NOTES ON SOME FRESH-WATER FISHES FROM MAINE,

WITH

DESCRIPTIONS OF THREE NEW SPECIES.

By WILLIAM CONVERSE KENDALL,
Assistant, United States Fish Commission.

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About forty years ago Ezekiel Holmes published a list of the fishes of Maine,[a] chiefly compiled and containing but few fresh-water species. Over thirty years later the present writer published a report[b] upon an investigation of the fresh waters of Washington County, which contained about the first record of observations upon Maine fresh-water fishes since Holmes's publication. Prior to this time there had been no systematic collecting in the inland waters of the State. In the four years immediately following some small collections were made, upon which there has been no detailed report.

In 1898 the United States Fish Commission, realizing that knowledge directly valuable to fish-culture and indirectly to the public could be derived from a study of the landlocked salmon and its native habitat, detailed the author to make such an investigation of Sebago Lake basin. Since then up to the present time the fresh waters of Maine have received considerable attention and a large amount of important information has been obtained.

In ten years 22 salt and fresh water species not previously recorded from the State, 12 of which are fresh-water[c] forms and 3 of which are new to science, have been found. This raises the list of native fresh-water (including anadromous) fishes from 35 to 47 species. Others have had their recorded range considerably extended in the State, and some which have not been recorded since their description, or known, perhaps, from only a single locality, have been found widely distributed. These statements are not astonishing when the great extent of the fresh waters in the State and the small amount of work done there are taken into consideration. There still remains a large unexplored area, and doubtless other forms new to the State and perhaps new to science may be discovered.

It is not the aim of this paper to enter into the details of the results of this work, this being reserved for a future more comprehensive paper, but to call attention to a few interesting fresh-water species of Maine fishes and put on record some observations regarding them.

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[a] Second Annual Report upon the Natural History and Geology of Maine, 1862.

[b] Notes on the Fresh-water Fishes of Washington County, Me. (Bulletin U. S. Fish Commission 1899, 43.)

[c] The additions to the fresh-water faunal list other than those mentioned in this paper are (1) *Chrosomus erythrogaster*, (2) *Semotilus atromaculatus*, (3) *Notropis muskoka*, (4) *Couesius plumbeus*, (5) *Fundulus diaphanus*, (6) *Eucalia inconstans*. Of marine species there are a number recorded in general range but mentioned from no definite locality in Maine, of which no account has been taken. The salt-water additions not recorded as extending so far north as Maine are (1) *Narcine occidentalis*, (2) *Gasterosteus wheatlandi*, (3) *Mugil curema*, (4) *Stenotomus chrysops*, (5) *Centropristes striatus*, (6) *Menticirrhus saxatilis*, (7) *Prionotus carolinus*, (8) *Spheroides maculatus*, (9) *Lophopsetta maculata*, and (10) *Macrurus bairdi*, of which *M. saxatilis* and *M. bairdi* have not previously been noted.

For courtesies, advice, and assistance the writer is indebted to Dr. David Starr Jordan, president of Leland Stanford Junior University; Dr. Barton W. Evermann and Dr. Hugh M. Smith, of the U. S. Fish Commission; Dr. Tarleton H. Bean and Mr. Barton A. Bean; the commissioners of inland fish and game, of Maine; Mr. Elmer D. Merrill, of the U. S. Department of Agriculture; Mr. Daniel Cummings, proprietor of a sportsman's camp and fish and game warden at Square Lake, and Mr. John A. Story, of the State fish-hatchery at Caribou, Me.

The drawings of the new species are by Mr. A. H. Baldwin.

Catostomus catostomus (Forster). *Northern Sucker.*

This species is known elsewhere by various other names, such as "small-scaled sucker," "long-nosed sucker," "red-sided sucker," etc. The only published intimations of its occurrence in Maine are by Prof. C. H. Hitchcock,[a] who said that a red-sided sucker was peculiar to Rangeley lakes, and Dr. A. Leith Adams,[b] who incidentally refers to the above locality and says the fish occurs in the St. Croix Lake waters. These are not undoubted references to this species, however, for the common sucker (*C. commersonii*) often has red sides during the breeding season. Dr. Adams's reference is definite regarding the Skiff Lake Stream specimens identified by Dr. Günther, but Skiff Lake Stream, though tributary to the St. Croix lakes, is in New Brunswick, and Dr. Adams's identification of it in Grand Lake Stream, where he procured his "silvery trout," may have been a mistake, owing to the common red-sided character of breeding *C. commersonii*. The inference is, however, that this species may be found in the St. Croix waters in Maine.

The first positive evidence of its occurrence in Maine was furnished by Mr. Elmer Merrill, who collected it at Craig Brook and sent it with some other species to the U. S. National Museum. Mr. Merrill gave the writer the following note regarding it:

"Mr. Atkins says it is the common sucker of Alamoosook and Toddy ponds, where it is abundant. In Craig Brook, in June, males were seen devouring the eggs as fast as extruded by the females."

This species has since been collected by the writer and Mr. Thomas B. Gould in Glasier Lake, which is an expansion of the St. Francis River, tributary to the St. John River, and in the "thoroughfare" connecting Long Lake with Cross Lake, of the Eagle Lake system, Aroostook County, in October, 1901. In this thoroughfare white-fish were spawning, and this sucker and *C. commersonii* were feeding upon the eggs.

This species is doubtless more widely distributed than it seems, but being an inhabitant of the cooler depths of the lakes, it is seldom seen unless in the breeding season when it ascends the streams to spawn, or in the fall when it follows trout, salmon, and white-fish to their spawning-grounds to feed upon their eggs. It is probably never recognized by the inexperienced observer, who sees in it only "a sucker." Like its congener, the common sucker, it varies in adult size; in some localities a length of 18 inches or more is attained, and in others only 6 to 10 inches. It may be distinguished from the common sucker by its longer nose, thicker lips, and smaller scales.

Leuciscus neogæus (Cope).

Prior to its discovery in New Brunswick in 1888, and again in 1895 by Philip Cox,[c] this species had not been recorded east of Wisconsin and Michigan. It was found by Kendall & Gould in Bill

[a] "The *Salmo oquassa* Girard, or blueback trout, an uncommon variety of dace, and a red-sided sucker are peculiar to these waters." (Geology of Maine, Second Annual Report, Natural History and Geology of the State of Maine. 1862, 328.)

[b] "During June, when the silvery salmon trout is plentiful in the streams connecting the various lakes, there is found associated with it a red-banded sucker, 5 or 6 inches in length, with a brilliant red bar extending lengthwise down its sides. I examined several specimens of this fish, kindly procured for me from Skiff Lake Stream of the eastern Schoodic chain of lakes, by Major Monk and Captain Wolseley. It seems to be also found in the upper waters of the Androscoggin in the State of Maine, but further there are no accounts of its presence north of the State of Vermont, where it was discovered by Le Sueur and named by him *Catostomus longirostris*. The specimens above referred to were examined by Dr. Günther, who informs me that they differ only from this species in the length of the anal fin, which varies according to sex and season." (Field and Forest Rambles, with Notes and Observations on the Natural History of Eastern Canada. 1873, 252.)

[c] History and present state of the Ichthyology of New Brunswick, with a catalogue of its fresh-water and marine fishes. (Bulletin XIII, Natural History Society of New Brunswick. 1895, 44.)

Fish Brook, a tributary of the east branch of the Penobscot River about a mile below Matagamon Lake, in Second or Matagamonsis Lake in October, 1900; in these same places and in a small pond near Hale Pond, West Branch of the Penobscot, in August; Smith Brook, outlet of Haymock Lake, a tributary of Eagle Lake of Allagash River, in September, and Cross Lake Thoroughfare, Aroostook County, in October, 1901. In September, 1902, it was obtained by the same collectors in Lunkasoos Lake, which empties into the east branch of the Penobscot.

