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NOTES ON THE SUNAPEE TROUT.

A SUPPOSED NEW SPECIES FROM NEW HAMPSHIRE.

ON Oct. 31, 1885, Colonel E. B. Hodge, Fish and Game Commissioner of New Hampshire, sent to the National Museum a fresh trout from Sunapee Lake weighing 5½ lbs. On Dec. 10, 1886, he sent several more large specimens from the same lake. It was supposed at first that this trout is most closely allied to the blueback of Maine, but as our specimens of *ogassa* were uniformly smaller than any of the Sunapee fish no satisfactory comparison could be made at the time.

During the summer of 1887, however, Dr. John D. Quackenbos obtained three young specimens of the Sunapee Lake species and Colonel Hodge added another somewhat larger. The longest of the young trout sent by Dr. Quackenbos measured about 7 in. I have compared it carefully with bluebacks from Maine of about the same size and find some differences which I had not observed before.

I have all along believed that the Sunapee Lake *Salvelinus* without mottled fins is identical with *ogassa*. It is possible that the identity of the two forms will yet be established, but so far it has been impossible to obtain specimens of the blueback from Maine which show a perfect agreement with the large individuals found in Sunapee.

The National Museum has numerous small examples of the blueback, the largest of which is about ten inches long. One significant fact which I have not seen recorded is that all of our bluebacks show very distinct parr marks and are consequently young. It is true that bluebacks begin the reproductive act before they have reached a length of ten inches, but the number of eggs in trout of that size is always small, about fifty to one hundred, and parr marks are always present. In my opinion the blueback reaches a large size. In a pamphlet entitled "Down East Latch Strings," published at Boston by the Boston & Maine Railroad in 1887, page 119, will be found an illustration of a species of *Salvelinus* caught in Lake Moos-lumeguntic, Maine, which measured 28 in. in length and weighed 10½ lbs. It is highly probable that this trout was not *fontinalis*, and it may have been the blueback; it shows a strong resemblance to the large trout of Sunapee Lake. It will be necessary to determine the species to which this trout belongs before we can say with certainty that the blueback does not reach a large size.

In FOREST AND STREAM of June 23, 1887, "The Large Trout Record" is reviewed by Geo. Shepard Page, A. N. Cheney and "Special." I do not believe that all of the large trout referred to in that record were *fontinalis*, but I cannot prove that they were not, because I have not seen any of the specimens. It is to be hoped that one of the Maine angling associations will send some of the very large trout from the Rangeley Lakes to the National Museum; specimens which have been in the collection a few years are usually unsuitable for comparison with fresh material from other sources. Salmon and trout are among the most difficult of all fishes to preserve.

FOREST AND STREAM during the years 1886 and 1887 published numerous articles relating to the trout from Sunapee Lake and the blueback, and to those columns the reader must turn for particulars as to the discovery and the subsequent history of the Sunapee trout in New Hampshire. Various theories as to the origin of the fish in Sunapee Lake have been proposed and discussed. My opinion at present is that the species have lived in the lake a great many years. It has probably not been distinguished from the common brook trout (*fontinalis*) until Colonel Hodge, Dr. Quackenbos and others called attention to its peculiarities. More than one ichthyologist, including myself, at first glance supposed the species to be *fontinalis*, but after subsequent careful examination it was found to belong to another group of species, namely the one having teeth well developed upon the hyoid bone. These teeth in *Salvelinus* are found on the bone between the lower extremities of the first two gill-arches. In the Sunapee Lake species this patch of teeth is very conspicuous in medium and large-sized individuals. If future investigations show that large trout like those in Sunapee Lake are found in the Rangeley Lakes of Maine, the origin of the Sunapee trout may be traced to some early introduction of the blueback into New Hampshire. This, however, is at present only a matter of opinion. The material now in the National Museum will not enable me to say positively that the Sunapee and blueback trout are identical. There is nothing left for me, therefore, but to describe the species from New Hampshire as probably new. This I have done in the current volume of the Proceedings of the National Museum and have given to it the name *Salvelinus aureolus*.

