

BOBCAT

# Our Fur-Bearers

*The twelfth in Nature Magazine's series of educational inserts*

By E. LAURENCE PALMER

THERE is an American industry that in 1938 imported some 43 millions of dollars' worth of materials, while it exported 14 millions. The year before, it imported some 86 millions of dollars' worth, and exported less than 18 millions. It is estimated that this industry put some 78 millions into the pockets of some of the less prosperous of our citizens, in part to adorn the more prosperous. It earned in a year some 9 millions for a special group of farmers who had invested in the business some 50 millions. In good times, the annual turnover in this business in the United States alone is considered to be better than 315 millions of dollars, on which there was a revenue tax of more than 3 millions. This industry, unlike many, is dependent for its existence on a renewable natural resource that can be dissipated and lost, or cultivated and made to prosper. What becomes of it is definitely a responsibility of our people, and this responsibility can best be cultivated by education.

The fur industry, which is dependent upon a steady supply of fur-bearing animals, has been much criticized. There is much anxiety about its future. With justice, it has been criticized for its inhumane trapping practices, which result in the needless torture of wild animals for the production of an unnecessary luxury. Our schools, which have gone into great detail concerning the steps in the production of stockings of silk or of rayon, have not dared demonstrate the

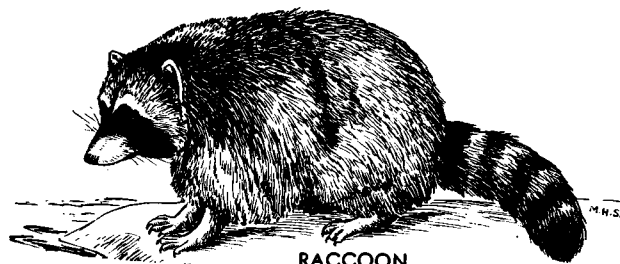
commoner practices associated with the initial step in the production of the average fur collar. We have sidestepped, and closed our eyes to the unpleasant aspects of the industry, and at the same time have appropriated large sums of our tax moneys to carry on unwarranted poison campaigns against some fur animals that are also among the best friends of agriculture. We have permitted several of our more valuable species of fur-bearers to become practically extinct over great areas of their original natural ranges. We have condoned the wholesale killing of such animals as the red squirrel for the few cents each that their pelts may bring. One state prints on the license it issues to its thousands of hunters advice to kill all they can of foxes and red squirrels.

In spite of the prevalence of such ill-advised suggestions, it is unlikely that any honest, well-informed person would contend that in the interests of all there should be a general decrease in the population of our fur-bearers.

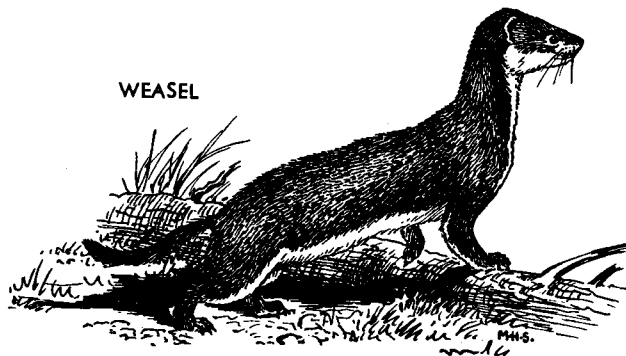
This should be true of the Nature lover, the farmer, the trapper, the dealer in or the wearer of furs, the professional wildlife worker, and the well-informed sportsman. It is difficult to draw fair comparisons in the conditions prevailing in different parts of the country. This is because some states get their statistics by guesses. Others base them on partial but careful records of takes by licensees. Maryland, for example, expresses the opinion that its take of muskrats in recent years has been around two million a



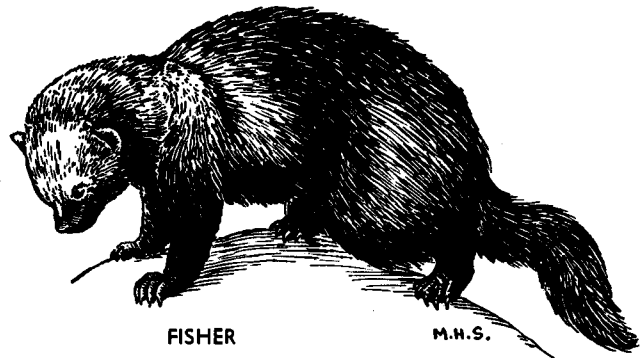
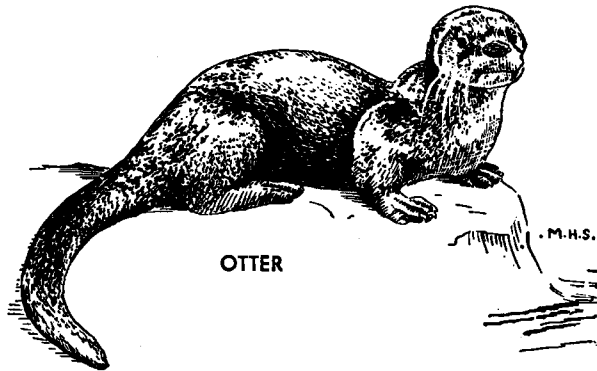
OPOSSUM



RACCOON



WEASEL



year, while New York reports only 165 thousand. However, the New York report is based upon the reports of about two-thirds of the State's licensed trappers. It does not include the take of boys who are not required to buy a license, but who are most active in trapping. So, while the Maryland estimate may be too high, it is certain that the New York figure is too low. Trends in takes might become evident where a state's system of making the count is relatively careful and is uniform through the years. It is with trends of population that we are more concerned than with anything else in this matter of fur-bearers.

