

TRANSACTIONS
OF THE
Nova Scotian Institute of Natural Science.

ART. I. ON THE MAMMALIA OF NOVA SCOTIA. BY J. BERNARD
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No. VI.

(Read November, 1869.)

THE AMERICAN BEAVER.

THOSE who did me the honor to listen to my last paper, will recollect that taking them in their proper order, I described the bear, the group of squirrels, both ground, tree, and flying, and the marmot, or woodchuck inhabiting our Province. This evening's paper will be given to the beaver, and the family of mice either introduced or indigenous.

Castor, Canadensis, (Kuhl, 1820. Baird.)

Castor, Fiber, (Linn. Audubon. Bachman.)

Castor, Fiber—variety Americanus—(Richardson.)

Castor, Americanus. (Fred. Cuvier, 1821.)

These synonyms show that from Linnæus, down to 1820, the American beaver was considered identical with the European, Kuhl at that date showed osteological differences which were at once recognised by naturalists as a difference in species. Cuvier followed in 1821, but giving the specific, *Americanus*. The law of priority, however, must give it to Kuhl.

These osteological differences are in the relative length of the bones of the nose, which are produced much farther back, in fact are longer than in the American, making in the European animal a much broader head. The castor bag in the American is smaller, the skin thinner, and the castoreum of amber colour, when kept a long time, and not waxy and lustreless as in the European.

I have no specimens of the Nova Scotia beaver before me, having only seen such captured ones as were kept in confinement

by Messrs. Downs and Leahy, but which are now dead. Therefore any description of them would be only repeating the observations of others. In confinement, they seem inert masses of fat, both crabbed and stupid, and not exhibiting their conventional sagacity. By early voyagers their numbers were said to be immense and their skins used to warm the living and shroud the dead. Even now, the grave of some warrior is yet turned up by the plough, and his bones with his stone spear, and jasper arrow heads are found resting in a fluffy bed of decomposed beaver skin wrapped in that almost incorruptible shroud of birch bark. They are now extinct in the eastern part of this Province, and were so nearly so in the western part, that some thirty years ago old hunter Hardwick was supposed to have trapped the last. They have, however, wonderfully revived of late years, and three or four hundred skins are annually exported from Halifax. The streams that flow from the great swampy lake basin forming the interior of the southern and western portion of the Province, are now frequently adorned by their dams and houses, so that a naturalist from Boston or New York might find himself in forty-eight hours, floating on a sluggish streamlet down to the waters of the great Rosignol, and hear his Indian say, "There beaver house," as he passes a low flattened cone of sticks and mud standing in and out the shallow waters. For a description of these, as well as the dams, with sectional measurements, I beg to refer you to a paper of Capt. C. Hardy, R. A., published in our "Transactions," and also to the beautiful model presented by him to this Institute, copies of which were exhibited at the Paris Exposition, and are also in the possession of the Halifax Museum, and the Zoological Society of London. These leave nothing to be said or seen on the subject.

The older naturalists put the muskrat next to the beaver in their systems. The later, and especially the American authorities, whom we follow, have placed him after the mice, placing him after the short-tailed mice or voles; whilst the former had a regard to his appearance, his habits of construction, his hind legs, and his tail, both of which approximate nearer to the beaver than any known animal, the latter taking the anatomical difference in form of skull and construction of teeth, in all which he resembles the

voles, have placed him after them. I merely mention this before taking up the family of mice, to make the article complete, and with no intention of remarking upon it, being well aware that original observations are the only ones worth anything by an amateur.

In Nova Scotia we find no connecting link between the beaver and the family of mice, excepting the very beautiful *Jaculus* or jumping mouse, which was formerly included with the mice. We have no gophers, or pouched rats, as in Western Canada, where several species exist under the trivial names of salamander rats, and pouched rats. American Fauna seems to have extended itself north and south, and the reverse, rarely do you find species identical east and west, with the exception of certain circumpolar animals which seem to have descended simultaneously both east and west.

We thus come next to the genus *Jaculus* having only one species representing it in North America—allied in form to the *Jerboa* of Europe.

JUMPING MOUSE.

- Jaculus, Hudsonius.* (Temm, Baird.)
Dipus, Hudsonius. (Zimm, 1780.)
Meriones, Hudsonius. (Audubon, Bachman.)
Meriones, Labradorius. (Richardson.)
Meriones, Acadicus. (Dawson.)
Labrador Rat. (Pennant.)
Gerbillus, Canadensis. (Godman.)

A beautiful specimen of this little animal lies before me:—

Extreme length.....	8 $\frac{1}{8}$ inches.
Length of tail.....	5 $\frac{1}{8}$ inches.
Length of hind leg from heel to toe.....	7 $\frac{1}{8}$ inches.

