

ART. VI.—ON THE SERPENTS OF NOVA SCOTIA. BY J. BERNARD GILPIN, A. B., M. D., M. R. C. S.

(Read April, 1875.)

FAMILY—COLUBRIDÆ.

Genus—EUTANIA.

Eutania sirtalis. B. & G.

Coluber sirtalis. Linn.

GARTER SNAKE.

Genus—BASCANION.

Bascanion constrictor. B. & G.

BLACK SNAKE.

Genus—Chlorosoma.

Chlorosoma vernalis. B. & G.

GREEN SNAKE.

Genus—Diadolphis.

Diadolphis punctatus. B. & G.

KING SNAKE.

Genus—Storeria.

Storeria occipitomaculata. B. & G.

RED-BELLIED SNAKE.

In the class Reptilia, to which the serpents belong, we find that air breathing is first introduced to life, yet this is not the great air breath of the hot blooded mammals. The reptile has only a single circulation, and though breathing air, can do without it. They live for indefinite periods beneath water, and when in the air, respire about twice in a minute.

From the record of the past, we find nature passing through the early life forms of the Silurian ages, emerging into the fish, (oxygen breathers if not of air) in the Devonian, then producing reptiles whose first life forms are fish, and whose adult forms are air breathers and then the subject of our present paper, the ophiidians, or serpents, who commence life as air breathers, but can do

without it, and which possess a small degree of parental affection in consequence of it, denied to the others : yet so slow is all this elaboration for the higher life of the hot blooded mammal, that there do exist fish that cannot live without air, and others that can live without air, but do have a parental affection. The young of the dog-fish accompany their parent and are taken into its stomach in time of danger, and a single species of East Indian fish cannot live without air. Fish generally live without air and devour their own spawn, frogs whose early life is fish do the same, but the serpent which commences from an egg in open air regards her young, cares for them, and like the dog-fish, receives them in her stomach as a conveyance, as well as a refuge, from danger.

The curious modiformalions, the bone used in the higher form for respiration alone, I mean the rib, undergoes in its progress to higher life, are striking, which must be my excuse for mentioning them in a paper on Nova Scotian Serpents. In fish the rib seems of no use in a respiration which is motionless. In the frog it seems a spinal process, having no attachment to a breast bone, but in the snake it is very numerous, strongly attached to the spine, extending the length of the body, and the free end attached to broad scales on the belly. By these scales moving forwards and backwards the snake glides. He may be said to run upon his ribs. These facts are of great value when we find the rib in the first hot blooded air breathers the porpoise jointed in the middle, and in the birds introduced into life at a contemporary period also jointed, and by the great power of contracting and extending its body adding vastly to its powers of locomotion in body.

THE GARTER SNAKE.

Eutania sirtalis. B. & G. Smithsonian. Institute.

Coluber sirtalis. Linn. Storer.

Trophidonatus sirtalis. Holb.

Trophidonatus taenia. DeKay.

This is the most common of our snakes, appearing in open springs, in April, and leaving us in October. I do not recollect ever finding them except alone. Though taking water very readily,

