presence is a loose pile of freshly-excavated earth that seems to have come from nowhere. Careful probing with the fingers will indicate that

the earth has been pushed up out of the mouth of a burrow which is usually completely concealed. Occasionally one will see the open burrow, which means that the animal has still another load ready to push out. If one stands absolutely motionless and silent he may see the animated bulldozer deliver the next load.

In winter, when snow covers the ground, the Gopher digs burrows through it, next to the ground, which he then fills with soil. When the snow melts away in spring, these earth-sausages remain for some time before they are washed away by the spring rains.

Pocket Gophers spend their lives burrowing to reach the roots of plants upon which they feed. Sometimes they make short trips out of the burrow, usually at night, to gather grasses and seeds, but never far and never for long.

The three genera found in Colorado are not easy to distinguish. *Thomomys* has ungrooved upper cutting teeth, *Cratogeomys* has one groove on the front surface and *Geomys* has two. Only one species of *Geomys* is found in this state, in extreme eastern Colorado. It reaches nearly 10 inches in total length, of which the tail is less than 3 inches. One species of *Cratogeomys,* heavier and darker than *Geomys,* is found in southeastern Colorado. The rest of our Pocket Gophers are *Thomomys* of which 12 species are known in the state. These vary somewhat in size and color but a Pocket Gopher is probably *Thomomys* if it is not found in extreme eastern or in southeastern Colorado. If you *really* want to know, you will have to examine the teeth, and I may warn you that teeth were made to bite with!

Pocket Rats and Mice
Heteromyidae

These are related to the Pocket Gophers, which relationship is made particularly apparent by the fact that, like the Pocket Gophers, they have fur-lined cheek pouches on either side. Beyond this there is little similarity for, while the Pocket Gophers are highly adapted to an underground life, the Pocket Rats and Mice are highly modified for leaping swiftly over the surface of the ground. Because of the similarity of habits with the Jumping Mice (see page 24) the body form of the Pocket Rats and Mice is similar, but there is no relationship. This suggests that real relationship between mammals is not always apparent from their outward appearance, which may depend more upon their mode of life.

Pocket Rats and Mice of Colorado belong to two genera, which are not much alike in size or appearance, but which may be compared as follows:

Total length about 10 inches, of which the tail constitutes more than half; hind legs very long; color yellowish-tan above, underparts white _____ **Kangaroo Rat**

Total length generally less than 6 inches of which the tail constitutes less than half; hind legs somewhat elongated; color grizzled brown, underparts white _____ **Pocket Mice**

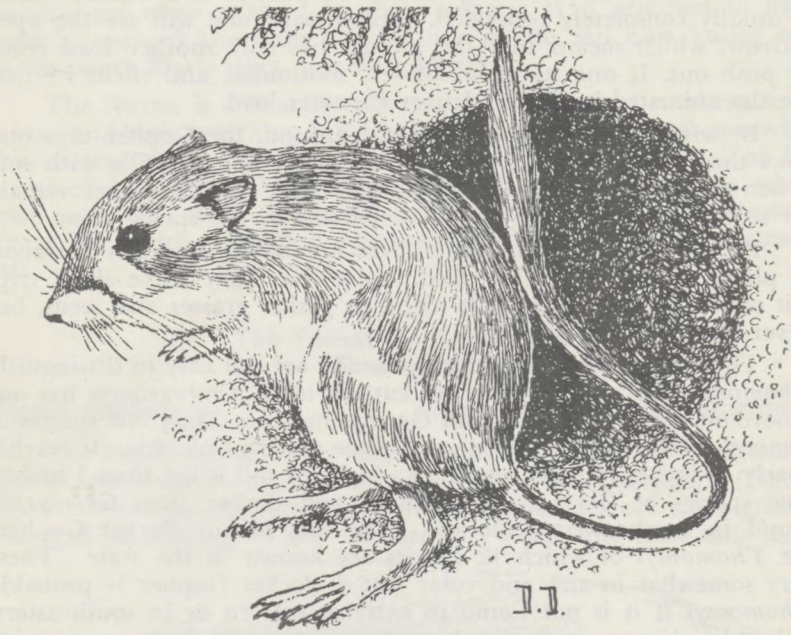

Figure 21. Kangaroo Rat

Kangaroo Rat *Dipodomys ordii*

As the name suggests, the Kangaroo Rat (Figure 21) has very long hind legs for leaping, and a very long tail to keep its balance while doing so. The head and body are stout, rather heavy-set, about 4 or 5 inches long. The long bicolored tail, white beneath and bright tan above, has a tuft of longer hairs at the tip. The animals themselves are mostly bright tan in color, with a black line on either side of the face, white marks at the mouth, over the eye, behind the ear, and over each hind leg, and the animals are completely white underneath.

Kangaroo Rats typically live in sandy places on the plains and in the mountain parks, where they dig a maze of branching burrows through the yielding soil. They are seldom seen in daylight, but in places where they are abundant they are often seen along country roads in the headlights of automobiles at night. They are among our most beautiful rodents and are gentle and interesting as pets.

Pocket Mice *Perognathus* spp.

The Pocket Mice are related to the Kangaroo Rats, but do not have such long hind legs and tail (Figure 22). They are mostly

rather small, head and body about 2 to 3 inches and tail slightly less, but there is a large species in eastern Colorado which reaches a total length of more than 8 inches, including the tail. The animals are all a rather dark grizzled brown with white or light underparts.

Like the Kangaroo Rats, the Pocket Mice seem to prefer sandy soil and their burrows are similar. They are seldom seen above ground in daylight. They feed on seeds which they carry in their fur-lined cheek pouches.

Figure 22. Pocket Mouse

The Squirrel Family
Sciuridae

All the remaining Colorado rodents which have not already been described in this Guide belong to a single large group, the Squirrel Family, and may roughly be divided into two general groups, the tree-living squirrels and the ground-living kinds. They are not especially difficult to identify because they are considerably different in appearance or in habits, and one may quickly learn to recognize the various genera at sight. The species are not so easy, and it is best for the non-professional to be satisfied to call them

Tree-squirrels
- Pine Squirrel (Chickaree)
- Tuft-eared Squirrel
- Fox Squirrel

Ground-squirrels
- Chipmunk
- Prairie-dog
- Ground Squirrels (Spermophiles)
  - Antelope Ground Squirrel
  - Desert Ground Squirrel
  - 13-striped Ground Squirrel
  - Wyoming Ground Squirrel (Picketpin)
  - Say's Ground Squirrel
  - Rock Squirrel
- Marmot (Woodchuck, Groundhog)

Pine Squirrel or Chickaree *Sciurus fremonti*

This common small tree squirrel (Figure 23) is really a "Red Squirrel", closely related to the eastern Red Squirrel, even though

Figure 23. Pine Squirrel or Chickaree

it is gray in color. It lives in the pine and spruce forests in our mountains, and is not found on the plains or among broad-leaved trees. Its head and body measure about 8 inches, to which is added a 5-inch bushy tail. The color is mixed dark grayish above, white beneath, with a black line separating the two along the sides of the body in the summer coat but not in winter.

This is the nervous, noisy little squirrel which exercises its barking chatter on hikers and picnickers. It builds its soft-lined nest in the treetops or sometimes in a burrow in the ground, and it feeds on the seeds of coniferous trees and the tender tips of branches. One frequently sees a pile of torn-up cones around a stump or under a tree branch where the animal has sat to open cones and extract the seeds.

Tuft-eared Squirrel *Sciurus aberti*

Like the Pine Squirrel the Tuft-ear feeds on pine seeds, but this squirrel (Figure 24) concentrates on the seeds of the Western Yellow or Ponderosa Pine which is not found at the higher altitudes in

Figure 24. Tuft-eared Squirrels, black phase above, normal gray phase below.

Colorado. At any rate the Tuft-ear is not found anywhere that the Ponderosa Pine is not also found.

