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Colonial Museum and Geological Survey Department.

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FISHES OF NEW ZEALAND.

CATALOGUE, WITH DIAGNOSES OF THE SPECIES,

BY

FREDERICK WOLLASTON HUTTON, F.G.S.,
ASSISTANT GEOLOGIST.

NOTES ON THE EDIBLE FISHES,

BY

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

WITH TWELVE PLATES.

NEW ZEALAND.
JAMES HUGHES, PRINTER, LAMBTON QUAY, WELLINGTON.
1872.

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PREFACE.

In 1868 Commissioners were appointed by the Colonial Government to enquire into the extent and value of the fisheries on the New Zealand coasts, as a natural source of wealth.

From their reports, which were published in the two following years,* it may be gathered that fishing was at that date pursued as a regular employment only by very few persons in proportion to the population and to the demand; and that the supply of fish, even for the local markets in the chief towns on the coast, was very insufficient and irregular, while little attention was directed to the preparation of fish, either for sale in the interior or for export. Owing to various causes, the statistics obtained were very imperfect, but, in a general way, it was shown to be probable that, at the date mentioned, the total annual value of fish brought to market in New Zealand did not exceed £15,000, which may be estimated from the other data, contained in the report, as equal to an average yearly consumption of about 35lbs. weight of fish by each person, taking as consumers only those who reside within reach of fishing stations. During the last two years more attention has been devoted to this industry, and it is worthy of special notice that several factories have been established for pickling, drying, and otherwise preserving fish for sale, so that this estimate may now be under the mark. At the same time the evidence obtained by the Commissioners sufficiently indicates that wholesome fish are abundant on every part of the coast, and that our seas afford choice varieties, suitable both for immediate use in the fresh state, and for preserving as an article of commerce. It was, however, found impossible to acquire any precise information about the seasonal distribution and habits of the different species from the want of an accepted nomenclature, and from the vague manner in which the popular names of English fishes are applied in various parts of the Colony.

The following work has therefore been prepared in this Department with the view of establishing an uniform nomenclature, accompanied by sufficient descriptive details to enable persons in different parts of the Colony to follow the study of this most useful and attractive branch

* Parliamentary Papers, 1869–70.

of Natural History. As the basis of the work, an extensive collection of our fishes was accumulated in the Museum, together with sketches and other information bearing on the subject, and from this material the systematic Catalogue has been prepared by Captain Hutton.

To his portion of the work I have added a few brief notes on the Natural History of those species of fishes which are useful as food, a subject on which as yet our information is very imperfect and frequently contradictory. Nevertheless, I have thought it better to publish these notes, as their defects may induce others, who have better opportunities for observation, to communicate information on the subject, and thus help us to acquire a complete knowledge of the Ichthyology of New Zealand at an early date.

In order to assist those who are not versed in the scientific terms of zoologists in their attempts to recognise our fishes by the popular names now proposed, forty-nine of the species, chiefly such as are most commonly met with in the market, have been lithographed in outline by Mr. Buchanan. In most cases these drawings were from fresh specimens, and may therefore be relied on as accurate. At the same time, beginners who desire to study Ichthyology, and to enlarge our list by further discoveries, must not rely in their comparisons on these or any other drawings, but on the fullest descriptions they can obtain, combined with personal observation of the fishes themselves.

Several changes will be observed in the nomenclature of our fishes from the list given in the Catalogue of the Colonial Museum (1870), which was prepared from Richardson's list given in Dieffenbach's work on New Zealand. These changes are chiefly owing to the circumstance that Dr. Günther's magnificent work on Ichthyology, which forms the basis of the present classification, was not accessible until that Catalogue was in type, and consequently only a few of the more prominent amendments could be adopted.

The changes in the present Catalogue affect sixty species out of one hundred and thirty-eight formerly enumerated; of these thirty are fishes that are not mentioned in the previous list, fifteen of them being species which have been discovered since its publication. The other thirty alterations are changes of name and do not affect the actual number of known fishes.

JAMES HECTOR.

Colonial Museum,
Wellington, February, 1872.

CONTENTS.

ERRATA.

Nos. 2, 3, 4, 6, 7, 10, 11, and 12, in the Fin Formula.—For "S. Lat." read "L. Lat."

Page 3, line 7 from bottom.—For "Squammipinnes" read "Squamipinnes."

,, 16, line 3 from top.—For "Mackarel" read "Mackerel."

,, 21, line 10 from bottom.—For "Mackarel" read "Mackerel."

,, 54, line 9 from bottom.—For "*subpelluceus*" read "*subpellucens.*"

By an oversight the positions of the genera *Galeus* and *Acanthias* have got transposed; the former should be in the family Carchariidæ, No. 121, the latter should be in the family Spinacidæ, No. 130.

Page 112, No. 28, line 2 from bottom.—For "Histiopteris" read "Histiopterus."

,, 116, No. 77, line 1.—For "blacoides" read "blacodes."

,, 118, No. 85, line 2.—For "Hemiramphus" read "Hemirhamphus."

,, 120, No. 114, line 1.—For "Monocanthus" read "Monacanthus."

,, 120, in "Sharks," line 2.—For "Mustellus" read "Mustelus."

,, 121, line 15.—For "Trigon" read "Trygon."

,, 121, line 12 from bottom.—For "Myliobates" read "Myliobatis."

,, 132, line 12 from bottom.—For "Congrus" read "Conger."

,, 132, line 10 from bottom.—For "Ngoio" read "Ngoiro."

Fishes of New Zealand.

CATALOGUE WITH DIAGNOSES OF THE SPECIES

BY

FREDERICK WOLLASTON HUTTON, F.G.S.,

ASSISTANT GEOLOGIST.

EXPLANATION OF CATALOGUE.

The arrangement of the Catalogue is that followed by Dr. Günther in the "Zoological Record," and the characters of the orders, families, and genera are taken, with slight modifications, from his invaluable Catalogue of Fishes,* the fountain head of systematic Ichthyology. The characters of the species, however, are original in all those cases in which I have been able personally to examine specimens, and which amount to 95 species out of the 141 mentioned in the Catalogue. Of the remaining 46 species I have seen evidence in the Colonial Museum and elsewhere of 16 more, leaving 30 species of which I know nothing whatever. These will be all found mentioned in the text. The geographical distribution, beyond New Zealand, of the genera and species has also been almost entirely taken from Dr. Günther's work, but I have been able to add a few other localities from later publications.

C.M. after the name of a species means that it is represented in the Colonial Museum, either by complete specimens, or else by fragments, or by drawings. When either of the latter is the case it is mentioned in the text.

The first line of the description is the formula for the fin rays. In it B. means branchiostegals, D. dorsal fin, A. anal fin, P. pectoral fins, V. ventral fins, and C. caudal fin. When one number is placed above another, with a horizontal line between them, the upper figure is the number of spines, the lower the number of soft rays in the fin. When two numbers are divided by a perpendicular line it means that the fin is divided at the point; the left hand figure then means the number of rays or spines in the division next to the head, the right hand figure those in the division next to the tail. In those fishes that have small finlets on the tail, as the Barracoota, their number is indicated by Roman numerals.

