

DESCRIPTION OF A SUPPOSED NEW SPECIES OF CHAR (*SALVELINUS AUREOLUS*), FROM SUNAPEE LAKE, NEW HAMPSHIRE.

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In October, 1885, Col. E. B. Hodge, fish and game commissioner of New Hampshire, sent to the National Museum a *Salvelinus*, from Sunapee Lake, weighing  $5\frac{1}{2}$  pounds. Again on December 10, 1886, he sent several large specimens of the same species from the same locality. During the summer of 1887 Dr. John D. Quackenbos, of Columbia College, New York, obtained our first young specimens of the *Salvelinus* from Sunapee, and Colonel Hodge added one which was somewhat older.

It was at first believed that this *Salvelinus* is identical with the *oquassa* of Maine, and I am not quite sure even now that it is distinct from *oquassa*. If the differences mentioned in the following description prove to be constant, there will be no difficulty in distinguishing the species; but we have only young individuals of *oquassa* in the collection, the size of our specimens ranging from about 9 to 10 inches. Smaller specimens than these, and larger ones, if such exist, are still necessary to a satisfactory determination of the question.

It has been assumed that *Salvelinus oquassa* never exceeds a length of 10 inches or a foot. This may be true, but I can not believe it. All of our numerous specimens show parr marks, and the breeding females have such a small number of free eggs in the abdominal cavity that I am forced to consider them not fully grown. The differences by which I have distinguished the Sunapee *Salvelinus* from *oquassa* are the following:

(1) The Sunapee species has eight developed rays in the anal fin and three rudiments, while *oquassa* has ten developed rays and three rudiments.

(2) *S. oquassa* begin spawning when they are about 9 inches long, while Sunapee trout of the same length in our collection are all immature.

(3) The *oquassa* trout in the fresh state are described as having the back uniform steel-blue, while the young Sunapee trout have numerous dark blotches on the top of the back, which give the fresh fish a very different 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, whereas no such marking has been observed in the embryos of *oquassa*.

(5) It is said that the *oquassa* trout spawn in streams, while the Sunapee trout are lake spawners.

(6) The gill-rakers of the Sunapee form are shorter and usually less numerous than in *oquassa*, and they are almost always curled up at the ends, while in *oquassa* they are always straight and slender. This may be due to a difference in the character of the food.

The specimen described below is a young individual  $6\frac{3}{4}$  inches with-

out the caudal. In the table of measurements a larger specimen—extreme length, 11 inches—is introduced by way of comparison.

The type of the description, No. 39334, was obtained in Sunapee Lake, New Hampshire, in the fall of 1887 by Dr. John D. Quackenbos.

The length of the specimen to the caudal base is 6.4 inches.

The greatest height of the body equals the length of the head, and is contained about four times in the total without caudal. The least height of the tail equals one-third the length of the head.

The maxilla reaches past the middle, but not to the end of the eye; its length is contained about two and two-thirds times in length of head. The length of the upper jaw is contained about two and one-third times in the length of the head, and is equal to the longest anal ray. The eye is a little longer than the snout, and is contained four and two-seventh times in the length of the head. Hyoid teeth well developed.

The first dorsal is a little nearer the tip of snout than to the base of caudal, and the length of its base is one-half the length of the head.

The adipose dorsal is distant from end of first dorsal a space equal to twice the length of the ventral.

The anal is at a distance from the snout equal to about three times the length of the head. The longest anal ray is equal to the length of the upper jaw.

The length of the middle caudal rays are equal to twice the diameter of the eye.

The ventral is situated midway between the tip of the snout and caudal base; its length equals one-half the length of the head.

The length of the pectoral is about twice the width of the interorbital area.

B. 10; D. iv, 9; A. iii, 8; P. 13; V. 9; scales 35–210–40; gill-rakers 6+10–12.

The peculiarity of the gill-rakers of this trout is that they are always curled up at the ends and not straight, as in the *oquassa* from Maine.