There are at least six apparent points of difference between the Sunapee trout and the blueback: 1. *Salvelinus aureolus* has eight developed rays in the anal fin besides three rudiments, while the blueback has ten developed rays and three rudiments. 2. Blueback trout begin spawning when they are about 9 in. long, but Sunapee trout of the same length in our collection are all immature. 3. Blueback trout in the fresh state are described as having the back uniform steel blue, while in the young Sunapee trout there are numerous dark blotches on the top of the back which give the fresh fish a mottled appearance. 4. It is stated by Fred Mather that the embryos of the Sunapee trout have a white line at the upper and lower edges of the caudal fin, and no such character has been observed in embryos of the blueback. 5. It is said that the blueback spawns in streams while the Sunapee trout is a lake spawner. 6. The gill-rakers of the Sunapee trout are shorter and usually less numerous than in the blueback, and they are almost invariably curled up at ends, while in the blueback they are always straight and slender. This may be due to a difference in the character of the food.

In FOREST AND STREAM of Jan. 14, 1886, Colonel Hodge thus describes the colors of Sunapee trout: "The females have a brownish back; sides lemon color. Males, small

ones, bluish-black back, large ones much lighter, in fact, almost cream color; some are very light olive; sides and belly golden orange. They are the most brilliant colored of any fresh-water fish that I know. The fins are very large, much larger than in the common trout, and the fish is entirely destitute of mottlings on the back, in fact, there are none of the usual characteristic mottlings of brook trout."

The fresh colors of the blueback are thus described by Mr. Henry O. Stanley in FOREST AND STREAM, May 5, 1887: "I have watched the bluebacks (*Salmo ogassa*) carefully, habits and characteristics, and have taken all the eggs that have ever been taken at Rangeley, have hatched them a number of years and watched them through all their stages till turned loose, and have never noticed any white line on the lower edge of the tail fin you speak of. Had there been any (even if very slight) I think I should not have failed to notice it. I am sorry to say we have not any eggs hatching this season to verify my opinion, but I feel very sure there is none. The adult fish does not have any white on the fins at all like the brook trout. The fins of the males are bright red, or the color of bright autumn leaves. When taken from the water they are of a dark color, after death turn to a bright yellowish cast. The spots are very minute, very thick, very bright yellow and red, both thicker and brighter than on the brook trout."

Dr. John D. Quackenbos describes the colors of the Sunapee trout as follows: "The coloration of the sides varies from a dead lustrous cream tint or a delicate olive to a dazzling orange, which in some specimens deepens into a dark steel blue on the back; always destitute of mottling and with none of the characteristic of the brook trout. The spots are generally secondary, though in some fish vermilion specks are a conspicuous feature, while in others spots of any hue are hardly perceptible. Occasionally the females are as highly colored as the males."

On Oct. 31, 1886, Colonel Hodge thus described the colors of the Sunapee trout in a letter to the late Professor Baird: "During the summer they are very light colored, almost white; they are not mottled on the back like the other trout in the lake. The smaller ones, from one to two pounds, are almost black on back, but orange on sides. These fish grow very large, reaching ten pounds and over, and at this season (Oct. 31) when first taken are in color on sides a deep golden orange, and as the males roll up in the water look like a broad band of gold. In swimming these fish move along exactly like a salmon, that is they swim with their whole body from head to tail."

On Dec. 10, 1886, Colonel Hodge sent some fresh specimens of the Sunapee trout to the National Museum. When received the colors were as follows: Head and upper parts brownish gray; caudal the same, with the exception of a narrow white margin on the lower lobe; under surface of head in most examples brownish gray, in others whitish; belly orange, this color extending up on the sides, but not to the middle line of the body, and orange with white margin in front; ventrals orange with broad white margin on the outer rays; upper half of pectoral gray, lower half orange; dorsal gray, lighter along the base; sides, both above and below the lateral line, with numerous orange spots fading out to whitish, the largest of these spots are a little more than one-third as long as the iris; no mottlings anywhere.