L. lat. is the number of pierced scales that form the lateral line, from the humeral arch to the end of the tail.

L. trans. is the number of series of scales between the dorsal fin and the abdomen; the oblique line dividing them shows the position of the lateral line.

The *height of the body* is always its greatest depth.

The *length of the head* is from the end of the snout to the posterior margin of the bony operculum.

* Catalogue of the Fishes in the British Museum, by Albert Günther, F.R.S., etc., 8 vols., 8vo. Printed by order of the Trustees, 1859–1870.

The *length of the snout* is to the vertical from the anterior margin of the eye.

The *length* is from the end of the snout to the end of the tail, *not including the caudal fin.* When the caudal fin is included it is always called *total length.*

The *diameter of the eye* is the horizontal diameter. This character, however, must be taken with caution, as the size of the eye often varies, and is always greater in proportion in young individuals.

In the references given after the names of the species, Günther means his Catalogue of Fishes; Jenyns means the Zoology of the Voyage of the 'Beagle'; Richardson means the Zoology of the Voyage of the 'Erebus' and 'Terror,' and Cat. Col. Mus. stands for the Catalogue of the Colonial Museum, 1870.

The following outline of Ichthyology has been abridged and re-arranged from Von der Hoven's "Hand-book of Zoology," for the assistance of the student:—

"Fishes are vertebrate, cold-blooded animals, which live in water and breathe by gills.

"Body.—The body may be divided into the head, the trunk, and the tail, for there is no proper neck, as the thoracic cavity succeeds immediately to that of the mouth, or is even confluent with it. The tail, which is that portion of the body lying behind the vent, must not be confounded with the tail fin, which is always called the caudal fin. In most fishes the body is *compressed* laterally, so that the section is an oval, of which the back forms the broadest end. In some, however, as in the Rays, it is *depressed*, or flat, while in others it is *cylindrical*, as in the Eels. In general the body is covered with scales (which are called *cycloid* when they are smooth edged, and *ctenoid* when toothed like a comb), but sometimes the scales are exceedingly minute, and the smooth skin seems to be *naked*. In some fish, however, scales are really wanting. On each side of the body lies a line of pores or apertures which form the *lateral line*, and it is from these pores that the slimy fluid, with which the body of fishes is covered, is secreted. Generally this line is continuous, but sometimes it is *interrupted*, that is, stops before reaching the end of the tail, sometimes ceasing altogether (*e.g. Stichærium*), or sometimes beginning again lower down (*e.g. Notothenia*), and pursuing a new direction on the tail. A few fishes have several lateral lines (*e.g. Acanthoclinus*), and some none at all (*e.g. Mugil*).

"Gills.—The gills have ordinarily a single opening on each side behind the head (*gill opening*), through which the water is expelled on

expiration, which is generally in the form of a semilunar fissure, convex backwards. They are protected by a cover of bony plates, called the *operculum* the posterior margin of which is free. Beneath this is a thin membrane (*gill-membrane*), which is folded, and supported by bony rays, called *branchiostegals*. The gills in most fishes consist of a series of small triangular leaflets of equal breadth (*pectinated or laminated* gills), attached by their bases to the *branchial arches*. These leaflets are nearly always in two rows on each branchial arch, but if only one such row alone be present (*e.g. Trachelochismus*), then the name of *half gill* is given to such an arch. In the bony fishes the branchial arches are free on the outside, but in the Sharks and Rays there proceeds from each branchial arch, between the branchial leaflets of the anterior and posterior row, a membranous production as far as the skin, which entirely covers the gills with the exception of about five apertures (*gill openings*) for the expulsion of the water. Many fishes have false gills (*pseudo branchiæ*) on the palate, above and outwards from the gills; these must not be confounded with the half gills.

"Head.—Below the orbits of the eye is placed a row of bony scales, forming a half ring (*suborbital ring*), the anterior of which forms the outer or inferior margin of the nasal cavity. The upper jaw bones (*maxillaries*) are commonly without teeth, and lie in the upper lip; they run obliquely backwards and downwards without being connected at the extremity with other bones. The *intermaxillary* bones form the central part of the mouth, and are usually armed with teeth, as are also the *palatine bones*, which are situated on each side of the *vomer* or central part of the roof of the mouth. Behind each of these palatine bones lie two bones called the *pterygoids*. The lower jaw is divided into a right and left portion (*mandibulæ*), united in the middle (*symphysis*) by cartilage. The tongue bone lies under the head, and usually consists of a series of unpaired bony pieces placed behind one another. To these bony pieces five arches are attached, like ribs to a sternum; the hindermost arch is incomplete and is simply laid on the under side of the gullet; it consists of two bones (*inferior pharyngeal bones*), one on each side, which are sometimes united to form a single unpaired bone. (Order II.)

"Teeth.—The teeth present much variety, and in some kinds are entirely absent. In others they exist in great numbers in the jaws, and on the vomer, palatine bones, tongue, branchial arches, and pharyngeal bones. [In form also they differ very much. Sometimes they are small,

equal in size, and arranged in numerous rows like strips of velvet (*villiform*) ; sometimes they are larger and in single or few rows, like the teeth of a comb (*cardiform*). Some species have large compressed *fangs*, some conical *canines*, while others have sharp cutting *incisors* in front, or grinding *molars* behind, while a few have flat *pavement-like* rows of teeth on the palate, or on the hinder parts of the jaws]. The mode of attachment differs, they are seldom contained in sockes, but are generally either united to the bones by ligament alone, or else are coalescent with them by ossification. Usually they are constantly renewed when broken.

"Fins.—The *fins* are in part unpaired and situated in the plane that divides the body into two halves, in part paired, and lying on each side. The last may be four in number, two *pectoral fins* placed behind the gills, and two *ventral fins* situated more below. In some fishes these last are placed quite forward in front of the pectoral fins (*ventrals jugular*) ; in others they lie almost directly below the pectorals (*ventrals thoracic*), and sometimes they lie nearer to the tail, behind the pectorals (*ventrals abdominal*). The unpaired fin at the end of the tail is called the *caudal fin ;* that which is attached to the body below the *anal fin ;* and that which is situated above, upon the back, the *dorsal fin.* Any of these fins may be divided into two or more portions. *Adipose fin* is the name given to a small dorsal fin without rays, which lies behind the ordinary dorsal fin. The small bones which support the fins, and between which the membrane is extended are named *rays.* These are either composed of joints (*articulated*), and often split at the point into different branches (*soft rays*), or simple, hard, and pointed (*spinous rays*). When these last are present they are situated at the fore part of the dorsal, anal, or ventral fins. The number of rays is used as a specific character. The ventral fins are situated in front of the vent, while the anal fin begins behind it, but in some fishes the vent is placed far forward, close under the head.

"The lips, jaws, and head have often filamentous appendages (*tentacles*) ; when under the chin they are called *barbels.*

"The number of *vertebræ*, of which the spine is composed, varies very much, from seventeen to more than one hundred. The *tail* is formed by nearly the half, and often by many more than the half, of these vertebræ."

