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XXIV.—*A Preliminary Revision of the Irish Char.*
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CHAR are Salmonoid fishes of the genus *Salvelinus*, which differs from *Salmo* (salmon and trout) in having the vomerine teeth present only as a group on the head of the bone, which is raised and has a boat-shaped depression behind it. Within the Arctic Circle and southwards to Iceland, Hudson Bay, and the Kurile Islands migratory char are found, which descend to the sea in the spring and towards the winter re-enter the rivers to spawn. In these high latitudes also many of the lakes are inhabited by permanently freshwater colonies, which have found the conditions of life favourable enough to induce them to abandon their habit of migrating to the sea, whilst in some cases they have become land-locked, so that they could not now migrate even if they wished to. Some of these freshwater colonies differ sufficiently from the migratory parent species to be recognized as distinct species or races; thus in Iceland the non-migratory *Salvelinus nivalis* may be distinguished from the migratory *S. alpinus*.

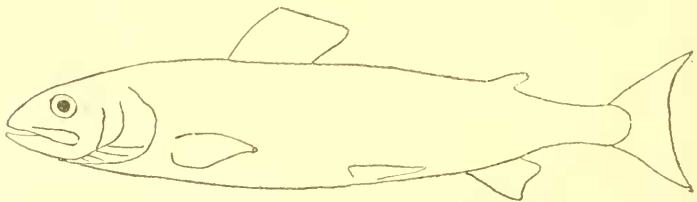
Further south all the char are non-migratory and are principally restricted to deep cold lakes; on the Continent of Europe they are found in the lakes of Scandinavia, Switzerland, and the Tyrol, and in the British Isles they occur in Scotland, the Lake District, North Wales, and Ireland.

There can be little doubt that when the temperature of the Northern Hemisphere was lower, as during the glacial epoch, migratory char were to be found much further south than at the present day, and that the char of the British Isles, Scandinavia, and Central Europe represent a number of lacustrine colonies of one or a few migratory ancestral forms.

The char of each lake or each system of lakes have been isolated for a considerable time and have become differentiated to a greater or less extent; the study of the different forms is one of great interest. I have for some time been trying to get together a good series of the char of the British Isles for the National Collection, but progress has been slow, and it has seemed to me worth while to publish this preliminary account of the Irish char in order to call attention to the subject.

In 1841 (*Ann. & Mag. Nat. Hist.* vi.) Thompson gave an interesting account of the Irish char, which he recorded from lakes in Donegal, Galway, and Waterford, and also from Lough Melvin in Fermanagh, Loughnabrack in Longford, Lough Eaghish in Monaghan, and Lough Dan in Wicklow. He described the char or "freshwater herring" of Lough Melvin, and noted some of its peculiarities, including the difficulty of distinguishing the sexes from external characters, writing "some of the largest finned are females." He also noted that in the lakes at the source of the River Lee in Cork, not long before celebrated for their fine char, these fish were apparently extinct in 1839. Similarly the char or "whiting" of Lough Neagh, formerly abundant, was quite extinct in 1837.

Fig. 1.



The extinct "Whiting" of Lough Neagh.

An account of this last-named fish was contributed to Dubourdiou's 'History of the County of Antrim,' published in 1812. The accompanying figure, although very inaccurate, is perhaps sufficiently interesting for me to reproduce a tracing, considerably reduced.

In 1862 and 1863 Dr. Günther described the char of Lough Melvin and Lough Eask as *Salmo grayi* and *S. colii* respectively. Since that time no serious study of the Irish char has been attempted, but most writers have agreed in regarding all the char of the British Isles as forms of the northern migratory *S. alpinus*, L. If this be so, I have no hesitation in saying that all char (*S. fontinalis* possibly excepted) must be included in *S. alpinus*, and I think it is simpler to keep to the binomial nomenclature and to call the Lough Melvin char *Salvelinus grayi* in preference to *Salvelinus alpinus grayi* or *Salvelinus alpinus*, var. *grayi*. In either case, whether we recognize only one species of char, *Salvelinus alpinus*, or numerous species, *S. grayi*, *S. colii*, &c., the species is by no means equivalent to species such as *Esox lucius* or *Leuciscus rutilus*, which have probably persisted unchanged during the whole of the time that the evolution of the *Salvelini* has been taking place.

The present revision is based on the specimens in the British Museum and also on the collection of the Dublin Museum, kindly sent to me on loan.

Synopsis of the Species.

- I. Snout conical, pointed; jaws equal anteriorly or the lower slightly projecting; lower jaw pointed; 13 or 14 gill-rakers on the lower part of the anterior branchial arch; interorbital region more or less convex.