The Tuft-eared Squirrel is a peculiar relative of the Gray Squirrel of other regions, particularly marked by its long tufts of hairs on the tips of the ear. The head and body is about 12 inches long and the busy tail about 8 inches. The color is normally plain light gray above with white underparts (Figure 24, lower), sometimes with a red mark on the back, but in certain localities you may see them *all brown* or *all black!* (Figure 24, upper) One of these color-phases of the normal gray color may even be the most common in certain places, such as the Black Forest near Colorado Springs, or the foothills near Boulder. An even more unusual condition is found in the Tuft-ear of the north rim of the Grand Canyon where the so-called Kaibab Squirrel is dark gray above and black beneath, with an all-white tail!

There are not many mammals as unusual and interesting as the Tuft-eared Squirrels, which are found only in the four-corners states

of Colorado, Utah, New Mexico, and Arizona. Anyone in a position to study them closely could make an important scientific contribution by taking careful and exhaustive notes on their distribution, habits, food, and nesting, and by investigating the inheritance of coat color.

Figure 25. Western Fox Squirrel

Fox Squirrel *Sciurus niger rufiventer*

The Fox Squirrel (Figure 25), unlike those previously described in this Guide, is not found among the coniferous forests but seems to prefer to live among the broad-leaved trees of our eastern Colorado river bottoms and our city parks and residential areas.

It is about the size of our Tuft-eared Squirrels; its head and body measure a foot long, and the graceful bushy tail about 10 inches. It is rather slender with small untufted ears, and is a beautiful reddish brown above and yellowish brown beneath.

The Fox Squirrel is active only during the day, and spends considerable time on the ground searching for food. It is particularly fond of nuts. Its nest is in a hollow tree or may be built in a crotch far up among the branches.

A few years ago there were no native Fox Squirrels in Colorado. A few had been introduced in the Denver city parks but did not seem to spread from there. In 1935 one was collected from the Platte River groves near Brush, in northeastern Colorado, where they seem to have come in from Nebraska. They gradually moved westward and by 1946 had reached Boulder, where they are now rather common on the University Campus and elsewhere.

This is an example of the manner in which our mammals may extend their range even today, in the same way in which the process of expansion of range has been going on among living things for millions of years. Unless some factor of their environment prevents, any animal or plant species tends to extend its living area indefinitely until in time it comes to occupy all the area available to it.

Figure 26. Chipmunk; compare with Figure 31

Chipmunk *Eutamias* spp.

The Chipmunk (Figure 26) is rather reddish-brown in color, with four white stripes running lengthwise on the back, separated and bordered by five dark stripes. On the sides of the face there is a dark stripe through the eye, with a white stripe below and above it. The head and body are about 5 inches long and the rather bushy slender tail is about 4 inches long.

This busy little creature becomes easily tamed and is a common sight around resorts, camp grounds, and picnic grounds in the foothills and mountains. It moves about with quick, nervous movements, and when alarmed, darts for cover with its tail extended straight upward.

The Chipmunk is commonly confused with Say's Ground Squirrel

(page 42), but may be distinguished by its smaller size and by the fact that it has lengthwise stripes all the way over the back and on the sides of the face.

Figure 27. Prairie-dog

Prairie-dog *Cynomys* spp.

The Prairie-dog is a heavy-bodied short-eared and short-tailed ground squirrel, about a foot long, and tan in color (Figure 27). It lives on the plains and in the mountain parks in cone-mouthed burrows, which are grouped in colonies. When alarmed it barks in a high-pitched voice, and it is this habit which gave rise to its common name, since it neither looks like a dog nor is it related in any way.

The Prairie-dogs found on the Great Plains have black-tipped tails, while those of the mountain parks and the western slope have white-tipped tails, or at least are not black-tipped.

The sight of these little animals, sitting bolt upright on top of the mound surrounding the burrow, ready to dive to safety at the approach of coyote or man, is a typically western sight, since the animals are not found east of the Mississippi River.

The individuals in a large colony eat so much grass that they compete very seriously with cattle, and stock-raisers must destroy them in large numbers in order to avoid loss of their pasture. In past years Prairie-dog colonies on the plains stretched uninterruptedly for miles, but more recently poisoning campaigns have reduced their numbers until now they must, in most areas, be sought out.

Ground Squirrels, Spermophiles
Citellus spp.

The following descriptions are concerned with several kinds of ground-living squirrels which are considered by some to belong to a single genus, *Citellus,* but which differ so widely in size, appearance, and habitat as to be fairly easily identified at sight. There is not much to be said about these animals individually, since they all have much the same habits. It must be remembered that each of these different groups, or subgenera, has numerous very similar species but these are not to be distinguished by the ordinary observer.

All of the Ground Squirrels live largely on seeds, from which fact they are often called spermophiles, or "seed lovers". They may become pests in agricultural areas, although only the 13-striped and Wyoming Ground Squirrels seem to be so inclined.

The Wyoming Ground Squirrel, because of its wide range and its habit of living in colonies, sometimes becomes a factor in the spread of flea-borne and tick-borne diseases which may be transmitted to man. Perhaps, under certain circumstances, the others also may be disease spreaders but under ordinary conditions they are not to be feared and, indeed, are attractive and interesting.

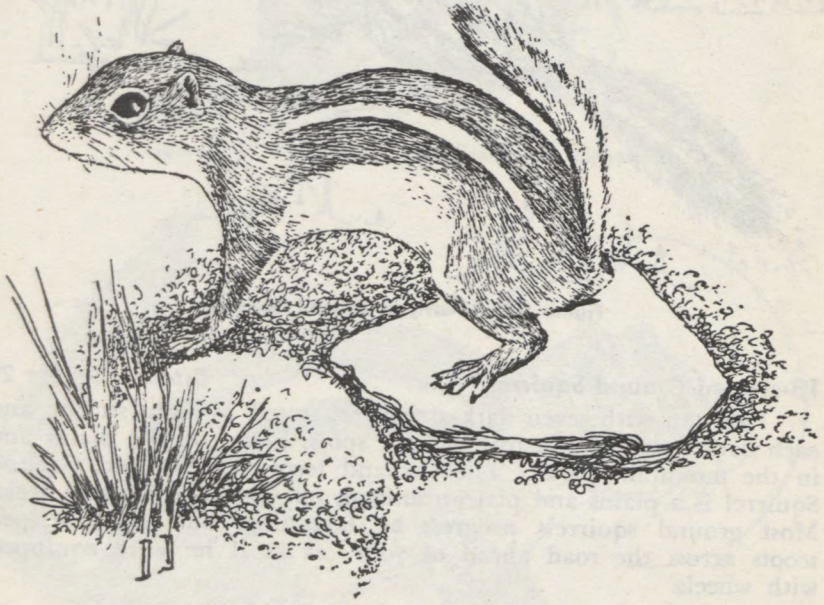

Figure 28. Antelope Ground Squirrel

Antelope Ground Squirrel *Ammospermophilus,* Figure 28

Pale tan with one white stripe on either side, tail white beneath, curved over body in flight, found only in southwestern and western Colorado.

The Antelope Ground Squirrel is so-called because of the white tail which is curved tightly over the back when the animal flees in alarm, much like the flash of the frightened Pronghorn, or American "antelope".

Desert Ground Squirrel *Citellus*

Brown or clay-colored with indistinct lighter spots on rear of back, found in eastern and southern Colorado. In the semi-desert areas along the southern and western borders of Colorado, the Desert and Antelope Ground Squirrels may be seen.

Figure 29. 13-striped Ground Squirrel

13-striped Ground Squirrel *Citellus,* Figure 29

Pale tan with seven dark stripes separated by light stripes, and each dark stripe with a row of light spots, found on the plains and in the mountain parks. The shy and secretive 13-striped Ground Squirrel is a plains and plateau animal, not found in forested areas. Most ground squirrels progress by bounding, but the 13-striped scoots across the road ahead of your car as if he were equipped with wheels.

Wyoming Ground Squirrel, Picketpin *Citellus,* Figure 30

Brown or grayish, slightly speckled, with somewhat lighter underparts and a light ring around the eye, found widespread but not on the eastern plains. In the mountain parks and valleys, the plain-colored Wyoming Ground Squirrel is becoming ever more widespread and numerous.