This is a beautiful little minnow. The small examples are not easily distinguished by color from *Chrosomus erythrogaster*, which usually occurs with it. An examination of the pharyngeal teeth, however, will quickly decide the matter, *Chrosomus* having but a single row on each bone, while the other has a double row. Some differences occur in the Maine specimens from those from farther west, to which, though not to separate them as distinct species, it is desirable to call attention. These will be shown in the accompanying table, from which it will be seen that there is considerable variation amongst them. Cox mentions still more in New Brunswick specimens.

The writer was privileged to examine some of the New Brunswick specimens, which were considerably deeper and more "stubby" fish than any of ours, with very steep foreheads and exceedingly projecting lower jaws. These were doubtless breeding males. Some of our specimens indicate the same form but to a lesser degree. This seems to be the first record of this species from Maine.

Table of proportional measurements of Leuciscus neogæus from Maine.

[Bill Fish Brook, September 7, 1901.]

Total length in millimeters.	Head in length without tail.	Depth in length.	Eye in head.	Snout in head.	Maxillary in head.	Mandible in head.	Pharyngeal teeth.	Scales.	Dorsal rays.	Anal rays.	Height of dorsal in head.	Height of anal in head.	Pectoral in head.	Ventral in head.	Sex.
76	4	5.23	4.25	3.77	4.25	3.40	1,4-5,2	82	8	8	1.54	1.70	1.70	2.26	Fem.
66	4.23	5	3.71	3.25	3.25	2.60	1,5-5,1	83	8	8	1.34	1.44	1.44	1.85	Fem.
63	4	4.72	4.33	4.33	4.33	3.25	2,5-5,2	83	8	8	1.44	1.62	1.44	2	Fem.
65	4.15	4.69	3.71	3.71	3.25	2.60	1,5-4,1	83	8	8	1.44	1.62	1.62	1.85	Fem.
65	4.50	4.99	4	4	4	3	1,5-5,0	83	8	8	1.20	1 33	1.33	1.71	Male.
63	4.33	4.72	4	4	4	3	1,5-4,1	85	8	8	1.20	1.50	1.50	1.71	Male.

[Southards Pond, August 19, 1901. A small pond near Hale Pond, West Branch Penobscot waters, having connection with Hale Pond only during stages of high water.]

89	4	5.06	4.75	3.80	3.16	2.71	2,4-5,2	77	8	8	1.58	1.72	1.72	2.11	Fem.?
89	4.11	4.93	4.50	3.60	3.60	2.57	2,4-4,2	82	8	8	1.50	1.50	2	2.37	Fem.?
91	4.22	5.01	4.50	3.60	3.60	2.57	2,4-4,1?	77	8	8	1.63	1.80	1.80	2.25	Fem.?

[Matagamon Lake, October 3, 1901.]

72	4	4.61	4.28	4.28	5	3	1,5-4,?	83	8	9	1.50	(?)	1.50	2.14	Fem.
69	4.13	4.64	4	3.50	3.51	2.80	1,5-4,1	80+	8	8	1.40	1.75	1.44	2	Fem.
69	3.73	4.30	3.75	3.70	3.75	3	1,5-4,1	90	8	8	1.50	1.50	1.50	2.14	Fem.
69	3.86	4.45	4.28	3.75	3.75	3	1,5-5,1	80+	8	8	1.50	1.66	1.50	2.14	Fem.
69	4.14	5.27	4.66	4.66	4.66	2.80	1,5-4,1	80+	8	8	1.33	1.55	1.55	1.75	Fem.
69	4.14	5.21	4.66	3.50	3.50	2.80	1,5-4,1	80+	8	8	1.40	1.40	1.55	1.75	Fem.

[Cross Lake Thoroughfare, October 23, 1901.]

73	4	5	5	3.50	3.50	2.50	1,5-4,1	About 80	8	8	1.50	1.66	1.66	2.14	Fem.
73	4.06	5.08	5	4.28	4.28	3	1,5-5,1	About 80	8	8	1.57	1.87	1.66	2.14	Fem.
73	4.06	5.08	5	3.75	3.75	3	1,5-4,1	About 80	8	8	1.87	1.87	1.87	2.14	Fem.
65	3.79	4.41	4.66	3.50	3.50	2.80	2,5-4,2	About 80	8	8	1.40	1.40	1.40	1.80	Male.
63	4	4.33	4.33	3.25	3.25	2.60	2,5-4,2	Over 80	8	8	1.30	1.30	1.30	1.62	Male.
62	3.84	4.16	3.71	3.25	3.25	2.60	1,5-4,2	Over 80	8	8	1.30	1.52	1.30	1.75	Male.

Leuciscus carletoni Kendall, new species. *Chub Minnow.*

Head 4.35 in length; depth 4.83; eye 4.44 in head; snout 3.33; D. i, 8; A. i, 8; scales 12–73–18; teeth 2, 5–4, 2. Body elongate, rounded, back little elevated; head blunt, the profile moderately steep; mouth terminal, oblique; maxillary 3.33 in head, with small barbel just above its extremity; jaws sub-

equal; mandible 2.85 in head; lateral line slightly decurved, nearly continuous, absent only on last scale; scales rather small. Dorsal fin inserted behind front of ventral, its height 1.25 in head; anal 1.53 in head; pectoral and ventral of moderate length, the former 1.53 and the latter 1.81 in head. Peritoneum pale.

Coloration, above, dusky olive, somewhat speckled with brown; an irregular dusky stripe along the lateral line to base of caudal, ending in a small black spot; below lateral line creamy white with brownish spots on side; dorsal and pectoral dusky; other fins pale. Colors after preservation in formalin and later in alcohol very much intensified.

Type, No. 50832, U. S. N. M., an individual 102 millimeters long, one of numerous specimens collected by W. C. Kendall and Thomas B. Gould in Bill Fish Brook, a tributary of the East Branch of the Penobscot River about a mile below Matagamon Lake, September 7, 1901. Cotypes, No. 2744, U. S. F. C.

Named for Hon. Leroy T. Carleton, chairman of commissioners of inland fish and game of Maine.

It will be seen from the accompanying table that there is considerable individual variation among the specimens from this one locality. There is also found a locality variation which, though possibly accidental, seems from its constancy to be more than that. For instance, specimens from a small pond near Hale Pond, West Branch of the Penobscot River, show a slightly shorter head, the scales run a little smaller, and there are sometimes fewer anal fin rays, with some other minor differences. The male sometimes becomes brilliantly red along the side of the abdomen from behind the pectoral fin to the lower base of the caudal. This color persists to some extent on individuals until fall.

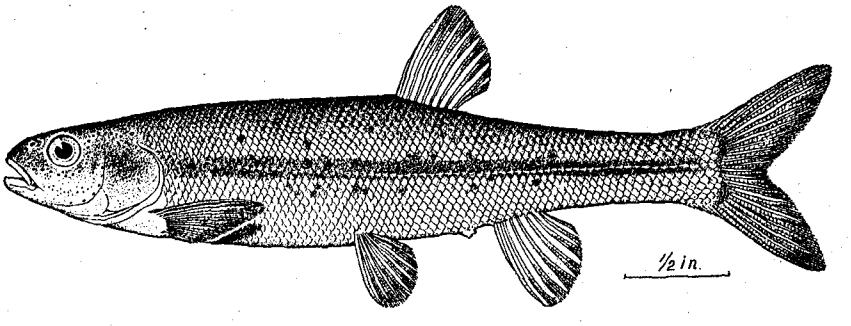


FIG. 1.—*Leuciscus carletoni* Kendall, new species.