Teeth moderate; snout $1\frac{1}{3}$ as long as eye (in a specimen of 280 mm.), less than interorbital width, which is 3 in the length of head; 186 scales in a longitudinal series* 1. *scharffi*.

Teeth strong; snout $1\frac{1}{2}$ as long as eye (in a specimen of 205 mm.), slightly more than interorbital width, which is $3\frac{1}{2}$ in the length of head; 165 scales in a longitudinal series 2. *trevelyani*.

- II. Snout subconical, decurved; jaws equal anteriorly, the lower more or less pointed.

A. 12 to 16 gill-rakers on the lower part of the anterior branchial arch; interorbital region more or less convex, its width 3 (adult) to $3\frac{1}{3}$ (young) in the length of head.

Depth of body 4 to 5 in the length; least depth of caudal peduncle about $\frac{2}{3}$ the length of head; pectoral fin extending $\frac{1}{2}$ to $\frac{3}{4}$ of the distance from its base to the origin of pelvics; 138 to 168 scales in a longitudinal series 3. *colii*.

* The number of scales in a longitudinal series is counted above the lateral line and does not include the scales covering the base of the caudal fin. The scales descend to the lateral line in regular oblique series and are easily counted.

Depth of body $3\frac{1}{3}$ to 4 in the length; least depth of caudal peduncle $\frac{1}{3}$ or nearly $\frac{1}{2}$ the length of head; pectoral fin extending $\frac{2}{3}$ to $\frac{9}{10}$ of the distance from its base to the origin of pelvics; 128 to 162 scales in a longitudinal series 4. *grayi*.

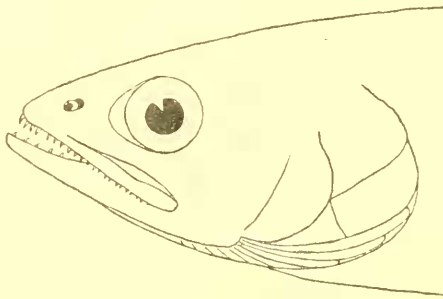
B. 18 or 19 gill-rakers on the lower part of the anterior branchial arch; interorbital region flat, its width $3\frac{3}{4}$ (young) in the length of head; 160 scales in a longitudinal series.... 5. *fimbriatus*.

III. Snout obtuse, decurved; lower jaw rounded anteriorly, shorter than and included within the upper; 13 to 15 gill-rakers on the lower part of the anterior arch; interorbital region flat, its width $3\frac{1}{3}$ to $3\frac{3}{4}$ in the length of head; 142 to 166 scales in a longitudinal series 6. *obtusus*.

1. *Salvelinus scharffi*, sp. n.

Depth of body $4\frac{2}{3}$ in the length, length of head $4\frac{1}{2}$. Snout conical, pointed, $1\frac{1}{3}$ as long as eye, the diameter of which is 5 in the length of head. Interorbital region slightly convex, its width 3 in the length of head. Dentition moderate; lower jaw slightly projecting; maxillary extending to below the posterior margin of pupil or a little beyond, its length $2\frac{2}{3}$ to $2\frac{3}{4}$ in the length of head; lower jaw pointed anteriorly, its length $1\frac{3}{5}$ in the length of head. 10 branchiostegals. 13 or 14 gill-rakers on the lower part of anterior arch, the longest less than $\frac{2}{3}$ the diameter of eye. 186 scales in a longitudinal

Fig. 2.



Salvelinus scharffi.

series. Dorsal 13, with 9 branched rays, its origin a little nearer to the tip of snout than the base of caudal, the longest ray $\frac{3}{5}$ the length of head. Anal 12, with 8 branched rays. Pectoral $\frac{3}{4}$ the length of head, extending $\frac{1}{2}$ of the distance from its base to the base of pelvics. Least depth of caudal peduncle nearly 2 in its length and a little more than $\frac{1}{3}$ the

length of head. Silvery; back bluish grey; dorsal, caudal, and pectoral fins dusky; pelvics and anal pale.

Hab. Lough Owel in Westmeath.

A single specimen, 280 mm. in total length.

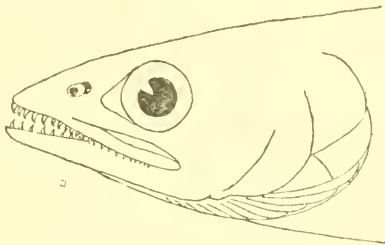
This species differs from *S. colii* in having the scales smaller, the snout more pointed, and the mouth more oblique and smaller, the maxillary having the same relative length as in specimens of *S. colii* of 200 mm.

