

ART. XXI. — *On the Salmonidæ of New Zealand.*

By JAMES HECTOR, M.D., F.R.S.

(Plates XVIII. figs. 4a and 4b, and XIX.)

[Read before the Wellington Philosophical Society, June 25, 1870.]

DURING the last few years, Salmon and several varieties of Trout have been introduced from England into the Australasian waters, and the Trout, at least, has been successfully established, both in this colony and Tasmania. Those reared in Nelson, and turned out in the Maitai stream, have already reached the full size, so that if they prove as prolific as in the native country of the species, we may expect soon to have the favoured streams, for a short season at least in each year, thrown open to the angler.

An inquiry, therefore, into the species of fish indigenous to our streams which belong to the same family, some of which might be confounded with the introduced Trout by a casual observer, has a peculiar interest, and though the materials yet obtained are scanty, they are advanced in the hope of inducing further communications on the subject.

The chief distinguishing character of all fish that belong to the *Salmonidæ* is the possession of a second dorsal fin, which consists merely of a small fleshy lobe without rays or membrane like the other fins.

In English Ichthyology the *Trouts* (including the Salmon of the fish market) form one division of this family, the other division having the smelts, grayling, and fresh-water herrings.

The representatives of the family in New Zealand belong to the latter miscellaneous group; the only species hitherto distinguished being referred to a genus (*Retropinna*) peculiar to these Islands.

This little fish, which is common in all the streams, was first named by Richardson, *Argentina retropinna* (*Voy. Ereb. and Terr.*, Ichth., p. 121), but was afterwards separated from this genus and described as *Retropinna Richardsonii*, Gill (*Proc. Acad. Nat. Science, Philadelphia*, 1852, p. 14).

Under this name it is described in Dr. Günther's *Catalogue of the Fishes in the Brit. Mus.*, Vol. vi., p. 171, of which description the following is an abstract:—

Genus. RETROPINNA.

Cleft of mouth of moderate width. Teeth small, in single series, with a cluster of hooked teeth on the tongue. Dorsal fin set far behind the ventrals, and above the vent. Stomach thick, and of horse-shoe shape. No pyloric appendages or air bladder. Ventral fin 6-rayed.

Species. *Retropinna Richardsonii*.

Native name, Inanga.*

Height of body less than length of head, and $4\frac{2}{3}$ times its length without* Also applied to the young of *Galaxias*.

caudal. Snout shorter than eye. Lower jaw longer. Silvery band along the side. P. 11. V. 6. D. 11. A. 20. B. 6.

Plate XVIII, fig. 3, is a careful drawing of a specimen of this fish caught in the Kakapo Lake, on the West Coast of Otago. It differs a little from the drawing given in Richardson's work, but from the description there is no doubt of the identity of the fish with this species.

They swarm in the lakes, and in most of the clear deep streams, migrating at certain seasons; they are never found possessing the above characters of greater size than $3\frac{1}{2}$ inches in length, and are generally called smelts, from their resemblance to that fish, and also from their having, when fresh, the peculiar strong scent of cucumber.

They are generally taken for the young of two other fish, which I will now describe:—

Retropinna osmeroides, n. sp.

Native name, Aua.*

P. 11. V. 6. D. 11. A. 19. B. 6. Body, without caudal, $3\frac{2}{3}$ times length of head. Maxillary prolonged, clavate. Mouth wide, armed with strong teeth.

Plate XIX, fig. 1, shows this fish of natural size, obtained, in 1863, in the Kaduka River, a tidal stream which leads up from the sea to the Kakapo Lake. It does not appear to present any sufficiently distinct characters to remove it from the genus *Retropinna*, as above defined, except that the cleft of the mouth is wide and very different in form from that in the other species hitherto placed in that genus. The teeth are also much stronger, and on the vomer are quite as formidable as in the true smelt (*Osmerus*). The maxillary bone also presents a marked difference, for while in the previous species it is feeble and short, extending only to the eye, in this species it is elongated and terminates in a clavate expansion posterior to the eye; lower jaw projecting.

In the external characters, such as fin rays, position of fins, the shiny patch on the cheek and silvery line on the side, the two fishes are the same. The abdominal cavity in both also is lined with a silvery membrane with distinct dots of pigment, and the intestine is straight.

This fish was seen in October in immense shoals, leaping out of the water in a very lively fashion, and following the tide into all the narrow tributary streams to which the brackish water penetrated.

All the individuals were alike in size, the length being about 7 inches.

Retropinna Upokororo, n. sp.

Native name, Upokororo.