Figure 30. Wyoming Ground Squirrel or Picketpin

Figure 31. Say's Ground Squirrel; compare with Figure 26

Say's Ground Squirrel, "Big Chipmunk"

Callospermophilus, Figure 31

Chipmunk-like but larger, reddish-brown with a single light stripe, bordered by blackish, on either side of back, no stripes on side of face, but a light ring around the eye, found from eastern foothills westward to Utah. In the wooded mountains the Say's Ground Squirrels ("Big Chipmunks") are regular companions of the true Chipmunks (page 39) and may often be compared with them side by side. Their larger size, heavier build, lack of stripes over the middle of the back, and lack of stripes on the sides of the face, distinguish them from true Chipmunks at a glance.

Figure 32. Rock Squirrel

Rock Squirrel

Otospermophilus, Figure 32

Large, slender, distinctly speckled gray, with reddish area on rear of back; long, graceful bushy tail, found in rocky areas at lower altitudes. In the eastern foothills and western valleys the speckled Rock Squirrel prefers the lower altitudes and the sandstone areas. It looks, in size and shape, much like a tree squirrel, and it often climbs in shrubs or low trees.

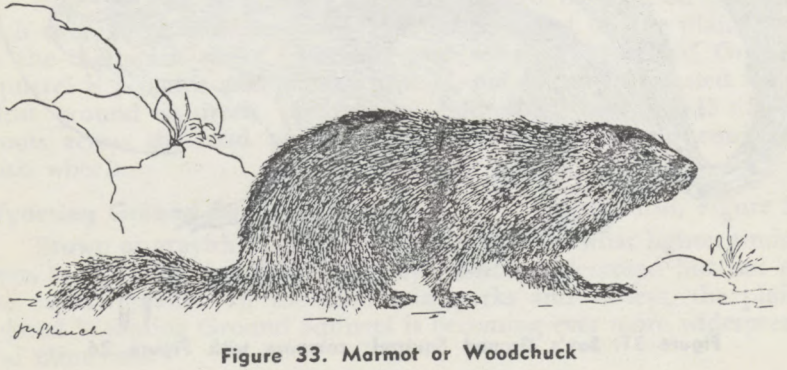

Figure 33. Marmot or Woodchuck

Marmot, Woodchuck *Marmota* spp.

The Marmot (Figure 33) which in areas east of Colorado is commonly called the Woodchuck or Groundhog, is a medium-sized, heavy-bodied rodent, from tan to dark brown in color with a rather short, hairy tail. Its ears are small and inconspicuous. Often there is a light-colored band across the face, and in certain lights the whole animal may have a silvery sheen.

The Marmot lives in rocky places, from the lower foothills to the tops of our highest peaks, where it is frequently seen sunning itself on prominent rocky points. When alarmed it whistles sharply. It gathers grasses for food and for nest-building and lives in a burrow deep among the rocks.

THE MEAT-EATING OR PREDATORY MAMMALS
Order Carnivora

The Carnivora ("meat eaters") are much better known to the general public than are the much more numerous (and more important) rodents. Nearly everyone knows the different kinds of carnivores, but for the benefit of those who do not, and as a convenient reminder for those who do, the following synopsis may be in order.

As the rodents are labeled by their chisel-like gnawing teeth, the carnivores are labeled by their possession of enlarged fangs or canine teeth, one on either side of both jaws, following the small front or incisor teeth, and just in front of the chewing teeth of the cheek region. These pointed canine teeth are the weapons by which the animal prey is seized and killed.

They all have soft-padded feet, the toes of which are equipped with claws. The claws of the dog family, and most of the others, are rather blunt, but those of the cats are very sharp, curved, and may be either exposed for use in grasping the prey, or drawn back into sheaths for protection of the points and for silent, stealthy stalking.

The Cat Family
Felidae

Mountain Lion, Puma — *Felis concolor*

The Mountain Lion (Figure 34) is the only wild long-tailed cat in Colorado, although there has been one report of the yellow, black-

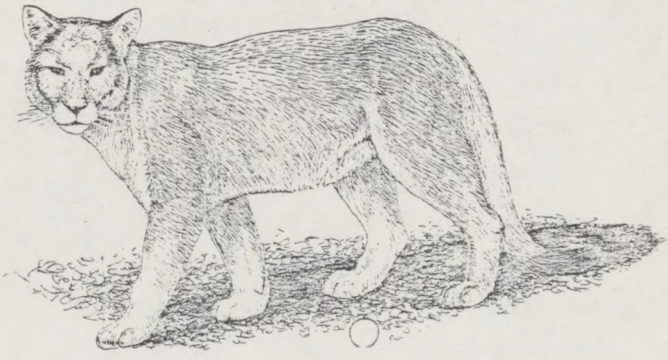

Figure 34. Mountain Lion or Puma

spotted Jaguar of Mexico, which may rarely have wandered into southern Colorado from the south in the past.

The Mountain Lion is large, up to 8 feet long, of which the tail occupies about 3 feet. An adult weighs more than 100 pounds, and large males may be twice that heavy. It is uniform pale tan to light brown in color, with whitish underparts, and a black tip on the tail.

It is found in Colorado in small numbers from the eastern foothills west into Utah. There appear to be certain places in the state where lions are killed in considerable numbers, but these may be the result of concentrations of lion hunters rather than of lions. The Mountain Lion is shy and is seldom seen until it is run down and brought to bay by dogs. It lives mainly on deer and serves a very useful purpose in eliminating aged and sickly deer and in maintaining the alertness and activity of healthy deer. It occasionally kills colts

and calves but is hardly a serious economic problem in this state. There is no known instance of its threatening human beings in Colorado.

Figure 35. Lynx or Bobcat

Lynx and Bobcat *Lynx* spp.

The Canada Lynx is an oversize Bobcat, and the two can conveniently be described together (Figure 35). Both are bobtailed, long-legged animals, with large ears, and round cat-like faces with short muzzles and large eyes. They are light brown to gray in color, with a soft furry coat which is more or less spotted and marked with black.

The Canada Lynx is about a yard long, with very large feet and usually with long points of hair on the tips of the ears. It is probably widely distributed, but rare, in the forested parts of Colorado.

The Bobcat, which is also a Lynx in the scientific sense, is a somewhat smaller animal, with smaller feet and shorter ear tufts in proportion to its size. The chances are that any short-tailed cat you may see in Colorado is a Bobcat, which cannot be confused with anything else because of the short, round head, long legs, and stubby tail. There are two species of Bobcat in Colorado, but one must examine the animals very closely to distinguish them. Being shy and retiring, they are not dangerous to human beings.

Both Lynx and Bobcat feed on rabbits, wood rats, mice, birds, and probably deer. Occasionally they feast on poultry or lambs.

The Dog Family
Canidae

The wild dog-animals of Colorado comprise two which are very dog-like, the Coyote and the Wolf, and three foxes which are not very dog-like. The Wolf is rare, perhaps even extinct, in the state. Coyotes are fairly abundant and frequently seen. The Kit Fox is becoming rare, and the Red and Gray Foxes are wary and seldom seen.