Another factor should be watched in drawing conclusions about reported takes of fur animals. This calls for a recognition of the areas of the two or more states being compared and, where possible, a comparison of the areas of land suitable for the species in the states. It is well-nigh impossible to get the figures on the amount of suitable land. So the only thing to do is to fall back on total area and not take the findings too seriously. If we use the reported takes of the whole of the United States, we find that the country as a whole produces about one muskrat per square mile. Of course, this figure would not be true for the drier states, nor would it fairly represent such states as Louisiana and Maryland, which have much suitable muskrat land. Using the areas of the states as bases and the reported takes we find representative states showing the following record. Kansas, Maine and New Hampshire produce one muskrat per square mile; Minnesota, 1½; Virginia and New York, 3; Connecticut, 3½; Iowa, 4; Massachusetts, 5; West Virginia, Vermont and Illinois, 6; Pennsylvania, 7; Wisconsin, 9; Michigan and Indiana, 10; New Jersey, 17; Ohio, 30; Louisiana, 50 and Maryland, 170. Obviously these figures are far from reliable but they

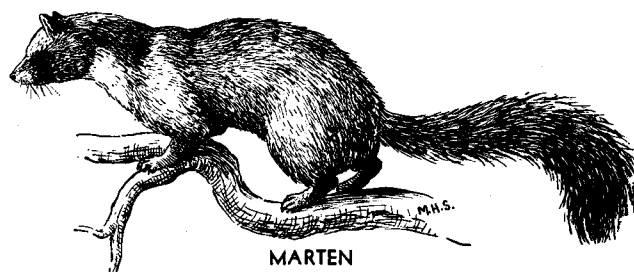
do show that more accurate records are needed before we can intelligently plan how best to use this valuable renewable natural resource.

Statistics on furs are complicated by the variability in the price of furs and the corresponding variability in the demand that they be taken. One cannot assume that a low price will lead to a low income, however. New York produces some of the highest quality muskrats in the country. Its furs brought individually on the average more than twice what Louisiana furs brought in 1934 and 1937. Nevertheless, the potential value of the Louisiana fur take rose 75 percent during the period, while the New York increase was only 10 percent.

The late Edward Breck pointed out the absurdity of members of humane societies wearing in summer the pelts of animals trapped by inhumane steel traps. In one state, his group carried their philosophy to the people and, over the opposition of the legislature, made it illegal to use steel traps except in the vicinity of farm buildings. The trappers got around this legal restriction by establishing box "tool sheds" wherever they wished to trap, and

calling these farm buildings. In another state there was a law requiring that animals be killed humanely, the law presumably referring to the slaughter of domestic mammals. Breck was proceeding to test this law as it might apply to wild animals at the time of his death. Apparently, the issue has not been followed up. Few can doubt the sincerity of many of these people who offer violent opposition to the use of steel traps. The question, if any, centers around how the traps may be eliminated. In New York, it is illegal to use a box trap or wire trap for taking fur-bearers.

Furs are beautiful. They may be produced by animals in captivity that may be killed humanely. There are enormous profits in the industry. The fur-bearers rep-



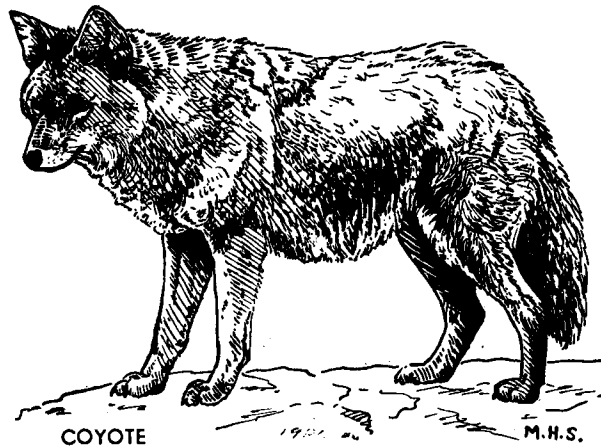
resent a possible financial reward to persons of low income. Persons of wealth are willing to spend large sums to get the finished product. Surely in this situation there must be some solution that can be worked out with justice to all, and with due consideration for the feelings of animals less intelligent than man.

One of the possible solutions lies in the perfection of cheap traps that will take the animals humanely. Vernon Bailey and others have made distinct progress in this direction.

Another solution may await the development of fur farms and the restriction of the use of furs so that only those species that may be killed humanely on fur farms may be sold. Thirty years ago there were practically no fur farms and yet, in 1936-37, forty percent of the fur produced in Canada reportedly came from fur farms. Skins from fox and mink farms in the United States alone in 1938 represented twenty percent of all the raw furs sold in the country. One farm in Wisconsin of 12,000 acres produces some 12,000 fox pelts a year, valued at \$10,000,000, and has produced nearly \$18,000,000 worth of fur. It provides employment for more than 400 people. An Ontario mink farm with some 44,000 mink has been in operation since 1933 only. Yet, in 1938, it produced about \$1,000,000 worth of fur. As shown in the life history charts, the farming of chinchillas is becoming safely established, with successful farms in various parts of the country. A ready market for these producers of the most highly-priced of furs seems assured.

Should these fur farms develop adequately there may be a much needed relief for the wild animals. The farm pelts are taken only when they are in their prime. Through selection of the animals, the pelts have become generally of superior quality. It might seem, then, that forces are lining up for an improvement for the fur-bearing animals which we and our forebears have abused.