Besides the type locality, this species has been taken in Smith Brook, which is the outlet of Haymock Lake, tributary to Eagle or Heron Lake of Allagash River and in thoroughfare between Long and Cross lakes, East Branch of the Fish River waters or Eagle Lakes of Aroostook County. It is doubtless widely distributed.

The presence of a barbel possibly should inhibit placing it in the genus *Leuciscus*. In this respect it is allied to *Semotilus* and *Couesius*. In *Couesius* the barbel is nearer the extremity of the maxillary than in this form, which in this respect is closer to *Semotilus*, to which the pharyngeal teeth would take it, being most commonly 2, 4–5, 2, which seems not to occur in a large series of *Couesius plumbeus* from Maine, or in other species. In fact, the generic distinction of *Couesius* seems to be the presence of only 4 teeth in each of the main rows. While teeth and barbel would suggest *Semotilus*, the incomplete and sometimes broken lateral line forbids that disposition of it. The barbel, however, is absent from a few of the cotypes and seems not to be present on the Southards Pond specimens.

Assuming that *Leuciscus* is the proper genus for it, which other minor characters would suggest, then it is closely allied to *Leuciscus margarita* Cope, under the subgenus *Phoxinus*. *Leuciscus margarita*, however, is proportionately a shorter and deeper fish, with slender caudal peduncle and larger scales. Our specimens have been compared with specimens of *L. margarita* from West Virginia and Lake Ontario, and barbels were found on some from the latter locality. Of 12 specimens, 4 had barbels on each side, 2 had a barbel on one side and none on the other, and 6 had no barbels at all. Barbels on our specimens can not be accounted for by age, for they are present on large and small, and of those from which they were absent one is a large individual. Its general form, and especially of the head, is that of *Couesius dissimilis*, but in the latter the mouth is much larger than in *Leuciscus carletoni*.

It would therefore seem that it must be called a *Leuciscus*, but the absence of barbels can no longer be considered a generic character by which to distinguish this group. It is very possible that this is the species reported by Cox from New Brunswick under the name of *Couesius plumbeus*, while *Couesius prosthemius* is undoubtedly *Couesius plumbeus*, as is shown by specimens sent by Dr. Cox to the United States National Museum.

Proportional measurements of Leuciscus carletoni, 10 cotypes.

Total length in millimeters.	Length, without tail.	Head in length, without tail.	Depth in length.	Eye in head.	Snout in head.	Maxillary in head.	Mandible in head.	Pharyngeal teeth.	Scales.	Dorsal rays.	Anal rays.	Longest ray of dorsal in head.	Longest ray of anal in head.	Length, pectoral in head.	Length, ventral in head.
124	116	4.29	5.52	5.40	3.85	3.50	3.50	1,5–4,?	12–68–9	8	8	1.58	1.80	1.58	1.92
123	116	4.46	5.80	5.20	3.71	3.71	2.88	2,4–5,2	13–71–9	8	8	(?)	(?)	(?)	(?)
84	69	4.31	5.30	4.57	3.55	4	2.90	2,4–5,2	13–73–9	8	8	1.39	1.39	1.23	1.88
76	63	3.93	4.84	4.57	3.20	4	3.20	2,4–5,2	12–68–8	8	8	(?)	(?)	(?)	(?)
100	84	4.20	4.94	4	4	3.81	3.33	2,4–5,2	13–66–9	8	8	1.35	1.53	1.21	1.66
85	71	4.18	4.73	4.25	3.40	4.25	2.83	2,4–5,2	12–70–8	8	8	1.66	1.81	1	1.88
87	72	4	3.60	4.50	3.60	3.60	3.27	2,4–5,2	13–70–8	8	8	1.24	1.38	1.24	1.71
73	61	4.06	4.35	3.75	3.33	3.75	3	2,4–5,2	12–72–8	8	8	1.25	1.50	1.25	1.66
71	61	4.06	4.35	3.75	3.33	3.75	3	2,4–5,1	12–71–8	8	8	1.40	1.50	1.21	1.77
74	62	4	4.76	3.82	3.87	3.82	3.10	2,4–5,1	12–69–8	8	8	1.29	1.40	1.29	1.82

Proportional measurements of Leuciscus carletoni from other localities.

[Southards Pond, August 19, 1901.]

Total length.	Head.	Depth.	Eye.	Snout.	Maxillary in head.	Mandible in head.	Teeth.	Scales.	Dorsal.	Anal.	Height of dorsal.	Height of anal.	Pectoral in head.	Ventral in head.	Sex.
111	4.12	5	4.20	3.50	3.50	3	2,5–4,2	11–73–10	8	7	1.50	1.61	1.61	2	.....
115	4.34	5	4.60	3.83	3.83	3.13	2,5–4,2	12–65–10	8	7	1.64	1.52	1	2.09	.....
115	4.21	4.85	4.60	3.80	5.59	3.28	2,5–4,2	14–68–10	8	8	1.53	1.69	1.64	1.93	.....
109	4.09	5.62	4.40	3.66	4	3.38	2,5–4,2	12–71–11	8	8	1.46	1.57	1.57	1.83	.....

[Smith Brook, September 27, 1901.]

76	3.82	5	4.25	3.77	3.40	3.40	2,5–4,2	13–68–8	8	8	1.41	1.36	1.30	1.88	Male.
70	3.86	4.83	3.75	3.75	3	3.75	2,5–4,2	66	9	8	1.36	1.50	1.36	1.87	Male.
76	3.93	4.84	4	4	2.66	3.20	2,5–4,2	69	8	8	1.33	1.45	1.33	1.88	Male.
75	4.13	5.16	4.28	3.33	3	3	2,4–4,1	68	8	8	1.36	1.50	1.50	2	Male.
86	4	4.73	4	3.60	3	3	1,5–4,1	12–66–8	8	6	1.64	1.80	1.64	2	Fem.
79	3.82	4.33	4.25	3.40	2.83	3.40	1,4–4,2	12–68–8	8	8	1.54	1.70	1.41	2.12	Fem.

[Cross Lake Thoroughfare, October 23, 1901.]

93	4.20	5	4.75	3.16	3.20	2.71	1,5–4,2	12–69–8	8	8	1.87	1.72	1.72	1.90	Fem.
80	4.25	5.23	4.57	3.20	3.55	3.20	2,5–4,1	13–69–8	8	8	1.45	1.88	1.60	2	Fem.
81	4.18	5.15	4.57	4	4	2.90	2,5–4,2	14–73–9	8	8	1.45	1.60	1.60	2	Fem.
100	4.10	4.68	4.44	3.33	3.33	2.85	2,5–4,2	14–72–8	8	8	1.66	1.53	1.25	1.81	Male.
77	4	4.42	4.57	3.20	3.20	2.90	2,5–4,2	13–69–8	8	8	1.33	1.33	1.23	1.77	Male.
75	4.20	4	4.28	3.33	3.75	3	2,4–4,2	13–73–8	8	8	1.30	1.50	1.25	1.87	Male.

Proportional measurements of Leuciscus margarita. (?)

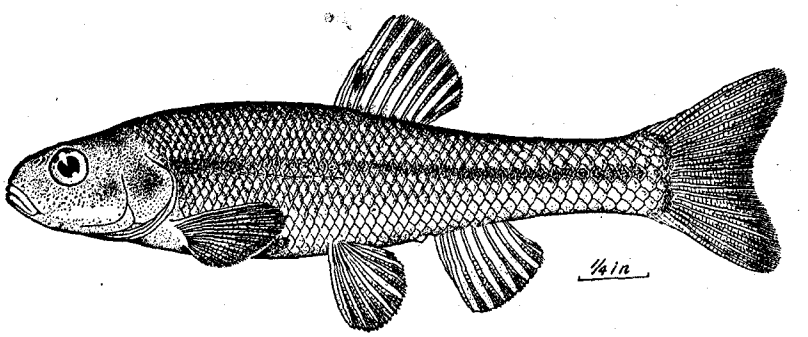
[From Lake Ontario (Cemetery Creek near Watertown, N. Y.), for comparison with above.]

