

SCIURUS MIGRATORIUS.—AUD. AND BACH.

MIGRATORY GRAY SQUIRREL.—NORTHERN GRAY SQUIRREL.

PLATE XXXV. MALE, FEMALE, AND YOUNG. Natural size.

S. S. Carolinense robustior, S. cinereo minor; cauda corpore multo longiore; variis coloribus.

CHARACTERS.

Larger than the Carolina gray squirrel; smaller than the cat-squirrel; tail, much longer than the body; subject to many varieties of colour.

SYNONYMES.

GRAY SQUIRREL, Pennant, Arct. Zool., vol. i., p. 185, Hist. Quad., No. 272.

SCIURUS CINEREUS, Harlan, Fauna, p. 173.

“ CAROLINENSIS, Godman, non Gmel.

“ LEUCOTIS, Gapper, Zool. Journ., London, vol. v., p. 206, (published about 1830.)

“ “ Bach., Proceedings of the Zoological Society, p. 91, London, 1838.

COMMON, or LITTLE GRAY SQUIRREL, Emmons, Report, 1842, p. 66.

SCIURUS LEUCOTIS, Dekay, Nat. Hist. N. Y., p. 57.

“ VULPINUS, do. do. do. p. 59.

DESCRIPTION.

This Squirrel seems to have permanently twenty-two teeth. A large number of specimens procured at different seasons of the year, some of which from the manner in which their teeth were worn appeared to be old animals, presented the small front molars in the upper jaw. Even in an old male, obtained in December, with tufted ears, (the measurements of which will be given in this article.) the small molar existed. This permanency in teeth that have been usually regarded as deciduous, would seem to require an enlargement of the characters given to this genus; it will moreover be seen that several of our species are similar to this in their dental arrangement.

Incisors, strong, and compressed, a little smaller than those of the cat-squirrel, convex, and of a deep orange colour anteriorly. The upper

ones have a sharp cutting edge, and are chisel-shaped; the lower are much longer and thinner. The anterior grinder, although round and small, is as long as the second; the remaining four grinders are considerably more excavated than those of the cat-squirrel, presenting two transverse ridges of enamel. The lower grinders corresponding to those above have also elevated crowns.

The hair is a little softer than that of the cat-squirrel, being coarsest on the forehead.

Nose, rather obtuse; forehead, arched; whiskers, as long as the head; ears, sharply rounded, concave on both sides, covered with hair; on the outside the hairs are longest. In winter the fur projects upward, about three lines beyond the margin; in summer, however, the hairs covering the ears are very short, and do not extend beyond the margin.

COLOUR.

This species appears under many varieties; there are, however, two very permanent ones, which we shall attempt to describe.

1st, Gray variety.—The nose, cheeks, a space around the eyes extending to the insertion of the neck, the upper surface of the fore and hind-feet, and a stripe along the sides, yellowish-brown; the ears on their posterior surface, are in most specimens brownish-yellow; in about one in ten they are dull white, edged with brown. On the back, from the shoulders there is an obscure stripe of brown, broadest at its commencement, running down to a point at the insertion of the tail. In some specimens this stripe is wanting. On the neck, sides, and hips, the colour is light gray; the hairs separately are for one half their length dark cinereous, then light umber, then a narrow mark of black, and are tipped with white; a considerable number of black hairs are interspersed, giving it a yellowish-brown colour on the dorsal aspect, and a light gray tint on the sides; the hairs in the tail are light yellowish-brown from the roots, with three stripes of black, the outer one being widest, and broadly tipped with white; the whole under surface is white. The above is the most common variety.

There are specimens in which the yellowish markings on the sides and feet are altogether wanting. Dr. GODMAN, (vol. ii., p. 133,) supposed that the golden colour of the hind-feet is a very permanent mark. The specimens from Pennsylvania in our possession, and a few from the Upper Missouri, have generally this peculiarity, but many of those from New York and New England have gray feet, without the slightest mixture of yellow.

2d, Black variety.—This we have on several occasions seen taken

with the gray variety from the same nest. Both varieties breed and rear their young together.

The black ones are of the same size and form as the gray; they are dark brownish-black on the whole upper surface, a little lighter beneath. In summer their colour is less black than in winter. The hairs of the back and sides of the body, and of the tail are obscurely annulated with yellow. There is here and there a white hair interspersed among the fur of the body, but no tuft of white as in *Sciurus niger*.

DIMENSIONS.

A Female in summer.

	Inches.	Lines.
Length of head and body	11	9
“ tail (vertebræ)	10	0
“ tail, to the tip	13	0
Height of ear	0	7
Palm to the end of middle claw	1	10
Heel to the end of middle nail	2	6
Length of fur on the back	0	5
Breadth of tail with hairs extended	4	2

An old Male in winter pelage, obtained Dec. 16th.

