

December—2nd, snow bunting first seen on the common; 10th, witch hazel in blossom.

By the kindness of Judge Wilkins I have had an opportunity of inspecting a register, in his possession, of observations, regularly noted three times a day, of the temperature at Halifax during the months of December and January in three successive years, from December 1809 to January 1812. With the assistance of this interesting document, I have been enabled to compare the mean temperature of these winter months, upwards of fifty years ago, with that of the same months in 1863, 1864, and 1865, and the result is as follows:—

Date.	Mean temp.	Date.	Mean temp.	Date.	Mean temp.
Dec. 1809	33°	1810	27°	1811	36°
		1863	26°	1864	27°
Jany. 1810	21°	1811	27°	1812	25°
“ 1863	30°	1864	23°	1865	22°

This tends rather to invalidate the supposition, so generally admitted, that the winters of the present time are milder than those of former years: but it would be premature to form a decided opinion upon this point without a more extended investigation, the means for pursuing which may possibly yet be found.

ART. XI. ON THE GASPEREAUX. BY J. BERNARD GILPIN,
A. B., M. D., M. R. C. S.

[Read April 6, 1865.]

Alosa Tyrannus { Gasperot (Mons. Deny, 1675,) Gaspereau.
Spring herring Blue back.
Alewife Kiack.

SHOULD any one on a warm evening of the last of April or beginning of May, stand at the mouth of any of our rocky streams, pouring their snow-swollen torrents down to join the sea, he may see, as the last of the flood tide sweeps up to meet their turbulent waters, on every jutting point, on every isolated rock, a figure with a bag net on the end of a ten or fifteen foot pole, casting his net again and again, into every little pool or whirling eddy at his feet, and returning it as often filled with one, two, or more glittering fish,

which with a dexterous toss he throws upon a silvery heap, tossing and flapping their lives away on the warm grass hard by. The warm setting sun is throwing his beams, athwart rock and tree, and little fires lighted to drive away the black flies, are wreathing the tree boles with scanty smoke. As we pass figure after figure we find them mostly young men or boys, negroes, here and there an old settler with a known love for sport, and at the day which we write of, numerous Indians. The game is not enough to lure the strong man from his farm or his mill; he leaves it for his boys and his poorer neighbours. We pass the rogue who stole our last year's best bough apples; we pass Peter Prince's ragged, and white-teethed progeny, but pause, attracted, as we all are, by the man of the forest, the man of no house, or no key to his front door. He stands before us casting back-handed throws of his bag-net, with true Asiatic grace, so different from the direct Anglo-Saxon plunge of his neighbours, so resembling round hand bowling, the last nobby dodge of the cricketer. In the days of which we speak, he stood bare head and neck, a scarlet-seamed blue hunting frock girt about his loins by a gay girdle, holding his knife and tobacco pouch, scarlet edged leggings shewed fairly his clean curved limbs, and mocassins of his own make covered his firm foot. "Brother," we say, "is the sport good?" "Too much water, all get up before the lakes fall;" and as he speaks he lands two or three glittering fish at our feet. As they roll and toss on the warm grass, their large lidless eyes filled with dust, the sun for the first time glinting their sides of molten silver, we handle and examine them. Fresh from the cool water they are covered with slime; the scales readily come off in our hands. When the scales are entire their colour is silvery from the belly nearly to the back; along the back there runs a dusky greenish line, a thousand reflections of green and violet break the surface; the head and cheeks have a yellowish tinge with a little violet; the fins so lately waving in water transparent are already darkening and stiffening. As in his restless struggles the scales come off, we find the colours of his back deepening, and a black spot showing near his gills. His description in our notes reads:—

Length from 10 to 12½ inches, colour, when fresh from the water and covered with scales, silvery, greenish dusky on back and about an inch

down the side, green and violet reflections casting everywhere; opercles yellowish with violet reflections; about ten or less faint bands, by turning the fish to the light may be observed, passing longitudinally from gills to tail; a black spot immediately behind the opercle, lips dusky, fins yellowish or greenish dusky, the points, and first rays darker than the others; the same colour in the caudal fins. The scales are so deciduous that they fall off in handling; and then we find the colour of the back more decided, the longitudinal bands showing as rows of distinct spots, and the black spot behind the opercle very distinct. In general appearance the fish is rounder and shorter than the herring—greatest width anterior to dorsal fin—and about one fifth the length, eye half an inch in diameter, irides silvery, a little more than its diameter from tip of upper lip, lip notched to receive the lower lip in; nostrils open half way between tip of nose, and eye; the head shorter and smaller than the herring; the belly strongly serrated, about 35 points from gill-ray to anus.