Colour dusky on the back reaching down to a line from tip of nose to tail, over a beautiful wash of yellow rusty. This yellow becomes brighter upon the flanks, and gives a fine yellow border to the white of the belly; chin, belly, and all below white, with a tinge of yellow. The darker colour of the back is formed by longish dark hairs which disappear upon the sides. The tail is naked, annulated, dusky above, white below, ending in a fine pencil. The feet are clothed with fine silky whitish hair, the soles dark, the palms rose colour; the whole hind heel is naked. The ears are dusky, with light margins, covered by thin hairs

outside and partially inside. His form in repose shows an arched and rather blunted nose, a humped back, and thighs and legs disproportionately long for the fore ones.

I watched one at St. Clement's, N. S., August, 1863. His leaps were so frog-like that had it not been for the colour, I should have passed it as one. The leap was, however, something more undulatory, more gliding and graceful. It was not at all like the conventional figure of Landseer, (*Fauna Borealis*,) which has been copied by all writers, and which represents the animal flying at an angle of 30° with the horizon. These leaps were scarcely more than horizontal. It reposed upon the branch of a dead tree, ears close, head and nose horizontal, feet concealed and back humped.

I subsequently kept one for a few weeks. It showed little docility, became soon dull, sleeping continually until it died. As it was in November I thought it was hybernating, but it proved the sleep of death. It ate its food sitting upon its haunches, but not very erect, and always held it between the back of both fore paws, (its knuckles, as it were,) and not by the palms. I have noticed this in all rats, mice, and squirrels I have watched, notwithstanding the very high authority against me in the exquisite print of "The Nut Crackers." Bears, marmots, porcupines, beavers and muskrats, use the palms as we do, though they all do not possess clavicles. In winter this beautiful little animal burrows a round hole in the ground, lines it with grass and moss, contrives to get into it, and from the inside to weave so tight a ball about himself, that it will roll upon the ground, himself inside. Here he hybernates a foot below the surface, and from hence awaking from his winter's sleep he digs his way out. They are far from rare in the Province.

In the family of mice this Province cannot be said to be well represented. It is not arctic enough to have the vast hordes of lemming and hamsters, neither is it genial enough for the numerous and more southern species. With all the world she has her three representatives of introduced species, the brown and black rat, and the common mouse, all true *mures*. Indigenous to her we have two long-tailed mice, the white-footed, and the hamster mouse, and two voles or short-tailed ones, at least I have identified but these,

I earnestly hope every member of the Institute would forward any specimens of mice they may obtain, as the settlers in the woods name two or three more kinds, and some new specimens have been found in the islands on the Atlantic coast, in the neighbouring States.

I think the Tusket, Mud Islands, and Cape Sable Island, off Yarmouth, might be found to contain some.

BROWN RAT.

Mus. decumanus. (Pallas, Dekay, Audubon, Bachman.)

Mus. Norvegicus. (Erxleben.)

Norway Rat. (Pennant.)

Nothing need be said of this cosmopolite, except that he is found in all parts of the Province, affecting rather the sea coast than the interior.

BLACK RAT.

Mus. rattus. (Linn., Dekay, Audubon, Bachman.)

Mus. Americanus. (Dekay.)

As I have only obtained four specimens of this animal, I have found him very rare here, as I believe he is elsewhere becoming. One was a mounted one by Mr. Downs, the skins of two others procured by myself are respectively in the Smithsonian Museum and in that of J. M. Jones. A fourth was given me by J. R. Willis, Esq.

Measurement of *M. rattus*, picked up by myself in Water Street, Halifax, and just killed out of a trap by a terrier, 1863:—

Entire length.....	14 $\frac{2}{10}$ inches.
Length of tail.....	7 $\frac{7}{10}$ inches.
Hind heel to end of toe.....	1 $\frac{3}{10}$ inches.
Height of ear.....	0 $\frac{6}{10}$ inch.

Colour, shiny blue-black on head, forehead, back, and one-third down the sides; under parts bluish-ash; feet and legs covered by short glistening bluish-ash hair; palms and soles, pale flesh or rose tint; tail annulated, naked or covered with very fine hair, with a small thin pencil. There were five tubercles on the palms, and six upon the soles, two at root of middle toes, one at root of outside and inside toe each, and two disposed diagonally along the sole. The palms and soles were very thick and fleshy. There were four toes and a rudimentary thumb, (the nail of which was scarce perceptible) on the fore foot, and five upon

the hind. The ear was large rounded, the anterior edge folded inward, the posterior edge outward, and backward; the entire ear naked, but under a strong glass, shewing scattered hairs; the nose was more pointed, head smaller, fur finer than *Decumanus*, having fewer of those coarse long hairs than the latter has; the nails were long and sharp; the hind toes very long, the three middle ones the longest and nearly equal, the inner one slightly shorter than the outside one, and both much shorter than the middle ones; the whiskers were about two inches long and deep shiny black. The specimen given me by J. R. Willis was taken in Jacob's Lane, Halifax, 1869, and measured—

Length of body.....	6 ⁶ / ₁₀ inches.
Length of tail.....	5 ⁷ / ₁₀ inches.
Heel to end of toe.....	1 ⁵ / ₁₀ inches.
Height of ear.....	0 ⁶ / ₁₀ inch.