F. W. HUTTON.

Colonial Museum,
December, 1871.

KEY TO THE FAMILIES.

[Adapted to the New Zealand Genera.]

I. Gills free, with one opening on each side; caudal symmetrical, or absent.

A. Gills comb-like; part of the anal and ventral fins spinose; body scaly or smooth.‡

a. No adhesive disc between the ventrals.

* VENTRALS THORACIC.

† Spinous dorsal greater than the soft.

1. Two dorsal fins.

Xiphiid. Upper jaw greatly produced ... ... p. 14

2. One dorsal fin.

Scorpænidæ (part). Scales none, or minute, dentition feeble ... p. 9

Trichiuridæ. Strong teeth in the jaws ... ... p. 12

Labridæ (part). Edge of the jaw sharp, but no teeth ... p. 42

†† Spinous dorsal equal to the soft.

1. Two dorsal fins.

Mullidæ. Barbels on the mouth ... ... p. 4

2. One dorsal fin.

Percidæ (part). Teeth small, some on the palatine bones ... p. 1

Pristipomatidæ. Palatine bones toothless ... ... p. 3

Squamipinnes. Body elevated; fins scaly ... ... p. 3

Sparidæ. Trenchant teeth in the jaws ... ... p. 5

Cirrhitidæ. Lower pectoral rays not branched ... ... p. 6

Scorpinidæ (part). Head armed ... ... p. 9

Pomacentridæ. Lateral line interrupted ... ... p. 4

††† Spinous dorsal less than the soft.

1. Two dorsal fins.

Scomberidæ. Finlets; ventrals moderate ... ... p. 21

Nomeidæ (part). Finlets; ventrals long ... ... p. 20

Carangidæ. No finlets; lateral line often armed ... p. 15

Gobiidæ. A papilla near the vent ... ... p. 28

2. One dorsal fin.

Percidæ (part). Ventrals 1/5; caudal forked ... ... p. 1

Berycidæ. Ventrals with more than five soft rays ... p. 12

Acronuridæ. Spines on each side of the tail ... ... p. 15

Cyttidæ. Body elevated; caudal rounded ... ... p. 18

Nomeidæ (part). First dorsal very low ... ... p. 20

Cottidæ. Three free pectoral rays; head cuirassed ... p. 27

Trachypteridæ. No caudal fin ... ... p. 34

Labridæ (part). A posterior canine tooth ... .. p. 42

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‡ "Saccarius" is covered with small spines.

II. Gills attached, generally with several openings; caudal unsymmetrical or absent.

A. One gill opening only.

Chimæridæ. Caudal unsymmetrical ... ... p. 74

B. Gill openings five to seven.

* Gill Openings Lateral (Sharks).

† Eye with a nictitating membrane.

Carchariidæ. Two dorsals and an anal ... ... p. 75

†† Eye without nictitating membrane.

a. An anal fin.

1. Two dorsal fins.

Lamnidæ. First dorsal between pectorals and ventrals ; teeth acute ... ... p. 77

Cestraciontidæ. First dorsal between pectorals and ventrals ; teeth obtuse ... ... p. 80

Scylliidæ. First dorsal above or behind the ventrals ... p. 79

2. One dorsal fin.

Notidanidæ. Dorsal opposite to the anal ... ... p. 78

b. No anal fin.

Spinacidæ. Two dorsal fins ... ... p. 80

* * Gill Openings Ventral (Rays).

† Snout produced.

Rhinobatidæ. Two dorsals on the tail ; pectorals not extending to the snout ... ... p. 82

Rajidæ. Two dorsals on the tail ; pectorals extending to the snout ... ... p. 83

Trygonidæ. Spine on the tail ; pectorals confluent at extremity of snout ... ... p. 84

Myliobatidæ. Spine on the tail ; snout with a detached pair of cephalic fins ... ... p. 86

†† Snout not produced ; rounded.

Torpedinidæ. Caudal well developed ... ... p. 83

III. Gills fixed sacs, generally with seven openings ; body eel-like, mouth circular, suctorial.

Petromyzontidæ. Head without barbels ; fresh water ... p. 86

Myxinidæ. Head with barbels ; marine .. ... p. 87

IV. Branchial clefts in great number ; mouth a longitudinal fissure with cirri on each side.

Cirrostomi. Marine ; small ; eye rudimentary ... ... p. 88

BIBLIOGRAPHY.

Bennett.—Proceedings of the Zoological Society, 1859.

Cuvier.—La Regne Animal, 1829–30.

,, Memoires des Museum, 1818.

Cuvier and Valenciennes.—Histoire Naturelle des Poissons, 1828–49.

Forster, G.—Drawings in the British Museum, 1771.

Forster, J. R.—Descriptiones Animalium quæ in itinere ad maris australis terras observavit. Ed. H. Lichtenstein, 8vo., Berlin, 1844.

Gay.—Historia Fiscia y Politica de Chili. Zoology II., Paris, 8vo., 1847.

Girard.—United States Pacific Expedition.

Gray, J. R.—Annals and Magazine of Natural History, I.

,, Zoological Miscellany, 1842.

Gray and Richardson.—Dieffenbach's New Zealand, II., 1843.

Griffith.—Cuvier's Animal Kingdom, 1834.

Gunther.—Catalogue of Fishes, 8 vols., 1859–70.

,, Annals and Magazine of Natural History, 1867.

,, Proceedings of the Zoological Society, 1861–1870.

Hector.—Transactions of the New Zealand Institute, II. and III.

Hombron and Jacquimot.—Voyage au Pole Sud, par Dumont D'Urville. Poissons, 1853–54.

Jenyns.—Voyage of the 'Beagle.' Zoology, 1842.

Kner.—Voyage of the 'Novara.' Zoology, 1869.

Knox.—Transactions of the New Zealand Institute, II. and III.

Lesson and Garnot.—Voyage de la 'Coquille,' 1826–30.

M'Coy.—Annals and Magazine of Natural History, 1865.

Owen.—Odontography, 1840–45.

,, Osteological Catalogue of the British Museum, 1853.

Powell.—Transactions of the New Zealand Institute, II.

Quoy and Gaimard.—Voyage of the 'Astrolabe.' Zoology, 1834.

Richardson.—Proceedings of the Zoological Society, 1839–40–50.

,, Annals and Magazine of Natural History, 1842–43–51.

,, Transactions of the Zoological Society, III.

,, Report of the British Association at Manchester, 1842.

,, Voyage of the 'Erebus' and 'Terror.' Zoology, 1846.

,, Voyage of the 'Samarang.' Zoology, 1848.

Smith, Sir A.—Zoology of South Africa, 1849.

Solander.—Manuscript Notes in the British Museum, 1820.

Travers, W. T. L.—"Nelson Examiner," Oct. 26th, 1860.

Acclimatisation Society of Auckland, Report for 1871.

,, ,, Canterbury, Reports for 1868–69–70.

,, ,, Otago, Reports for 1868–69–70.