There are reasons other than esthetic ones, and those aside from the profit angle, why wild fur-bearers should receive better protection. These concern the value of the living animals as pest destroyers, and in other respects. The great bulk of flesh and animal products that man uses for food will come from the plant-eating domestic



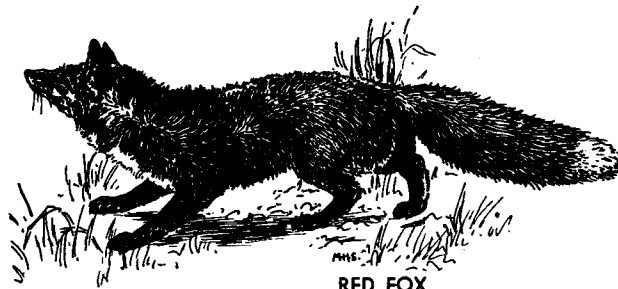
animals. Anything that competes with these animals for their food supply interferes with man's interests. The most serious competitors are the mice, pocket gophers, rabbits, and ground squirrels of one sort or another. It would not be abnormal for the small rodents on an acre of land to remove annually one-half ton of dry hay or alfalfa. This would go far to help in feeding the live stock on that land. The greatest mammal enemies of the small rodents usually called mice are such fur-bearers as

the skunks, foxes, coyotes, weasels, and minks. If the numbers of these natural checks on the rodents are reduced, the rodents increase, and the forage available for sheep and cattle goes down. It is not surprising, then, that in some parts of the country the coyote is defended,

even by the sheep men, as a protector of the forage.

An important aquatic fur-bearing mammal, the beaver, performs a valuable function in flood control by building dams on the headwaters of our streams. These stop the floods at their source and do not require tax money for their construction. They are repaired promptly by the beavers, who do not require emergency funds for maintenance. They may influence considerably the continued flow of streams and the amount of fish life these waterways can support.

And, further, one may lay aside all economic considerations, everything that has a bearing on the pocket-book or relief from the discomforts of flood, and even his feelings about the inhumane steel trap, and hope that the fur-bearers may be better understood and appreciated. Without a weasel now and then in the side yard, a rabbit on the front lawn, a squirrel up a tree, or the occasional "whicker" of a raccoon in the woods across the road, home would not be home to many of us. The writer flatters himself that there are plenty of others like him who get wholesome satisfaction from living relatively close to these fur-bearing friends, and who are willing to make certain sac- (Continued on page 588)



COMMON NAME SCIENTIFIC NAME	OPOSSUM <i>Didelphis virginiana</i>	RACCOON <i>Procyon lotor</i>	BOBCAT <i>Lynx rufus</i>	MARTEN; AMERICAN SABLE <i>Martes americana</i>
<b>DESCRIPTION</b>	Length, to 30 inches, with 15-inch, rat-like, prehensile tail. Weight, to 12 pounds, male, much smaller. Female has brood sac. Ears, naked and black and white. Feet, black. General appearance, furry, grayish white. Eyes, large, dark, and conspicuous in white face. Toes on each foot, 5; widespread, making star-like tracks.	Length, 30 inches. Tail, bushy; length, 10 inches. Weight, 15 to 45 pounds. Sexes, alike. Fur, long and of excellent quality, gray, brown, and black; dull brown at base. Conspicuous black band across face and eyes and in 6 or 7 rings around tail. Feet, with 5, slender, finger-like toes, front and back, yellowish gray.	Length, to 36 inches; tail, 7 inches. Weight, to 39 pounds, but 20 is normal; male, the larger. Sexes, colored alike but paler in winter. Normal color, soft, reddish brown, with cloudings or spots of brown or brownish black all over body. Ears marked heavily on back with black; tail, dark-barred and tipped with black above but not below. Fur, short, sleek. Claws retractile.	Length, total 25 inches. Tail, 8 inches, relatively bushy. Weight, to 4 pounds. Rich, dark brown with irregular patch on throat, though color varies and the throat patch may be white or orange. Ears, white or dull inside. General appearance, much like a squirrel.
<b>CLASSIFICATION AND RANGE</b>	Order Marsupialia. Family Didelphiidae. Only North American marsupial. New York west to Iowa, south through central Mexico, and along Atlantic Coast from southern New England to middle Florida. Introduced and established in southern California.	Order Carnivora. Family Procyonidae. Related to bears. From Gulf of St. Lawrence, southern Quebec, Ontario and Manitoba, and southeastern British Columbia south to Gulf of Mexico and South America. Absent from northern Rockies and drier parts of Great Basin, including most of Montana, Idaho, Wyoming, Utah, and Nevada, and W. Colorado and N. W. New Mexico.	Order Carnivora. Family Felidae. All of United States, except parts of Northern Plains region, south through Mexico except the southern quarter and except the highlands of central Mexico. Extirpated in all thickly settled sections.	Order Carnivora. Family Mustelidae, weasel-like mammals. Through wooded Canada and Alaska, formerly south in Alleghanies to West Virginia, in the Rockies to Colorado and in the West Coast ranges to central California; also groups in Colorado, and northern New Mexico.