70	5	4.14	4.14	3.62	4.83	2.90	(?)	12–59–7	9	7	1.45	1.61	1.45	1.93	.....
66	4.30	4.30	4.33	3.71	3.71	2.60	1,5–5,2	11–64–6	9	8	1.44	1.62	1.52	1.85	.....
62.5	4.16	4.16	4.16	4.16	4.16	2.66	1,4–(?)	11–64–7	9	8	.....	1.66	1.25	1.66	.....
61	4.16	4.34	4	4	4	3	(?)	11–61–7	8	8	1.33	1.50	1.20	1.71	.....
57	4.90	4.26	3.33	3.33	.....	.....	(?), 5–4,1	11–58–6	8	8	.....	.....	.....	.....	.....
59	4.25	4.63	4	4	4	3	1,5–4,1	11–59–7	9	8	.....	.....	.....	.....	.....

Pimephales anuli Kendall, new species. *Blunt-nose Minnow.*

Among the fishes collected in the "thoroughfare" connecting Mud Lake and Cross Lake, October 23, 1901, were two specimens of *Pimephales*, or what were at the time thought to be *P. notatus*. But upon comparison with description and specimens of that species there were found notable differences. It was by the same methods decided that it could not be *P. promelas*, having very little in common with that species save the incomplete lateral line which at once distinguishes it from *P. notatus*. August 31, 1902, a large number of smaller individuals, which seem to be the same species, were taken in Lunkasoos Lake. Though they are apparently *Pimephales*, they bear a most striking resemblance to *Notropis*, which at first they were thought to be, rather than *Pimephales*.

These little fish in Lunkasoos Lake were fairly swarming about the shores on this and other days, and were fed upon by trout and eels. The only other minnows found in the lake were *Leuciscus neogæus* and *Couesius plumbeus*. Apparently the only other fishes than these are *Catostomus commersonii*, *Salmo sebago* (introduced), *Salvelinus fontinalis*, and *Anguilla chrysypa*. This lake empties into the East Branch of the Penobscot through several miles of brook, though the lake in a direct line is only 1.5 miles from the river. The water is inaccessible to any fish except eels, owing to steep falls of considerable height. This lake is about 3 miles long. The shores are mainly rocky and in many places bold, but the lake is nowhere very deep. Trout here reach a large size, 5 or 6 pounds or more. From these conditions it might be expected that its fish inhabitants possibly might differ somewhat from other waters not so landlocked.



Pimephales anuli Kendall, new species.

Although this minnow has been found only in these two localities, it probably occurs in many other suitable waters. The type (No. 50830, U. S. N. M.) is the larger individual, a male fish, from Cross Lake Thoroughfare.

Named in honor of Hon. Edgar E. Ring (Latin, *anulus*), one of the commissioners of inland fishes and game of Maine.

Total length of type, 68 mm. Head 3.8 in length; depth 3.8; eye 5 in head; snout 3.33; scales 46,–13; D. i, 9; A. i, 7; teeth 4–4. General appearance of body is that of *P. notatus*, though somewhat deeper and with more arched back. The head is blunt, but with straighter profile than *P. promelas*. Lateral line very incomplete, pores upon about 16 to 20 scales; about 26 scales before the dorsal, which is inserted midway between tip of snout and base of caudal fin. Peritoneum black; intestine elongate, but not so long as in either *P. promelas* or *P. notatus* examined by the writer, about 1.5 the length of the body, not more than twice the length which is given as a generic character of *Pimephales*.

Color when fresh, light olive on back, with white sides and belly; head dark on top; an indistinct lateral stripe along axis of body, and a dark bar across base of caudal; a dark olive line from occiput splitting and passing each side of dorsal fin, reuniting behind and continuing to upper base of caudal; upper part of head, snout, and upper opercles dusky; a black spot in front of dorsal and a somewhat indistinct one similarly situated behind; other fins all pale.

The other specimen or cotype (No. 2745, U. S. F. C.) is the link that connects the above specimen with those of Lunkasoos Lake. Its total length is 55 mm. Head 4 in length; depth 3.38; eye 4.60 in head; snout 3.83; scales 45,–13; D. 8; A. 8. Similarly colored, but with no spots on dorsal fin.

The Lunkasoos Lake specimens are much smaller than the type—about the size of the cotype, but of much darker coloration. The lateral stripe is black; top of head, snout, and opercles black; scales outlined with black on back and indistinctly on sides. No spots on dorsal fin of any specimen, but on some specimens a dusky shade on front base of dorsal is distinguishable. There seem to be about 28 scales before the dorsal, which in some specimens is situated farther back than in the type, midway between pupil and base of caudal. Peritoneum black; intestine slightly more than 1.5 body without the tail. Pores on 6 to 12 or more scales. Front ray of dorsal not reaching tip of last ray when depressed; front of anal just about reaching tip of last rays.

Proportional measurements of Pimephales anuli from Lunkasoos Lake, August 31, 1902.

Total length, in millimeters.	Head.	Depth.	Eye.	Snout.	Scales.	Dorsal.	Anal.
58	3.84	4.36	4.16	3.12	45–13	i, 8	i, 7
48	3.72	4.55	4.40	3.66	46–13	i, 8	i, 7
55	3.91	4.71	4	3.42	45–13	i, 8	i, 7
51	3.90	4.30	4.40	3.66	46–13	i, 8	i, 7
56	3.75	4.71	4.16	3.57	46–13	i, 8	i, 7
51	3.90	4.30	4.40	3.66	45–13	i, 8	i, 7
51	3.81	4.66	4.40	3.57	46–13	i, 8	i, 7
52	3.58	4.52	4.80	3.42	46–13	i, 8	i, 7
52	3.50	4.20	4	3.42	46–13	i, 8	i, 7
50	3.81	4.66	4.90	3.57	46–13	i, 8	i, 7

Notropis bifrenatus (Cope). *Bridled Minnow.*

This little minnow, collected by Cope in the Schuylkill River and described under the name of *Hybopsis bifrenatus*, has not previously been recorded east or north of Massachusetts. In 1898 it was found in abundance by the writer in Sebago and Little Sebago lakes. It inhabits quiet, weedy coves, streams, "bogs" or "logans." It seems to attain a length of not over 2 inches. The form is very similar to that of the members of *N. heterodon* group of minnows. The lateral line is very incomplete, usually on 5 or 6 scales. Anterior rays of dorsal and anal, when depressed, extending considerably beyond last rays; anal somewhat falcate.

Color after preservation in formalin and subsequently in alcohol generally as follows: Scales on back finely dotted with dark brown, most intense on edges; dark-brown line from top of head, which is of a like color, to front of dorsal, less distinct from dorsal to upper base of caudal; a broad, shiny black stripe from snout through eye to base of caudal, where it ends in a small jet-black spot; fins all pale. In life, while in the water, the back seems of brick-red hue.

Proportional measurements of Notropis bifrenatus from Little Sebago Lake, July 27, 1898.