I have named it after Dr. R. Scharff, to whom I am indebted for the opportunity of describing it, in recognition of the favours I have received from him during my work on Irish fishes.

2. *Salvelinus trevelyanii*, sp. n.

Depth of body 5 in the length, length of head 4. Snout conical, pointed, considerably longer than eye, the diameter of which is 5 in the length of head. Interorbital region convex, its width $3\frac{1}{2}$ in the length of head. Dentition strong; cleft of mouth oblique; jaws equal anteriorly; maxillary extending nearly to below the posterior margin of eye, its length $2\frac{1}{2}$ in the length of head; lower jaw pointed anteriorly,

Fig. 3.



Salvelinus trevelyanii.

its length $1\frac{1}{2}$ in the length of head. 9 or 10 branchiostegals. 14 gill-rakers on the lower part of anterior arch, the longest $\frac{1}{3}$ the diameter of eye. 165 scales in a longitudinal series. Dorsal 13, with 9 branched rays, its origin a little nearer to the tip of snout than the base of caudal, the longest ray a little more than $\frac{2}{3}$ the length of head. Anal 11, with 7 branched rays. Pectoral $\frac{4}{5}$ the length of head, extending $\frac{3}{5}$ of the distance from its base to the base of pelvics. Least depth of caudal peduncle 2 in its length and $\frac{1}{3}$ the length of head. Scattered rounded spots on the sides; fins dusky.

Hab. Lough Finn in Donegal.

A single specimen (σ), 205 mm. in total length.

This species is closely allied to *S. colii*, differing in the longer head, produced pointed snout, strong teeth, &c.

I have named it after the donor, Major H. Trevelyan, to whom the British Museum is also indebted for a fine series of the fishes of Lough Erne.

3. *Salvelinus colii*.

Salmo colii, Günth. Proc. Zool. Soc. 1863, p. 12, pl. ii., and Cat. Fish. vi. p. 138 (1866); Day, Fish. Britain, p. 114, pl. cxviii. fig. 2 (1884).

Depth of body 4 to $4\frac{1}{2}$ in the length, length of head $4\frac{1}{2}$ to $4\frac{3}{5}$. Snout subconical, with upper profile decurved anteriorly, as long as or a little longer than eye, the diameter of which is $4\frac{1}{4}$ to $4\frac{2}{3}$ in the length of head. Interorbital region slightly convex, its width 3 to $3\frac{1}{3}$ in the length of head. Dentition feeble or moderate; jaws equal anteriorly; maxillary extending to below the posterior margin of pupil or beyond, its length $2\frac{3}{5}$ to $2\frac{3}{4}$ in the length of head; lower jaw pointed anteriorly, its length $1\frac{3}{5}$ to $1\frac{3}{4}$ in the length of head. 8 to 12 branchiostegals. 13 to 16 gill-rakers on the lower part of anterior arch, the longest about $\frac{2}{5}$ the diameter of eye. 138 to 168 scales in a longitudinal series. Dorsal 13-15, with 9 or 10 branched rays, its origin nearer to the tip of snout than the base of caudal, the longest ray $\frac{3}{5}$ to $\frac{3}{4}$ the length of head. Anal 11-14, with 7 to 9 branched rays. Pectoral $\frac{2}{3}$ to $\frac{7}{8}$ the length of head, extending from $\frac{1}{2}$ to nearly $\frac{3}{4}$ of the distance from its base to the base of pelvics. Least depth of caudal peduncle $1\frac{1}{2}$ to 2 in its length and about $\frac{2}{5}$ the length of head. 62 or 63 vertebrae. Bluish black above, silvery or orange below; sides with orange spots; fins dusky.

Hab. Lough Eske (Eask) in Donegal.

Here described from twelve examples, 170 to 210 mm. in total length.

Char from Lough Derg in Donegal, Lough Conn in Mayo, and Loughs Mask and Inagh in Galway are essentially identical with the Lough Eske form.

A single example (σ) from Lough Derg, 200 mm. in total length, has all the characters of the Lough Eske char.

Two examples (σ) from Lough Conn measure 290 and 230 mm. in total length. In each the dorsal fin has 9 and the anal 8 branched rays. There are 154 to 160 scales in a longitudinal series and 13 or 14 gill-rakers on the lower part of the anterior arch.

Three char from Lough Mask, recently presented to the British Museum by Alick Duncan, Esq. (2), and Godfrey Allen, Esq. (1), measure 240 to 260 mm. in total length. In them I count 8 or 9 branched rays in the dorsal fin, 7 or 8 in the anal, and 148 to 166 scales in a longitudinal series. In one of them the vertebræ number 62. The gill-rakers are rather shorter than in *S. colii* from other localities, the longest measuring $\frac{1}{3}$ the diameter of the eye.