<b>LIFE HISTORY</b>	About 2 weeks after adults mate, up to 18 young, each smaller than honeybee, about 1/2 inch long with 1/5 inch tail, are born, make their way to brood sac, and attach themselves to teats; some die if not enough teats. Increase size ten-fold in one week. In 4 weeks, may stick heads from pouch; in 5, may leave pouch temporarily; and in 8, shift for themselves. May breed at 1 year. One or two litters a year; maybe more in South.	Probably monogamous; mates in February, and 2 to 6 young born 63 days later. Male may help in rearing young, though in captivity male may kill young. Young, blind for 3 weeks; suckle about 2 months; remain in family circle through winter. May breed when 1 year old, while family is still a unit, or may wait until new litter of young forces them from home den.	In North, mates probably in late February or early March; 2 to 4 young, small, blind and helpless at birth, born in April or May. Den in a standing hollow tree, in or under a fallen log, or in a slashing or thicket; lined with dried leaves and moss; kept clean. Not known whether male shares in caring for young.	Possibly pair, mating in January; 1 to 5, blind young, born in grass-lined, hollow tree or burrow 100 days after mating; gestation may be delayed to 8 months. Young, reared by mother only, suckled about 5 weeks. Not sociable animals; tireless hunters of the treetops night or day, ranging over at least 2 square miles. One annual litter when conditions are favorable. No hibernation.
<b>FOOD AND OTHER HABITS</b>	Food, almost anything organic in nature but prefers birds and eggs; persimmons a favorite fruit. Climbs trees readily with help of tail and feet. May threaten fight if cornered but more likely pretend death. May sleep long in den in bad weather. Den not clean. Usually active throughout year; usually nocturnal.	Food, insects, aquatic animals, frogs, corn, vegetables. Den, preferably high in hollow tree, but sometimes cave in cliff. Does not store food; may hibernate during cold weather. Highly inquisitive and sociable. Desperate fighter when cornered, but easily tamed if caught young. Although it washes food, living quarters not kept clean.	Shy and furtive in behavior, rarely seen, partly because of nocturnal habits. Able hunter of small mammals and ground birds, and sometimes even kills animals the size of sheep and deer. Occasionally feeds on fish, crayfish or frogs.	Squirrels, rabbits, birds, mice or eggs, or any animals that they can overcome. About the only protection a squirrel has is to get into a small hole which marten cannot enter, since marten can out-leap and catch a squirrel in the treetops. Generally found in evergreens; also in second-growth deciduous forest.
<b>RELATIONS TO MAN</b>	Enjoyed as food by some people. Undoubtedly a pest to poultrymen and fruit farmers, but also provides sport for hunters and destroys mice and many insects. Fur take in New York State increased from 1,086 in 1927 to 2,908 in 1936. Price in 1923, \$1. Ranks among first six species of the fur-bearers.	Valuable fur-bearer, take rapidly decreasing in New York State (from 40,908 in 1927 to 26,921 in 1936). May take corn and poultry from farmer but probably compensates in destruction of mice and insects. Prime northern pelt, 1919, \$9; 1938, \$3.50; southern, \$6 and \$1. Durability, 65% of otter.	In Southwest, serves as effective control of rabbits and small rodents. Possibly a menace to smaller farm animals when wild prey is not available. Flesh edible by man. Prime northern pelt, 1919, \$4.50, 1938, \$1.50; southern, \$1.75 and \$0.50. Durability, 25% of otter.	Valuable as destroyer of injurious mice and other rodents, but also enemy of useful small birds and mammals. Valuable fur-bearer now becoming scarce nearly everywhere. 1923 New York take, 300; 1936, 102. In good country, 6 per square mile would be a high population. Now protected in New York.