Length of head and body	12	6
“ tail (vertebræ)	11	0
“ tail, to end of hair	14	0
Height of ear	0	7
“ ear, to end of fur	0	9
Heel to end of longest nail	2	6
Length of fur on the back	0	8

Weight 1 lb. 6 oz.

HABITS.

This appears to be the most active and sprightly species of squirrel existing in our Atlantic States. It sallies forth with the sun, and is industriously engaged in search of food for four or five hours in the morning, scratching among leaves, running over fallen logs, ascending trees, or playfully skipping from bough to bough, often making almost incredible leaps from the higher branches of one tree to another. In the middle of the day it retires for a few hours to its nest, resuming its active labours and amusements in the afternoon, and continuing them without intermission till long after the setting of the sun. During the warm

weather of spring and summer it prepares itself a nest on a tree, but not often at its summit. When constructing this summer-house it does not descend to the earth in search of materials, finding them ready at hand on the tree it intends to make its temporary residence. It first breaks off some dry sticks, if they can be procured; if, however, such materials are not within reach, it gnaws off green branches as large as a man's thumb, and lays them in a fork of the stem, or of some large branch. It then proceeds to the extremities of the branches, and breaks off twigs and bunches of leaves, with which a compact nest is constructed, which, on the inner side is sometimes lined with moss found on the bark of the tree. In the preparation of this nest both male and female are usually engaged for an hour in the morning during several successive days; and the noise they make in cutting the branches and dragging them with their leaves to the nest can be heard at a great distance. In winter they reside altogether in holes in trees, where their young in most instances are brought forth.

Although a family, to the number of five or six, probably the offspring of a single pair the preceding season, may occupy the same nest during winter, they all pair off in spring, when each couple occupies a separate nest, in order to engage in the duties of reproduction. The young, in number from four to six, are brought forth in May or June; they increase in size rapidly, and are sufficiently grown in a few weeks to leave the nest; at this time they may be seen clinging around the tree which contains their domicile; as soon as alarmed they run into the hole, but one of them usually returns to the entrance of it, and protruding his head out of the hollow, watches the movements of the intruder. In this stage of their growth they are easily captured by stopping up the entrance of the nest, and making an opening beneath; they can then be taken out by the hand protected by a glove. They soon become tolerably gentle, and are frequently kept in cages, with a wheel attached, which revolves as they bound forward, in which as if on a treadmill they exercise themselves for hours together.

Sometimes two are placed within a wheel, when they soon learn to accommodate themselves to it, and move together with great regularity. Notwithstanding the fact that they become very gentle in confinement, no instance has come to our knowledge of their having produced young while in a state of domestication, although in a suitable cage such a result would in all probability be attained. This species is a troublesome pet; it is sometimes inclined to close its teeth on the fingers of the intruder on its cage, and does not always spare even its feeder. When permitted to have the freedom of the house, it soon excites the displea-

sure of the notable housewife by its habit of gnawing chairs, tables, and books.

During the rutting season the males (like deer and some other species) engage in frequent contests, and often bite and wound each other severely. The story of the conqueror emasculating the vanquished on these occasions, has been so often repeated, that it perhaps is somewhat presumptuous to set it down as a vulgar error. It may, however, be advanced, that the admission of such skill and refinement in inflicting revenge would be ascribing to the squirrel a higher degree of physiological and anatomical knowledge than is possessed by any other quadruped. From the observations we have been enabled to make, we are led to believe that the error originated from the fact that those parts in the male, which in the rutting season are greatly enlarged, are at other periods of the year diminished to a very small size; and that, in young males especially, they are drawn into the pelvis by the contraction of the muscles. A friend, who was a strenuous believer in this spiteful propensity ascribed to the squirrel, was induced to test the truth of the theory by examining a suitable number of squirrels of this species. He obtained in a few weeks upwards of thirty males; in none of these had any mutilation taken place. Two however out of this number were triumphantly brought forward as evidences of the correctness of the general belief. On examination it appeared that these were young animals of the previous autumn, with the organs perfect, but concealed in the manner above stated.

It is generally believed that this species lays up a great hoard of food as a winter supply; it may however be reasonably doubted whether it is very provident in this respect. The hollow trees in which these Squirrels shelter themselves in winter are frequently cut down, and but a very small supply of provisions has ever been found in their nests. On following their tracks in the snow, they cannot be traced to any hoards buried in the ground. We have sometimes observed them during a warm day in winter coming from great distances into the open fields, in search of a few dry hickory nuts which were still left suspended on the trees. If provisions had been laid up nearer home, they would hardly have undertaken these long journeys, or exposed themselves to so much danger in seeking a precarious supply. In fact, this species, in cold climates, seldom leaves its nest in winter, except on a warm sunny day, and in a state of inactivity and partial torpidity, it requires but little food.