List of New Zealand Fishes in the Catalogue of the Colonial Museum, 1870.

Parliamentary Papers—

Papers relative to the Fisheries of the Colony, 1868.

Further Papers relative to the Fisheries of the Colony, 1869.

Report of the Fisheries Commission, 1870.

FISHES OF NEW ZEALAND.

SUB-CLASS I.—TELEOSTEI.

Fishes with a bony skeleton, and completely separated vertebræ; branchiæ free.

Order I.—ACANTHOPTERYGII.

Some of the rays of the dorsal, anal, and ventral fins not articulated, forming spines. The inferior pharyngeal bones separated.

PERCIDÆ.

Body oblong; eye lateral; præoperculum serrated; *teeth pointed, in villiform bands, on the jaws, vomer, and palatine bones;* tongue smooth; one dorsal, the spinous portion nearly equal to the soft; *anal rather smaller than soft dorsal;* ventrals thoracic, with one spine and five soft rays.

Oligorus.

Seven branchiostegals; dorsal with eleven spines, anal with three; operculum with one point; scales small.

Australia.

1. OLIGORUS GIGAS. Owen. C.M.

Hapuka.

O. gigas, Günth., I. 251.

B. 7; D. $\frac{11}{12}$; A. $\frac{3}{8}$.

Length equals three times that of the head; height of body rather less than the length of the head, which is three and one-third times that of

the snout; spinous part of the dorsal lower than the soft part, but two and a half times its length; ventrals under the pectorals, which are short; præoperculum obtusely serrated; scales cycloid.

Dark greyish brown above, paler below.

This species is represented in the Museum by two skulls, one of which was prepared by Dr. Knox, and by drawings. I have never seen a complete specimen.

Not uncommon among rocks all round the coast.

Sometimes nearly six feet in length, and 120lbs. in weight.

Arripis.

Seven branchiostegals; dorsal with nine spines, anal with three; operculum with one or two points; scales moderate.

Seas of the Australian regions.

2. ARRIPIS SALAR. Rich. C.M.

Kahawai.

Centropristes salar, Rich., Voy. Ereb. and Ter., p. 29, pl. 20. *A. salar*, Günth., I., 253. *Arripis salar et mulloides*, Cat. Col. Mus.

D. $\frac{9}{16\text{-}17}$; A. $\frac{3}{10}$; S. Lat., 48–52; L. trans., 6/12.

Length about four and a half times the height, or nearly four times the length of the head, which is five to seven times the length of the horizontal diameter of the eye; præoperculum serrated on the inferior, and lower part of the posterior margins; sub and inter-operculum with scales; fourth dorsal spine the longest; last soft ray of dorsal and anal considerably elongated; a long soft double spinous process in the upper part of the axil of the pectorals; caudal forked.

Above greenish grey, spotted with lead-blue on the back; belly white; a pale lead-colored streak from the pectorals to the caudal, and a black spot in the axil of the pectorals; fins dusky; lower margin of caudal white; iris bright yellow.

Specimen in spirits, and skeleton prepared by Dr. Knox.

Abundant all round the coasts, and in the mouths of rivers; it sometimes ascends the Waikato for about thirty or forty miles. Grows to about 2 or $2\frac{1}{2}$ feet in total length.

Tasmania, Australia, Raoul Island, Norfolk Island.

Two other species, *Centropristes mulloides*, Banks, and *Centropristes sapidissimus*, Solander, are mentioned by Sir J. Richardson (Dieffenbach's

New Zealand, II., 206) as occurring in New Zealand, but there does not appear to be any descriptions of them, and they are not mentioned by Dr. Günther.

PRISTIPOMATIDÆ.

Body oblong; scales ctenoid; eyes lateral; *no teeth on the vomer; anal either equal to, or smaller than the soft dorsal;* ventrals thoracic, with one spine and five soft rays; lower rays of the pectorals branched.

Erythrichthys.

Rather elongate; mouth protractile; two dorsals, with several isolated spines between; caudal forked; no teeth in the jaws nor on the palate; præoperculum entire; scales rather small.

Molucca Sea, Sunda Sea, Australian Seas, Pacific.

3. ERYTHRICHTHYS NITIDUS. Rich. C.M.

Emmelichthys nitidus, Rich., p. 47, pl. 29. *Erythrichthys nitidus*, Günth, I., p. 395.

B. 7; .D 9| 3|$\frac{1}{9\text{-}10}$; A. $\frac{3}{10}$; S. Lat., 96; L. trans., 8/20.

Length rather more than three and a quarter times that of the head, which is about equal to the height of the body.

Whole of the head, base of the pectorals outside, lower half of anal and soft dorsal, and outside of the ventrals, covered with scales; caudal with small scales almost to the tip; angle of præoperculum rounded.

Mr. W. Travers informs me that when fresh this fish is of a bright salmon color, rather darker on the back. A stuffed specimen is in the Museum, which was caught at the mouth of the river Avon, in Canterbury, and presented by W. T. L. Travers, Esq. Total length of the specimen, fifteen inches.

SQUAMMIPINNES.

Body compressed and elevated, covered with scales; eye lateral; *teeth in villiform bands, without canines or incisors;* dorsal single, with spinous and soft portions of nearly equal development; anal with three or four spines; *the vertical fins more or less densely covered with small scales;* lower pectoral rays branched; ventrals thoracic, with one spine and five soft rays.

SCORPIS.

One dorsal, with nine or ten spines; jaws with an outer series of stronger teeth; teeth on the vomer and palatine bones; seven branchiostegals.

Australian seas, Coast of Chili.

4. SCORPIS HECTORI. sp. nov. C.M.

D. $\frac{10}{20}$; A. $\frac{3}{9}$; V. $\frac{1}{5}$; S. Lat., 60; L. trans., 3/22.

LENGTH about three and three-quarters the length of the head, or three times the height of the body; length of the head rather more than three and a half times the diameter of the eye; lower jaw longer; operculum, with two flat spines; præoperculum serrated, feebly on the posterior margin, acutely on the lower; teeth in the jaws in villiform bands, with a few stronger ones outside; head scaly; dorsal rather low, rounded, and covered with scales, the spinous part for half its height, and the soft part nearly to the margin; anal shorter than the soft dorsal, not very scaly; pectorals rather longer than the head, but not equal to the height of the body, scaly outside; caudal emarginate, the basal half covered with scales; scales sharply toothed; lateral line continuous, following the curve of the back.

Colors, (preserved in carbolic acid), reddish, brighter on the dorsal, caudal, and pectorals, and paler below; a large black spot on the side over the commencement of the anal.

Obtained by Dr. Hector, in Milford Sound.

The small number of rays in the anal, the spinous portion of the dorsal being covered with scales, and the small number of stronger teeth in the jaws, appear to take this species out of *Scorpis*, but I do not know a better place for it.

MULLIDÆ.

Body elongate, slightly compressed, *covered with large scales; two long barbels under the chin;* eyes lateral; *four branchiostegals;* dentition feeble; *two dorsals,* remote from each other; anal similar to second dorsal; ventrals with one spine and five rays.