The young specimens received from Dr. John D. Quackenbos, which were collected in Sunapee Lake during last summer, have the following color marks: Sides, silvery white; back, with six or more well-defined, band-like dark markings, besides some irregular intervening dark blotches. There are about ten parr marks on the sides and numerous small roundish white spots. A female 11 in. long sent by Colonel Hodge from Sunapee Lake, November 28, 1885, has a few free eggs in the abdominal cavity; it seems to be nearly spent. This example has numerous parr marks on the sides and band-like markings on the back are still very evident.

T. H. BEAN, Ichthyologist, U. S. Fish Commission, U. S. NATIONAL MUSEUM, WASHINGTON, D. C., Jan. 23.

SENSIBLE ICELANDIC FISHERMEN.

IN the nineteenth century many a fisherman is foolish enough, in order to obtain a single meal, to destroy fishes that would have sufficed, if not interfered with in breeding times, to feed twenty families for a week. A recent letter from Iceland shows a remarkable contrast in this regard, and its people are certainly entitled to call us barbarians, as compared with themselves in the matter of securing a permanent supply of fish food.

Dr. Labonne, member of a scientific mission to Iceland, met a young Scotchman, who, like many of his countrymen, passes six weeks every year in Iceland, fishing for trout, salmon, and the red-fleshed char. "Being permitted to accompany him," he writes, "on lake and river, I was astonished to meet frequently, at short distances apart, rectangular boxes with gratings at each end, fixed in the middle of the stream by cords attached to the basaltic rocks on the banks. On raising the lid of one he saw inside a number of small trout and salmon, a few inches long, grouped on a bed of small stones and volcanic mud, carefully arranged on the bottom. He explained this to me as follows: 'When an Icelandic catches a trout, salmon, or char, filled with eggs or milt, he thinks of others than himself, and does not cook the whole. Before eating his fish he never fails to place in the boxes above alluded to, the reproductive contents of the fish. The eggs retained by the gratings find themselves under the same circumstances as if they had been laid in the stream, and hatch out perfectly. The little fish are fed with the refuse of the kitchen, and when they have attained a sufficient size to look out for themselves, are distributed in the neighboring streams.'"—Translated for D. T. Curtis by Dr. Samuel Kneeland.

ICE FISHING.—Worcester, Mass., Jan. 28.—Ice fishing has been excellent the past four weeks and many fine strings of pickerel have been taken; so plenty have they been in the markets that citizens who do not care to indulge in the sport could purchase them for their Friday fare at a very moderate price.—E. S. K.

"RANGELEY SPAWNING GROUNDS."—In Capt. Barker's communication, Jan. 12, page 489, first paragraph, the writer is made to say that the Kennebec stream empties into the Cuscutic stream. He wrote, "empties into the Cuscutic Lake about three miles below the Cuscutic stream."

SUNAPEE LAKE.

WORCESTER, Mass., Jan. 10.—All last winter I watched the columns of FOREST AND STREAM for some account of the fishing at Sunapee Lake, N. H., but seeing none and being unable to learn much about the lake I gave up the trip and went up to Lake Champlain after bass again. I once lived in New Hampshire and when there contracted (took it from the New Hampshire boys I think) a severe case of "Sunapee fever," which I have never been able to entirely shake off. I have seen occasional accounts of the peculiar trout taken there, the re-stocking, etc., but never a word, as I remember, about the fishing. Why is it? Don't any one fish there? Don't they catch enough to pay for a trip up there, or don't they care to have outsiders come in and share their sport?

I always commence laying out my vacation plans right after the holidays, and have already several Maine lakes under consideration for the coming season, but I can't get over the glowing description the New Hampshire boys used to give me of Sunapee. Neither can I learn of a lake in Maine where there is good fishing that is not overrun with sportsmen or else hard to reach. By good fishing I mean a fair day's sport with fair sized trout. Trout running ½ to 2 lbs. are large enough for me, and I enjoy paddling along a pretty shore if I don't catch many.

You see my companion and I go fishing to fish, and be by ourselves. Now, don't set us down for a pair of unsocial cranks, for we are not, but when a fellow is limited to one week's outing a year, he can't afford to spend much of it visiting. I can stand a heap of fishing. A week solid does not tire me of it a particle, and when I come in after an all day's session I am ready to lie off and listen to a good story, swap lies with the guides, etc., but I don't enjoy being kept awake till daylight by those members of nearly every large party who do their heaviest fishing after supper, "sounding" for the bottom of a glass bait can. They usually find it before they quit, too.