we find them in high elevations. The larger specimens attain about eighteen inches in length, according to my own observations, by others much more, and agree with Baird, and Gerard's description; light ashy, or dark reddish brown on back greenish white beneath with three pale stripes from head to tail, on the back and sides, with numerous irregular brown spots. The brown in some runs so reddish as to suppose a new species. They feed upon living food, toads, birds, butterflies, (on Mr. Downs' authority,) and worms. I have frequently seen them swallowing toads, and what struck me more, was the utter indifference of the toad, contrasted with the eager ferocity of the snake. I think the toad becomes benumbed, when rescued will not get out of the way, whilst the snake will fight a fair battle to retain his prize, charging you boldly again and again, that is if you forbear to break with your riding whip his beautiful coils, and be content to spoil him of his dinner alone, without taking his life. I found two toads in one that was coiled on the top of a low tree on a rocky islet in the great Fairy lake. His huge size arrested my attention and I had him shot. This fact is opposed to the ordinary belief that they become torpid after swallowing their food until it is digested, as he evidently had swallowed the two after a short interval. On the tenth of August I captured one at Bedford Basin. He bit the glove covering my hand so that I could feel his teeth gritting upon the buckskin. I transferred him to a glass case about two feet square, floored with moss. He made great efforts to escape, heaving himself upright, nearly his full length—about eighteen inches—upon the smooth glass. I have no doubt on a roughened surface he could have moved vertically. He could raise his body six inches vertically without support. His usual attitude was in a coil, his head raised two or three inches, his ever vigilant eye open and bright, and his forked tongue menacing night and day. Yet certain noises or odors seemed to have more effect upon him than objects of sight. In feeding he tracked the earth worms by the slime they left upon the glass, and pounced upon them with a sudden fury that made one thrill. One day he eat twelve earthworms, and after that he allowed them to crawl over him. He took no notice of

flies, though I frequently offered them. He would not touch milk, but like others I have had was fond of water, drinking it, and continually gliding through it.

One day I found his whole appearance changed, bright yellow rings of the liveliest colour encircled his body. On close examination I found that the scales which cover the body of all snakes, (except the abdomen and beneath the tail which are covered by scutella) are capable of separation, one from the other, when the skin is distended beneath them, and in this specimen the skin being bright yellow, this caused the yellow ring. Doubtless the puff adders when enraged and swollen owe their brilliant colour to this power. DeKay, speaking of the garter snake, says, it often changes its colours, but does not allude to the cause. In my specimen it was caused by distension from feeding; it returned the next day to its usual coloring. It performed the function of respiration about twice in a minute.

The eggs of this species are found repeatedly under stones and banks, yearly, in the Province. They are dark olive, flattened roundish pellets, soft, apparently glutinous, and attached to each other by the extremities, and forming chains of from twenty-five to thirty and about one-third inch in diameter. On opening them a small snake is found coiled within them already with the typical marks of the adult. These eggs are usually picked up in August, and when kept will hatch out about the middle of that month—a period later than that of other reptiles which spawn in early spring. Three eggs of the garter snake (*E. sirtalis*) were sent by mail to Halifax; Archdeacon Gilpin, who received them, handed them over to his son. They were placed in a cigar box with gravel and about the middle of August one hatched out, a few days after birth small detached bits of skin were picked up in the gravel, and in a day or two an entire skin everted and perfect to the eyes was found. This analogy with seals and perhaps all mammals including man whose babies shed their hair directly after birth, is striking. This young snake was very lively, ate or drank nothing, began to fade about the end of October, and died in November. This is the most numerous snake of our Province. He affects dry rocky positions,

though he may be found in swamps and borders of rivers in search of frogs. He is often seen basking in the sun coiled upon warm rocks, in company with the green snake (*C. vernalis*).

In my observation they seemingly never recognize each other, even of their own species, when even crossing each other's bodies in confinement, though others have informed me they have seen them coiled together in struggling groups during their breeding season or in torpid masses hibernating. "Two men," says the Kentville Farmer 1875, "ploughing in a field near Kentville, rooted up a large stump, under which they found a coil of snakes numbering forty-five, in a torpid state." Their powers of penetration into the ground are small, nor can they penetrate below "the frost" or 32° Fah., at which temperature the moisture from the surface is frozen to the depth of three or four feet in our climate. They therefore get beneath rocks and old stumps, or choose the soft soil of an old ant-hill. Mr. Stayner of Halifax, informed me that early in October, near town, in passing an ant-hill he pushed his cane into it and forced out a torpid snake. Returning to the spot he turned out above sixty of various sizes and species, including *E. sirtalis*, *C. vernalis*, *D. punctatus*, and *E. occipitomaculatus*, a common instinct seemingly bringing all species together.