UPENEOIDES.

Teeth in both the jaws, on the vomer and palatine bones.

Red Sea, East Indian and Australian seas.

5. UPENEOIDES VLAMINGII. C. and V.

Red Mullet.

U. Vlamingii, Günth., I., 400.

D. 8|9; A. 8.

The height of the body equals the length of the head, and is three and two-thirds in the total; the barbels reach to the angle of the præoperculum; the vomerine teeth are divided into two lateral groups.

Red, each scale with a violet speck, forming together longitudinal series; snout and cheeks with oblique violet streaks; the second dorsal and anal fins with longitudinal series of violet specks (Günth.)

Island of Motuaro, in Queen Charlotte's Sound (Rich.)

I have seen no specimens.

Upeneichthys.

Teeth in both the jaws and on the vomer, none on the palatine bones.

Australian seas, entering rivers.

6. UPENEICHTHYS POROSUS. C. and V.

U. porosus, Günth., I., 400.

D. 8|9; A. 7; S. Lat., 28; L. trans., 2/6.

The barbels reach to the vertical from the extremity of the operculum; two silvery streaks between the eye and the mouth, the lower continued below and behind the eye (Günth.)

New Zealand, entering rivers (Rich.); Australia, Tasmania.

I have seen no specimens.

SPARIDÆ.

Body compressed and oblong, with scales; eyes lateral; *trenchant teeth in front of the jaws;* dorsal one or two, anal with three spines; ventrals thoracic, with one spine and five rays.

Haplodactylus.

In both jaws series of flat and generally tricuspid teeth, behind which is a band of small cardiform teeth; no molars; vomerine teeth; cheeks and opercles, scaly; two elongate dorsal fins, the first with fifteen to sixteen spines; anal short; the lower pectoral rays simple; scales very small; five or six branchiostegals (Günth.)

Western coasts of South America, Port Arthur (Australia).

Richardson (Dieff. N.Z. II., p. 207) mentions a fish under the name of *Aplodactylus meandratus*, as having been caught off Cape Kidnappers, but there appears to be no description of it.

Pagrus.

Several pairs of strong conical teeth in the outer series of both jaws; molars in two series; cheeks scaly; dorsal with twelve spines, anal with three; scales moderate; six branchiostegals.

Mediterranean, Africa, United States, East Indian and Australian seas.

7. PAGRUS UNICOLOR. Quoy. and Gaim. C.M.

Snapper.

P. guttulatus, C. and V. *P. unicolor*, Günth., I., 468. *P. micropterus*, C. and V.

D. $\frac{12}{10}$; A. $\frac{3}{8}$; S. Lat., 52; L. trans., 8/17.

Length about three and three-quarters the length of the head, and two and three-quarters the height of the body; diameter of the eye equal to the interorbital space; fourth dorsal spine the longest, and goes two and a half times in the length of the head.

Reddish, more or less tinted with brown, and with numerous blue spots on the sides; below silvery grey; upper part of caudal reddish, lower part pale grey; iris pale brown.

Common round the coasts of the North Island; Australia, Tasmania.

A skeleton, prepared by Dr. Knox, is in the Museum.

This fish sometimes attains a total length of 31 inches.

CIRRHITIDÆ.

Body compressed and oblong; scales cycloid; eyes lateral; teeth small; *one dorsal, with the spinal and soft portions nearly equal;* anal with three spines, equal to or smaller than the soft dorsal; *lower rays of pectorals simple, and generally stout;* ventrals thoracic, with one spine and five rays.

Chironemus.

Villiform teeth in both jaws, and on the vomer, none on the palate; six branchiostegals; præoperculum entire; operculum with points.

Australian seas.

8. CHIRONEMUS GEORGIANUS. C. and V.

C. georgianus, Günth., II., 76.

D. 14 | $\frac{1}{16}$; A. $\frac{3}{7}$; C. 18; P. 13; V. $\frac{1}{5}$.

Total length four times that of the head, or two and a half times the height of the body; body covered with small scales, none on the cheeks; dorsal continuous, with a deep notch between the two portions, the spinous portion slightly, and the soft decidedly convex; third and fourth spines the longest, base of the soft part twice as long as that of the spinous; length of the pectorals not quite half the height of the body; lower rays simple, very soft and fleshy; ventrals behind the pectorals, under the fifth spine of the dorsal; caudal emarginate.

Greyish white, marbled all over with brown; back darker than the belly.

The specimen from which this description is taken was caught in a net in Whangarei Harbor, in March, 1869; unfortunately, it could not be preserved. It was 14 inches in total length. The fisherman told me that he had never seen it before.

Australia.

Chilodactylus.

Teeth in villiform bands, none on the vomer or palate; dorsal single, with sixteen to nineteen spines; anal shorter than the soft dorsal; caudal forked; *one of the simple pectoral rays more or less elongated;* scales cycloid; cheeks scaly.

Tropical parts of the Pacific, Chinese seas, Cape of Good Hope.

9. CHILODACTYLUS CARPONEMUS. Parkinson.

C. carponemus, Günth., II., 78.

B. 6; D. $\frac{17}{21}$; A. $\frac{3}{19}$.

Seven rays of the pectorals simple, the longest reaching nearly to the end of the anal, and one-third of the total length; dorsal scarcely notched.

Coloration uniform, the caudal with blackish tips (Günth.)

Coasts of New Zealand and South Australia (Günth.)

I have seen no specimens.

10. CHILODACTYLUS MACROPTERUS. Forst. C.M.

Tarakihi.

C. macropterus, Günth., II., 78.

D. $\frac{17}{26}$; A. $\frac{3}{14}$; S. Lat., 55; L. trans., 6/17.

Length about three and a half times that of the head; six simple pectoral rays, the uppermost reaching to the fourth soft ray of the anal; dorsal notched, seventh spine the longest, rather more than half the length of the head; second anal spine strong, and longer than the third.

Silvery grey, paler below, sometimes reddish purple on the back; a black patch over the base of the pectorals; fins dusky; iris purplish.

Australian seas.

Skeleton, prepared by Dr. Knox.

11. CHILODACTYLUS SPECTABILIS. sp. nov. C.M.

D. $\frac{17}{26}$; A. $\frac{3}{9}$; S. Lat., 55; L. trans., 5/16.

Total length about four and a quarter times the length of the head, and rather more than three times the height of the body; six simple pectoral rays, the upper one the longest, not so long as the head, and not extending to the end of the ventrals, the others graduated; dorsal deeply notched, fourth, fifth, and sixth spines about equal and longest, rather more than one-third of the length of the head.

Back and sides yellowish orange, with six transverse bands of reddish orange; belly yellowish white; dorsal blackish.

A single specimen, 15 inches in total length, which was taken in Cook Straits, is in the Museum.

Latris.

Dorsal fin deeply notched, with seventeen spines; anal fin nearly as long as the soft part of the dorsal; teeth villiform in both jaws; præoperculum minutely ciliated; scales small; cheeks scaly.

Coasts of Australia.