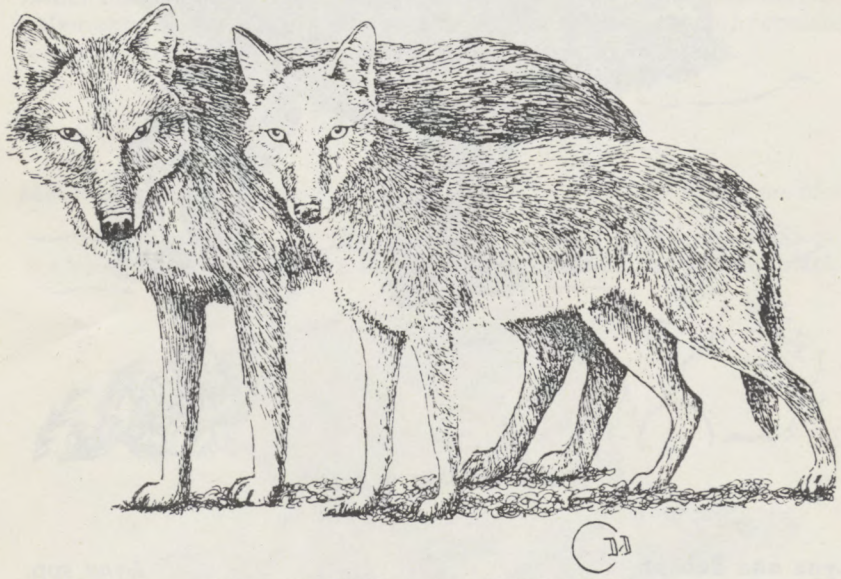

Figure 36. Wolf, rear, and Coyote, front

Coyote and Wolf *Canis* spp.

Both of these (Figure 36) are gray animals, although the Coyote occasionally runs to a reddish brown, especially in summer and on the plains. Both look like dogs at first glance and a great many dogs look like wolves or coyotes. Both have round eye pupils, like dogs. The Wolf is large in size, heavier-bodied, with a shorter, thicker muzzle, while the Coyote is smaller, more slender, with a more pointed face and slimmer legs. A large Wolf may be 5 feet long, with the tail taking up about 18 inches of the total, and it may weigh 100 lbs. A coyote will measure about 4 feet long, including the 14-inch tail, and weigh about 25 pounds. Both Coyotes and Wolves may be found from the plains to the mountain tops.

The Coyote is one of the animals which has learned to live with, and in spite of, man. It is probably nearly as abundant in the west as it ever was, and in recent years is extending its range into the eastern United States. It is nearly omnivorous, eating fruits, grasses, insects, and reptiles, as well as birds, mammals, and carrion. They frequently damage watermelons in the fields.

Don Coyote is one of our most efficient and persistent allies in controlling the numbers of harmful rodents. Campaigns for the extermination of coyotes almost always lead to outbreaks of prairie-dogs, ground squirrels, mice, and rabbits. When natural food becomes scarce, the Coyote may turn to lambs, calves, and poultry which arouses stockmen and farmers to attempt the elimination of coyotes. Here we have one of those endless circles which result from our tampering with the natural balance of living things, and which so often lead to the conclusion that we had best leave things as they are.

Foxes

Foxes are medium to small in size, with rather short legs, and rather long and very bushy tails. The pupils of their eyes are elliptical, forming a vertical oval slit. They are all rather omnivorous, eating a wide variety of animal and plant foods.

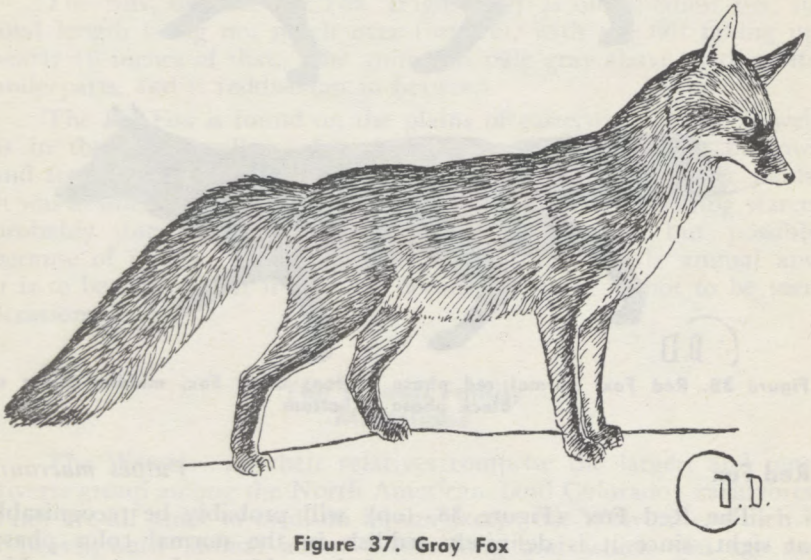

Figure 37. Gray Fox

Gray Fox *Urocyon cinereo-argenteus scotti*

As the name implies, this fox (Figure 37) is gray in color with the underparts white, margined with reddish. The total length is somewhat over 3 feet, of which the tail occupies nearly half.

It is a shy and retiring animal and not likely to be seen except by accident. It inhabits neither the plains nor the higher mountains, but is most likely to be encountered in the foothills of the eastern slope of Colorado and the pinon-juniper areas of western Colorado. It feeds on small mammals and birds and a wide variety of other animal and plant foods, and has a reputation for being able to climb low or slanting trees!

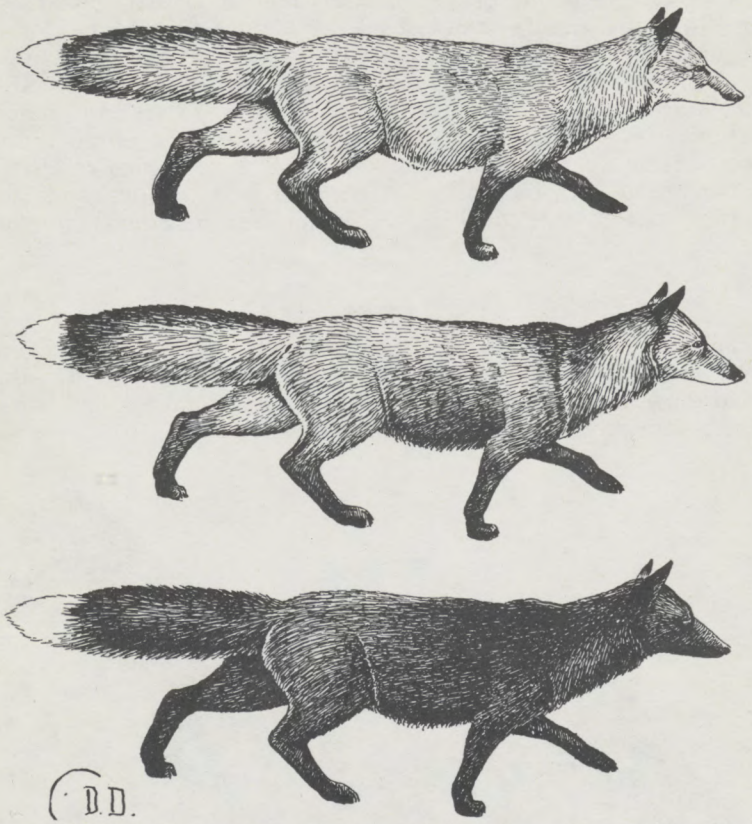

Figure 38. Red Fox; normal red phase at top; Cross Fox, middle; Silver or Black phase at bottom

Red Fox

Vulpes macroura

The Red Fox (Figure 38, top) will probably be recognizable at sight, since it is definitely reddish in the normal color phase, although sometimes it is a tan-red. It has white underparts, a white tip on the tail, black legs and black behind the ears.

Don't overlook the fact, however, that this is the animal which has the color varieties which we call Cross and Silver Fox (Figure 38, middle and lower). The Cross Fox is yellowish-gray with a dark stripe down over either shoulder and usually down the middle of the back. The Silver phase appears all black at a distance, although sometimes the white hair-tips are visible. Both color varieties have the white tail tip and the black legs and ears of the normal red variety.

The Red Fox is the fox of our higher mountains, beginning at about 8000 feet, where the Gray Fox leaves off, and extending

its range to the mountain summits. Its food is much the same—small mammals and birds, fruits, berries, insects, and even reptiles and frogs.

Figure 39. Kit Fox or Swift Fox

Kit Fox, Swift *Vulpes velox*

The tiny, delicate Kit Fox (Figure 39) is our smallest fox, its total length being not much over two feet, with the tail taking up nearly 10 inches of that. The animal is pale gray above, with white underparts, and is reddish-tan in between.