Now, if this catches the eye of any one lucky enough to have been to Sunapee I hope he will give us the benefit of his experience there. Tell us how to get there and where to go when we do get there.

We are both poor fishermen and mighty unlucky at that, but we do like to drop into a place where we can have a good week's fish.

We feel obliged to spend about so much of our yearly stipend and a week's time in somebody's woods looking for somebody's fish or game every summer, and we would just as soon have it in New Hampshire as in Maine. In fact we would prefer to, as it is nearer. Let us hear from Sunapee.

SWIRL.

CHUBB'S CATALOGUE.

THOS. H. CHUBB, the well-known manufacturer of fishing tackle, has issued a new catalogue which is a valuable guide to the purchase of angling supplies, and gives also a series of well-written papers on fishing subjects. Dr. James A. Henshall discusses of black bass and blueback bass fishing. Mr. A. N. Cheney writes luminously of trout fishing. There are several pages of fish lore from the pen of Geo. P. Goff, A. M. Mr. W. H. H. Murray talks of practical angling. Hints on salmon fishing are followed by notes on the manufacture and choice of hooks by Mr. John R. Bartin, and "Old Izak" concludes this portion of the book with a talk on angling. The description of Chubb's manufacture is instructive as a setting forth of how a small business can rapidly grow into a big one, if the product be only something that the public wants, and it appears to have taken a shine to Chubb's rods.

Fishculture.

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BLACK BASS IN GERMANY.

COUNT MAX VON DEM BORNE, Bernuchen, has issued a little illustrated pamphlet on the two species of American black bass, introduced by him into Germany.* He has not designated them as the small-mouth and big-mouth, but has followed the obsolete nomenclature of "black" bass, for the first named, and has translated the specific name of the last (salmonides) into "trout-perch," fortunately he did not adopt the absurd name of "Oswego," for this fish.

He calls them "royal" fish, and says that in Michigan and Ohio they are, next to the whitefish, the most important food fish of fresh water. Quotations from Dr. Henshall and Dr. Sterling are frequent, and from these two authors alone the German readers get much valuable information concerning the life, history and habits of these fishes. In Germany the adult fish spawn in May and June, as in New York, but our author says that young fish sometimes spawn in the south (in America) from August to November, a statement which is new to us. A careful study of the literature of these fishes has enabled the author to condense a great deal of valuable information in a small compass, and yet he is careful to credit the authorities from which he draws, a most commendable thing in a compiler.

The two men in Germany who have been the most enterprising in exchanging the fishes of their country for those of America, are Count von Behr, President of the German Fishery Association, and Count von den Borne, a private fishculturer. The former confines himself to the introduction of American salmonide, while the latter inclines to the percoids, of which European waters have but two good native specimens. In return they have sent many valuable lots of eggs of the different European salmonide to this country, and their energy and enterprise will be remembered while the literature of fishes remains.

*Der Schwarzbarsch und der Forellenbarsch. Black Bass; zwei Amerikanische Fische in Deutschland. Von Max von dem Borne, Bernuchen, Neudamm. Verlag von T. Neumann, 1888.

CANADIAN LOBSTERS.—Ottawa, Jan. 23.—The Dominion Government has adopted a few of the recommendations contained in the report of the Lobster Commission appointed in May last. The last *Canada Gazette* contains an order in Council setting forth that hereafter it will be unlawful to catch or have in possession anywhere on the Atlantic coasts, any lobsters between the 1st of July and the 31st of December, and on the coasts of the Gulf of St. Lawrence the close season is to extend from the 15th of July to the 31st of December. It is further provided, that "It shall be unlawful at any time to fish for, catch, kill, buy, sell, expose for sale, or have in possession any berried or soft-shell lobsters, or any lobster under 9 in. in length, measuring from head to tail, exclusive of claws or feelers, and when caught in fishing apparatus in legal use, they shall be liberated alive by the proprietor, owner, agent, tenant, occupier, partner, or person actually in charge, either as occupant or servant, on each of whom shall devolve the proof of such actual liberations."