GENUS PSEUDOSTOMA.—SAY.

DENTAL FORMULA.

$$\text{Incisive } \frac{2}{2}; \text{ Canine } \frac{0-0}{0-0}; \text{ Molar } \frac{4-4}{4-4} = 20.$$

Incisors, naked, truncated; molars, destitute of radicles; crowns, simple, oval; anterior ones, double.

Head, large and depressed; nose, short; mouth, small.

The cheek-pouches are large, and open exterior to the mouth.

The eyes are small and far apart. The external ear is very short; auditory openings, large. Body, sub-cylindrical; tail, rather short, round, tapering slightly, clothed with short hairs.

Legs, short, with five toes to each foot.

Burrowing in sandy soils, feeding on grasses, roots, nuts, &c., which they convey to their burrows in their capacious cheek-pouches, are habits common to this genus.

There are about six well determined species of Pouched Rats, all existing in North America.

The generic name is derived from *ψευδο*, (*pseudo*), false, and *στομα*, (*stoma*), a mouth, in allusion to the false mouths or cheek-pouches of the genus.

PSEUDOSTOMA BURSARIUS.—SHAW.

CANADA POUCHED RAT.

PLATE XLIV.—MALES, FEMALE AND YOUNG.

P. supra, rufo-fuscus; *subtus*, cinereo-fuscus; *pedibus*, albis.

CHARACTERS.

Reddish-brown above, ashy-brown beneath; feet, white.

Canada Pouched Rat.

Drawn from Nature by J.J. Audubon F.R.S. F.L.S.

Lith. Printed & Col'd by J.T. Bowen, Philada.

SYNONYMES.

- MUS BURSARIUS, Shaw, Descript. of the M. Bursarius in Linn. Transact., vol. v., p. 227 to 228.
- MUS BURSARIUS, Shaw's Gen. Zool., vol. ii., p. 100, pl. 138, (figures with cheek-pouches unnaturally inverted.)
- MUS BURSARIUS, Mitchill, Silliman's Journal, vol. iv., p. 183.
- MUS SACCATUS, Mitchill, N. Y., Medical Repository, Jan. 1821.
- SACCOPHORUS BURSARIUS, Kuhl, Beit., p. 66.
- CRICETUS BURSARIUS, Desm. in Nouv. Dict., 14, p. 177.
- “ “ F. Cuv. in Dict. des Sc. Nat., t. xx., p. 257.
- PSEUDOSTOMA BURSARIUS, Say, in Long's Expedi., vol. i., p. 406.
- “ “ Godm., vol. ii., p. 90, fig. 2.
- “ “ Harlan, p. 133.
- GEOMYS ? BURSARIUS, Rich., F. B. A., p. 203.

DESCRIPTION.

Head, large ; nose, broad and obtuse, covered with hair, with the exception of the margins of the nostrils, which are naked ; the nostrils are small oblong openings a line apart, and are on their superior margins considerably vaulted.

The incisors protrude beyond the lips ; they are very large and truncated ; in the superior jaw they are each marked by a deep longitudinal groove near the middle, and by a smaller one at the inner margin ; in the young, they exhibit only a single groove. The molars penetrate to the base of their respective alveoles without any division into roots, their crowns are simply discoidal, transversely oblong-oval, margined by the enamel ; the posterior tooth is rather more rounded than the others, and that of the upper-jaw has a small prominent angle on its posterior face ; the anterior tooth is double, in consequence of a profound duplicature in its side, so that its crown presents two oval disks, of which, the anterior one is smallest, and in the lower-jaw somewhat angulated. (Say.)

Eyes, small ; ears, very short, and scarcely visible ; whiskers, not numerous, shorter than the head.

The cheek-pouches are very large, extending from the sides of the mouth to the shoulders, and are internally lined with short soft hairs ; the body is broad and stout, sub-cylindrical, and has a clumsy appearance, not unlike that of the shrew-mole. It is thickly clothed on both the upper and lower surfaces with soft hair, that on the back being in some parts half an inch long, whilst on the under surface it is much shorter, and more compact.