The Kit Fox is found on the plains of eastern Colorado, as well as in the broad valleys of western Colorado. It lives in burrows and feeds on small mammals, birds, and a great many other foods. It was at one time fairly abundant but appears to be becoming scarce, probably due to wholesale rodent-control by man, but possibly because of its shy, wary habits. It is a beautiful little animal and it is to be hoped that it will not become so scarce as not to be seen occasionally.

The Weasel Family
Mustelidae

The Weasels and their relatives comprise the largest and most diverse group among the North American (and Colorado) carnivores. They are all small to medium in size except the Wolverine, which is a heavily-built animal about 3 feet long and which you are not likely to see anyway! They are all short-legged and either with a long slender body like the weasels or with a broad chunky body like the skunks and badger. The tail may be long and slim (weasels), long and stout (otter), long and bushy (skunks), or rather short (badger).

All these differences give the impression that it is difficult to get acquainted with this family, but the synopsis on page 45 will show that you already know most of them! Don't try to get *too* well acquainted with them since they all have bad-smelling scent glands—the skunks being the worst! All of them bear furs which are valued for making garments, and the family is sometimes spoken of as the "furbearers".

Figure 40. Marten

Marten, Pine Marten *Martes caurina origenes*

The Pine Marten is a good-sized weasel, about two feet long over-all, including an 8-inch tail (Figure 40). It is rich brown in color, yellowish underneath.

The Marten is comonly said to be a tree-hunting animal, but more recent observations by Jack Remington in Colorado and William C. Marshall in Idaho show that it spends most of its hunting time on the ground. It lives among the evergreens in our higher mountains where it feeds largely on mice and insects, only occasionally on squirrels and birds. Contrary to most accounts, investigators find that the Marten does not retreat before human settlement but is often to be seen about cabins and garbage dumps. Its scarcity in such localities may be due to the ease with which it is said to be trapped.

Figure 41. Weasels; winter pelage at left, summer at right

Weasels *Mustela* spp.

The three kinds of color-changing weasels found in Colorado are so much alike that they may very well be described together. They are all short-legged, bullet-headed little animals, with long and very slender bodies, and short to long tails (Figure 41). In summer they are reddish brown above and light-colored underneath. In winter they are all white with a black tip on the tail. The winter coat is the "ermine", once permitted only to kings and queens.

The Long-tailed Weasel and Mountain Weasel are more than a foot long over all, with rather long tails and with the underparts orange-yellow in the summer coat. The Long-tailed is lighter in color in the summer than is the Mountain Weasel.

The Dwarf Weasel is not more than 10 inches in total length, with a tail not more than about 3 inches long. In summer it is white underneath the body.

The Long-tailed Weasel is found on the plains of Colorado, the Mountain Weasel over the mountainous portion of the state, and the Dwarf Weasel apparently scattered over the state above 6000 feet altitude.

Black-footed Ferret *Mustela (Putorius) nigripes*

The Black-footed Ferret (Figure 42) is strictly a Weasel, related

Figure 42. Black-footed Ferret

to those already described, but sufficiently different in appearance as to warrant its separate treatment.

The Black-footed Ferret is larger than our other Weasels, about 20 inches in all-over length when full-grown, and its body is less slender than the others. It does not change color in the winter. It is pale tan in color with a black "mask" across the eyes, and with black feet and a black tip on the 4-inch tail.

The Black-footed Ferret is of unusual interest because of its rarity and our lack of knowledge of its distribution and habits. It is one of the mammals which appear to be on the verge of extinction in North America, and is known in Colorado from only a few specimens and records. It appears to be found only where there are prairie-dogs, and may live nearly exclusively on these rodents. Perhaps the destruction of prairie-dogs has reduced the number of ferrets. It is commonly considered a plains animal but it has been found in mountain parks and in western Colorado. Black-footed Ferrets should not be killed, and if found dead, should be preserved. Any museum will be glad to make it worth your while to preserve them as scientific specimens.

Mink *Mustela vison energumenos*

The Mink (Figure 43) is another weasel, belonging to the same genus as the ordinary weasels, but the Mink is a semi-aquatic, or water-haunting weasel. It reaches nearly two feet in length including an 8-inch tail, and is rich dark brown in color, somewhat paler underneath.

The Mink is never found far from water, and its tiny, round,

Figure 43. Mink

cat-like tracks are common around lakes and along streams all over Colorado, on the plains as well as in the mountains. It swims well and catches fish and crayfish in the water, but feeds principally on small mammals and birds.

The fur of the mink is highly prized for women's coats because of its fine texture and great durability.

Wolverine *Gulo luscus*

The chances of your ever seeing a Wolverine are very slight, but if you should chance to catch a glimpse of a heavy-set, bear-like animal about 3 feet long (Figure 44), with short legs and an 8 inch bushy tail, dark dirty brown in color with an indistinct yellowish stripe on each side, joining over the base of the tail, you will have had an exceptional experience! Closer examination (if any) will show that the underparts are slightly paler than the back and that the animal has sharp, strong claws and an evil-looking face.

It was formerly more abundant in Colorado, and probably still exists in small numbers in the more remote forests of our mountains. In the Canadian woods it is known as Glutton or Carcajou, and is notorious for robbing traps and destroying food caches. It has enormous strength for its size and can overcome a deer if it can catch one. Its fur is coarse but very durable and is highly valued for certain purposes.

Specimens or observations of the Wolverine in Colorado are very valuable from the scientific point of view since its very presence in the state is questionable.

Figure 44. Wolverine

Otter *Lutra canadensis*

The Otter is a large, weasel-like animal (Figure 45) reaching nearly 4 feet in length including a 14-inch tail. It is dark brown in color, slightly lighter beneath. Its head is short and round with very small ears, its legs short and toes webbed, its tapering tail thick at the base. The whole form of the animal is streamlined and it feeds on crayfish, mollusks, and an occasional fish.

The Otter is never found away from fish-bearing waters, but when suitable conditions are present it may be found at almost any

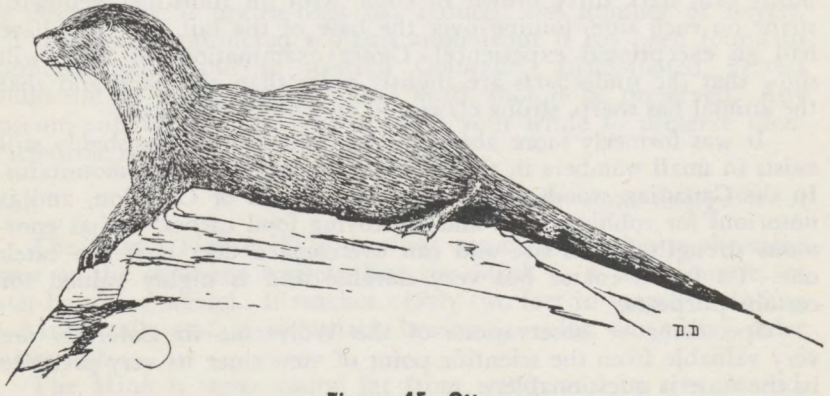

Figure 45. Otter

altitude. It appears to be rare in Colorado although its shyness may prevent its being seen even where it is fairly abundant.

The Otter is celebrated for its playfulness, and many accounts have been written about the otter slides, where the animals slide down the muddy bank into the water, apparently in a spirit of pure fun. Otter fur is of very high quality and trapping has contributed to the scarcity of the animal. Its relative the Sea Otter, of the Pacific coast, is even more highly prized and rare.

Skunks

The Skunks (Figure 46) are undoubtedly the best-known and most notorious members of the Weasel family. We have two common kinds in Colorado, and one which may be more common than we realize. They may easily be recognized from the following outline. All of them are black and white, with short legs and long bushy tails, and all have the same disagreeable method of defense.