12. LATRIS HECATEIA. Rich. C.M.

Trumpeter.

L. lineata, Rich. *L. salmonea*, Cat. Col. Mus. *L. hecateia*, Günth., II., 86.

B. 6; D. 17 | $\frac{1}{34}$; A. $\frac{3}{27}$; S. Lat., 110.

Length equal to three and three-fifths that of the head, or three and a quarter times the height of the body; upper profile of head concave;

teeth in the jaws rather strong, some on the vomer; the lower nine pectoral rays simple.

Back and sides greenish bronze, with three whitish longitudinal bands; belly yellowish white; fins bright yellow, more or less marked with black.

Tasmania.

13. LATRIS CILIARIS. Forst. C.M.

Moki.

L. ciliaris, Rich., p. 37, pl. 26. Günth., II., 86.

B. 6; D. 17|39; A. $\frac{3}{32}$; L. Lat., 84.

Length four times that of the head, or three times the height of the body; six simple pectoral rays, no vomerine teeth.

Above plumbous, with golden reflections; below silvery white, with small brown dots; fins blackish.

Skeleton prepared by Dr. Knox.

Common from Wellington southwards.

SCORPÆNIDÆ.

Body compressed, oblong, covered with scales, sometimes rudimentary; eyes lateral; dentition feeble; *suborbital ring articulated with the præoperculum; one dorsal fin, the spinous equally or more developed than the soft;* ventrals thoracic; five to seven branchiostegals.

Sebastes.

Head and body compressed to the orbits, *without a groove on the occiput;* præoperculum armed; body and top of the head covered with rather small scales; dorsal deeply notched with twelve or thirteen spines; villiform teeth in the jaws, on the vomer, and generally on the palate; seven branchiostegals.

Almost all seas.

14. SEBASTES PERCOIDES. Solander. C.M.

S. percoides, Rich., p. 23, pl. 15. Günth., II., p. 101.

D. 11|$\frac{1}{12\text{-}13}$; A. $\frac{3}{5}$; L. Lat., 60 – 65.

Total length three and a quarter times that of the head, or three and a half times the height of the body; diameter of the eye rather more than

the length of the snout, and less than one-third of the head; interorbital space rather less than half the diameter of the eye; vertex with prominent spines; a flat expanded and crenulated tentacle on the interior side of the anterior nostril; third and fourth dorsal spines the longest, rather less than half the length of the head.

Head and fore part of the back olivaceous brown; hinder part of the back and sides reddish orange; belly yellowish; five transverse bands of olivaceous brown on the sides and back, which are partly produced on to the dorsal; fins pale yellowish, marbled with olivaceous brown; inside of the mouth violet; iris hazel.

Australia and Tasmania. Common.

Scorpæna.

Head slightly compressed, *with a naked groove on the occiput*, armed with spines; body with rather small scales; dorsal more or less deeply notched; ventrals thoracic; pectorals large and rounded; villiform teeth in the jaws, on the vomer, and generally on the palate; seven branchiostegals.

All tropical seas, extending into the Mediterranean.

15. SCORPÆNA CRUENTA. Solander. C.M.

S. militaris, Rich., p. 22, pl. 14. *S. cruenta*, Günth., II., p. 112.

D. 11 | $\frac{1}{10}$; A. $\frac{3}{5}$; L. Lat., 45.

Length about three and two-fifths that of the head; height about equal to the length of the head; the length of the snout is between one quarter and one-fifth of the head, and the interorbital space is rather less, or contained six times in the length of the head; head with scarcely any scales; interorbital space concave, with two ridges, each of which terminates posteriorly in a spine; vertex with prominent spines; third dorsal spine nearly equal to second of anal, and about one eighth of the length.

Bright orange to rose pink, marbled with purple; belly bright red; a black spot between the eighth and ninth dorsal spine.

Cook Straits.

Another species, called *S. plebeia*, is mentioned by Sir J. Richardson (Dieff. N.Z. II., p. 208) as obtained at Tolaga Bay, but there appears to be no description of it, and it is not mentioned by Dr. Günther.

AGRIOPUS.

Head and body compressed; mouth small; *snout produced;* scales none; *one dorsal deeply notched, beginning on the head;* anal short; villiform teeth in the jaws; five branchiostegals.

Cape seas, Coast of Chili, South Australian seas.

16. AGRIOPUS LEUCOPOECILUS. Rich. C.M.

A. leucopoecilus, Rich., p. 60, pl. 37. Günth., II., p. 137.

D. $\frac{17}{13\text{-}14}$; A. 10.

LENGTH three and a half times that of the head, or two and three-quarters the height of the body; length of the head two and a quarter times that of the snout, or three and a half times the diameter of the eye; interorbital space contained one and a half times in the diameter of the eye; the fourth and fifth dorsal spines the longest, but less than the length of the head; body smooth.

Brown, marbled with black, and with irregular white blotches along the lateral line; a dark band across the caudal.

Two stuffed specimens; Otago, presented by Mrs. Balfour, and Wellington Harbor, presented by Mr. W. Travers.

South Australian seas.

PROSOPODASYS.

Head and body more or less compressed; scales rudimentary; præorbital and præoperculum armed; *the three anterior dorsal spines more or less separated from the others, and forming a distinct division;* remainder of the fin continuous, with nine to twelve spines; anal with three; teeth in the jaws and vomer.

East Indian seas.

17. PROSOPODASYS COTTOIDES. L.

P. cottoides, Günth., II., p. 142.

B. 7; D. 3 | $\frac{11}{5}$; A. $\frac{3}{7}$.

CLEFT of the mouth slightly oblique, wide, the upper maxillary reaching to the vertical from the posterior margin of the eye.

Body and fins with small brown spots and rings (Günth.)

China, Borneo, Java, and New Zealand (Günth.)

I have seen no specimens.

BERYCIDÆ.

Body oblong, compressed; eyes lateral, large; cleft of the mouth oblique; villiform teeth in both jaws, and on the vomer; *four to eight branchiostegals;* opercular bones armed; scales ctenoid; *ventrals thoracic, with more than five soft rays.*

Trachichthys.

Snout very short and rounded; chin prominent; fine teeth in the jaws, and on the vomer and palate; eight branchiostegals; a strong spine on the shoulder, and at the angle of the præoperculum; suborbital arch with radiating ridges; scales rather small; abdomen serrated; one dorsal; ventrals with six soft rays; caudal forked.

Australian seas.

18. TRACHICHTHYS ELONGATUS. Gunth.

T. elongatus, Günth., I., p. 10.

D. $\frac{4}{11}$; A. $\frac{3}{9}$; V. 1/6; L. Lat. 65.

Scales rough, those of the lateral line not larger; the serrated ventral keel composed of eleven to twelve scales; height of the body one-third of the length (Günth.)

Australia and Great Barrier Island, N.Z. (Günth.)

I have seen no specimen.

TRICHIURIDÆ.

Body elongate and compressed, naked, or with minute scales; *cleft of the mouth wide, with several long and strong teeth in the jaws; dorsal and anal elongate,* sometimes with finlets; ventrals thoracic or rudimentary; seven or eight branchiostegals; caudal distinct.