Of this innocent species, it may be said he inhabits our Province in very considerable numbers, that he is seen in April, thawing out his winter's torpid sleep in the warm sun,—in August is seen with his little group of young which accompany their mother, and in danger received into her belly, and coached away—and in October retires again to the earth.

THE BLACK SNAKE.

Bascanion constrictor. B. & G.

This snake is exceedingly rare in our Province, and I am indebted to Mr. J. M. Jones, F. L. S., for the only adult specimen I have identified. Mr. Downs had recognized it, and the various stories of large snakes from many sources could only have been referred to it. Mr. Jones' specimen was of moderate size, and agreed perfectly with the description of Baird & Girard, (Smith-

sonian Inst.) in its dark shining black above, bluish black below, and white about the chin and breast. Of its habits or haunts, I have no notes or observations, as in our Province.

Mr. Blackwood, a merchant of Halifax, gave me in August, 1871, three snake eggs out of a chain he had found beneath the root of a tree at Truro. They were double the size of the garter or green snake's eggs. I lined a glass wide-mouthed phial with damp cotton wool, and placed them in it, putting the phial in the sun. On the third day one of them was broken, and a young snake half way through the aperture. By the end of the day he had freed himself from the egg that was sticking to him by a yellowish substance, and was a lively brilliant young serpent. The next day a second came out, whilst the third egg proved dead. They loved the sunlight, tried hard to escape, but survived only a fortnight, daily failing in liveliness before my eyes; as after trying them with milk, sugar and water, flies and egg, I had no means of feeding them—the whole group of an egg still containing its embryo; an egg empty, and the little snakes themselves, in alcohol now, form the proof of a physiological fact that no one may doubt. From their great size, about two inches and a half in length, and their bluish-black colour, I considered them the young of *B. constrictor*; but having no specimen by me, I will not assert it as a fact. They were the young of no other species inhabiting this Province.

THE GREEN SNAKE.

Chlorosoma vernalis. B. & G.

Next to the garter snake this beautiful species is the most numerous in the Province. It is most usually seen about half grown, in the grass, of a lively green, but attains to the size of between two and three feet. It is not unfrequently met crossing the wood roads. It produces eggs very like the garter snake, and receives its young in its mouth when in danger. I have identified its eggs.

THE KING SNAKE.

Diadolphis punctatus. B. & G.

This species is still more rare. I captured one on the borders

of Fairy Lake, Sept. 1870, and sacrificed a small flask of whiskey to preserve him. Mr. Silver of Halifax does not consider them so rare, and has identified their eggs.

RED BELLIED SNAKE.

Storeria occipitomaculata. B. & G.

This, like the preceding, is a small species, but more numerous, frequently coming around inhabited houses. I have no notes of its habits, and have never seen its eggs.

This ends our list of Nova Scotia serpents.

Scanty in species and in individuals, they share their scantiness with the other reptilia, which, with the exception of several species of frogs, are also few. The common toad is scarce, compared with New England. Our situation at the extremity of a continent, and almost insular position, seems the cause rather than our northern climate. According to Agassiz, the common toad attains great size on Lake Superior, and whilst no reptiles are found in Newfoundland, the opposite side of the Straits of Belle Isle are vocal with frogs, according to modern travellers, which is attested to by old Martin Frobisher, who relates of feeding upon them in Hudson's Bay.

As the habits of all our snakes seem alike, and what may be said of one may be said of all, I have left to the last the discussion of one or two subjects which may be general to all. Although Cuvier long ago laid it down that snakes are oviparous, the exception being when the female was constrained to hold her egg beyond the proper time within the ovaria, yet many writers still maintain they are ovoviparous. Of the five species in Nova Scotia, we have personally identified their eggs, deposited beneath stones and hatched some time after deposition.