*Colors.*—Sides silvery white. Back with about six well-defined band like markings, besides some irregular dark blotches. There are about ten parr marks on the sides, and numerous small, roundish, white spots. In colors this char is different from the *oquassa* from Maine, but if fresh specimens of the Maine trout were compared with this young fish the difference in color might not be so great.

The specimen described is a young male with the spermaries showing as a mere slight ribbon; its stomach contained an earth-worm and the wing-cases of a squash-beetle. The other two specimens (somewhat smaller) are females far from maturity.

In a female, No. 37408, 11 inches in total length, both parr marks and bands across the back show very plainly. This female has a few free eggs in the abdominal cavity and seems to be nearly spent. In examples of this size the tail is deeply forked, the middle rays being less than one-half as long as the external rays.

In males the pectoral is always longer than in females of equal size.

The following color notes were taken from Nos. 38321 to 38328, collected by Colonel Hodge in Sunapee Lake, December 10, 1886:

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. Anal orange, with white margin in front. Ventrals orange, with broad white margin on the outer rays. Pectorals gray, upper half, and orange, lower half. Dorsal gray, lighter along the base. Sides, both above and below lateral line, with numerous orange spots, fading out to whitish. The largest of these spots are little more than one-third as long as the iris. No mottlings anywhere.

*Measurements of Salvelinus aureolus.*

Current number of specimen..... Locality .....	37408 ♀. Sunapee Lake, N. H.		39334 ♂. Sunapee Lake, N. H.	
	Millime- ters.	100ths of length.	Millime- ters.	100ths of length.
Length to base of caudal .....	257	100	160	100
Body:				
Greatest height .....	51	20	38	23½
Greatest width .....	25	9½	.....	.....
Height at ventrals .....	49	19	36	22
Least height of tail .....	21	8	13	8
Length of longest gill-raker.....	4	1½	2	1½
Head:				
Greatest length .....	54	21	38	23½
Distance from snout to nape .....	36	14	27	16½
Greatest width .....	24	9	18	11
Width of interorbital area .....	18	6¾	11	6½
Length of snout .....	11	4	7	4
Length of operculum .....	13	5	.....	.....
Length of maxillary .....	21	8	14	8½
Length of upper jaw .....	25	9½	16½	10
Length of mandible .....	31	12	21	13
Distance from snout to orbit .....	13	5	8	5
Diameter of orbit .....	13	5	11	6½
Diameter of iris .....	9	3½	8½	5
Dorsal (first):				
Distance from snout .....	112	43½	76	47
Length of base .....	28	11	19	11½
Length of longest ray .....	32	12½	21	13
Length of last ray .....	15	5¾	12	7½
Dorsal (soft):				
From origin of first .....	90	35	60	37½
Length along hind margin .....	9	3½	6	3¾
Length of base .....	5	2	3	1¾
Anal:				
Distance from snout .....	183	71	117	73
Length of base .....	22	8½	15	9
Longest ray .....	28	11	16½	10
Last ray .....	13	5	8	5
Caudal				
Length of middle rays from end of scales.....	18	6¾	13	8
Length of external rays .....	41	15¾	32	19¾
Pectoral:				
Distance from snout .....	53	20½	36	22
Length .....	37	14¾	24	14¾
Ventral:				
Distance from snout .....	127	49	84	52½
Length .....	31	12	20	12¾
Length of appendage .....	14	5½	8	5
Branchiostegals .....	10	.....	10	.....
Dorsal .....	9	.....	9	.....
Anal .....	8	.....	8	.....
Pectoral .....	.....	.....	13	.....
Ventral .....	1, 8	.....	1, 8	.....
Number of scales in lateral line .....	.....	.....	210	.....
Number of transverse rows above lateral line .....	34	.....	35	.....
Number of transverse rows below lateral line .....	38	.....	40	.....
Number of gill-rakers .....	7, 7½	.....	10-12	.....
Number of caecal appendages .....	39	.....	.....	.....