It thus differed in having a longer heel. The tail was shortened by disease; the whole appearance sickly, and colour dull sooty black. On examination, one of the lower incisors had overgrown, and had entered the palate at the root of the upper incisor, causing no doubt great pain in eating.

As these rats are becoming so rare I thought it best to give the most minute account of them I could. I believe they are more abundant in the West India Islands. Our stevedores tell me that in smoking vessels from the West Indies to clear them of rats, they usually find them all black.

COMMON MOUSE.

Mus Musculus. (Linn.)

Like the Norway or brown rat, this sprightly cosmopolite has been introduced into all lands. In comparing many specimens I found they differed as to length of tail. They abound often in old grist mills built on the edge of the forest, and turned by some mountain streamlet. Here they obtain to such a size and have such a soft creamy wash over their brown skins that would almost make a permanent variety. Isolation and abundance of food cause no doubt these differences. We come now to our indigenous species.

WHITE-FOOTED MOUSE.

Hesperomys, leucopus. (Baird, LeConte.)

Musculus, leucopus. (Rafinesque.)

Mus leucopus. (Dekay, Bachman, Audubon.)

Mus agrarius, Americanus. (Linnæus.)

I have chosen four synonyms out of about fifteen with which this little animal has been honoured, and those of the best American and European naturalists. From a specimen before me given me by Mr. Downs, Dec. 19th, 1863—

Extreme length.....6 $\frac{1}{4}$ inches.
Length of tail.....2 $\frac{1}{2}$ inches.

In colour it is brown with a yellow wash above a line drawn from the tip of the nose along the sides and running down to the front of thighs, along which to the hind leg; all below this is pure white, the feet and toes pale pink; a streak commencing between the ears of dusky passes down the back widening above the flank towards the tail; tail brown above, white beneath, and well clothed with hair; whiskers long, both white and black; ears very long, rounded, dusky, with a small white rim, and naked inside and out; the forehead was very arched; ears prominent and eyes full.

This mouse does not hybernate, this specimen having been taken abroad in December. Mr. James Melville also informed me that on 17th January, 1863, he cut and hauled from the forest a stick of timber for fire wood; in cross cutting it with a saw, he came upon a hollow lined with vegetable down from a shrub common in the swamps, also other hollows not lined, but filled by a pint and half of pine and fir seeds. Out of the lined nest two white-footed mice crept and were agile enough to escape his pursuit. It seems nothing but the invasion of sharp steel in their comfortable quarters ejected them; the rough hauling from the forest they seemed to have withstood. Thus, constructing their nests on trees they frequent the open, and enter settlers' houses where they are trapped like the house mouse.

HAMSTER MOUSE.

Hesperomys, Myoides. (Baird.)

Cricetus, Myoides. (Gapper.)

In examining specimens I frequently found some white-footed mice with longer tails than others, and with a faint ash colour over the yellow brown. I confounded them together, until my attention was called to the subject in the article on *Hesperomys*, in Baird's Mammals of North America. The following is a description of one given me by Mr. Downs in February, 1864, which differed from *leucopus* in having cheek pouches and a longer tail:—

Extreme length	$7\frac{9}{10}$	inches.
Length of tail	$3\frac{7}{10}$	inches.
Length of hind foot	$\frac{8}{10}$	inches.
Height of ears	$\frac{5}{10}$	inch.

Colour below a line drawn irregularly from point of nose along the cheek, shoulder, side and front of thigh, white; above this line yellowish brown, brighter on the cheek and sides; along forehead, back and rump dusky; feet pale pink and clothed with short silky hair; tail dusky above, white below and covered with white short hairs, with a pencil; ears dusky with a narrow white rim; the cheek pouches extended nearly to the ear, lined with a pale pink mucous membrane, and having a strong white tendon running the whole length on the inside.

Here we have two mice identical even in typical marks, yet one possessing side pouches, the other not. We cannot wonder that *Gapper* created a new genus, to separate them. As bearing on the great question of the day these facts are interesting. The northern mouse collecting stores for the winter having pouches, the more southern one sustaining himself in the open winter, not having them. Does use produce the organ? Or, originally distinct was the organ created before the use. Truth gains and error loses in boldly stating facts though they may be adverse to one's own speculations, and in this spirit have I placed them here on record.