Pattern of white spots and bars, total length not over 18 inches including tail ---------- **Spotted Skunk**

Pattern of two white stripes on back, meeting on head, total length about 2 feet ---------- **Striped Skunk**

Entire back and tail white, total length about 2 feet ---- **Hog-nosed Skunk**

Figure 46. Skunks; Hog-nosed at left, Striped at upper right, and Spotted at lower right

Spotted Skunk *Spilogale* spp.

The Spotted Skunk (Figure 46, lower right) is smaller and more attractive than the other kinds, and much less offensive. It is frequently (but mistakenly) called "civet cat" in Colorado. It is more slender than the other species and actually rather tame. Many accounts have been written about its lack of fear of man, and about its playfulness in the presence of human beings. The writer can vouch

for the fact that some individuals will allow themselves to be handled by man without giving offense.

The Spotted Skunk in Colorado seems to be confined to the plains, foothills and valleys at the lower altitudes, as indeed the others seem to be as well. There are apparently no skunks in our higher mountain regions. The Spotted Skunk feeds on small mammals and birds, but also takes considerable number of insects, especially grasshoppers.

Striped Skunk *Mephitis* spp.

The Striped Skunk of Colorado (Figure 46, upper right) is *the* Skunk to most of us, being the most common and most widespread. It has a suspicious nature and does not hesitate to defend itself with its potent scent, which is squirted from a pair of glands at the base of the tail and which may be rather accurately directed to a distance of 15 or 20 feet.

The width of the two white stripes is very variable. Some individuals have very narrow stripes, some are nearly all black, while others have such wide stripes as to appear white-backed, almost like the Hog-nosed Skunk. Skunk fur is rich, glossy, and durable. It is comonly plucked or dyed to produce an all-black fur, so that the skins with the minimum of white are the most valuable.

Hog-nosed Skunk *Conepatus* sp.

The Hog-nosed or White-backed Skunk (Figure 46, left) merits some special discussion, even though it is so rare in Colorado. It is a representative of a group of skunks found in South America, with a few in Central America and Mexico. Colorado seems to be the extreme northern limit of the genus. It may be that the Hog-nose is more abundant than we think, but this is unlikely considering the numbers of skunks trapped for their skins by farm boys and others each year.

It has been recorded here only twice, from extreme southeastern Colorado and from near Colorado Springs. More records of its occurrence in Colorado are necessary before we can feel that we know much about it in this state.

In the event that it might be confused with an unusually white-backed Striped Skunk, the Hog-nose has a peculiar nose from which it derives its common name. The nose is pig-like—broad, flat, and naked on top—which combined with its very small ears makes an error in identification unlikely.

Badger *Taxidea taxus*

The Badger is very short-legged, with a very broad, flattened body (Figure 47) quite different in appearance from any other member of the weasel family. It is over two feet long, but the tail occupies only about 5 to 6 inches. It is light grizzled gray in color, with white trimmings. There is a narrow white stripe down the

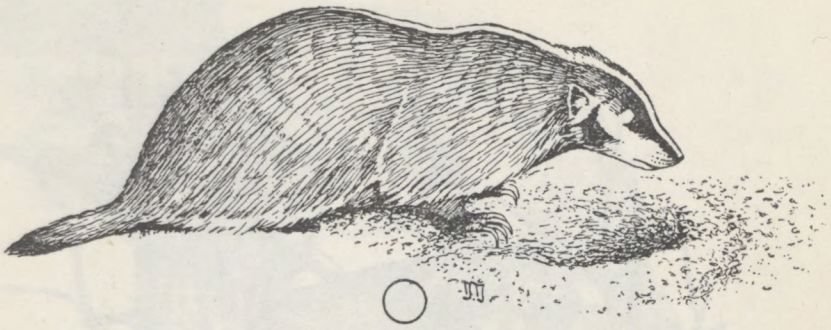

Figure 47. Badger

middle of the dark head, sometimes onto the shoulders, and white marks on the sides of the face.

The Badger is the most accomplished digger among our predatory animals, being able to outdig and capture prairie-dogs and ground squirrels upon which it feeds. It is a very valuable ally in helping to control these agricultural pests and should be encouraged. At one time Badgers were hated by stockmen because the large burrows occasionally crippled their riding horses, but in these modern days a jeep wheel passes over the burrow without harm to it or to the rider.

The Raccoon Family
Procyonidae

Some mammal specialists give the Ringtail a family name of its own (Bassariscidae) but in this Guide we prefer to emphasize the relationship between the Raccoon and Ringtail. There are two related animals in Asia, and two in South and Central America. Like most of their relatives ours have alternate dark-and-light colored rings around their tails.

There are only two members of the family found in Colorado, both with bushy ringed tails.

Body stout, tail about half length of head and body_____**Raccoon**
Body slender, tail about equal to length of head and body_____**Ringtail**

Raccoon *Procyon lotor*

The Raccoon is a medium-sized heavy-bodied animal about 30 inches long including the 10-inch tail (Figure 48). It is rather dark grizzled gray with a conspicuous black "mask" over the eyes.

It is most generally found along river bottoms and in broad-leaf forests east from the foothills of Colorado but has also been reported from western Colorado, from the pine forests of the Black Forest

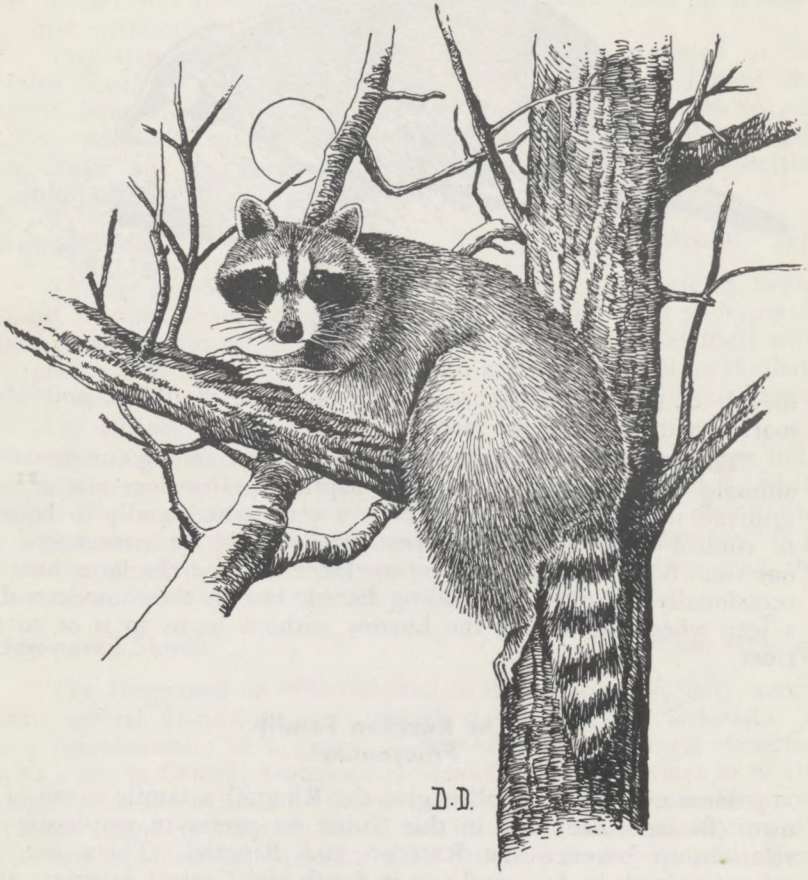

Figure 48. Raccoon

area near Palmer Lake, and from the broken country north of Limon in eastern Colorado. It seems to occupy the same kind of habitat as the Opossum and, like the Opossum, may be increasing its range in the state.

The Raccoon is active mostly at night, when it feeds on anything it can find—mammals, birds, frogs, eggs, insects, fish and crayfish—and it is notoriously fond of green corn, as well as fruits and melons. Nearly everyone knows that this is the animal which likes to wash its food before eating. Raccoon hunting is a night-time affair in which trained dogs trail the animal by scent and finally tree it and keep it treed until the hunter arrives.

