

## XI.—\*THE LAKE TROUTS.

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The non-migratory lake trouts of North America, as far as has yet been ascertained, comprehend three forms, to which the following specific names have been given: the Namaycush, or Great Trout of the Lakes: the Togue, or Gray-spotted Lake-Trout; and the Siscowet. The first was described by Pennant, at the close of the last century; the second by Dekay, in 1842; and the third by Agassiz, in 1850. According to the present state of our knowledge of their haunts, it appears that the Namaycush inhabits the great lakes extending from the Northern United States to the Arctic Sea. The Togue is said to frequent only the New England, Nova Scotian, and New Brunswick lakes, including the State of Maine, while the Siscowet is seemingly restricted to Lake Superior, where Agassiz also recognized the Namaycush. But little is known of their habits; moreover, several instances have occurred lately of one or other of these trouts turning up in lakes where their presence was unsuspected; it is, therefore, not unlikely, when their geographical distributions are better worked out, that this seeming partiality to certain waters may, after all, be more apparent than real. Further, it appears that their claims to be considered distinct species rest altogether on certain minor details of structure and coloring in each, which, however, have been further abridged by late researches. It will not, therefore, be surprising to such observers as may have enjoyed opportunities of studying them in their native haunts, should these so-called species turn out to be only varieties of seasonal or sexual conditions of one gray-spotted lake-trout, common to the boreal regions of the continent. I shall now point out the recorded differences between each, together with my own personal observations of the Togue, as met with within the boundaries of our region.

The Namaycush, Mackinaw salmon, and salmon-trout of the Canadians is known to Indians by various other names. It was first described by Sir John Richardson, who gives a lucid account of the fish.† The most noticeable differences between it and the other two are in the formation of the labials, where the crest projects beyond the limb of the bone, the latter being not quite three times the length of the in-

\* From Field and Forest Rambles, with notes and observations on the Natural History of Eastern Canada, by A. Leith Adams, M. A., M. B., F. R. S., F. G. S., Staff Surgeon-Major. London, Henry S. King & Co., 1873.

† Fauna Boreali-Americana, part third, The fish, p. 179, pl. 79, 85.

termaxillary. This peculiarity (if persistent) is certainly very characteristic of the Namaycush. The ventral fin is placed farther back than in the Togue and Siscowet, and the tail is more forked. There is a double row of teeth, extending at least half an inch backward on the vomer. The teeth, gums, and roof of the mouth have a tinge of purple, hence Mitchill's name, "Amethystine Salmon."

The Siscowet is known by this native name apparently in contradistinction to the last, which is also found in Lake Superior. The former appears to be very plentiful about Isle Royal. Agassiz makes out the following distinctive characters; but as many are also common to the other two, I merely indicate the discrepancies. The lower branch of the pre-operculum is more extended than the upper. The pectoral fin is longer, and farther from the gill-opening, than in either of the other two trouts, and the dorsal is said to be larger, with a more slender and less club shaped adipose fin. The anal is as high as the dorsal, but not so long.

The Togue was supposed to be identical with the Namaycush until Dekay's description, when he named it *Salmo confinis*.

I find, however, that his so-called differences are in several instances not general; and perhaps a better acquaintance with their natural histories will further establish a closer connection between the two. For several years this fish, as met with in our waters, was supposed to be identical with the Loch Awe trout *S. ferox*,\* from which it seems to differ in many points.

I had abundant opportunities of seeing the Togue at all seasons and in various stages of its growth, so that, as far as the denizen of our forest-shaded lakes is concerned, I believe the following will be found to be an accurate description of its appearance and habits.

The external coloring varies, of course, according to the nature of the lake-bottom, and whether or not the individual may have been caught during the breeding-season. When in full vigor, in October, during the spawning-month, the males, with the exception of the unusually large individuals, will be found very much alike, and more or less of a dark greenish-gray, getting fainter toward the belly, which is dappled with dull and purer white patches. The yellowish-gray spots, some as large as buck-shot, extend over the body and tail. The latter is said *not* to be the case in the Namaycush, but, from Agassiz's drawing,† they are evidently present on the tail of the Siscowet.

There is more or less of an orange tinge on the lower fins, especially the pectorals, but the purple in the inner surface of the mouth of the Namaycush is seemingly absent in the Togue.

In full health and vigor, the Togue presents a close resemblance to the

\* Mr. Perley was, I believe, the originator of this opinion, from a comparison between figures and general descriptions of the European fish.