Although this Squirrel is at particular seasons of the year known to search for the larvæ of different insects, which it greedily devours, it feeds principally on nuts, seeds, and grain, which are periodically sought for

by all the species of this genus ; among these it seems to prefer the shell-bark, (*Carya alba*), and several species of hickory nuts, to any other kind of food. Even when the nuts are so green as to afford scarcely any nourishment, it may be seen gnawing off the thick pericarp or outer shell which drops in small particles to the ground like rain, and then with its lower incisors it makes a small linear opening in the thinnest part of the shell immediately over the kernel. When this part has been extracted, it proceeds to another, till in an incredibly short space of time, the nut is cut longitudinally on its four sides, and the whole kernel picked out, leaving the dividing portions of the hard shell untouched.

At the season of the year when it feeds on unripe nuts, its paws and legs are tinged by the juices of the shells, which stain them an ochrey-red colour, that wears off, however, towards spring.

Were this species to confine its depredations to the fruit of the hickory, chesnut, beech, oak and maple, it would be less obnoxious to the farmer ; but unfortunately for the peace of both, it is fond of the green Indian-corn and young wheat, to which the rightful owner imagines himself to have a prior claim. A war of extermination consequently ensues, and various inducements have been held out at different times to tempt the gunner to destroy it. In Pennsylvania an ancient law existed offering three pence a head for every squirrel destroyed, and in one year (1749) the sum of eight thousand pounds was paid out of the treasury in premiums for the destruction of these depredators. This was equal to 640,000 individuals killed. In several of the Northern and Western States the inhabitants, on an appointed day, are in the habit of turning out on what is called a squirrel hunt. They arrange themselves under opposite leaders, each party being stimulated by the ambition of killing the greatest number, and fastening on the other the expense of a plentiful supper. The hunters range the forest in every direction, and the accounts given us of the number of squirrels brought together at the evening rendezvous are almost incredible.

In addition to the usual enemies of this species in the Northern States, such as the weasel, fox, lynx, &c., the red-tailed hawk seems to regard it as his natural and lawful prey. It is amusing to see the skill and dexterity exercised by the hawk in the attack, and by the squirrel in attempting to escape. When the hawk is unaccompanied by his mate, he finds it no easy matter to secure the little animal ; unless the latter be pounced upon whilst upon the ground, he is enabled by dodging and twisting round a branch to evade the attacks of the hawk for an hour or more, and frequently worries him into a reluctant retreat.

But the red-tails learn by experience that they are most certain of this

prey when hunting in couples. The male is frequently accompanied by his mate, especially in the breeding season, and in this case the Squirrel is soon captured. The hawks course rapidly in opposite directions, above and below the branch; the attention of the Squirrel is thus divided and distracted, and before he is aware of it the talons of one of the hawks are in his back, and with a shriek of triumph the rapacious birds bear him off, either to the aerie in which their young are deposited, to some low branch of a tree, or to a sheltered situation on the ground, where with a suspicious glance towards each other, occasionally hissing and grumbling for the choice parts, the hawks devour their prey.

This species of squirrel has occasionally excited the wonder of the populace by its wandering habits and its singular and long migrations. Like the lemming (*Lemmus Norvegicus*) of the Eastern continent, it is stimulated either by a scarcity of food, or by some other inexplicable instinct, to leave its native haunts, and seek for adventures or for food in some (to it) unexplored portion of our land.

The newspapers from the West contain many interesting details of these migrations; they appear to have been more frequent in former years than at the present time. The farmers in the Western wilds regard them with sensations which may be compared to the anxious apprehensions of the Eastern nations at the flight of the devouring locust. At such periods, which usually occur in autumn, the Squirrels congregate in different districts of the far North-west; and in irregular troops bend their way instinctively in an eastern direction. Mountains, cleared fields, the narrow bays of some of our lakes, or our broad rivers, present no unconquerable impediments. Onward they come, devouring on their way every thing that is suited to their taste, laying waste the corn and wheat-fields of the farmer; and as their numbers are thinned by the gun, the dog, and the club, others fall in and fill up the ranks, till they occasion infinite mischief, and call forth more than empty threats of vengeance. It is often inquired, how these little creatures, that on common occasions have such an instinctive dread of water, are enabled to cross broad and rapid rivers, like the Ohio and Hudson for instance. It has been asserted by authors, and is believed by many, that they carry to the shore a suitable piece of bark, and seizing the opportunity of a favourable breeze, seat themselves upon this substitute for a boat, hoist their broad tails as a sail, and float safely to the opposite shore. This, together with many other traits of intelligence ascribed to this species, we suspect to be apocryphal. That they do migrate at irregular, and occasionally at distant periods, is a fact sufficiently established; but in the only two instances in which we had opportunities of witnessing the mi-