<b>FISHER, PEKAN</b> <i>Martes pennanti</i>	<b>MINK</b> <i>Mustela vison</i>	<b>WEASEL</b> <i>Mustela cicognanii</i> and kin	<b>OTTER</b> <i>Lutra canadensis</i>	<b>COMMON SKUNK</b> <i>Mephitis mephitis</i> , and related forms
<p>Length, total 3 feet. Tail, 14 inches. Weight, to 18 pounds. Dark brown to blackish, with legs and tip of tail black. The female is the smaller and the general appearance is that of a long-nosed, black cat. Possesses great agility and strength, particularly active in the tree-tops.</p>	<p>Length, to 25.5 inches. Tail, 8.5 inches. Weight, males to 3½ pounds; females, to 1½ pounds. Tail, bushy. Sexes, colored alike, a dark, rich, brown with white under chin. Nose, pointed, and ears, small. Runs by rapid leaps. Toes, 5 on each foot. Scent glands, well developed.</p>	<p>Length, 11 inches (male), 9 inches (female). Tail, 3.2 inches (male), 2.8 inches (female). Toes, 5 on each foot; soles of feet, furry. Soft, close underfur and glistening chestnut outer hairs. Brown above and whitish beneath; everything except black tail-tip white in winter over most of range. Strong, disagreeable odor. Sexes, colored alike, and young like adults.</p>	<p>Length, 4 to 5 feet with 1-foot tail. Height, 7 to 8 inches. Weight, about 20 pounds. Feet webbed, and soles of feet hairy. Each foot with 5 toes. Tail, strong and muscular. Fur, rich, glossy brown; gray on lips and cheeks and lighter gray-brown underparts. Sexes, colored similarly; little seasonal or age variation.</p>	<p>Length, 24.5 inches. Tail, 7.5 inches (male), 6.6 inches (female). Weight, to 10 pounds. Foreclaws good for digging. Sexes, superficially alike, either all black or black with conspicuous white stripe down back and tail; market value of pelt decreases with abundance of white. Strong, repulsive scent from anal glands.</p>
<p>Order Carnivora. Family Mustelidae, with the weasels. North, mainly north of Gulf of St. Lawrence, to N. Quebec, N. Ontario, Manitoba, Saskatchewan, Alberta, and British Columbia, south in mountains to central California. Formerly, now very rarely, in northern Appalachians. Absent on plains of southern Canada and northern United States. Found in dense wooded areas.</p>	<p>Order Carnivora. Family Mustelidae. Related to the weasels, skunks and otters. Through most of Canada and Alaska except extreme northern treeless border, and south through most of United States except Texas, New Mexico, Arizona and southern Nevada and California.</p>	<p>Order Carnivora. Family Mustelidae. Related to the otters, skunks and minks. Just south of the Great Lakes almost to northern border of the continent, west to the Pacific and south along the Rockies and Sierras to central Wyoming and central California. Place taken by other species in south and most of west.</p>	<p>Order Carnivora. Family Mustelidae. Nine species and subspecies recognized. Related to minks, skunks and weasels. Through Canada and Alaska except northern parts, and south through United States except southern Texas, southeastern New Mexico and southern Nevada and California.</p>	<p>Order Carnivora. Family Mustelidae. Related to minks, otters and weasels. Southern half of Canada and south nearly throughout United States except for southern tip of Florida, and parts of coastal plain.</p>
<p>Possibly pair, mating in early March, with 1 to 5 young, born 60 days (some claim nearly 1 year) after mating; reared by mother only. One litter annually. The family breaks up early. Home, a series of dens often high in hollow trees, with 4- to 5-inch entrance. May range over a territory 8 to 10 miles across. Not sociable. May give growl, snarl, spit or mournful cry.</p>	<p>Mates in February or March; both males and females take one or more mates. Males fight fiercely for mates. Young born 50 to 60 days after mating, sometimes much longer, 3 to 7, blind 3½ to 4 weeks after birth, and helpless. Leave den, usually at end of a tunnel 4 inches in diameter, when 6 to 8 weeks old. One litter to season, and family may remain together for first summer.</p>	<p>Mates probably in July, and later (sometimes 8½ months) 4 to 8 young are born; blind for 5 weeks; weaned, at 6 weeks; sometimes cared for by both parents in hidden den lined with fur of animals which have been killed. Will defend young at risk of own lives. One litter a year, and den is clean and free from excrement.</p>	<p>Probably mates for life, breeding in late February. Young, born about 60 days after mating. Litter of 1 to 3 young, which are blind for a few weeks and suckled by mother for 4 months. Family stays together first year; both parents help in rearing young in admirable family life. Lives in den in bank or hollow log.</p>	<p>Mates February or March after family of preceding year breaks up. In 9 weeks, 4 to 10 naked, blind, almost helpless young are born in den which may be occupied by other animals. Nurse for 6 weeks. Male may rejoin family after young are partly grown and when young become partly independent by July or August. Male does not provide for young in earlier stages.</p>
<p>Food, such animals as hares, martens, squirrels, mice, foxes, porcupines and birds of almost any sort that may be captured. Hides surplus food supply and seems to show signs of mischievousness. Does not burrow as do many of its close relatives. Obviously has certain beats that may be followed day or night.</p>	<p>Food, mostly mice, rats and fish. Relish poultry, and may be enemy of marsh-dwelling birds; also eat young snapping turtles, which prey upon birds and fish. Probably do not kill wantonly; and although can climb, does not do so often. Preys on cotton rat in South and on rabbits, which are enemies of agriculture. May (usually not) live in harmony with muskrats.</p>	<p>Food of 360 individuals (Hamilton): 34.5%, field mice; 13.1%, rabbits; 11.3%, deer mice; 11.2%, shrews; 6.7%, rats; 3.6%, chipmunks and kin; 3.2%, birds, frogs, and snakes; and 16.4%, undetermined, but chiefly mammals. Among 500, there was no evidence of blood sucking. Active mostly at night but seen in day and through year.</p>	<p>Food, mainly fish and crayfish. Occasionally kill muskrats, ducks, young beavers, birds, and poultry; range over a 50-mile territory during activities extending through year and during day or night. Apparently can adjust to varying light and temperature conditions readily. Match for an average dog. Give off offensive odor.</p>	<p>Food: 414 analyses show 41.3%, insects; 22.1%, fruits and berries; 14.1%, mammals, chiefly mice; 12.9%, grains; 5.4%, carrion; 2%, birds; 2.2%, unidentified. Female seeks blood about time young are born. Largely beneficial. Destroys white grubs and pests of hops; also mice, eggs of turtles, and potato-beetles.</p>
<p>Most valuable fur-bearer, the yield for entire range averaging around 8 or 9 thousand a year for some 70 years but rapidly dropping. The take in New York was in 1923, 35; 1936, none. Must be acknowledged as great destroyers of game and of small fur-bearers. Pelts have brought as high as \$150, though average is very much lower.</p>	<p>Value of fur more than compensates for game destruction. Decreasing rapidly in New York State (9,612 in 1927 to 5,608 in 1936). One of most valuable fur-bearers, can be reared in captivity. Prime northern pelt, 1919, \$12; 1938, \$10; southern, \$5, \$4. Farm pelts constitute about 40% of annual American crop. High in recent years, \$25. Durability, natural, 70%, dyed, 35% of otter.</p>	<p>Splendid destroyer of mice and other rodents, killing millions of rats and mice yearly. Reputed to break up grouse nests. Pennsylvania has spent half a million dollars (\$80,000 in 1937) in bounties, at \$0.50 to \$1 a head, and number taken increased. Prime white pelts brought \$2 in 1919, \$0.30 in 1938; brown pelts, \$0.20 and \$0.45; New York production, 1923, 3,000.</p>	<p>Valuable fur-bearer which has been trapped to practical extinction (1,135 taken in the State in 1928, and the number decreased to 163 in 1936). Fur is most durable of all furs. Prime northern pelt, 1919, \$25; 1938, \$14; southern, \$7.50 and \$5. Durability, natural, 100%, plucked, 95%.</p>	<p>Was used as food by Indians. New York supply is steadily on decrease (300,000 in 1923 to 42,669 in 1936). Reported to break up grouse nests. Value of skunk to man much more than compensates for the damage it causes to poultry and game. Prime northern pelt, 1919, \$6; 1938, \$1.50; southern, \$4 and \$0.60. Durability, 70% of otter. Trade name, Alaska sable.</p>

