

adopts the second species of Johnston's *Northia*, the *N. conchylega* (*Onuphis conchylega* of Sars). But I cannot see why M. Malmgren adopts Dr. Johnston's genus and at the same time refuses to accept the species *tubicola* as the type. For my own part, I should have preferred retaining the genus *Nothria* for the species *tubicola*, and should have wished M. Malmgren had constituted a new genus for *conchylega*. The only generic difference between the two species, as far as I can see, consists in the presence of the two postoccipital cirri in *conchylega*, and their absence in *tubicola*. Johnston does not seem to have seen these cirri in the specimens of *conchylega* which he examined; and Sars, who originally described the species, takes no notice of them, either in his description or his figures (see Sars, Beskriv. og Jaktt. p. 61, tab. 10. fig. 28). Our British specimens of the species are unfortunately imperfect, those from Berwick Bay (Dr. Johnston's own specimens) consisting of tubes only and one fragment of the animal; while the specimens we possess from the sea off the Shetland Islands, collected by Mr. Jeffreys, are equally fragmentary, seven or eight specimens existing of the inferior half of the animal only, not one having the head or anterior portion of the body entire.

It is just possible, therefore, that the *Northia conchylega* described and figured by Sars and Johnston may turn out to be a distinct species from that described by Ørsted, Grube, Malmgren, &c., which not only possesses the postoccipital cirri, but, according to Ørsted's figure and description of *Onuphis Eschrichti* (considered to be synonymous with *conchylega* by Malmgren), has also bipartite branchiæ.

On the Natural History and Hunting of the Beaver (*Castor canadensis*, Kuhl) on the Pacific Slope of the Rocky Mountains, by ASHDOWN H. GREEN, Esq. With Supplementary Notes by ROBERT BROWN, Esq., F.R.G.S. (Communicated by JAMES MURIE, M.D., F.L.S.)

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I HAVE been for three years almost constantly engaged in trapping beavers, so that what remarks I may have to make on their habits and history, though somewhat at variance with the

stereotyped notions prevalent in compilations, are yet the result of my own independent observations.

About January their tracks may be seen in the snow near the outlet of the lakes where young fir trees grow. At this time they prefer young fir trees as food to any other kind of tree, the reason, doubtless, being that at this period the sap has not risen in the willow or alder (*Alnus oregana*). It is not often that females are caught in the spring; and the males seem to travel about, as the runs are not used so regularly as they are when the beavers are living near.

Some of the beavers become torpid during January, especially those living near lakes, swamps, or large sheets of water which are frozen. They do not lay in a store of sticks for winter use as stated by Capt. Bonville (Washington Irving's 'Adventures of Capt. Bonville'), as one day's supply of sticks for a single beaver would fill a house—and if a stick were cut in the autumn, before the winter was over it would have lost its sap, and would not be eaten by the beaver. A beaver never eats the bark of a tree that is dead, though he may gnaw a hard piece of wood to keep his teeth down. A little grass is generally found in the houses, but is used as a bed and not for food.

If February is an open month, the beavers begin to come out of their retreats, and frequent any running water near them; but it is generally March before the bulk of them come out of winter-quarters. When they come out they are lean; but their furs are still good, and continue so till the middle of May—though if a trapper thought of revisiting the place, he would not trap after April, so as to allow them to breed quietly.

About the end of March the beaver begins to "call." Both males and females "call" and answer one another. Sometimes on one "calling," half-a-dozen will answer from different parts of the lake. I have known beavers to "call" as late as August. Males fight during the rutting-season most fiercely. Hardly a skin is without scars; and large pieces are often bitten out of their tails. The beaver holds like a bull-dog, but does not snap. It shakes its head so as to tear. When trapped, it will face a man, dodge a stick, and then seize it, taking chips out of it at every bite. It seems to attack from behind.

The period of gestation is known with little certainty, as they are never trapped in summer. The female brings forth some time about the end of June; and it is a year before a beaver is full-

grown; and even then it has not the *embonpoint* of an elderly beaver.

I have read that the beaver breeds at any time during the year; but this cannot be, or all the kittens that are trapped in the fall would not be of the same size. It produces from three to four at a birth. The teats are placed between the fore legs. The young (called kittens) whimper like young puppies when suckling, even when two months old. The females prefer deep sedgy lakes to bring their young up in, and they feed on grass about that time of the year (July or August). They feed on willow about April, May, and June. I cannot say whether they are born blind or not, but suspect so. They are very fond of water-lilies (*Nuphar advena*, Ait.) in the spring. It is with me a matter of uncertainty whether the female litters in a house, under the ground, or in the dry sedges; but I should think, under ground or in the houses. In the autumn more females are caught than males. Trapping commences in September and continues to May; after that the trappers leave them alone, so that I do not know much about their doings in the summer.