Total length in millimeters.	Head.	Depth.	Eye.	Snout.	Scales.	Scales before dorsal.	Dorsal rays.	Height of dorsal in head.	Anal rays.
52	4.3	4.77	3.33	4	31–9	14	8	1	7
49	4	4.44	3.33	4	31–9	12	8	1, 11	7
46.5	4.27–	4.27	3.6	4.5	32–8	12	8	1	7
50	4.15	4.6	3.33	4	34–9	14	8	1+	7
49	4	4.4	3.33	4+	35–8	14	8	1+	7
46	4.11	4.35	3	3.6	35–9	14	8	1	7
43	4.37	5.38	3.2	4–	35–9	14	8	1	7
44	4.23	4.8	3.4	4.25	34–10	14	8	1	7
47	4.22	5.4	3	3.6	34–10	13	8	1	7
45	4.23	4.8	3.4	4.25	33–9	14	8	1–	7

Cottus gracilis (Heckel).

In a small brook tributary to Aroostook River, utilized by the State hatchery at Caribou, Me., for fish-cultural purposes, Mr. John A. Story, who is connected with the State Fish and Game Commission at that place, collected a good series of *Cottus* for the writer, who has never observed finer or larger specimens elsewhere. It seems to be locally known in the region as "rock cusk," deriving its name

probably from a fancied resemblance to the "cusk" (*Lota maculosa*). In the Synopsis of the Fishes of North America, Jordan & Gilbert included all the common fresh-water sculpins under the one genus *Uranidea* of DeKay, restricting the genus *Cottus* to that group now recognized as *Myoxocephalus* in Jordan & Evermann's Fishes of North and Middle America. In the latter work, however, the fresh-water *Cottidæ* are comprised in two genera—one of which is *Cottus* Linnæus and the other *Uranidea* DeKay—which are distinguished one from the other only by the number of ventral rays. The genus *Cottus* is supposed to have a ventral fin formula of i, 4, while *Uranidea* has i, 3.

Out of 28 specimens otherwise essentially alike from Caribou 18 had 3 ventral rays in each ventral fin, 6 had 4 rays in each fin, and 4 had 4 rays on one side and 3 on the other. Of 15 specimens from six other localities in northern Maine, 4 had 3 rays in each ventral, 7 had 4 on each side, and 4 had 3 on one side and 4 on the other. Six specimens from Bear River, Newry, in the western part of Maine, had uniformly 3 rays in each fin.

Accordingly it would seem that the number of rays in the ventral fin will not serve to distinguish the two genera, and DeKay's *Uranidea* will have to be dropped in favor of the older name of *Cottus*. It is possible that more material will show that one or more species under *Cottus* in Fishes of North and Middle America may be identical with the form here identified as *Cottus gracilis* (Heckel).

Color after one year's preservation in alcohol: Head above, back, and sides dark gray thickly speckled with small black spots, some of which coalesce; lower parts a soiled pinkish white; soft fins all dusky, barred with pale gray on rays; spinous dorsal with jet black membrane, gray spines, margined with white which is orange in life. There are individual and sexual variations in the intensity and pattern of the colors. On some specimens the ventral and anal are wholly pale and the other fins much lighter than the above. In fact, the general shade is lighter.

Proportional measurements of Cottus gracilis, from Caribou, Me.

Total length in millimeters.	Head.	Depth.	Eye.	Snout.	Maxillary in head.	Mandible in head.	Interorbital in head.	Maxillary extends to (relative to pupil)—	Dorsal.	Anal.	Longest spine of dorsal in head.	Longest ray of dorsal in head.	Longest anal ray in head.	Pectoral in head.	Number of ventral rays.
115	3.31	5.05	5.27	3.75	2.23	2.07	5.5	Middle.	VIII, 16	13	4.83	1.81	1.93	1.03	3;3
110	3.28	5.41	5.60	3.50	2.33	2.14	5	....do...	VII, 12	12	4.66	2.33	2	1.03	3;3
107	3.38	5.86	6.50	3.25	2.36	2.16	4	....do...	VII, 18	12	4.33	1.85	1.83	1.04	3;3
96	3.22	5.26	5.44	3.50	2.45	2.13	3.5	Front..	VII, 16	11	4.45	2.13	2.04	1.06	4;4
114	3.28	5.11	5.60	3	2.33	1.20	4	Middle.	VII, 16	11	4.66	1.24	1.64	1	3;3
110	3.37	5.35	5.40	3.37	2.25	1.92	4.5	Front..	VII, 17	12	4.50	1.92	1.80	1	3;3
94	3.25	5.20	4.80	3	2.40	2	3.5	....do...	VI, 17	11	4.36	1.84	1.71	1.04	3;3
92	3.34	5.13	5.11	3.53	2.55	2.09	3	....do...	VII, 17	12	3.83	2.30	1.76	1.02	3;3
97	3.20	5	5.55	3.07	2.77	2.08	4	....do...	VII, 17	12	4.16	2.08	1.56	1.08	4;3
101	3.23	5.09	6.50	3.46	2.26	2	4	....do...	VII, 16	12	4.33	2.16	1.85	1.08	3;3
104	3.14	5.31	5.40	3.37	2.45	2.07	4	....do...	VII, 18	12	4.50	2.07	1.80	1	3;3
111	3.28	5.41	5.09	3.50	2.33	2	4	Middle.	VIII, 16	11	3.50	2.16	1.64	1.03	3;4
95	3.50	5.92	6.28	3.66	2.44	2.20	3	Front..	VII, 16	11	3.66	2	2	.95	4;3
118	3.34	5.10	5.27	3.22	2.07	1.93	4.5	Posterior....	VIII, 16	11	4.12	1.93	1.15	.96	4;4
103	3.40	4.72	5	3.57	2.17	1.92	3.5	Front..	VII, 16	11	4.16	1.85	1.79	1.08	3;4
93	3.45	5.06	4.40	3.14	2.20	2	3	....do...	VII, 16	11	4.40	1.76	1.76	1	3;3
94	3.30	5.06	5.11	3.28	2.30	2.19	3	Middle.	VII, 17	12	4.18	1.84	1.78	.93	4;4
88	3.47	4.70	4	3.50	2.75	2.10	3	Front..	VII, 17	11	4.20	1.90	1.90	.95	4;4
85	3.50	5	5	3.63	2.50	2.22	3	....do...	VII, 17	12	3.63	1.90	1.90	.95	4;3
102	3.40	5.86	5	3.33	2.27	2	3.5	Middle.	VIII, 16	12	4.54	2	1.85	1.04	3;3
88	3.27	5.14	5.50	3.66	2.44	2.20	3	....do...	VII, 16	11	3.66	2	1.83	1	4;4
89	3.47	4.86	5.25	3	2.21	1.90	3	Front..	VIII, 17	11	3.50	1.75	1.61	.95	3;3
90	3.36	5.48	4.88	3.14	2.58	2.20	3	....do...	VII, 17	11	4.40	2	1.83	1	3;3

THE WHITE-FISHES OF MAINE.