Ringtail, Bassarisk *Bassariscus astutus flavus*

The Ringtail is a beautiful animal about 30 inches long, of

Figure 49. Ringtail or Bassarisk

which nearly half the length is taken up by the long, bushy, ringed tail (Figure 49). It is pale tan to gray in color and whitish underneath. Its very long ringed tail is sufficient identification.

The Ringtail is found in the sandstone canyons of extreme western Colorado, from Mesa Verde to Grand Junction and north to the Yampa Canyon of northwestern Colorado. It feeds on small rodents, birds, insects, and fruits, mostly at night or at dusk. It is rather unafraid of man and frequently hunts about, or even in, buildings. It is gentle and easily tamed and its attractiveness makes it a desirable neighbor, since it apparently has no bad habits from the human point of view.

The Ringtail is locally known as "civet cat", which is a doubly poor name since it is not related to either the Old World civets nor to the cats.

The Bear Family
Ursidae

It is hardly necessary to describe the bears, since everyone can identify a bear at sight. It is desirable, however, to distinguish between the two genera of bears found here because the Grizzly Bear has become so very scarce (or extinct) in Colorado that any reports of its occurrence should be supported by an accurate identification.

Figure 50. Grizzly Bear

Grizzly Bear *Ursus shoshone*

The Grizzly Bear (Figure 50) is distinguished from the more common Black Bear by being larger—up to 7 feet or more from the tip of the nose to the tip of the stubby tail—by its grizzled color, usually brownish or yellowish brown; by the "dished-in" or "teddy-bear" profile of the face; by the sway-back behind the shoulder which makes the shoulder appear humped; and (if you get a close enough look) by the very long, straight claws of the fore feet which are longer than those of the hind feet.

The first white men who came west encountered the Grizzly far out on the plains along the river bottoms. These giants reportedly attacked without provocation but their unneighborly conduct resulted in their early extermination. The less pugnacious kinds

retreated before the human invasion so that now we think of Grizzlies as inhabitants only of our most inaccessible mountain forests. A few still live in such places in Colorado, but are in constant danger of their lives.

Observations of Grizzlies in Yellowstone Park at present show them to be more wary and bad-tempered than the Black Bear, and less easily adapted to living near men. They are undependable and dangerous when cornered. It is probable that they take a considerable toll of livestock when occasion permits, but for the most part they live on small mammals and fruits, with an ocasional deer or fawn, and it would seem a pity not to preserve a few as a souvenir of our past history.

Figure 51. Black Bear, with brown or cinnamon color phase at right

Black Bear, Cinnamon Bear *Euarctos americanus*

The American Black Bear (Figure 51) is a "black" bear even when its color is brown, or even tan. The so-called "cinnamon" bear is only a color variety of the Black Bear, and twin cubs may be different in color—one cinnamon and the other glossy black. Regardless of color, if a Colorado bear is not a Grizzly, it is a Black Bear.

The Black Bear differs from the Grizzly in being smaller in size—not much over 6 feet in total length; by the smooth "roman" profile of its face; by the evenly-rounded line of the back (not sway-backed behind the shoulder) and by the fact that the front claws are as short and as curved as those of the hind feet.

Indiscriminate hunting at all seasons, without legal protection in the past, has taken its toll of Colorado's bears. This, combined with the popular fear of large predators and a tendency to blame all dead stock on bears, has made the sight of a bear in Colorado rare indeed! At present, with state protection, bears seem to be on a slow increase in Colorado and it is to be hoped that over-timid citizens can be convinced that bears are ordinarily shy and, unless encouraged by garbage-feeding around human settlements, are likely to stay in the forest and make no trouble.

BATS, THE FLYING MAMMALS
Order Chiroptera

The translation of "Chiroptera", the name of the order of mammals to which the bats belong, is "hand-wing", and this literally describes a bat (Figure 52). During the course of its evolution the bat's finger bones have become extremely long and slender, with a thin skin membrane between, connecting all the fingers to each other, to the hind leg, and connecting the hind legs and the tail. By means of its hand-wings, the bat is able to fly—not just glide but actually to take off at will and direct its flight where it pleases and as long as it pleases, just as a bird can fly with a feather-wing instead of a skin-wing.

Figure 52. Bat

Bats are found on all the continents and even on the isolated oceanic islands where they, by reason of their powers of flight, were able to go when other mammals were prevented by wide stretches of ocean. In the tropics there are bats whose wing-spread reaches 5 feet, but all of our American bats are quite small.

The North American bats feed exclusively on insects, which they catch in flight at dusk or during the night. In the daytime they hang by their hind legs in some dark, quiet place such as a cave, hollow tree, belfry, or attic, with their

wings folded beside them. They are absolutely harmless in spite of the tall stories about vampires, bed-bugs, and getting tangled in people's hair, *There are no blood-feeding vampire bats in North-America. There is no evidence to suggest that bats carry bed-bugs. There is probably nothing that a bat would hate worse than getting tangled in your hair!*

Even without these legends and superstitions there is enough wonder connected with bats to sustain our interest. Their marvelous ability to avoid obstacles in night-time flight is the result of their perfecting sonar (like radar, but using sound waves) long before man had done so.

There are only eight genera of bats recorded from Colorado but they are rather difficult to distinguish. In the event that you may have an opportunity to examine a bat closely perhaps a few outstanding characters may help.

First examine the tail. If a third or more of its length extends out beyond the membrane connecting the hind legs, the animal is a Free-tailed Bat, *Tadarida*. This bat is rare in Colorado but there are literally millions of them at Carlsbad Caverns, New Mexico.

If the tail does not project beyond the membrane, look at its ears. All bats have rather large ears, but if they are *very* long (they may be coiled up when the animal is at rest) see whether they are joined together at the base or whether they are widely separated. If they are joined the bat is probably the Big-eared Bat, *Corynorhinus megalotis,* which is fond of caves and mine tunnels amost anywhere in Colorado. If the very long ears are not joined at the base, the animal is probably the Pale Bat, *Antrozous pallidus,* which is very pale yellowish or whitish. It may be encountered anywhere in Colorado, but most likely in the southwestern and western portions. If your big-eared bat should possibly have a large white spot on each shoulder and on the rump, get it to a museum as quickly as possible, since it may be the Spotted Bat, *Euderma maculata,* the rarest bat in North America!

If your specimen has neither projecting tail nor very long ears, you may be able to decide its possible identity by observing closely the fur or absence of fur on the upper surface of the membrane which connects the hind legs. If there is practically none, except a sprinkling of hairs near the body, and if the animal is about 4½ or more inches long (tip of nose to tip of tail) it is possibly the rather common Big Brown Bat, *Eptesicus fuscus.* If the hind membrane is covered with dense fur all over, the animal is either the Red Bat, usually reddish in color, or the Hoary Bat, rather silvery in color, both belonging to the genus *Nycteris.*

If the tail membrane has fur covering about a third of the base and the animal is very dark with silvery-tipped hairs and is about 4 inches long, it may be the Silver-haired Bat, *Lasionycteris noctivagans,* which is found generally over Colorado. If the basal third of the membrane has only scattered hairs (not dense fur) and the color is pale and the animal not over 3 inches long, it is probably the

Pipistrelle, *Pipistrellus hesperus*, which is found in the western part of Colorado.

If your animal does not seem to fit any of the above requirements it is probably a member of the only remaining genus known from Colorado, *Myotis*. The bats of this genus, in which there are 8 different species known from Colorado, are all some shade of brown, with slender forms, long tails, hairy faces and narrow ears. They are widespread in Colorado and likely to be found almost anywhere in the state.

There is a great deal still to be learned about the habits of our bats. Probably most Colorado bats migrate to warmer climates each autumn, but some of them spend the winter in caves and mine tunnels. Anyone with an oportunity to study bats, including the banding of individuals, is sure to be rewarded by a real contribution to scientific knowledge.

THE INSECT-EATING MAMMALS

Order Insectivora

Many kinds of mammals eat insects, but the shrews and moles are officially the insectivores, or "insect eaters".