P. 15. V. 6. D. 11. A. 18. B. 6. Body, without caudal, $4\frac{1}{2}$ times length of head. Mouth small and tumid, and teeth almost absent, or only in

* Also applied to *Dajaus Forsteri*, the Herring of the colonists.

one feeble row on upper jaw. Tongue short, feebly armed. Maxillary not extending beyond eye. Snout conical, and receiving the lower jaw, which is shorter. Dorsal fin over the ventral, and in advance of the vent. Abdominal cavity black. Intestine folded, and $3\frac{1}{2}$ times the length of the abdomen. Stomach thin and membranous. Shiny patch on the cheek, but no silvery line on the side.

These characters at once distinguish this fish from either of the preceding species. It is possible that difference of growth might in them give rise to their distinguishing features, but this fish clearly differs in the dentition, form of mouth and intestine, which indicate a different kind of food, and also in the number of rays and position of the dorsal fin. The specimens I have obtained of this fish present a great deal of variety, but only in the colouring, which varies from a general silvery hue, slightly brown on the back, to a rich red-brown on the back speckled with grey, and a rich yellow, almost golden, tinge on the belly.

Plate XIX., fig. 2, is a full-size drawing of a specimen obtained for me by Mr. Travers, from the Maitai River, Nelson, and with which he furnished the following notes:—

“These fish appear at the mouth of the Maitai River usually in the early part of October, evidently from the sea; at what period they return to the sea I am unable to say.

“The migration beyond the influence of the tide does not take place immediately after the fish leaves the sea, for they evidently ascend and descend daily as far as the tide-way is felt, ascending with the flood and descending with the ebb, probably the better to prepare for their continuance in purely fresh water during the period of spawning. They occur in considerable shoals, and appear at first to prefer the shallower and slower-flowing parts of the river, basking in the sun on the shingle beds. They rise to various kinds of fly and moth, and are taken also with the worm as a bait. As they descend the river, they change colour from a dull silver grey below to a rich brown, assimilating, in this respect, to the colour of the river-bed. In the shoals the fish are of various sizes, from nine and ten inches to five and six in length.”

Plate XVIII., figs. 4a and 4b, is the life-size drawing of the head of a specimen* that was obtained in the Hutt River, in January, 1870, at which season they were ascending from the sea in immense shoals, the females being gravid and swollen to enormous size.

They are found in most of the streams in the colony, and are highly esteemed as food, but have not the flavour of the true Trout.

The following table shows the actual dimensions of average full-sized

* Named *Coregonus*, by mistake on the plate.

specimens of the fish which are described in the foregoing paper, the specimens in each case being females full of roe :—

	<i>R. Richardsonii.</i>	<i>R. osmeroides.</i>	<i>C. Upokororo.</i>
Total length (inches)	3·7	7·0	10·3
To dorsal	2·2	4·0	5·5
To ventral	1·5	2·9	5·5
Dorsal to adipose fin	0·7	1·4	3·0
Length of head	0·7	1·5	1·8
Maxillary	0·2	0·8	0·7
To anterior margin of eye	0·1	0·5	0·6
Depth of body	0·5	1·2	2·3

ART. XXII.—*On a New Species of Fish, Coryphænoides Novæ Zelandiæ; Native name, Okarari.* By JAMES HECTOR, M.D., F.R.S.

(Plate XVIII., fig. 1.)

[Read before the Wellington Philosophical Society, October 22, 1870.]

IN August last, the fish which forms the subject of this notice was brought to me as a *Frost-fish*, to which rare fish, from its narrow body and silvery colour, it bears a general resemblance. It however belongs to a group more allied to that which includes the cod, and, from its having no caudal fins, to the family *Macruridæ*, and, from the absence of ridges on the skull, to the genus *Coryphænoides*. At the same time, it is distinct from any species described by Dr. Günther (*Fishes of Brit. Mus.*, Vol. iv., p. 395), by the position of the vent, which is set much further back than the commencement of the second dorsal fin.

The colour of the fish, when fresh, was silver grey, a little darker above than beneath, with a pale brown patch extending on each side from above the eye to the pectoral fin. The fins were all darker in colour than the body.

The eye is remarkably large in proportion to the size of the head. The iris of a pale bluish brown.

From under the jaw there is a long bifid barbel, as in the cod.

The teeth are in two series, the outer row set fine, and the inner long and recurved.

P. 12. V. 8. 1st D. 12. 2nd 102. A. 92.

Only one mutilated specimen, now in the British Museum, appears to have been obtained in the Australian seas of any of the species of this genus, and as the specimen above described differs in a very marked manner from the figure and description of that fish given in Richardson's work, I think it must be undescribed, and therefore propose to call it *Coryphænoides Novæ Zelandiæ*.

Its length is 21 inches; height $2\frac{1}{2}$ inches; thickness about $\frac{3}{4}$ inch.

The diameter of the orbit is nearly $1\frac{1}{4}$ inch; and the gape $1\frac{3}{4}$ inch long.

The only specimen yet obtained was caught off Ward Island, in Port Nicholson.