COMMON NAME SCIENTIFIC NAME	COYOTE <i>Canis latrans</i>	RED FOX <i>Vulpes fulva</i>	GRAY FOX <i>Urocyon cinereoargenteus</i>	BEAVER <i>Castor canadensis</i>
DESCRIPTION	Length, snout to tail-tip, about 4 feet, over 1/8 tail. Average weight, males, 26 pounds; females, 22 pounds. Ears, large, 4 inches long. Color, pale brown, sprinkled with gray or black or sometimes white, with underparts nearly white and ears darker. Fur, of good quality in season.	Length, to 41 inches. Tail, 16 inches. Weight, to 14 pounds. Males, larger than females. Tail, bushy. Ears, large and pointed. Nose, pointed. Sexes, colored alike a golden yellow-brown; or reddish above and white beneath, with white tip on end of tail, and black legs. In young, black on muzzle and back of ears. Several phases, including black.	Length, 40 inches. Tail, 12 inches. Weight, to 8 pounds. Sexes, about equal in size and in coloration. "Pepper and salt", black, and gray above, with reddish brown along the sides and gray and tawny beneath. Tail, black-marked. Fur, shorter and generally inferior to that of red fox.	Length, 43 inches. Tail, 16 inches by 4 1/2 inches, broad and paddle-like. Weight, to 60 pounds or more, but average nearer 30 pounds. Front feet, with 5 toes; hind feet, with 5 webbed toes. Brown, with beautiful, soft, close underfur. Sexes colored alike, with little seasonal or age change.
CLASSIFICATION AND RANGE	Order Carnivora. Family Canidae. North to Lake Michigan, southern Mackenzie, N. British Columbia, middle Alaska, south to Central America. Range, larger than originally, mainly by extension northward from Great Plains and Great Basin. Individual range, around 6 square miles. Essentially, animals of open country.	Order Carnivora. Family Canidae. Related to dogs and wolves. All of wooded Alaska and Canada south throughout United States except for Pacific coast strip and southern Gulf States and parts of Southwest.	Order Carnivora. Family Canidae. Related to dogs and wolves. New Hampshire and New York to Minnesota, south to central Texas, thence north to Colorado and Utah, south to southern California, north along coast to Oregon. Individual range one or two square miles.	Order Rodentia. Family Castoridae. Canada and Alaska except northernmost areas, and (latterly) the south central plains. Extending south in U. S. to Mexican border, except S. Nev. and S. California; and to Gulf, except Fla. and S. E. coast region. Extirpated from much of plains, Mississippi Valley, and settled East. Now being restored locally.
LIFE HISTORY	Probably pairs for life. Mates in January and young born 63 days later, 3 to 10, blind but furred. May be taken from den at 3 weeks and at 6 may venture out on own and run with parents by July. Family together at least until early fall. Two litters a year rare. Breeds at 2 years. Lives, if fortunate, probably about 10 years.	Strictly monogamous. Mate in February or March; 4 to 7 young born 51 days later. Blind for 8 or 9 days and remain in den 3 or 4 weeks; then may come out and play but retreat to safety until normally about 3 months old. Males feed females and the family, and lead enemies away from dens by exposing selves at risk of life. Family life, exemplary. Den, clean.	Ideal family life. Mates in January; young born 50 to 60 days later in clean den in hollow log, cave, or tunnel; blind and helpless at birth and take solid food at about 6 weeks of age, when father is permitted to rejoin family circle. Family breaks up in August or September though parents stay together through year. Unlike red fox, gray fox has winter den.	Apparently mates for life, breeding early in year; young born 3 months later, 2 to 5 in number. At age of 1 month young eats and seeks solid food; may cease nursing when 6 weeks old, though family may stay together for 2 years. Young animals become sexually mature when 3 years old and establish own homes. Surplus males crowded out of community.
FOOD AND OTHER HABITS	Food, a variety of plants (mostly fruits), and animals but mostly animals. Probably worst enemy of gophers, prairie dogs and other small animals that feed on forage needed by domestic stock. Animals are caught by stalking singly or by hunting in packs, in this way catching more fleet jack rabbits and hole-dwelling ground squirrels. Speed, 24 miles an hour.	Food, principally rodents, but prey also on birds and game. Eat carrion, fruit, vegetables, and a variety of materials; store food more than do gray foxes. With gray fox is reported to break up grouse nests. Does not climb trees as does gray fox. Remarkable sense of smell, good sight, excellent hearing, intelligence, and endurance.	Eats almost anything—poultry, game, mice, mushrooms, fruits, vegetables, insects, and carrion. Does not store as much as does red fox but climbs trees better and considered by sportsmen to be worse enemy of game. Lacks rank odor, and also endurance, of red fox, and takes to trees when pursued by dogs. More nocturnal than red fox and less intelligent.	Food, probably exclusively plants, largely bark of softwoods felled near shore, cut up and stored under water for use in winter. Den, a house surrounded by water, of sticks and mud, with underwater entrance, a large, ventilated, clean room with nest of dry materials. Water level is maintained by dams of sticks and mud kept in order by whole community.
RELATIONS TO MAN	Economic status is debated but service in destroying competitors of live stock for forage cannot be overlooked. Known to kill sheep but may be a lesser factor in this than domestic dogs. May kill deserted newborn calves or colts and, when driven by hunger, may overcome weakened deer. Widespread poisoning campaigns, generally not justified.	Decreasing slowly in New York State (from 35,658 in 1927 to 10,593 in 1936), without legal protection. Silver fox, a color-phase of red fox, is raised on farms. Valuable because of destruction of harmful mice. Prime northern pelt, 1919, \$20, 1938, \$4; southern, \$6 and \$2. Average ranch silver pelt brings about \$45. Durability, 40% of otter.	Numbers slightly on increase in some parts of New York State (from 2,338 in 1927 to 4,247 in 1936). Probably enemy of game, but partly offsets this by destruction of mice and other pests, and no worse than cats or some dogs as enemy of wild life. Prime northern pelt, 1919, \$4; 1938, \$2; southern, \$1.50 and \$1. Durability, 40% of otter.	Highly valuable skin, which formerly constituted basis of wealth and trade in this country. Work as agent of flood control has been recognized only recently, and work in delaying water loss in headwater streams may be more valuable than fur. Flesh is edible. Animals gentle and shy. Prime northern pelts brought \$18 in 1919; southern, \$14 and \$6.