We come next to the voles, or short-tailed mice, certainly more arctic in their rougher coats, concealed ears and short tails:—

GAPPER'S MOUSE.

Arvicola. Gapperi, (Vigors, Baird, Dekay.)

Arvicola. Dekayi, (Audubon, Bachman.)

From a specimen before me in the flesh, given me by J. M. Jones, Esq., February 2nd, 1862:—

Extreme length..... 5 inches.

Length of head..... $1\frac{1}{4}$ inch.

Colour rufus chestnut on the head and back toning down to yellowish brown on the sides, which insensibly fades to the greyish yellow ash of the lower parts. The nose is more pointed, the feet and legs more graceful than the meadow mouse. The tail dusky chestnut above, light ash below. The ears large, chestnut colour, with a very large antitragus. The ear is densely covered, inside and out, with hair, but projects beyond the head. These voles, though not known in the neighbouring States, are not uncommon here, but not so numerous as the meadow mouse. I know nothing of their habits; as this specimen was taken in January they probably do not hibernate.

BANK MOUSE.

Arvicola riparia. (Ord, Baird, Audubon, Bachman.)

This vole varies much in size from many specimens before me, the largest measures :—

Extreme length..... $6\frac{2}{8}$ inches.
Length of tail.. $1\frac{6}{8}$ inch.

The smallest, evidently a young one, though taken on June 4th, and large for the time of year :—

Extreme length..... $3\frac{8}{10}$ inches.
Length of tail $1\frac{2}{10}$ inch.

There are many specimens intermediate. The prevailing colour is dark brown, with a scarcely perceptible reddish mark as seen in certain lights; the sides have a yellowish wash, and the belly and beneath a plumbeous wash over the prevailing brown. The tail and feet are dusky; the head is robust, though the nose is pointed; the ears well concealed by the numerous longish hairs covering the head and back. The hind legs are far back in running, and the eyes small, but prominent.

These voles are numerous in the Province, colonies of them often inhabiting small islands on the sea coast, where they become very abundant, perhaps from being sheltered from their enemies, the weasel and mink.

With this vole ends the Nova Scotian mice, at least, of my identifying. Of their habits I have had but little observation. Though not personally seeing it, I had the account of the hybernation of *Jaculus Hudsonius*, from one of highest intelligence, who dug one of those curious balls from the ground with its torpid inhabitants. From obtaining *A. Gapperi* in mid winter, as well as *A. leucopus* with a supply of seeds, I infer they do not hibernate. . On the other hand, *A. riparia* burrows in the ground though he does not nest there, and entirely disappears in winter. After the grass fields are cut numerous little paths are seen in the short stubble. The waving grass, all the summer long, had made them delightful covered ways for him to travel in, but the hawk and the day-owl pursue him through his unprotected galleries.

In the year 1825, the Province was visited by a plague of mice with white bellies, which, in the rural parts, destroyed everything before them of grain and fruit, whether from excessive reproduction, or an instinct of migration, one knows not. Dr. Baird, in noticing a similar occurrence, on the northern shore of Lake Erie, attributes

it rather to the *myoides* than the *leucopas*. An intelligent friend informed me that, disturbing a female mouse in the fields one day, she made off with prodigious leaps with her family hanging to her back, most probably they were attached to her mammæ, as the young of the opossum do, thus showing some slight analogy to that isolated animal. He could not determine the species, which must have been the white bellied or the jumping mouse.

ART. II. MONOGRAPH OF RANUNCULACEÆ OF THE DOMINION OF CANADA AND ADJACENT PARTS OF BRITISH AMERICA. BY GEORGE LAWSON, Ph. D., LL. D., *Professor of Chemistry and Mineralogy, Dalhousie College and University, Halifax, N. S.*

(Read December 13th, 1869.)

Synopsis of Genera.

TRIBE I. CLEMATIDÆ.—Fruit consists of numerous separate carpels, which are single seeded and indehiscent, (Achenes), with long feathery awns. Sepals coloured like petals, valvate or induplicate in æstivation, not caducous. Petals absent, or represented by stamen-like bodies. Mostly tall climbers, with weak woody stems and opposite compound (or simple) leaves, whose petioles (in our species) are twisted-clasping like tendrils.

Genus 1. CLEMATIS, Linn.—Calyx of 4 or 5 large petaloid sepals. Petals absent in some species, in others represented by stamen-like processes graduated centripetally into stamens.

TRIBE II. ANEMONEÆ.—Fruit consists of separate carpels, which are single-seeded and indehiscent, (Achenes), in some species with, in others without, long feathery awns. Sepals green, or, more usually, coloured like petals, (frequently large), imbricate in æstivation, not caducous. Petals absent or represented by stamen-like bodies. Herbs with radical leaves and verticillate involucre or alternate cauline leaves.