Leaving then this fact as settled beyond doubt, that some snakes produce their young from eggs deposited in the ground, it leads to another question of great physiological importance as giving to the class Reptilia the highest function of protecting their young—of maternal affection. The tailless batrachians, or frogs, having their eggs or spawn hatched under the water, and having them in their

first form as fish or tadpoles, living upon vegetable matter, have no need of maternal instinct. There are a few records of our Salamanders being seen hovering over their eggs, but the numerous stories from persons of every class in life, though doubted by many eminent naturalists, of our snakes being seen with their young during the summer months, and of their young taking refuge within the mother's stomach during danger, render it beyond doubt.

Of instances of the green snake (*C. vernalis*), Archdeacon Gilpin informed me he passed on the high road of Nova Scotia, a green snake, dead, and of large size. It had been crushed by a wheel and much torn, and lying dead also, within and without the belly were many young ones. Dr. Baird, (Smithsonian Institute) says in his work, "Serpents of New Jersey" he took from a "graved" female of the same species, eighty-three young snakes, six inches long, on the Allegany River. Now in both these instances, we know that the young had been hatched from eggs, and must have entered the mother's stomach after birth. In Dr. Baird's case, though he calls the snake "graved," the great size of the young "six inches," shows they must have been a month old; the size when hatched being one and a half, and the aggregate length of forty-one feet, being too great a bulk for any ovary to hold. Of similar instances in the garter snake—Mr. Stayner, a merchant of Halifax, as well as an observer of nature, and a fine sportsman, informs me he saw during the autumn of 1875, near Halifax, a large garter snake lying dead, much crushed, and many small ones lying dead about. He pushed with his cane others from within her belly—from which there was a chain of eggs also hanging. In a letter Mr. William Gossip of Halifax, gave me from his grandson,—the boy states, he with his companions found a large garter snake near the railroad at Wilmot, Nova Scotia, surrounded by many young ones, when she immediately opened her mouth and they all took shelter within it. They pursued her from under a pile of lumber, beneath which she took refuge—killed her, and forcing thirty live young ones out of her mouth—killed and counted them all. These few instances I have given from hundreds I have heard, from all classes of society. That then our snakes are pro-

duced from eggs, need and receive some nourishment and care from the mother during infancy, and are received in times of danger, or perhaps for conveyance, into her stomach, is as well established as any fact in nature. This also gives to the order Reptilia the higher attributes of parental affection.

It would need some apology for enlarging on facts, no doubt old and well known long since, were it not for the persistent disbelief of some eminent British Naturalists—a disbelief to which is added an insinuation of its being a trick or hoax, although they well know that the Squalidæ, a lower order, possess it. This I have verified myself, having cut young dog-fish from the mother's belly, and keeping them alive some days. Couch "British Fishes" also gives instances, and our own fishermen affirm it. Future observers will be rewarded by witnessing our salamanders as well as our snakes, watching over their chaplet of leathery eggs, feeding their young, and both protecting and coaching them by their own bodies.

I have never identified the power of our snakes in emitting vocal sounds. All observers unite in the mother's giving a warning call to her young; and when camping on long September nights by the lake side, one hears a night long call—very peculiar, very froggy, but elongated. This your Indians tell you is a snake. I have thought this their nuptial call. The wading birds and the frogs are all now silent, their summer gone, whilst the snake season of hatching being deferred to the middle of August, might make this late season their time of pairing.

Our arctic climate but ill accords with this child of the sun. Grey colours deck him, nor can our slanting sun rays nourish him to the huge proportions of the tropic, or concentrate his poison to their deadly power; yet slow as his action comparatively is, deliberate as his rustle through the dried grass is, his old historical name, his obscure attributes, used of old in true religion and false enchantment, as well as his present, extreme abstemiousness joined to an extremem gluttony, and his magnificent repose, the extremities so coiled, that the sleepless eye and forked tongue of the centre guards all, a very type of a citadel, will make him a fascinating study to all for all time.