The feet have five toes each ; the fore-feet are robust, with large, elongated, compressed, and hooked nails ; the middle nail is much the

longest, the fourth is next in length, the second shorter, the fifth still shorter, and the first very short; there is a large callous protuberance on the hinder-part of the palms. On the hind-feet the toes are short, and the nails are very short, concave beneath, and rounded at tip; the middle nail is longest, the second almost as long, the fourth a little shorter, the first still shorter, the fifth very short. This Rat is plantigrade, and presses on the earth from the heel to the toes.

The tail is for one-third of its length from the root clothed with hair, but toward the extremity is naked.

COLOUR.

Incisors, yellow; nostrils, light pink; eyes, black. The fur is plumbeous from the roots to near the extremity, where it is broadly tipped with reddish-brown; on the under surface it is a little paler, owing to the ends of the hairs being but slightly tipped with brown.

The head and the dorsal line are a shade darker than the surrounding parts.

Moustaches, white and black; nails, and all the feet, white.

The colours here described are those which this species exhibits during winter and the early part of summer. Immediately after shedding its hair it takes the colour of the young, light-plumbeous, which gradually deepens at the approach of winter.

DIMENSIONS.

From nose to root of tail	-	-	-	-	-	9 $\frac{3}{4}$ inches.
“ “ to ear	-	-	-	-	-	2 do.
“ “ to end of pouch	-	-	-	-	-	4 $\frac{1}{4}$ do.
Tail	-	-	-	-	-	2 $\frac{1}{4}$ do.
Depth of pouch	-	-	-	-	-	3 do.
Fore-foot with longest claw	-	-	-	-	-	1 $\frac{5}{8}$ do.
Distance between the eyes	-	-	-	-	-	$\frac{7}{8}$ do.

Weight of largest specimen, 14 oz.

HABITS.

During a visit which we made to the Upper Missouri in the spring and summer of 1843, we had many opportunities of studying the habits of this species. In the neighbourhood of St. Louis, at the hospitable residence of the late PIERRE CHOUTEAU, Esq., we procured several of them alive. In that section of country they are called “Muloes.”

They are considered by the gardeners in that vicinity as great plagues, devouring every tap-root vegetable, or grass, within their reach, and

perforating the earth in every direction, not only at night, but oftentimes during the day.

Having observed some freshly thrown up mounds in Mr. CHOUTEAU'S garden, several servants were called, and set to work to dig out the animals, if practicable, alive; and we soon dug up several galleries worked by the Muloes, in different directions. One of the main galleries was about a foot beneath the surface of the ground, except where it passed under the walks, in which places it was sunk rather lower. We turned up this entire gallery, which led across a large garden-bed and two walks, into another bed, where we discovered that several fine plants had been killed by these animals eating off their roots just beneath the surface of the ground. The burrow ended near these plants under a large rose-bush. We then dug out another principal burrow, but its terminus was amongst the roots of a large peach-tree, some of the bark of which had been eaten off by these animals. We could not capture any of them at this time, owing to the ramifications of their galleries having escaped our notice whilst following the main burrows. On carefully examining the ground, we discovered that several galleries existed that appeared to run entirely out of the garden into the open fields and woods beyond, so that we were obliged to give up the chase. This species throws up the earth in little mounds about twelve or fifteen inches in height, at irregular distances, sometimes near each other, and occasionally ten, twenty, even thirty paces asunder, generally opening near a surface well covered with grass or vegetables of different kinds.

The Pouched Rat remains under ground during cold weather in an inactive state, most probably dormant, as it is not seen to disturb the surface of the earth until the return of spring, when the grass is well grown.

The earth when thrown up is broken or pulverized, and as soon as the animal has completed his galleries and chambers, he closes the aperture on the side towards the sun, or on the top, although more usually on the side, leaving a sort of ring or opening about the size of his body.