Fins—dorsal fin, 15 rays, the first very short, and joining the second which is the highest—irregularly rhomboidal, pectoral 16 rays, second and third the longest, ventral 9, anal 17; caudal deeply cleft almost to the scales, having two half rays, then seven entire rays, then several more half rays, then seven entire ones and ending with two short ones, the caudal fin often split and fringed, the gill ray seven of a side, the last one square pointed—no teeth.

D. 15, P. 16. V. 9, A. 17, C. 14 entire, 8 or 10 half rays.

Our specimen is now dead, and we note how fleeting the colours of the fins are, which almost should be described when floating in water, and covered as the whole body is with nacre, doubtless to keep the water from penetrating the joints of the scales. We are now aware that our fish is a true *alosa*, allied to the shad, the menhaden, and many others, and that the stream before us is crowded with a multitudinous marine army, coming up with the last of the flood, and running the rivers to reach the lakes to spawn. A little further up the stream, the river becomes deep and smooth, and is crossed by the high road. Lying at our length on the log bridge, we watch a continuous stream passing slowly up and up, two or three inches apart. Farther up, and the river breaks over a smooth plane of slate stones too shallow for his depth. Arrived at this plane, he throws himself as far up as he can, and then commences a series of spasmodic flaps with his tail.

Slowly and painfully he passes over and drops exhausted into the tranquil pool above. Utterly exhausted, they lie heads and tails in a confused mass. Presently recruiting, their heads all pointing up stream, they again commence their march.

In countless hordes they sweep through lonely still waters, the home of the trout, cool and pellucid enough to tempt a weary way wanderer, but on and on his irresistible instinct drives him. A natural dam, some two or three feet elevation, and over which the waters fall with a perpendicular rush, now arrests his progress. He throws himself (no doubt with a vigorous sweep of tail) directly at it. That about two and a half to three feet is his utmost range, the many failures he makes before he drops into the pool above attest.

He has now gained his lake, often a very small one in the heart of the forest, and perhaps six hundred feet elevation from high water mark. And now commences his brief courtship, for, unlike the lordly salmon who dallies until November, our fish has but little time for delay. Camping on the lake-side of a moonlight night, you hear a swash in the water. "What fish is that?" you ask your Indian; "Gaspereaux," is his answer. The trout-fisher by day sees the surface of the lake ruffled by a hundred fins, then the trout break all around him. "See the Gaspereaux hunting the trout," he says. But these are only his harmless gambols, coloured by the resistless instinct of reproduction. He has even been known to rise at a fly, and to take a bait on these waters. Although the salmon and trout are often seen spawning, I never met any one who has seen the Gaspereaux in the act. So I suppose he spawns in deep water, as we know he loves the deep lakes with clear sandy margins.

As hatching is a much shorter process than with the salmonidæ, there seems to be less need of a current of aerated water constantly floating over the eggs, and thus the deep still waters of the lake may be chosen. No doubt the moment spawning is over, his instinct teaches him to return to salt water; but there seems some difficulty in determining the exact time. This must be measured by the power of either parent fish to retain the spawn within their bodies. Some observers put it at twenty-one days, in which time, from leaving the sea, the Gaspereaux has spawned and commenced his return, allowing that he has met with no obstruction. On the other hand, sportsmen assure me that they have met them during July on the lakes, and others, whose powers of observation I cannot doubt, have seen them passing down in August. But they all

agree that the young fry go down into the sea in September and October, at which time they are over four inches in length. Messrs. Treat & Sons' gaspereaux spawned about the first of June. The date of placing them in fresh water is not given, but as they would scarcely have been obtained before the first of May, it gives them three weeks for their spawning period.*