The insectivores include two types, closely related to each other but quite different in appearance and habits. The burrowing Moles are almost as highly developed for burrowing and living underground as a mammal can be, while the shrews are tiny active hunters which spend the night searching thickets and meadows for their prey.

The food habits of both moles and shrews are beneficial from the human point of view so that these animals should be sharply distinguished from pocket gophers and mice, with which they might be confused by the uncritical observer because of their similarity in appearance and habitat.

The Mole Family
Talpidae

Mole *Scalopus aquaticus caryi*

The only mole known from Colorado is this pale brown, chunky animal (Figure 53) about 6 inches long including the short tail, with very fine short fur which will lie in any direction, and enormously broad front feet for digging. Its eyes are so small as to be seen with difficulty and its external ears are practically absent.

This mammal is rare in Colorado, or at least has only been recorded at Wray, near the Nebraska state line. It burrows by means of its shovel-like front feet, close under the surface of the ground. The animal literally forces its way through the soil with a swimming action and raises the surface of the ground above its burrow. It is this ridge of soil, usually through sod, which discloses the presence of moles, and which alarms gardeners who think the animal is feeding on plant roots and bulbs, instead of the insects, grubs, and worms which it really is seeking.

Additional information on the presence of moles at this or other localities in Colorado is greatly desired and should be transmitted to the University or to the Colorado A and M College.

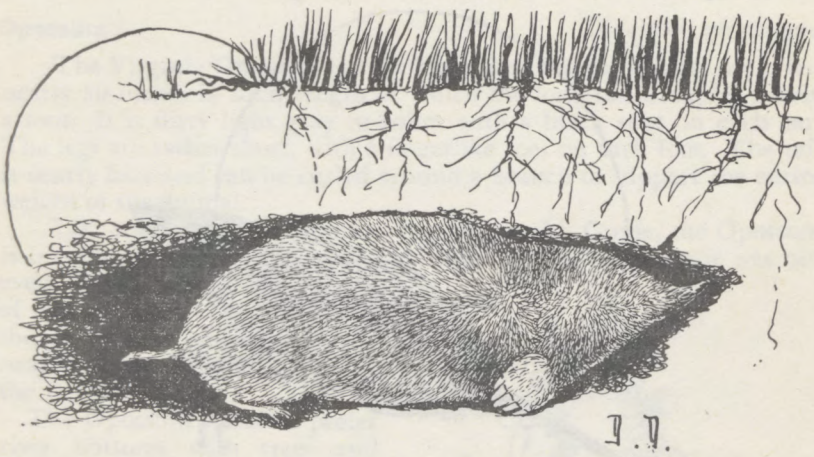

Figure 53. Mole

The Shrew Family
Soricidae

Shrews are small, mouselike mammals (Figure 54) which can be distinguished from mice by their pointed noses which project beyond the mouth. Examination of their teeth shows that instead of a single pair of chisel-teeth above and below, followed by a space as in the rodents, shrews have teeth all around more like those of a dog or other carnivore. These teeth are used for seizing and holding the prey just as are those of the carnivores.

There are three types of shrews in Colorado, identifiable by their size and length of tail.

Total length about 6 inches (including 3 inch tail); hind feet large and fringed with hairs for swimming ---------- **Water Shrew**

Total length not more than 4½ inches, tail not more than 1¾ inches ---------- **Long-tailed Shrews**

Total length not more than 3½ inches, tail less than 1 inch ---------- **Short-tailed Shrew**

Water Shrew *Neosorex navigator*

This largest of our shrews is very dark lead gray in color with the underparts nearly white. Its enlarged and hair-fringed hind feet are used to propel the animal through the waters of mountain streams and lakes. It swims swiftly both on and under the water where its coat may appear brilliantly silver because of the myriad of tiny air bubbles trapped in the fur.

It feeds on insects and any other animal life it can catch. It seems to occur all through the mountains but to shun the plains.

Long-tailed Shrews *Sorex* spp.

Several species of shrews of the genus *Sorex* in Colorado are alike in being rather dull brown above and dirty gray beneath, and in having the tail from 1/3 to 1/2 the length of the head and body.

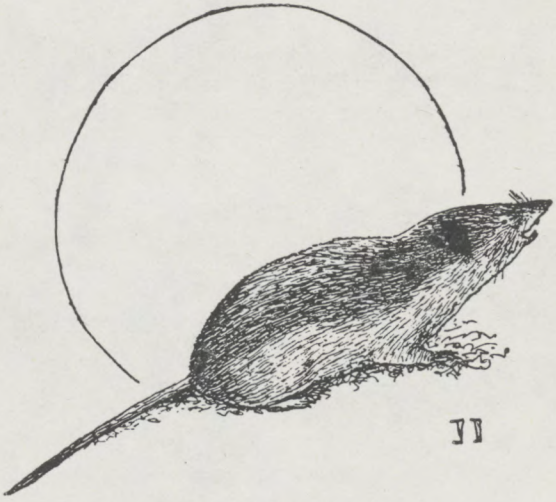

Figure 54. Shrew

Their eyes and ears are small, and they differ from mice in their extremely pointed noses which project forward beyond the mouth (Figure 54).

These bloodthirsty little killers perform a useful service to mankind in catching and devouring insects, grubs, spiders, and worms, as well as such small mice as they are able to overcome. They even put small boys to shame with their insatiable hunger since they eat more than their own weight in food every day, and will starve to death in a matter of hours if deprived of food.

Short-tailed Shrew *Cryptotis parva*

Like several other rare Colorado mammals, more information about the occurrence of the Short-tailed Shrew in Colorado is needed, and one of the purposes of this Guide will have been served if it results in increased interest in the distributions and occurrence of such forms. The Short-tailed Shrew has been found just once in Colorado, at Dry Willow Creek in Yuma County. The University Museum is anxious to obtain other specimens through the cooperation of users of this Guide.

The Short-tailed Shrew is a chunky little animal with total length of somewhat over 3 inches, of which only a little over ½ inch is tail! It is brown above and darkish gray beneath. Otherwise it looks much like shrews of the genus *Sorex* and, like them, it prefers damp meadowy localities, and burrows into the ground in search of food and for nesting.

THE POUCHED MAMMALS
Order Marsupialia

Opossum *Didelphis virginiana*

The Virginia Opossum is a medium-sized animal (Figure 55) often nearly 30 inches in total length of which the long tail occupies nearly a foot. It is dirty light gray in color, with a black spot on each ear. The legs are rather short, with 5 fingerlike toes on each foot. The tail is nearly bare and can be curled around a branch to support the entire weight of the animal.

Like several other mammals discussed in this Guide, the Opossum is becoming more abundant in Colorado. A few years ago it was not even considered an inhabitant of the state, but a recent report shows it to be widespread over nearly all of Colorado east of the Divide.

The Opossum seems to prefer river bottoms with trees and brush thickets and feeds on almost any kind of animal life it can catch, as well as on fruits.

The expression "playing possum" arises from the habit of the Opossum of "playing dead" when in danger and unable to escape. While in this state of trance it will withstand very rough treatment but when the danger is past it will recover and escape.

Figure 55. Opossum

The marsupials, of which the Opossum is a member, are those animals in which the young are born in a very rudimentary state, and are transferred to a pouch on the belly of the mother where they spend a considerable period firmly attached to the nipples of the mammary glands. Everyone knows about the pouch of the kangaroos but not everyone knows that the female Opossum also has a pouch in which it protects the tiny young. Australia has many different kinds of marsupials, South America has a number of kinds, but in the United States we have only the Virginia Opossum. Occasionally a tiny Mouse Opossum comes into the United States from Central America in a banana stalk and sometimes gets all the way to the corner grocery before it is discovered.

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Identification Service

The University of Colorado Museum is anxious to receive specimens for identification, especially of forms which are rare in Colorado, or which do not seem to fit satisfactorily into the keys and descriptions in this Guide. The Museum will pay transportation on specimens sent to it, and identification will be supplied to the sender.

Packages should be marked "Rush" and sent by *Express Collect* to

University of Colorado Museum
Boulder, Colorado

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