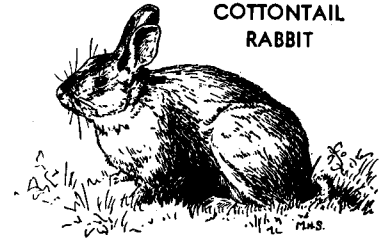
<b>MUSKRAT</b> <i>Ondatra zibethica</i>	<b>CHINCHILLA</b> <i>Chinchilla lanigera</i>	<b>WOODCHUCK</b> <i>Marmota monax</i>	<b>RED SQUIRREL</b> <i>Sciurus hudsonicus</i>	<b>COTTONTAIL RABBIT</b> <i>Sylvilagus floridanus</i>
<p>Length, to 25 inches. Tail, 10 inches, compressed, scantily haired, and scaly. Weight, 1½ to 2 pounds. Head, rather round. Fur, dark uniform brown above with longer hairs darker and underparts gray. Sexes, colored alike and young resemble the adults. No seasonal change.</p>	<p>Squirrel-like, with body 9 inches long. Tail, 5 inches. Head, rabbit-like. Eyes, large, black. Ears, broad, rounded at tip, nearly as long as head. Moustaches, long, white or black. Skin, thin but strong. Hair, fine, making thick pelt, gray or ash above and paler beneath.</p>	<p>Length, to 27 inches; tail, 6 inches. Males, larger than females. Fur, rather coarse but might be used for decoration. Grayish or reddish brown above or black or, rarely, white with light underparts. Sexes are colored alike but young are not so richly colored as parents. Hind feet, with 5 toes; forefeet, with 4 toes.</p>	<p>Length, 12½ inches. Tail, to 5 inches, bushy. Forefeet, modified for holding food. Red to rusty, with black stripe on the sides and underparts grayish white. In summer, underparts are whiter, ears lack tufts which may be present in winter, and young animals are duller in appearance than adults.</p>	<p>Length, to 15 inches. Tail, 2 inches. Weight, 2½ to 3 pounds. Ears, long. Hind legs, long. Dark brown above, mixed with gray. Top of tail brown, but underpart of tail and general underparts, white. Sexes, colored similarly. Young, with comparatively short ears and a more yellowish brown.</p>
<p>Order Rodentia. Family Muridae. All of Canada and Alaska except northernmost areas and all of United States, except the extreme southeast including Florida, most of eastern Texas, practically all of California and the southern part of Oregon.</p>	<p>Family Chinchillidae of Order Rodentia. Short-tailed chinchilla larger than common chinchilla. Native of the higher Andes from south of Chile to the north of Bolivia. Practically vanished from native range but now domesticated in United States.</p>	<p>Order Rodentia. Family Sciuridae with chipmunks, squirrels and prairie dogs. Mouth of Gulf of St. Lawrence, north to Hudson Bay, upper Mackenzie and central Alaska. In West S. to N. W. Montana, E. Nebraska and Louisiana. In East to W. N. Carolina.</p>	<p>Order Rodentia. Family Sciuridae with chipmunks, woodchucks and prairie dogs. Canada and Alaska except north of tree zone and through northern United States and Appalachians in the wooded area. Represented in wooded West by related forms.</p>	<p>Order Lagomorpha. Family Leporidae. The United States east of Montana and Arizona. Represented by other forms in most of western United States, in parts of Mexico and south to Panama.</p>
<p>Three to five litters a year; the first born in March or April. May be polygamous and young are born about a month after breeding. Usually 4 to 9 young, late summer litters commonly larger than those of early summer. Mothers fight effectively to protect young.</p>	<p>Monogamous. Mates for life, bearing first litter of 1 to 4, 111 days after mating. Young, full-furred, open-eyed at birth; able to run within hour; nursed 45 days but stay with parent 75 days. In captivity, court and mate when 5 to 8 months old, bearing 1 to 3 litters annually and living 8 to 10 years. Males help raise young.</p>	<p>Mates in early spring immediately after hibernation period; young born 4 weeks later, blind, naked, and helpless, about 4 inches long, with ½-inch tails; crawl at 3 weeks; begin solid food at 4 weeks, to play, at 5 weeks, then cease nursing. Sexually mature at 1 year. Average weight in March 5 pounds 10 ounces; in September, 9 pounds 15 ounces. Den, clean and dry.</p>	<p>One litter a year, of 4 or 5, helpless young, born in late spring or early summer. Usually mother alone assumes family cares which, in early summer, may consist not only of protection, but concern about teaching to climb, jump, and similar activities. Adults probably do not remain together, though there is some contrary evidence.</p>	<p>Probably promiscuous in mating; breed several times a year, probably four in warmer parts. Young born 30 days after mating; hidden in hollowed, fur-lined form, among vegetation; nest made by mother; 4 to 7 tiny, naked, helpless creatures, each about 4 inches long; by 2 weeks, may run from nest, though may suckle until a month old.</p>
<p>Food, largely plant material, stored at times; also shell-fish, such as fresh-water mussels, and other small aquatic animals. Enemies include minks, otters, hawks, and owls. Live in burrows in banks or in houses made of marsh plants piled high and with a room hollowed from the inside over an underwater and under-ice entrance.</p>	<p>Ground animals, unable to climb but run rapidly and hide quickly. Nests bare, without soft lining. Animals, gentle, affectionate, clean, nocturnal. In captivity, are fed yeast, molasses, wheat germ, oat middlings, peanut oil, soy bean oil, alfalfa meal, bone meal, with carrots thrice and orange juice twice weekly. Daily food ration, about two ounces.</p>	<p>Food, almost exclusively plants, though flesh may be eaten on occasion. Den at end of burrow and above lowest level of burrow. Wastes left in particular place. Active mostly during day but sometimes during night as well. May climb trees; normally escapes by retreating to burrow, but often fights effectively enemies of superior size.</p>	<p>Food, seeds and nuts, fruits, and the like, with also some flesh, birds' eggs, insects, and similar animal matter. Much more a flesh-eater than the gray squirrel and sometimes a great enemy to nesting birds. Great mushroom eater, and stores food. Den or nest not always kept clean.</p>	<p>Food, a variety of plants including herbs, the bark of trees, vegetables, but not fungi commonly. The animals are direct competitors with man for the plants which he wishes to raise for his own use. May be bearers of tularemia, a disease sometimes fatal to man.</p>
<p>Possibly most valuable fur animal; take in New York State dropped from 553,270 in 1927 to 165,825 in 1937. In 1936 New York produced 3 per square mile; Ohio, 30; Minnesota, 1½. Prime northern pelts sold for \$1.25 in 1938, for \$4 in 1919; southern pelts, \$2.75 and \$0.65. Durability, 45% of otter. Trade name, Hudson seal, Russian otter, red seal, river mink.</p>	<p>Probably most valuable fur-bearer, a coat of pelts bringing from \$20,000 to \$100,000. Breeding animals worth, in 1939, \$3,200 a pair. Breeders introduced into United States in 1923 by M. F. Chapman, who started with 18 animals. In 1939, there were 29 chinchilla farms in California, Colorado, New York and Wyoming.</p>	<p>Great destroyers of forage grasses, and burrows sometimes dangerous to horses, but burrows also permit water to enter the ground and thus help hold soil moisture. Flesh edible, particularly in young animals if musk glands are removed. May be controlled by introducing gas into burrows or by shooting. Wholesale destruction not justified. Durability, 20% of otter.</p>	<p>Not a useful species because of depredation on birds and stored supplies. Skins now sold as fur and flesh is edible. Considered as game in Canada and some states, but animals too small to justify hunting them for food or clothing. Are interesting neighbors because of their noisy inquisitive ways, and as pets are reasonably satisfactory.</p>	<p>A real pest on farms as destroyer of crops; have appeal to hunters, and their flesh and fur have some value. Fur used for trimming and for manufacture of felt hats. Somewhat on increase in New York (take from 797,750 in 1927 to 906,200 in 1933); by 1936 number had dropped to 597,966. Durability under 5% of otter. Trade name, electric seal.</p>