One species of white-fish has for many years been known to occur in certain Maine waters. Holmes mentions two species under the names of *Coregonus albus* and *Coregonus* (*Argyrosomus*) *clupeiformis*. The former the writer has decided must be the species formerly recognized as *C. labradoricus*, and the other doubtfully as *C. quadrilateralis;* but they are assigned to no particular locality. In the first report of the State Fish Commission, 1867–68, Mr. Charles G. Atkins, the commissioner, says, under the heading "White-fish (*Coregonus*)," page 25:

> Of this genus we possess at least one, and probably more than one, species. They occur principally in the central, northern, and northeastern portions of the State. The species found abundantly on the St. John and its tributaries has been referred to the species *C. albus*, but we doubt whether that is correct. Whether or not our white-fish is identical with the famous white-fish of the Great Lakes, it certainly partakes of that excellence which is a characteristic of all the members of this genus. In the Fish River region, in Moosehead Lake, in Schoodic Grand, they pronounce the white-fish the best of fishes. Like nearly all the salmon family, to which they belong, they spawn in the autumn and seem to prefer running water. On the Schoodic they resort to Pocompus and Grand lakes, where the water is flowing from 3 to 5 feet deep and the bottom sandy and gravelly. In November each year small quantities of them are taken here with the spear. One night Mr. B. W. French, of Calais, set a net 30 feet long at this thoroughfare, and in the morning had a barrel of white-fish. In Moosehead Lake they sometimes take the fly. In June last we saw one taken with a fly near Mount Kineo by Artemas Libby, esq., of Augusta. It weighed 1½ pounds. Two trout weighing a pound each were taken at the same cast. They can be taken with the hook at any season of the year in deep water. Almost any bait will answer, but the best is a piece of small fish. The most of them are taken in winter. The greatest success is obtained by sinking through a hole in the ice, at the end of a line, a "cusk" thoroughly gashed with a knife. This remains there one day and tolls a great many white-fish around. They are then taken by smallest baits on small hooks. One winter many of these Moosehead Lake white-fish were sold in Augusta, and their weight was so uniformly one pound that they received the name of "pound fish," and the trouble of weighing was dispensed with by the mutual consent of seller and buyer.
>
> The white-fish differs from most of its family in being nearly or quite destitute of teeth. Its mouth is small and tender. It has therefore none of the fierce predatory character of the trout and togue. It probably feeds mostly on small aquatic animals of various kinds, such as insects, crustaceans, and mollusks, being guiltless of the death of any of its fellow-fishes.

Several other annual reports of the State fish commission allude to these fish under the general name of "white-fish," but give no localities besides those mentioned above by Atkins and nothing further indicating more than one species.

For many years the common white-fish of Maine bore the name of *Coregonus labradoricus*, but a few years ago the well-known ichthyologist, Dr. Tarleton H. Bean, announced the identity of this species with *Coregonus clupeiformis*, or the common white-fish of the Great Lakes.[a] Whatever changes the names may undergo, the fish remains the same for the table, unexcelled by any other fresh-water fish in Maine.

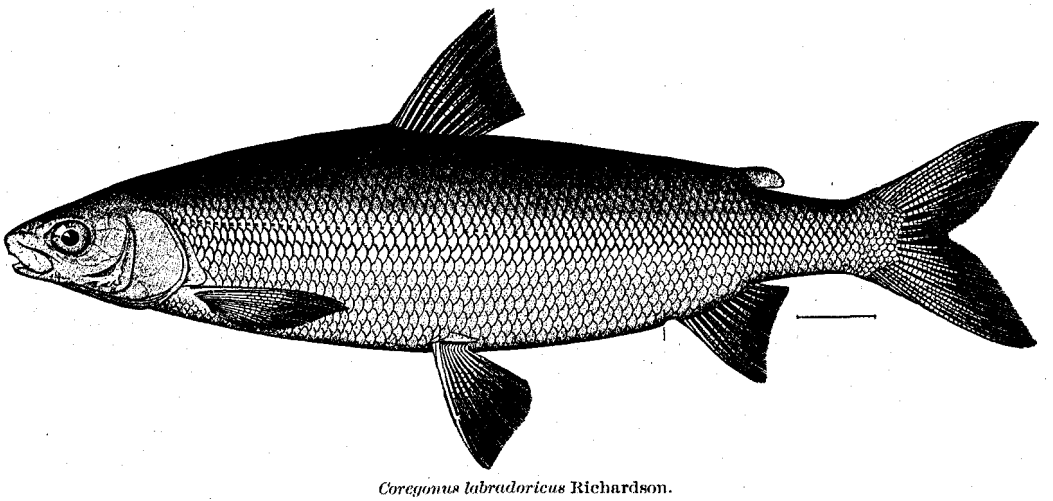
During most of the year this species (the others, too, for that matter) affects the deep water of the lakes or streams. It is essentially a lake fish, but is found throughout the year in some fresh-water streams, probably having strayed from its lacustrine home over falls which were barriers to its return. In the lakes early in the evening and throughout twilight these fishes often appear at the surface to feed upon insects, and their "rises" may be seen everywhere at some distance from the shore. The white-fish rarely, if ever, leaps from the water, and his "wake" is incon-

[a] Identity of common and Labrador white-fish. <Science, N. S., vol. IX, No. 220, March 17, 1899, 416.

spicuous compared with that of the trout or most other fishes. At this time it will occasionally take an artificial fly, as also sometimes on cloudy days, but the most successful method of angling for it is that described above by Atkins. It may be caught in gill nets[a] if set in deep water The writer has taken white-fish in August in gill nets set at the bottom, extending from a depth of 75 to 115 feet, and from rocky to soft muddy bottom. The white-fish were about midway of the net, but this is most likely due to the part being more favorably constructed. Gill nets should be tan-colored.

This white-fish feeds upon small animals of various kinds and probably almost any kind. White-fish taken in First Debsconeag Lake August 12 and 24, 1901, contained large quantities of larvæ of a species of dipterous or mosquito-like insect.

The height of the spawning season seems to be about November 25 in the Fish River Lakes, where the fish run up the thoroughfares at night and descend before morning. They spawn in running water over gravel and where the water ranges from 1 to 3 feet deep. They also ascend streams for this purpose, but so far as



Coregonus labradoricus Richardson.

known do not spawn on shoals or shores of lakes. The nearest approach to shore spawning known to the writer is in First Debsconeag Lake, where they seek the lake end of the shallow strait connecting the lake with Debsconeag Deadwater. Atkins states that the fecundity of a 2-pound white-fish is 25,076 ova. In some Maine lakes this species attains a weight of 4 or 5 pounds, but the average is 1 to 2 pounds.

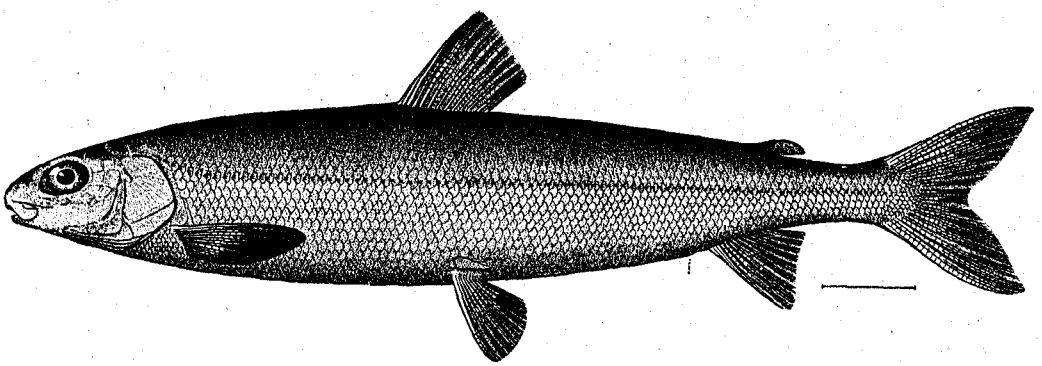
It is not known to the writer that the young of this species has been observed, except the fry at fish-hatcheries, or where they are to be found after leaving their birthplace in the thoroughfares and streams, or at what age they leave these places. It is probable that when quite young they go to deep water, where having thus escaped their enemies of the streams they become the prey of the rapacious fishes of the lake. Young individuals ranging from 4.63 to 9.5 inches long were collected in the Allagash and St. Francis waters in October, 1901, with a drag seine, along the shores of the lake. The method employed was to bait the shore about dark with fish and ruffed-grouse entrails or with corn-meal mush, and in about an hour draw the seine over the baited ground, when these fish were taken, together with hornpout,

[a] This method is unlawful in Maine except by special permit from the commissioner of inland fishes and game.

suckers, minnows, round white-fish, eels, trout, etc. In some lakes white-fish afford the principal food for trout and salmon.