They begin to build their dams about July or August, as soon as the summer floods begin to subside. For this purpose they generally choose a bend in the stream, with high and clayey banks, and commence by felling a large tree that will reach across the water; or they fell a tree on each side of the water so as to meet in the centre. They then float sticks from 6 to 4 feet long down to the dam, and lay them horizontally, filling in the spaces with roots, tufts of grass, leaves, and clay or mud. The branches of the first tree are the perpendicular supports, almost all the remaining sticks being placed horizontally and crosswise. The last six or eight inches in height is very insecurely constructed, being nothing but mud and leaves.

The highest dam I ever saw was only about 4 feet 6 inches; but the generality of them are not above 2 or 3 feet. The action of the water by bringing down mud, gravel, or fallen leaves, strengthens the dam by making a sloping bank against it; and, the willow sticks of which it is composed sending forth their roots and shoots, the dam in course of time becomes a fixture bound together as strongly as well could be. The winter floods almost invariably destroy the upper part of the dam, which is reconstructed afresh every year. The shape of the dam is almost always semicircular, with the crown of the arch down stream, thus reversing the order of things; but

I have no doubt this is in consequence of the heads of the first or principal trees being floated down stream when they are first thrown. The body of water raised by these dams varies, of course, according to the fall of the original stream, from a small hole of 20 feet diameter to a lake of miles in length. In the former case the Beaver builds his house close to the dam, so as to get depth of water, and there saves himself from any hungry panther (*Felis concolor*, L.) or wolf who might feel inclined to indulge in beaver-meat. The beaver also burrows into the banks of streams, always taking care to have two entrances, one under (or close to) the water, and a smaller air-hole on land. With a good dog, capital sport may be had on some of the smaller rivulets leading into or out of a lake. The houses are formed of water-logged sticks placed horizontally in the water. They have always two or more entrances, and a small chamber with a little grass for the beaver to lie on. The top of the house is constructed very thick, to guard against attacks by animals. Mud and roots are used to make the house solid; but no mud is seen from the outside, as the top is covered with loose sticks left there by the beaver after taking the bark off. The houses are generally about 4 feet in height, and about 6 in diameter on the outside, and would hold about four Beavers, though I have known small houses to hold two only.

The traps generally used in securing the beaver are large steel traps with a strong spring at each end, and fastened with a chain, from 4 to 6 feet long, to a pole, which is stuck in the bottom of the water as far out as the chain will allow, so that the beaver, when he feels the trap, may run into deep water; and as he gets tired, the weight of trap taking him down, he drowns. A beaver, when trapped, never tries to get to land, but makes a dive for the deepest water; and should the water be shallower than 4 feet, he will, in a short time, amputate his foot so as to relieve himself. He always takes his foot off at a joint, and draws the sinews out of his shoulder instead of biting them through. The stump heals up; and I think the beaver is none the worse for it, though he gets shy, and, perhaps, tells the other beavers to beware of traps. A beaver is generally caught by his fore foot; and should the trap be set too deep below water, his toe-nail only gets caught. The trap is set in the beaver-run, or just where it springs into a hole in the bank. It must not be set in too shallow water, for then he amputates his foot,—or in too deep, for in that case he does not get caught at all, but swims over the

trap. The proper depth to set a trap is 5 inches. The beaver is then caught by his fore foot. Sometimes the teeth of a beaver are found to have grown beyond their proper length. I once saw one with the lower teeth $3\frac{1}{2}$ inches beyond the gums. He was caught in a trap, and was miserably thin; but, singularly enough, he had about the finest fur I ever saw. He was an aged animal. It is rare to see a beaver which has been trapped with its teeth whole, as they are often broken in trying to get out of the trap. A full-grown beaver weighs about 34 lbs. I am not an anatomist; but still I do not think there is anything very peculiar about its internal structure*, except that the heart weighs a mere nothing—the cavities being so very large. An old beaver when shot sinks, a kitten floats. A good skin will weigh $2\frac{1}{2}$ lbs.; but it is very rarely that one weighing that amount is caught in Vancouver Island. The Hudson's Bay Company give only from 75 to 85 cents per lb. at Victoria for peltries, so that a trapper now-a-days cannot get very fat at the work. There are at present very few beavers on either Vancouver Island or the mainland, compared with what there must have been some years ago; but they have been increasing for the last six years; and no doubt by the time beaver-skins come into fashion again there will be a plentiful supply.

Supplementary Notes by Mr. BROWN.

The following I add as an Appendix to the foregoing observations of my friend Mr. Green, whose opportunities for studying the animal were much superior to my own during my travels in North-west America, and whose account is valuable as being the plain unvarnished notes of a hunter—a narration of facts very familiar to him, written with no reference to preconceived notions or received theories. First, therefore, regarding the range of the beaver. It is found all over British Columbia, Oregon, Washington Territory, and even south to California and north to the limit of trees. It is not, however, found, as far as I can learn, in the Queen Charlotte Islands, but is abundant in Vancouver Island, though, curiously enough (in such a manner is history written) Colonel Colquhoun Grant, in his 'Description of Vancouver Island' (Journal of the Royal Geographical Society, vol. xxvii. p. 268), mentions that he has seen traces, and was not aware

* *Vide* Cleland, Edin. New Phil. Journal, new series, vol. xiii. (1860) pp. 14-20.