Possessed of an exquisite sense of hearing, and an acute nose, at the approach of any one travelling on the ground the "Muloes" stop their labours instantaneously, being easily alarmed; but if you retire some twenty or thirty paces to *leeward* of the hole, and wait there for a quarter of an hour or so, you will see the "Gopher" (another name given to these animals by the inhabitants of the State of Missouri), raising the earth with his back and shoulders, and forcing it out before and around him, leaving an aperture open during the process. He now runs a few

steps from the hole and cuts the grass, with which he fills his cheek-pouches, and then retires into his burrow to eat it undisturbed.

You may see the *Pseudostoma* now and then sitting on its rump and basking in the rays of the sun, on which occasion it may easily be shot if you are prompt, but if missed it disappears at once, is seen no more, and will even dig a burrow to a considerable distance, in order to get out of the ground at some other place where it may not be observed.

This species may be caught in steel-traps, or common box-traps, with which we procured two of them. When caught in a steel-trap, they frequently lacerate the leg by which they are held, which is generally the hind one, by their struggles to get free. They are now and then turned up by the plough, and we have known one caught in this manner. They sometimes destroy the roots of young fruit-trees to the number of one or two hundred in the course of a few days and nights; and they will cut those of full grown trees of the most valuable kinds, such as the apple, pear, peach and plum. This species is found to vary in size very greatly on comparing different individuals, and they also vary in their colour according to age, although we found no difference caused by sex.

The commonly received opinion is, that these rats fill their pouches with the earth from their burrows, and empty them at the entrance. This is, however, quite an erroneous idea. Of about a dozen, which were shot dead in the very act of rising out of their mounds and burrows, none had any earth in their sacs; but the fore-feet, teeth, nose, and the anterior and upper portion of their heads, were found covered with adherent earth. On the contrary, most of them had their pouches filled with either blades of grass or roots of different trees; and we think of these pouches, that their being hairy within, rather corroborates the idea that they are only used to convey food to their burrows. This species appears to raise up the earth very much in the manner of the common shrew-mole.

When running, the tails of these animals drag on the ground, and they hobble along at times with their long front claws bent underneath their feet as it were, backwards, and never by leaps. They can travel almost as fast backwards as forwards. When turned on their backs they have great difficulty in regaining their natural position, and kick about in the air for a minute or two with their legs and claws extended, before they can turn over. They can bite severely, as their incisors by their size and sharpness plainly indicate; and they do not hesitate to attack their enemies or assailants with open mouth, squealing when in a rage like the common Norway or wharf rat, (*Mus decumanus*.) When they fight among themselves they make great use of their snouts, somewhat in the

manner of hogs. They cannot travel faster when above ground than a man walks; they feed frequently whilst seated on their rump, using their fore-feet and long claws somewhat in the manner of squirrels. When sleeping they place their heads beneath the shoulder on the breast, and look like a round ball or a lump of earth. They clean their hair, whiskers, and body, in the same manner as rats, squirrels, &c.

We kept four of these animals alive for several weeks, and they never during that time drank any thing, although we offered them both water and milk. We fed them on cabbages, potatoes, carrots, &c., of which they ate a larger quantity than we supposed them capable of consuming. They tried constantly to make their escape, by gnawing at the floor of the apartment. They slept on any of the clothing about the room which would keep them warm; and these mischievous pets cut the lining of our hunting coat, so that we were obliged to have it repaired and patched. We had left a handkerchief containing sundry articles, tied as we thought securely, but they discovered it, and on opening it one of them caught hold of our thumb, with (luckily) only one of his incisors, and hung on until we shook it off violently. While confined thus in our room, these animals gnawed the leather straps of our trunks, and although we rose frequently from our bed at night to stop their career of destruction, they began to gnaw again as soon as we were once more snugly ensconced beneath the counterpane. Two of them entered one of our boots, and probably not liking the idea of returning by the same way, ate a hole at the toes, by which they made their exit. We have given in our plate four figures of this singular species.

The nest of the Canada Pouched Rat is usually rounded, and is about eight inches in diameter. It is well lined with soft substances as well as with the hair of the female. It is not placed at the end of a burrow, nor in a short gallery, but generally is one that is in the centre of sundry others diverging to various points, at which the animal can escape if pursued, and most of which lead to the vicinity of grounds where their favourite food is abundant.