This species is known to occur in Maine in the St. Croix waters—both east and west branches—Moosehead Lake, Debsconeag lakes, Allagash, St. Francis, and Fish rivers. It undoubtedly is a resident of nearly all, if not all, of the larger lakes of Maine. It is propagated to some extent by the State Fish Commission.

There is another white-fish found in Maine which is not so well known as the above, consequently no one disputes the right to its name of *Coregonus quadrilateralis*, or round white-fish, Menominee white-fish, frost-fish, shadwaiter, pilot-fish, chiven, Chateaugay shad, black-back, etc., according to the locality in which it occurs. It is found from New Brunswick westward through the Adirondacks and the Great Lakes, thence northward into Alaska. It may be distinguished from other Maine species by its more elongate, rounder body, more pointed snout, and much smaller mouth. Its habits are similar in almost every respect to the above, but it is more seldom noticed owing to its smaller size and less abundance, perhaps, and from its never being taken on a hook. It has doubtless been observed by residents of the



Coregonus quadrilateralis Richardson.

State and its difference from the others noticed, but it has been previously recorded from but one locality in the State—Clearwater Pond, Industry.

In 1901 the writer collected this white-fish in Umsaskis Lake, October 3, and the Cross Lake thoroughfare of Eagle lakes, Aroostook County, October 23. Late in November some were also received from Mr. John Story, who collected them with the common white-fish in Square Lake thoroughfare of the same region. It is doubtless more commonly distributed in the State than recorded observations indicate.

A NEW WHITE FISH FROM MAINE.

Supported by the opinions of such eminent ichthyologists as Dr. Jordan, Dr. Evermann, and Dr. Bean, and an abundance of material and data, the writer has no hesitation in describing a new white-fish from Maine, which will be designated *Coregonus stanleyi*. It was found in abundance upon its spawning-beds in the thoroughfare from Mud Lake to Cross Lake on the night of October 23, 1901. At one haul of a hundred-foot seine fully two barrels of these little fish were captured,[a] with them being one large specimen of *C. quadrilateralis*, several small *S. sebago*, numerous common suckers (*Catostomus commersonii*), and a few *Catostomus catostomus*.

[a] All but a few were liberated.

This spawning-bed was fine gravel covered with 1 to 2 feet of moderately flowing water. Before the haul was made the abundance of fish there was evinced by the constant "flipping" of their tails on the water surface, where it is said the spawning takes place with this as well as other species of white-fish, though the eggs sink.

There are but two instances of the introduction of non-indigenous white-fishes into Maine waters. One was *Coregonus clupeiformis*,[a] the other *Coregonus albula*, with either of which *Coregonus stanleyi* is unidentifiable. Regarding the former, in a letter dated April 1, 1901, Commissioner H. O. Stanley says:

> Some twenty years ago the United States Commission sent me some white-fish eggs, I think from one of the lakes in Michigan. I hatched them at Rangeley and planted them in the upper lake—Rangeley. This winter they have been caught with hook and line in considerable numbers in Umbagog Lake, which is the fourth lake below. This is the only lake in which fishing through the ice is allowed. It is a pickerel lake. These white-fish were caught with a small live minnow. I have had some sent me twice this winter; they run in size from 1½ to 2 pounds. I presume they are in the lakes just the same and could be caught if fished for in the same way. It seems queer that they should turn up in the lower lake first, some 40 miles or more away. They are surely white-fish and none has ever been seen in Rangeley waters, to my knowledge, till this year, and I have been familiar with them all my life.

The other case was a single plant, concerning which Superintendent Charles G. Atkins, of Craig Brook Station, writes that having searched the records, as well as his own memory, he finds that he has knowledge of only one introduction of such species—namely, that of *Coregonus albula*, of which an importation of eggs was hatched at Craig Brook in the spring of 1886, and all the resulting fry, estimated at 51,000, were planted in Heart Pond at East Orland April 21 of that year.

Coregonus stanleyi Kendall, new species.

Description: Head 4.52 in length; depth 4.33; eye 4.66 in head; snout 3.81; D. 10; A. ii, 14; scales 10–82–7; gillrakers 10+17 and 11+17, the longest 1.6 in eye. Body fusiform, not very deep, somewhat compressed, back gradually curving from the tip of snout to front of dorsal; head rather sharply rounded, not truncate as in *C. labradoricus*; vertical height of head from edge of branchiostegal membranes to occiput about 1.6 in length of head; maxillary reaching front of eye, 3 in head (maxillary measured from tip of snout); mandible nearly 3.5 in head; dorsal inserted in front of ventral nearer snout than base of caudal, its anterior rays extending considerably beyond tips of posterior rays when depressed, the longest 1.23 in head; pectoral 1.27; ventral 1.4, and anal 1.82 in head; anterior rays of anal not nearly reaching tip of posterior rays when depressed; caudal deeply forked, the peduncle slender, compressed, the distance from anal to first lower rudimentary rays of caudal equal to distance from adipose to upper rudimentary rays of caudal and equal to length of base of anal.

Body and head covered with white tubercles, small and dot-like on the back and belly, 1 and 2 on each scale, large and more prominent on the head and sides of body, those of the sides raised and elongate, arranged in linear series, one on each scale.

Color after preservation in formalin and subsequently in alcohol: Back, top of head, tip of snout, and around eyes, blue-black; sides and under parts yellowish, the scales margined with dusky dots. The white tubercles give the body the appearance of being striped with narrow white lines. Dorsal and caudal with blue-black rays and pale membranes; pectorals, ventrals, and anal with pale rays and slightly dusky membranes. The color when fresh was somewhat lighter, the belly and sides being more nearly white. The present color is intensification of the original shades.

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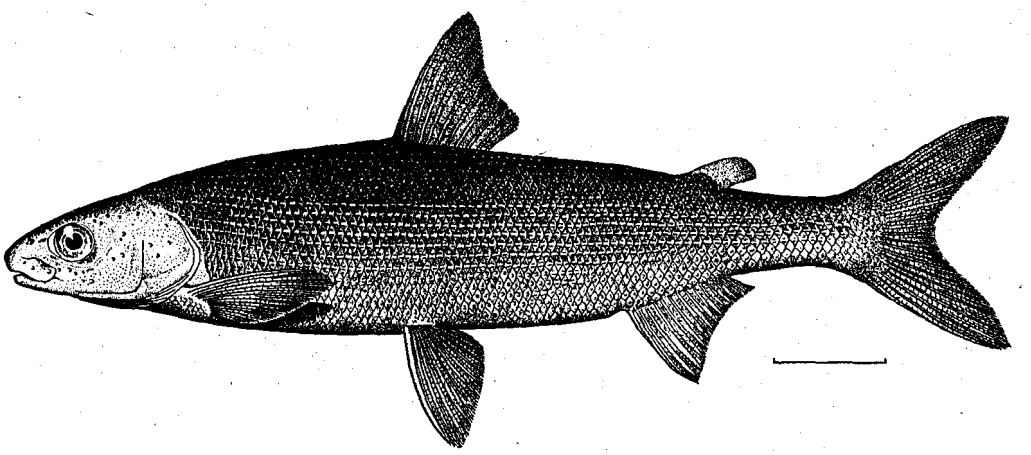
[a] We were presented by Professor Baird, from the establishment of Frank N. Clark, Northville, Mich., 1,000,000 white-fish eggs. Owing to the extreme cold weather, long distance of transportation, and tenderness of the eggs, the percentage of loss was large; should judge about 25 per cent of the eggs hatched. They were received in February; were hatched and turned loose March 20. About 15,000 of these were put in Rangeley, the balance were turned loose in Mooseluemeguntic Lake. (Report of the Commissioner of Fisheries and Game of the State of Maine, 1881 (1882), 16.)