† Lake Superior, pl. 1, fig. 3.

full-grown salmon. The head forms one-fourth of the total length from the snout to the tip of the caudal. It is rather flat above and convex in profile. The eye is midway between the tip of the snout and the nape, and about twice as near to the former as to the hinder edge of the gill-cover. The labials are fully three times as long as the intermaxillaries, thus contrasting with the Namaycush, but identical with the Siscowet. The labial crest does not extend beyond the extremity of the bone, as it does in the Namaycush. The length of the lower jaw is equal to that of the upper surface of the head. Like other lake and river salmonoids, it has a prominent knob on the extremity of the lower jaw, which in ordinary-sized males is not permanent, and only seen during the spawning-season. In old males, however, it is very conspicuous, and, as in the salmon, fits into a cavity in the upper jaw; indeed, it would appear to become developed with age, so that all very large salmonoids have it more or less throughout the year. The gill-covers are almost similar in the three, and broadly distinctive as compared with the brook-trout and the sea and salmon trouts, while the outline of the gill-cover, and the relative dimensions of the operculum, and its points of junction with the suboperculum, in all the American lake-trouts, assimilate closely to the salmon *S. salar*, while the crescentic outline of the preoperculum is broadly distinctive, and resembles that of *S. ferox* of Europe.

In the New World lake trouts, the pre-operculum bulges to a degree, owing to the enormous development of the great masticating muscle in front. The general features of the opercular apparatus in lake-trouts, as compared with other salmonoids, are distinctive. The operculum is four-sided, well rounded, and of greater height than breadth; the suboperculum is nearly one-third smaller than the last, and is triangular in its upper half, elliptical in its lower borders, and terminates at its articulation somewhat in the form of a fish-hook. The operculum, with the exception of the Siscowet, is long, slender, crescentic, and almost vertical, with a prominent ridge, and the usual foramina upon its anterior surface.

The teeth of the Togue are strong, slightly curved, and conical; those on the outer and lower maxillaries are the largest. The vomer is armed with a few teeth in a cluster or in regular double row, as is said to be the case in the Namaycush; although in the young of the former the teeth run in a zigzag way down the bone in a single row for some distance, but in old fish there are usually seven. Two adult male Toggles examined by me gave the following formula, which it may be remarked is absolutely identical with that given by Richardson as the scheme of dentition in the Namaycush, viz: intermaxillaries, 7-7; labials, 19-19; palatines, 13-13; lower jaw, 19-19; tongue, 8-8; vomer, 7-7.\*

It is worthy of note that in young and adolescent individuals of the

\* Fauna Boreali-Americana, part third, Fish, p. 182.

Togue, a third row of teeth is frequently observed on the center of the tongue, where sometimes one or two may be met with in the adult.

The fins vary considerably. By compounding many notes taken at different times from a large number of specimens, and striking an average, I found that the same discrepancies are applicable to the three American lake trouts.\*

The adipose fin is club-shaped in the Togue and Namaycush, and, as before stated, not so long and slender as in the Siscowet. The specimen represented in page 235† was a very fine Togue, captured during the spawning season in the Toledi Lakes, Upper Saint John. It displays the powerful proportions of the fish at this time of the year, which are very different to what obtain subsequently when fecundation has taken place. The scales of this species, and seemingly of the other two, are small and elliptical, decreasing in size from above downward. I counted in two instances 132 along the lateral line, which some authorities state takes its origin at the upper angle of the operculum; but this statement, made, I believe, originally by Dekay, is incorrect in the case of the Togue, and it would appear, also, in the other two. The line commences at the upper third of the operculum and curves slightly downward until beyond the pectoral fin, when it runs straight for the tail. The latter, although furcate in the old, is by no means so in younger individuals. There is often an abnormal thickening or enlargement of the lower caudal lobe, which I have seen in several instances, and the same has been noticed by other observers. It is met with in both sexes, but whether congenital or induced I cannot say; it may have originated from the friction in digging the sand for the deposition of the ova. I counted 130 pyloric cæca and 62 vertebræ‡ in two females of the Togue.