Lepidopus.

Body very elongate and thin; one dorsal along the whole back; caudal well developed; ventrals reduced to a pair of scales; anal spines numerous; no finlets; no scales; eight branchiostegals.

Mediterranean and Atlantic.

19. LEPIDOPUS CAUDATUS. Euphrasen. C.M.

Frost Fish.

L. caudatus, Günth., II., p. 344.

D. 100–104; A. 23–25; P. 12.

Length ten times that of the head, or fourteen and a half times the height of the body; length of the head three and three-quarters the diameter of the eye; snout more than half the length of the head; lower jaw longer; the upper jaws with a row of about twenty-three lancet-shaped teeth on each side, those in front much smaller; near the front two pairs of long fangs, the hinder ones longer, and the left rather in advance; lower jaws with a pair of small fangs in front, and a series of about eighteen smaller teeth on each side, the hinder ones the largest; operculum angular above, rounded below, the posterior margin fringed; the maxillary does not extend quite to the vertical from the anterior margin of the eye; caudal deeply forked; a short thick barbel at the symphysis of the lower jaw.

Bluish silvery, rather darker above.

From England to the Cape of Good Hope.

A specimen in the Colonial Museum measures 45 inches in total length; there is also another mutilated specimen about the same length, but much lower in the body, the length being twenty-eight times the height, but as I can find no other difference I look upon it as a variety only.

Thyrsites.

The greater portion of the body naked; teeth on the palatine bones; two to six finlets behind the dorsal and anal; no keel on the tail; seven branchiostegals.

Seas between the Tropics, extending into temperate regions.

20. THYRSITES ATUN. Euphrasen. C.M.

Barracoota.

T. atun, Günth., II., p. 350. *T. atun et solandri*, Cat. Col. Mus.

D. 20 | $\frac{1}{10}$ | VI.; A. $\frac{1}{9\text{-}10}$ | VI.; V. $\frac{1}{5}$.

Total length four and a half times that of the head, or eight times the height of the body; three pairs of strong teeth in the upper jaw;

the lateral line descends abruptly below the posterior part of the spinous dorsal.

Above plumbous, whitish below.

Common all round the coasts; South Africa, Tasmania, Australia.

This is, I believe, the fish called "Snook" in Cape Colony.

XIPHIIDÆ.

Body elongated; teeth small or none; upper jaw much produced; one or two dorsals without a distinct spinous portion; ventrals absent, or rudimentary and thoracic; seven branchiostegals.

Seas near the Tropics.

Histiophorus.

Two dorsals and two anals; ventrals present; no true scales; small teeth on the jaws and palatine bones; none on the vomer.

Seas near the Tropics.

21. HISTIOPHORUS HERSCHELII. Gray. C.M.

Sword-fish.

H. herschelii, Günth., II., 513. *Sword-fish sp.*, Knox., Trans. N.Z. Inst., 1869, II., p. 13. *H. indicus*, Cat. Col. Mus.

D. 42 | 7; A. 12 | 6; VI.

The greater portion of the dorsal fin much lower than the body; height of the body more than one-half the length of the head; and one-seventh of the total; upper jaw rather depressed, rounded superiorly and inferiorly; its length from the nostrils is nearly three-fourths the length of the head. Dermal productions numerous, bifurcate, hidden in the skin (Günth.)

Cape of Good Hope.

A head of a Sword-fish, which I refer to this species, is in the Museum. It was obtained near Waikanae and presented by Dr. Knox, who described it in the second volume of the Trans. N.Z. Institute. The diameter of the eye is 2·75 inches, and the interorbital space 7 inches; both jaws are covered with minute teeth; upper profile slightly concave; produced portion of upper jaw broader than high, rounded above and below; præoperculum entire.

ACRONURIDÆ.

Body compressed, elevated, covered with minute scales; *tail armed with one or more bony plates or spines*, sometimes absent in the young; mouth small, with a single series of compressed incisors in each jaw, palate smooth; one dorsal, the spinous portion less developed; ventral thoracic; pseudobranchiæ well developed.

Acanthurus.

A moveable spine in a groove on each side of the tail; scales minute, ctenoid.

Tropical seas.

22. ACANTHURUS TRIOSTEGUS. L.

A. triostegus, Günth., III., 327.

D. $\frac{9}{23\text{-}25}$; A. $\frac{3}{20}$ V. $\frac{1}{5}$.

Length equal to twice the height; upper jaw with seven lobate incisors on each side; caudal spine small; upper profile of snout concave.

Reddish violet, with five blackish brown transverse bands, the anterior of which passes through the orbit; another streak of the same color along the median line of the snout; two brown spots, one above the other, on the end of the tail (Günth.)

From Mauritius to Polynesia and New Zealand (Günth.)

I have seen no specimens.

CARANGIDÆ.

Body more or less compressed, oblong or elevated, with small scales or naked; dentition variable; spinous dorsal rather less developed than the soft; no finlets; ventral thoracic or absent; vertebræ 10/14; *lateral line often armed with plates; two anal spines remote from the soft portion;* seven branchiostegals.

Trachurus.

Body slightly compressed, covered with very small scales; *lateral line with a band of high plates from origin to end;* each plate with a curved spine. Two dorsals, with eight spines and a horizontal anterior spine directed forwards; two anal spines; minute teeth in the jaws, on the vomer, and on the palatines.

Coasts of Europe, Africa, India, and Australia.

23. TRACHURUS TRACHURUS. L. C.M.

Horse Mackarel.

T. novæ zelandiæ, C. and V. *T. trachurus*, Günth., II., 419. *Caranx declivis*, Jenyns, Voy. Beagle, p. 68., pl. 14. *C. sinus obscuri*, Forst?

D. 8 | $\frac{1}{31\text{-}33}$; A. 2 | $\frac{1}{26\text{-}29}$; L. Lat., 70-99.

Height of the body is about one-fifth of the total length, which is about four and a half times the length of the head; the snout is longer than the diameter of the eye, which is one quarter the height of the body; lower jaw longer; the maxillary reaches to, or a little beyond, the vertical from the anterior margin of the eye; the lateral line becomes straight under about the fifth ray of the soft dorsal; pectorals reach beyond the commencement of the second dorsal.

Back shining bluish green, lighter on the sides; belly silvery white; a black blotch on the posterior margin of the operculum, and a darkish patch on the upper anterior edge of the pectorals; iris purplish.

Common. Distribution same as the genus.

Caranx.

Body compressed; scales very small; two dorsals; a spine directed forwards in front of the spinous dorsal; second dorsal and anal more developed than the first; lateral line with anterior curved and a posterior straight portion, *the latter with large plates*, generally keeled and with a spine; dentition feeble.

Nearly all temperate and tropical seas.

24. CARANX GEORGIANUS, C. and V. C.M.

Trevally.

Scomber lutescens, Soland.? *C. georgianus*, Jenyns, p. 61. Richardson, p. 135, pl. 58. Günth., II., p. 440.