Type, No. 50828, U. S. N. M., a male 222 mm. (nearly 9 inches) long, from thoroughfare between Mud and Cross lakes, Maine, October 23, 1901. Cotype No. 2746, U. S. F. C.

Named for Hon. Henry O. Stanley, one of the commissioners of inland fishes and game of Maine.

The males of this species are conspicuously marked with the white tubercles, and many, though not all, of the females have them to a lesser extent. In this respect they resemble *Coregonus williamsoni*, but otherwise differ markedly. The tables of proportional measurements do not reveal a great many characteristics to distinguish this fish from its closely-related cogener, *C. labradoricus*, of the same waters. But to the eye, specimens compared may be readily distinguished by the sharper, less truncated snout, shorter appearance of the head, having more the general appearance of *C. quadrilateralis*, yet differing from this in conspicuous details, such as body less slender, shape of head, less curved profile, less compressed snout, and larger mouth, etc.



Coregonus stanleyi Kendall, new species.

Then again, it is of much smaller adult size than *C. labradoricus*, which in the same waters attains a weight of 5 pounds. In the breeding season it is more conspicuously and characteristically tuberculated, and the height of the spawning season on the same grounds is one month earlier. On the average there are more gillrakers, which are considerably longer than in the other species.

A female 230 mm. (a little over 9 inches) in length contained 3,447 eggs.

This fish abounds in the chain of Eagle Lakes, and is doubtless a conspicuous item in the menu of salmon, togue, and trout. Reports of small white-fish from other parts of the State indicate that this species may be common in other waters. It is never, or very seldom, seen, except in breeding season, but very likely could be caught with fine-meshed gill nets made of fine twine if set in deep water. It is an excellent pan fish.

Proportional measurements of Coregonus stanleyi (cotypes).

Total length in millimeters.	Head.	Depth.	Eye.	Snout.	Maxillary.	Mandible.	Scales.	Dorsal.	Anal.	Height of dorsal in head.	Length of anal in head.	Pectoral in head.	Sex.	Teeth on tongue.	Longest gillraker in eye.	Number of gill-rakers.	Whole number of gillrakers on each side.
238	4.76	4.47	3.90	4.30	3.07	2.38	10–82–7	10	13	1.30	1.53	1.28	♀	0	2.50[a]	9+17; 9+17	26; 26
235	4.71	4.40	4.42	4.20	3.23	2.33	10–82–8	10	13	1.23	1.90	1.27	♀	0	1.90	9+17; 9+16	26; 26
247	4.77	4.66	4.40	4.82	3.14	2.44	10–90–7	11	14	1.18	1.69	1.22	♀	0	1.81	10+17; 9+17	27; 26
245	4.47	4.28	4.70	3.91	3.35	2.35	10–86–7	10	13	1.23	1.88	1.23	♀	0	1.81	10+18; 10+17	28; 27
221	5	4.75	4.50	4.22	3.16	2.12	10–82–6	10	12	1.11	1.21	1.18	♂	0	1.60	9+18; 9+17	27; 26
222	4.87	4.14	4.21	3.80	3.33	2.38	10–82–6	12	13	1.11	1.30	1.25	♀	0	2.11[a]	10+16; 9+17	26; 26
233	4.77	4.47	4.88	4.19	3.14	2.31	10–87–8	11	13	1.18	1.76	1.25	♂	0	1.80	10+18; 9+19	28; 28
230	4.64	4.18	4.42	4.20	3.23	2.33	10–89–8	11	13	1.23	1.61	1.35	♀	0	1.90	10+19; 11+18	29; 29

[a] These exceptional results are explained by the unusually large eye in these 2 specimens

Coregonus labradoricus.

[Eagle Lakes, November 23, 1901.]

Total length in millimeters.	Head.	Depth.	Eye.	Snout.	Maxillary.	Mandible.	Scales.	Dorsal.	Anal.	Height of dorsal in head.	Length of anal in head.	Pectoral in head.	Sex.	Teeth on tongue.	Longest gillraker in eye.	Number of gill-rakers.	Whole number of gillrakers on each side.
435	4.75	4.22	5.33	4	3.63	2.75	10–87–8	11	12	1.31	1.81	1.31	♀	Few.	2.14	11+15; 10+15	25; 25
420	4.93	4.97	5	3.94	3.57	2.58	10–87–8	9	11	1.29	1.70	1.22	♀	..do..	2.14	9+13; 9+13	22; 22
4	4.69	3.61	5.40	4.05	3.24	2.61	10–83–8	11	14	1.35	1.87	1.30	♀	..do..	2.14	9+17; 9+17	26; 26
380	4.44	3.66	4.80	4.80	3.60	2.66	10–87–8	11	12	1.20	1.71	1.24	♀	..do..	2.30	9+15; 10+15	24; 24

[Debsconeag Lake, August 1, 1901.]

3.75	4.63	4.15	4.92	3.83	3.28	2.46	10–82–9	11	12	1.13	1.81	1.13	♀	(?)	2.37	9+16; 9+17	25: 26
3.80	4.35	4	5.57	3.90	3.39	2.60	10–85–9	11	13	1.28	2.05	1.50	♀	(?)	(?)	11+17; 11+16	28; 27
3.30	4.30	3.83	4.81	3.94	3.09	2.60	10–84–9	11	13	1.30	1.71	1.32	♀	Few.	2.70	11+17; 11+17	28; 28
3.60	4.76	4.42	5.00	3.82	3.25	2.70	10–82–8	11	13	1.14	1.62	1.30	♂	(?)	2.33	10+15; 10+16	25; 26

Comparative average measurements of Coregonus stanleyi and Coregonus labradoricus (8 specimens of each).

Species.	Head.	Depth.	Eye.	Snout.	Maxillary.	Mandible.	Scales.	Dorsal rays.	Anal rays.	Height of dorsal.	Height of anal.	Pectoral.	Longest gillraker in eye.	Gillrakers.
C. labradoricus, Cross and Debsconeag lakes	4.60	3.98	5.10	4.03	3.38	2.62	10–84–8	10.7	12.5	1.25	1.78	1.29	2.30	25.3; 25.3
C. stanleyi, Cross Lake	4.74	4.41	4.42	4.23	3.08	2.33	10–85–7	10.6	13	1.19	1.48	1.25	1.92	27.1; 26.7

Comparative measurements of young Coregonus labradoricus and Coregonus stanleyi of the same length.

Species.	Total length in millimeters.	Length without tail.	Head.	Depth.	Eye.	Snout.	Maxillary.	Mandible.	Scales.	Dorsal.	Anal.	Height of dorsal.	Height of anal.	Pectoral.	Longest gillraker in eye.	Gillrakers.
C. stanleyi	230	205	4.64	4.18	4.42	4.20	3.23	2.33	10–89–8	11	13	1.23	1.61	1.35	1.9	29; 29
C. labradoricus	230	190	4.75	4.75	4.21	4.44	3.23	2.43	10–83–8	11	13	1.17	1.02	1.29	2.37	25; 25
C. stanleyi	235	198	4.71	4.40	4.42	4.20	3.23	2.33	10–82–8	10	13	1.23	1.90	1.27	1.9	26; 26
C. labradoricus	235	200	4.08	4.44	4.26	4.08	3.30	2.45	10–79–8	13	13	1.28	1.44	1.32	2.87	25; 23
C. stanleyi	233	210	4.77	4.47	4.88	4.19	3.14	2.31	10–87–8	11	13	1.18	1.76	1.25	1.8	28; 28
C. labradoricus	240	210	4.77	4.77	4.40	4.40	3.38	2.58	10–81–8	11	13	1.25	2	1.33	2	28; 26