From all these we learn that in three or four weeks after leaving the salt water, his brief holiday over, our fish commences his return. Unnerved by the exhausting toil of reproduction, by the absence of food (their stomachs are found empty on the lakes), and perchance by the warming summer waters, he addresses himself to the perils and dangers of descent. Too poor for an object of capture, he slips down unnoticed, save by the idle or curious, where, a few weeks before, a whole population watched his ascent. It is said those marine wolves, the eels, follow the advancing and retreating armies in their rear, gobbling up many a weak fish, or unlucky little one on the march. A dry summer has emptied the lakes and turned the foaming torrents of the spring into dusty rills. He often gets caught in these lukewarm shallows and dies. Not unfrequently the hunter finds them in bushels in the fords; quite as often the bear secures a rich feast—dipping his hairy paws into the shallow pools. He may be seen approaching nervously and timidly a rapid, then striking up stream, and returning pass down tail first. Those which are seen in July, or passing down in August, we must consider fish that have left the sea late in May, or that are caught by

* Messrs. U. S. Treat & Sons, of Eastport, Maine, placed Gaspereaux in fresh water ponds during the spring of 1857; on the first of June they spawned, in six weeks the eggs were hatched, in four months they were let down to the sea from three to five inches in length.—*Patent Office Report*, 1857, page 230.

A gentleman who allows me to use his experience, but not his name, and who is entitled by his position and practical knowledge to the highest consideration says, "My observation has led me to note that the gaspereaux having free access to their spawning grounds, remain exactly twenty-one days in fresh water, and during the twenty-four hours, only journey downwards to the salt water between the hours of three and five P. M. The fry of gaspereaux leave the lake in which they spawned on the dark nights of September, together with the eels. Any one can notice this that chooses to watch an eel weir placed upon a stream. When gaspereaux are heard and seen at night breaking the water about the sandy margins of a lake, in my opinion they are spawning and act in a precisely like manner to salt water herring when they seek shoal-water in salt water for that purpose. I have never observed a gaspereau to rise at a fly; but I know of many instances of their being hooked by fishermen, but it was what I call a foul hook—the angler having thrown over them when the school arose to the surface of the water. The instances that I have witnessed have invariably taken place when a multitude of gaspereaux have been detained on their ascent by a dam."

the dry season, and go down during the August freshets. Finally, October seems to be the last date for even the fry to be seen in fresh water.

We have thus received the Gaspereaux from the moment he left salt water, conducted him through all his perils, and had him as it were under our eye till we have returned him to deep water again, three months out of the twelve. The other nine months he is hid from us. They are taken in small numbers, generally with herring, sometimes with the mackerel, as late as 24th November, on our coast, but they are evidently only stragglers, the great body that swarmed our rivers must leave our coast, to return in spring. They return either to deep soundings or to the south. And now a change takes place in the colour of a few individuals, that is, so far, unaccountable to us. After gaining the salt water the lean weak fish rapidly recruits, becomes silvery, very fat, and a few individuals have a deep blue band of one inch and a quarter extending along the back. In all other respects—of fins and fin rays—they are identical with the rest. Our fishermen call them blue-backs, readily distinguish them, and maintain them to be a separate fish. Whilst differing from them, I must accord my obligation to their intelligence and exact appreciation of minute differences, in the form and habits of fish. On the 15th November, 1864, Martin Harrigan gave me two blue-backs; 27th November, two more specimens.

COLOUR.—Very brilliant; silvery, with deep blue backs extending one inch and a quarter down the side. Covered with nacre, and scales entire, the longitudinal bands extending from gills to tail difficult to see,—the black spot behind the opercle showing,—by turning them in various lights they become apparent; the colour of all the fins yellowish white; the extremities dusky, in pectoral first ray dusky; the caudal light-dusky, frayed and split on its extremities; opercles yellowish, with reflections, and lips yellowish-dusky. In comparing them with a gaspereaux taken at the same date, I find fins, fin-rays identical; the blue-back is rather shorter, but much rounder and thicker through the sides, the scales appearing larger.

A gaspereau seen at this late date being very thin, “slinky” as the fishermen call it, his scales loose, and his colour yellowish silvery, and green dusky on the back. A very fat fish swells out the scales, making them larger; as he thins they slide in upon each other. Whilst concluding that they are of one species, I still think that the salt water is the cause of the change; but why it only

affects individuals is still unknown. Blue-backs are often seen ascending the rivers, but I have no evidence of any being found descending them. Their more valuable congener, the shad,* is subject to the same change.