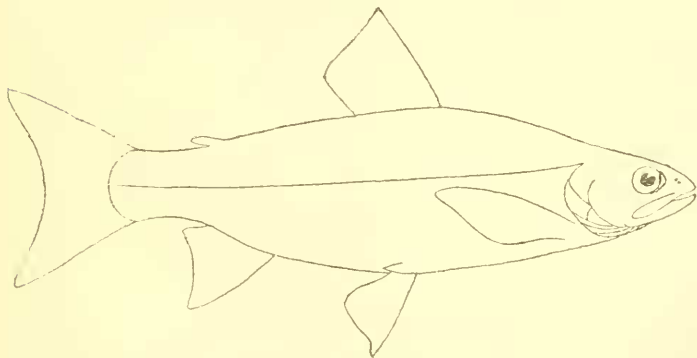
In a single small specimen (♀) from Lough Inagh, 150 mm. in total length, I count 10 branched rays in the dorsal fin, 7 in the anal, 160 scales in a longitudinal series, and 14 gill-rakers on the lower part of the anterior arch. The longest gill-rakers are nearly equal to $\frac{1}{2}$ the diameter of the eye.

4. *Salvelinus grayi*.

Salmo grayi, Günth. Proc. Zool. Soc. 1862, p. 51, pl. vii., 1863, p. 12, and Cat. Fish. vi. p. 136 (1866); Day, Fish. Britain, p. 114, pl. cxix. fig. 1 (1884).

Depth of body $3\frac{1}{3}$ to 4 in the length, length of head 4 to $4\frac{3}{5}$. Snout subconical, with upper profile decurved anteriorly, longer than eye, the diameter of which is $4\frac{1}{2}$ to 5 in the length of head. Interorbital region convex, its width 3 in

Fig. 4.



Salvelinus grayi (after Günther).

the length of head. Dentition feeble; jaws equal anteriorly; maxillary extending nearly to below the posterior margin of eye or a little beyond, its length $2\frac{1}{3}$ to $2\frac{3}{5}$ in the length of head; lower jaw pointed anteriorly, its length $1\frac{1}{2}$ to $1\frac{2}{3}$ in

the length of head. 9 to 12 branchiostegals. 12 to 15 gill-rakers on the lower part of anterior arch, the longest $\frac{1}{3}$ to $\frac{1}{2}$ the diameter of eye. 128 to 162 scales in a longitudinal series. Dorsal 12-15, with 8 to 10 branched rays, its origin nearer to the tip of snout than the base of caudal, the longest ray from $\frac{2}{3}$ to as long as the head. Anal 11-14, with 7 to 9 branched rays. Pectoral $\frac{5}{6}$ to $1\frac{1}{6}$ the length of head, extending $\frac{2}{3}$ to $\frac{9}{10}$ of the distance from its base to the base of pelvics. Least depth of caudal peduncle $1\frac{1}{5}$ to $1\frac{2}{3}$ in its length and $\frac{1}{2}$ or nearly $\frac{1}{2}$ the length of head. 59 or 60 vertebræ. Bluish black above, silvery below, sometimes shaded with orange; back and sides sometimes with small pale spots; fins dusky.

Hab. Lough Melvin in Fermanagh.

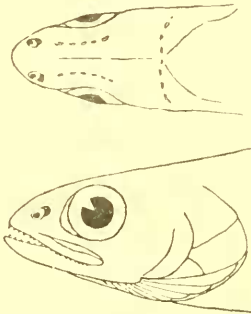
Here described from twenty-six examples, 210 to 260 mm. in total length.

Of the sixteen specimens in the British Museum only one is a female; this has the pectoral fin longer than the head.

5. *Salvelinus fimbriatus*, sp. n.

Depth of body $4\frac{2}{3}$ in the length, length of head $4\frac{2}{5}$. Snout subconical, with upper profile decurved anteriorly, as long as eye, the diameter of which is $4\frac{1}{4}$ in the length of head. Interorbital region flat, its width $3\frac{3}{4}$ in the length of head. Dentition moderate; jaws equal anteriorly; maxillary

Fig. 5.