The female brings forth from five to seven young at a litter, about the end of March or early in April. They are at a very early period able to run about, dig burrows, and provide for themselves.

GEOGRAPHICAL DISTRIBUTION.

The *Pseudostoma bursarius* has a wide geographical range. We found it in all those places we visited, east of the Rocky Mountains and west of the Mississippi, where the soil and food suited its habits. It

has been observed as far to the north as lat. 52° . It abounds in Michigan and Illinois. Farther to the south it extends along the western prairies, and it was observed near the shores of the Platte, Arkansas, Canadian, and Red Rivers, to lat. 34° , and probably ranges still further to the south.

There are Pouched Rats in Texas and Mexico, but we are at present unable to determine whether they are of this species.

GENERAL REMARKS.

The first naturalist who gave a specific name to this Pouched Rat was Dr. SHAW, in the Linnæan Transactions, accompanied by a figure representing it as having only three toes. The drawing had been made by Major DAVIES. Subsequently (in 1801) he again described and figured it in his General Zoology, vol. ii., p. 100, pl. 138. The pouches in both cases are inverted, and hanging down like long sacks on each side. These would be very inconvenient, as the animal could not place its nose on the earth or fill its sacks, with such an unnatural appendage dangling at its mouth. The error seems to have originated from the whim or ignorance of an Indian. It is recorded, that in 1798 one of this species was presented by a Canadian Indian to the Lady of Governor PRESCOTT. Its pouches had been inverted, filled, and greatly distended with earth; and from this trival circumstance an error originated which has been perpetuated even to the present day.

RAFINESQUE, who was either careless or unscrupulous in forming new genera and species, and whose writings are so erroneous that we have seldom referred to him, contributed to create still farther confusion among the species of this genus. He arranged them under two genera: GEOMYS, with cheek-pouches opening into the mouth, and DIPLOSTOMA, with cheek-pouches opening exterior to the mouth. This last genus he characterizes by its having no tail, and only four toes on each foot. (Am. Monthly Magazine, 1817.)

We consider it unfortunate that our friend Dr. RICHARDSON should have adopted both these genera, and given several species under each. We have examined nearly all the original specimens from which his descriptions were taken, and feel confident that they all belong to the genus PSEUDOSTOMA, of SAY.

In regard to the present species, Dr. RICHARDSON was undecided under what genus it should be placed. The opportunities afforded us for making a careful examination, leave no room for any doubt on that subject.

That there are several species of pouched rats on both sides of the

Rocky Mountains from Mexico to Canada, cannot be doubted, but the difficulty of distinguishing the species is greater than is usually supposed.

They possess similar habits, specimens belonging to the same species are found of different sizes and of different colours; all the species have short ears and tails. They live under the earth; and many persons who have for years resided in their immediate vicinity, although they daily observe traces of their existence, have never seen the animals.

American naturalists have sometimes been reminded by their European brethren, of the duty devolving on them of investigating the habits and describing the species of animals existing in their country. The charge of our having hitherto depended too much on Europeans to effect this laudable object, is true to a considerable extent. It should, however, be borne in mind, that this vast country belongs to many nations; that large portions of it are either unpeopled deserts or are roamed over by fierce savage tribes; that the Northern regions visited by RICHARDSON are exclusively under the control of Great Britain and that the vast chain of the Rocky Mountains presents more formidable barriers than the oceans which separate Europe from the Western shores of America.

It is not, therefore, surprising, that in order to become acquainted with some rare species, American naturalists are obliged to seek access to European museums, instead of the imperfect private collections of their own country.

In the United States, east of the Rocky Mountains, we are not aware of the existence of more than two species of Pouched Rat,—the present species and another existing in Georgia and Florida. It is, however, not improbable that *Pseudostoma Mexicanus* may yet be found in Texas.

Audubon, John James and Bachman, John. 1851. "Pseudostoma Bursarius, Canada Pouched Rat [Pl. XLIV, males, female and young]." *The quadrupeds of North America* 1, 332–339. <https://doi.org/10.5962/p.322513>.

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