Of the food of gaspereaux, one would suppose from the toothless jaws and wide extensive gape, so unlike the recurved teeth and armed tongue of the genus salmo, evidently formed for seizing living and struggling food, that he was fed by gelatinous masses sucked into a wide mouth. Of his rising to a fly, and taking bait in the lakes, we have proof, and Dekay asserts, the stomach of one he examined was filled with shrimps. Dekay's descriptions refer to a smaller and longer proportioned fish than ours, with the eye further from the end of nose, but otherwise it tallies with ours, and his plate is good. From him, too, we learn that its southern range is the Chesapeake, where he appears in April. From Perley we find his northern range, Miramichi, which river he ascends to spawn in the lakes from which it has its source. Though doubtless it was known from the earliest discoveries of the province,† yet Latrobe, in the Philosophical Transactions of America, was the first to describe it, and give it the specific name, "*tyrannus*," preceding Peck, who calls it "*serratus*," in Belknap's History of New Hampshire, I have not the exact date to refer to, but somewhere about 1780. As an article of food, when eaten fresh, it is not held in great estimation in our markets. When slightly struck with salt and smoke-dried it is called a "Kiack," and is very palatable. Many are cured in this way about Lunenburg and the Atlantic seaboard. The Indians dry them in the sun about their wigwams, but the usual way is to salt them in barrels like herring, and use them in each family for home consumption. Their leanness makes them a good export for the West Indies, as the fat herring becomes completely decomposed into oil by the climate. As is the case with all fish which perform annual migrations to spawn in fresh water, they gradually desert cultivated countries. The various obstructions to

* The Rev. Ferdinand Gauvreau, P. P., Memremcook, N. B., says of the shad, "the first run are green on the back, the second a pale green, and the third run have blue backs, and are the best fish."—*Perley's Report*, p. 144.

† Beamish Murdoch, Esq., was kind enough to point out to me, in Mons. Deny's History of Acady, 1675, the word "Gasperot." This gentleman, who describes what he saw with the liveliness of an eye witness, says of them truly enough, "they are not equal to the herring for eating."

the streams, caused by mill-dams, and accumulations of saw dust, and the passing of boats, are doubtless the reason. Their numbers have very much diminished along our coast, and doubtless will continue so to do. By the government returns for 1861, the total number cured is put down at 12,565 barrels, but this does not include all used for family consumption,—the eastern portion of the province giving by far the greater quantity. Since that date they are not returned separately, but classed with herring. I have not mentioned one power attributed to it, because I think it needs further corroboration,—the power of climbing up perpendicular heights, as mill-dams, by holding on by its sharp serrated belly. The instinct of all fish is to lie flat in shallow places; the climbing fish having a different apparatus. However, I mention it as a very common belief. I would rather hazard the suggestion that their saw points are used in spawning, as the trout uses his lower jaw, in furrowing up the sand.

Note.—Since this article went to press, I have the most undoubted authority that trout possess the power of running up perpendicular sheets of water at least six feet high, and I cannot but accord the same power to the gaspereaux; in both instances by muscular action, and not by the serrated belly. On 2nd August, 1865, the mill dam at nine mile river was filled by young and old gaspereaux, returning to the sea, caught there by the dry summer. LEWIS KIRBY, Esq. gave me this fact.

In both these facts, I feel pleased to corroborate the statements of our fishermen, which I have always found correct and exact, though doubted by some.

ART. XII. CONTRIBUTIONS TO THE NATURAL HISTORY OF NOVA SCOTIA. REPTILIA. BY J. M. JONES, F. L. S.

(*Read May 2, 1865.*)

THE class REPTILIA forms no unimportant part of the animal kingdom, and in the present advanced state of zoological knowledge the species known to naturalists are annually becoming more numerous. In the early days of science, when natural history had few students, and even down to a comparatively recent period, the study of reptiles was almost totally neglected; and in the museums of divers countries a few stray bottles full of snakes and lizards, unnamed and uncared for, lying in some obscure corner, and deemed too disgusting for the eyes of visitors, were the only representatives of this singular race of creatures. It is far different, however, now, for in our splendid national museum we possess a collection which for interest can hardly be surpassed by other zoological