grations of these Squirrels, it appeared to us, that they were not only unskilful sailors but clumsy swimmers. One of these occasions, (as far as our recollection serves us) was in the autumn of 1808 or 1809; troops of Squirrels suddenly and unexpectedly made their appearance in the neighbourhood; among them were varieties not previously seen in those parts; some were broadly striped with yellow on the sides, and a few had a black stripe on each side, bordered with yellow or brown, resembling the stripes on the sides of the Hudson's Bay squirrel, (*S. Hudsonius*.) They swam the Hudson in various places between Waterford and Saratoga; those which we observed crossing the river were swimming deep and awkwardly, their bodies and tails wholly submerged; several that had been drowned were carried downwards by the stream, and those which were so fortunate as to reach the opposite bank were so wet and fatigued, that the boys stationed there with clubs found no difficulty in securing them alive or in killing them. Their migrations on that occasion did not, as far as we could learn, extend farther eastward than the mountains of Vermont; many remained in the county of Rensselaer, and it was remarked that for several years afterwards squirrels were far more numerous there than before. It is doubtful whether any ever return to the west, as finding forests and food suited to their taste and habits, they take up their permanent residence in their newly explored country, where they remain and propagate their species, until they are gradually thinned off by the increase of inhabitants, new clearings, and the dexterity of the sportsmen around them. The other instance occurred in 1819, when we were descending the Ohio river in a flat-boat, or ark, chiefly with the intention of seeking for birds then unknown to us. About one hundred miles below Cincinnati, as we were floating down the stream, we observed a large number of Squirrels swimming across the river, and we continued to see them at various places, until we had nearly reached Smithland, a town not more than about one hundred miles above the mouth of the Ohio.

At times they were strewed, as it were, over the surface of the water, and some of them being fatigued sought a few moments' rest on our long "steering oar," which hung into the water in a slanting direction over the stern of our boat. The boys, along the shores and in boats were killing the Squirrels with clubs in great numbers, although most of them got safe across. After they had reached the shore we saw some of them trimming their fur on the fences or on logs of drift-wood.

We kept some of these Squirrels alive; they were fed with hickory nuts, pecans, and ground or pea-nuts, (*Arachis hypogæa*.) Immediately after eating as much as sufficed for a meal, they hid away the remainder

he eateth the straw and cotton at the bottom of their cage in a little heap. A very tame and gentle one we had in a room at Shippingport, near Louisville, Kentucky, one night ate its way into a bureau, in which we had a quantity of arsenic in powder, and died next morning a victim to curiosity or appetite, probably the latter, for the bureau also contained some wheat.

GEOGRAPHICAL DISTRIBUTION.

This species exists as far to the north as Hudson's Bay. It was formerly very common in the New England States, and in their least cultivated districts is still frequently met with. It is abundant in New York and in the mountainous portions of Pennsylvania. We have observed it on the northern mountains of Virginia, and we obtained several specimens on the Upper Missouri. The black variety is more abundant in Upper Canada, in the western part of New York, and in the States of Ohio and Indiana, than elsewhere. The Northern Gray Squirrel does not exist in any of its varieties in South Carolina, Georgia, Florida, or Alabama; and among specimens sent to us from Louisiana, stated to include all the squirrels existing in that State, we did not discover this species.

GENERAL REMARKS.

There exists a strong general resemblance among all our species of this genus, and it is therefore not surprising that there should have been great difficulty in finding characters to designate the various species. In the museums we examined in Europe, we observed that several species had been confounded, and we were every where told by the eminent naturalists with whom we conversed on the subject, that they could find no characters by which the different species could be distinguished. The little Carolina gray squirrel was first described by GMELIN. DESMAREST, who created a confusion among the various species of this genus, which is almost inextricable, confounded three species—the Northern Gray Squirrel, the Southern Carolina squirrel, and the cat-squirrel—under the name of *Sc. cinereus*, and gave them the diminutive size of ten inches six lines. His article was literally translated by HARLAN, including the measurements, (DESM., Mamm., p. 332; HARLAN'S Fauna, p. 173,) and he also apparently blended the three species—*S. cinereus*, *S. migratorius*, and *S. Carolinensis*. GODMAN called the Northern species *S. Carolinensis*, and LECONTE, who appears to have had a more correct view of the species generally than all previous authors, (see Appendix to McMurtrie's trans-