CHINCHILLA



WOODCHUCK



COTTONTAIL RABBIT

(Continued from page 583) rifices to guarantee that such pleasant experiences be shared by succeeding generations. After all, happiness is the greatest thing in life. It is doubtful if there is much happiness more wholesome and unselfish than that of sharing with neighborhood wildlife in an understanding way their problems of survival, of food, shelter and recreation.

### ACKNOWLEDGMENTS

This article is based on a similar one by the author published as a number of the Cornell Rural School Leaflet by the New York State College of Agriculture at Cornell University. Modifications felt to be improvements have been made to that leaflet. Appreciation is expressed to the College for permission to revise the material, and to the books and pamphlets that were used to supplement the author's personal experiences. Suggestions for school room activities appear on the School Page. The illustrations are by Hope Sawyer. The books most commonly used are as follows:

*American Mammals*, by W. J. Hamilton, Jr. The McGraw-Hill Book Company, New York City, 1939.

*Furs*, Leaflet No. 230, Ladies' Home Journal Clearing House of Consumer Information.

*Lives of Game Animals*, by Ernest Thompson Seton. Doubleday Doran, 1909.

The Biological Survey, United States Department of Agriculture (now Interior Department), issues useful bulletins for farmers on the raising of fur-bearing animals for profit, and with their habits in the wild, with special numbers on foxes, skunks, moles, minks, beavers, muskrats and others. These have been consulted and used where the information was appropriate.

In amplification of the preceding paragraphs, the following instructive publications are cited:

*Fur Bearing Animals*, A monograph of North American Mustelidae, by Elliott Coues. Misc. Pub. No. 8, U. S. Geological Survey, Dept. Interior, 1877.

*Fur-Bearing Mammals of California, Their Natural History, Systematic Status and Relation to Man*, by Joseph Grinnell, Joseph S. Dixon, and Jean M. Linsdale. University of California Press, Berkeley, California, 1939. 2 volumes. (With special reference to California conditions, but all species and the group treated from a broad standpoint.)

*Our Disappearing Fur Bearers*, by Edward A. Preble, Nature Magazine, Dec. 1927. Reprinted, 24-page pamphlet. (Biography, Conservation.)

*Fur Animals of Louisiana*, by Stanley C. Arthur. Bull. 18, Louisiana Dept. of Conservation, New Orleans, 1928. (Valuable book; historical, authoritative.)

*Foods of Some Predatory Fur-Bearing Animals in Michigan*, by Ned Dearborn. University of Michigan Press, Ann Arbor, 1932.

*Fur-Farming for Profit*, by Frank G. Ashbrook, The Macmillan Co., New York City, 1928. (Current review of the industry.)

*Silver Fox Farming*, by Frank G. Ashbrook, Department of Agriculture, Bull. No. 1151, 1923. (Other editions.)

*A Survey of the Animal Fur Catch of the United States*. From Section Fur Resources, Bureau Biological Survey, U. S. Dept. Agriculture. (Figures for 27 states.)

*Wild Animal Pets*, by William and Irene Finley. Charles Scribner's Sons, New York City, 1928. (Accounts wild pets in household.)

*Can We Save the Mammals?* By Osborn and Anthony, Natural History, New York City, Vol. 22, pp. 388-405, 1922.

BEAVER



MUSKRAT



RED SQUIRREL