Salvelinus fimbriatus. Head from above and from the side.

extending to below the posterior margin of pupil, its length $2\frac{3}{4}$ in the length of head; lower jaw pointed anteriorly, its length nearly $1\frac{2}{3}$ in the length of head. 10 branchiostegals. 18 or 19 gill-rakers on the lower part of anterior arch, the

longest $\frac{1}{2}$ the diameter of eye. 160 scales in a longitudinal series. Dorsal 14, with 10 branched rays, its origin nearer to the tip of snout than the base of caudal, the longest ray $\frac{2}{3}$ the length of head. Anal 12, with 8 branched rays. Pectoral $\frac{3}{4}$ the length of head, extending nearly $\frac{2}{3}$ of the distance from its base to the base of pelvics. Least depth of caudal peduncle $1\frac{1}{5}$ in its length and $\frac{2}{5}$ the length of head. Back and sides brownish (in spirit); sides with rounded spots; abdomen silvery; fins dusky.

Hab. Lough Coomasaharn in Kerry.

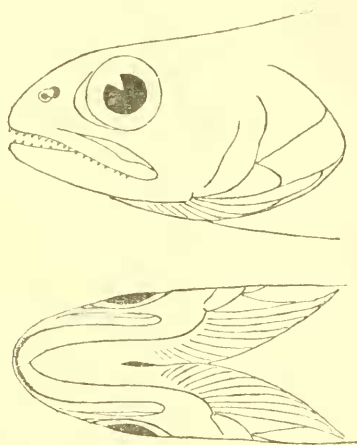
Here described from a single specimen (♀) 155 mm. in total length.

This form resembles *S. colii*, but differs in the narrow, flat, interorbital region and the numerous gill-rakers, the latter feature suggesting the specific name.

6. *Salvelinus obtusus*, sp. n.

Depth of body 4 to 5 in the length, length of head $4\frac{1}{5}$ to $4\frac{2}{3}$. Snout obtuse, with upper profile decurved throughout, not or scarcely longer than eye, the diameter of which is $4\frac{1}{4}$ to $4\frac{1}{2}$ in

Fig. 6.



Salvelinus obtusus. Head from the side and from below.

the length of head. Interorbital region flat, its width $3\frac{1}{3}$ to $3\frac{3}{4}$ in the length of head. Dentition feeble or moderate; lower jaw a little shorter than and included within the upper;

maxillary extending to below the middle, posterior part or posterior margin of eye, its length $2\frac{1}{2}$ to 3 in the length of head; lower jaw rounded anteriorly, its length $1\frac{2}{3}$ to $1\frac{4}{5}$ in the length of head. 9 to 12 branchiostegals. 12 to 15 gill-rakers on the lower part of anterior arch, the longest $\frac{1}{4}$ to $\frac{2}{3}$ the diameter of eye. 142 to 166 scales in a longitudinal series. Dorsal 13-15, with 9 to 11 branched rays, its origin a little nearer to the tip of snout than the base of caudal, the longest ray $\frac{3}{5}$ to $\frac{3}{4}$ the length of head. Anal 12 to 15, with 8 to 11 branched rays. Pectoral $\frac{5}{7}$ to $\frac{7}{8}$ the length of head, extending $\frac{1}{2}$ to $\frac{2}{3}$ of the distance from its base to the base of pelvics. Least depth of caudal peduncle $1\frac{1}{3}$ to $1\frac{3}{4}$ in its length and about $\frac{2}{5}$ the length of head. 62 vertebræ. Brownish or purplish above, silvery or orange below; fins dusky.

Hab. Lough Luggala in Wicklow.

Here described from fourteen examples, 140 to 200 mm. in total length.

Char from Lough Dan in Wicklow and from Killarney and Lough Acoose in Kerry are similar to the char of Lough Luggala.

A single specimen (♀) from Lough Dan measures 145 mm. in total length; it agrees entirely with the Lough Luggala char. There are 9 branched rays in both dorsal and anal, 164 scales in a longitudinal series, and 14 gill-rakers on the lower part of the anterior arch.

Two specimens (♀) from Lough Acoose measure 145 and 185 mm. in total length. They have 9 or 10 branched rays in the dorsal and 8 in the anal fin, 148 and 152 scales in a longitudinal series, and 14 or 15 gill-rakers on the lower part of the anterior arch. The caudal peduncle is $1\frac{3}{4}$ to 2 as long as deep. The larger specimen has the sides well spotted.

In a single example (♂) from Killarney, 210 mm. in total length, the dorsal has 10 and the anal 9 branched rays. There are 166 scales in a longitudinal series and 15 gill-rakers on the lower part of the anterior arch, the longest nearly $\frac{1}{2}$ the diameter of eye. The pectoral fin is $\frac{7}{8}$ the length of head and extends a little more than $\frac{2}{3}$ of the distance from its base to the origin of the pelvics.