The Togue abounds in the great lakes at the sources of the Saint Croix and Saint John Rivers, deriving one of its local names from the Toledi Lake, where, and in Lake Temiscouata, it is extremely plentiful. Dr. Gilpin, of Halifax, seems to have been the first to proclaim its presence in Nova Scotia. According to Dekay, it is common in the lakes of New England, where Europeans give it a variety of names; its western and northern extension, however, is imperfectly noted. I am unaware of the Namaycush and Togue having been met with in the same waters. The partiality of the latter for certain lakes, or at all events its seeming absence from others to all appearance better adapted to its habits, may be more apparent than real, seeing that, like non-

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\* Thus in the Namaycush, Siscowet, and Togue, the fin-rays are as follows: Gill-rays, 12-13; D, 12-14; P, 12-14; A, 11-13; V, 9-10; C, 19½-21.

† "Illustration of the togue or grey-spotted trout of the lakes." Field and Forest Rambles.

‡ Holmes, in the Maine Agricultural and Scientific Report, 1862, p. 110, gives 113 cæcal appendages and 65 vertebræ, which, unless it is a mistake, shows considerable irregularity in the numerical proportions of the former.

migratory lake trouts in general, it passes much of its existence in the profoundest depths, as is shown by the frequent use of a thirty-fathom line in fishing for Togue through the ice. It repairs to shallows to feed on trouts, smelts, and the like; indeed, the last-named fish would appear to constitute its favorite winter-subsistence, inasmuch as out of several individuals dissected by me in midwinter, and from different lakes, all contained smelts. It preys extensively also on eels and cyprinids, and is *in-fact a tyrant with an appetite so voracious*, that quantities of twigs, leaves, and fragments of wood are constantly found in its stomach. The great monster will sometimes rise to spinning tackle, but in so sluggish and undemonstrative a manner, that the troller may fancy he has caught a water-logged pine or stone. In this way I had my line checked on the Schoodic Lake, when, striking gently, I found I had missed a large Togue, whose trenchant teeth had made a series of deep furrows in the chub with which the hook was baited. It is rare for this fish to rise to spinning tackle, and the Indian who steered the canoe assured us that he had not seen the like before. No doubt the flashing of the blades attracted the monster, to find the chub on the hook. It is naturally sluggish and inert, and apparently much of a bottom-feeder. As we glided along the shore of one of the islets, composed more or less of granitic boulders, our attention was directed by the guide to a large black object on the bottom, among a mass of stones. This he asserted was a monster Togue, which, if such was the case, must have exceeded three feet in length; moreover, he showed us two notches on the side of his canoe, representing the dimensions of an enormous individual, which an Indian had speared in the same waters during the spawning-season, the admeasurement being no less than four feet five inches.

The average weight of the Togue is seemingly about nine pounds, but this may not be altogether correct. I have seen individuals weighing fifteen pounds, and fishermen and Indians speak of having captured Toggles from twenty-five pounds to thirty pounds, and even forty pounds in weight. Probably the largest seldom leave the deep bottoms of the great lakes. A noble specimen of this uncouth-looking denizen of these forest-shaded lochs is now before me. If ever bull-trout deserved the name, those prominent eyes, huge muscular jaws, broad back, deep sides, with the force of the frame centered in front, might well win that appellation for the Togue. The Indian indulges his love of the marvelous when talking of him; and although often impromptu stories are got up to amuse and impress you with the learning and knowledge of the speaker, still, even in the absence of unwritten history, one may detect figments of their wild legends and mythology strangely mingled even with the traditions of their earliest Christian instructors, of monster Toggles and Sturgeons that appeared on the surface of the lakes at night, striking such terror among the tribe that they were forced to abandon their hunting-grounds; indeed, such, with the pigmy fairies,

giants, and other offspring of their ever-fruitful imaginations, rendered famous whatever localities the apparitions were said to frequent.

Raftsmen accustomed to pass along Grand Lake assured me that they had often seen a shoal of Toggles depositing their spawn, and surrounded by thousands of eels, hornpouts, dace, &c., which assemble to feed on the ova ; moreover, that neither the males nor the females remain beyond a few days on the ground. Sometimes the roe is deposited between stones, where the males may be observed fertilizing it. At this season the Indian plies his spear unmercifully, killing hundreds and wounding more. The flesh varies in color, from orange to cream color—according, I imagine, to the season of the year. As an article of food it is very fat, with little flavor, unless in the shape of “fish-cake well seasoned by Harvey’s sauce,” when the fisherman’s appetite will pronounce it a delicacy, only surpassed a hundredfold by a broiled or fried brook-trout, or its congener the silvery salmon-trout.