D. 8 | $\frac{1}{26\text{-}29}$; A. 2 | $\frac{1}{22\text{-}24}$; L. Lat., 20–25.

Teeth very small in both jaws, on the vomer and palate; total length four or four and a half times the length of the head, or about three and a half times the height of the body; upper jaw rather longer; maxillary does not quite reach to the anterior margin of the eye; breast scaly; lateral line follows the curve of the back and becomes straight below the middle of the soft dorsal.

Above pale green and purple, with golden and silvery reflections, below silvery white; a blackish spot on the operculum; top of spinous dorsal blackish.

Common. Australia, Norfolk Island, Raoul Island.

Skeleton prepared by Dr. Knox.

Both this and the last species are called Yellow-tail in Auckland, but as that name is applied to a very different fish in Otago, it would be better, I think, to drop it altogether and use for this fish the name by which it is known in all parts of the Colony but Auckland.

Seriola.

Body slightly compressed, abdomen rounded, with small or rudimentary scales; second dorsal and anal much more developed than the first; *spines before anal sometimes absent; lateral line not armed*; teeth on jaws, vomer, and palate in villiform bands.

Nearly all temperate and tropical seas.

25. SERIOLA LALANDII. C. and V. C.M.

King Fish.

S. lalandii, Günth., II., 463. *S. gigas et cultrata*, Cat. Col. Mus., not *S. cultrata* of Forst. and Rich., which is *Platystethus cultratum*, Günth.

D. 6–8 | $\frac{1}{32\text{-}36}$; A. 0–2 | $\frac{1}{20\text{-}22}$; V. 5; P. 18–21.

Length about four times that of the head, or four and a half times the height of the body; snout long, from two to two and a half times the diameter of the eye; ventrals moderate, the distance between their base and that of the anal being from two and a half to two and three quarters their length; maxillary reaches rather beyond the anterior margin of the eye.

Above steel blue, below white.

Sometimes four and a half feet or more in total length. Represented in the Museum by drawings by Mr. Buchanan.

Brazil, Cape of Good Hope, Japanese Seas, Australia.

Naucrates.

Body oblong, sub-cylindrical, with small scales; *a keel on each side of the tail; spinous dorsal reduced to a few free spines*; ventrals thoracic; villiform teeth on the jaws, vomer, and palatine bones.

All temperate and tropical seas.

26. NAUCRATES DUCTOR. L.

Pilot Fish.

N. ductor, Günth., II., p. 374.

D. 3–6 | $\frac{1}{26\text{-}28}$; A. $\frac{2}{16\text{-}17}$.

Bluish, with five to seven dark vertical bars (Günth.)

Same distribution as the genus.

The Pilot Fish is commonly reported to be found on our coasts, and Dr. Hector informs me that he obtained one in Dusky Bay.

I have seen no specimens.

CYTTIDÆ.

Body much compressed and elevated, with small or rudimentary scales, *sometimes with bony protuberances;* spinous portion of dorsal less developed than the soft; *caudal rounded;* ventrals thoracic; minute teeth in both jaws; seven or eight branchiostegals; vertebræ more than 10/14.

Zeus.

Mouth wide; scales very small or absent; *a series of bony plates along the base of the dorsal and anal fins, and another on the abdomen;* branchiostegals seven.

Atlantic, Japanese, and Australian seas.

27. ZEUS FABER. L. C.M.

John Dory.

Z. australis, Rich., pp. 36, 138, pl. 25. *Z. faber*, Günth., II., 393.

D. 10 | 24; A. 4 | 22.

Eight double spined plates on each side of the soft dorsal, and seven along that of the anal; abdominal plates with very short blunt spines.

A round black spot on the middle of each side.

A skeleton is in the Museum from Kapiti, at the west entry of Cook Straits; also at Tauranga. Distribution same as the genus.

Cyttus.

Body with very small scales; mouth protractile; two contiguous dorsal fins; anal with two spines; no bony plates along the base of the dorsal and anal fins; ventrals of one spine and six to eight soft rays.

Australian seas; Madeira.

28. CYTTUS AUSTRALIS. Rich. C.M.

Boar Fish.

Capros australis, Rich., p. 137, pl. 59. *Cyttus australis*, Günth., II., 396.

B. 8; D. 10 | 33; A. 2 | 37; V. 1/6; P. 17.

Length equal to two and four-fifths the length of the head, or one and three-eighths the height of the body; length of the head three and two-thirds the diameter of the eye; profile of snout straight; scales small, ctenoid; lateral line more or less sinuated, following the curve of the back; dorsal fins stout, produced into long filaments (generally broken off); ventral rays not produced, one-fourth the length of the head, when closed covering the vent; anal spines very short and stout.

Silvery, pale purple above; no lateral black spot.

Two specimens were picked up after the gale of November, 1871; the largest was 19 inches in length.

Tasmania, and South parts of Australia.

29. CYTTUS TRAVERSI. sp. nov. C.M.

Caranx gallus var. Cat. Col. Mus.

D. 10 | 31; A. 2 | 37; V $\frac{1}{6}$.

Length two and a half times that of the head, about equal to the height; eye rather smaller than the length of the snout, about one half times the interorbital distance; first dorsal with the first spine short, the others produced into long filiform rays, of which the fourth is the longest and rather less than the height of the body; second dorsal highest in the middle; anal with two short, apparently detached, spines; the rest as the soft dorsal; *ventrals produced into long filaments*, of which the first is the longest, and equal to the height of the body; pectorals short; caudal rounded; the highest point of the back is at the origin of the first dorsal, the upper profile sloping downwards from this in a nearly straight line; scales very minute, each prolonged backwards into a small tooth; lateral line strongly curved, following the outline of the back as far as the end of the soft dorsal, thence straight, not armed; from the throat to the anal fin serrated; minute teeth on the lower jaw, and on the centre only of the upper jaw; palate smooth; lower jaw prominent; upper margin of orbits sharply denticulated; præperculum entire; a short tentacle on the middle of the forehead.

Color (in spirits) Silvery, reddish brown on the back and tail, and with spots of the same color on the sides; fins yellowish; rays of the pectorals spotted with black, and two marks of the same color on the caudal.

A specimen, 3 inches long, presented by W. T. L. Travers, Esq., from Saltwater Creek, Canterbury.

NOMEIDÆ.

Body oblong, compressed, covered with cycloid scales of moderate size; *dorsal with a distinct spinous portion separated from or continuous with the soft,* which is the more developed; teeth small; ventrals thoracic.

Gasterochisma.

Cleft of the mouth wide; several finlets between the dorsal and anal and the caudal; no separate anal spines; ventrals very long and broad, and can be completely concealed in a deep fissure on the abdomen; teeth conical, small, forming single series in the jaws; teeth on the vomer and palatine bones.

New Zealand only.

30. GASTEROCHISMA MELAMPUS. Rich.

Butterfly Fish.

G. melampus, Rich., p. 60, pl. 37. Günth., II., p. 387.

D. 17| $\frac{1}{10}$ | VI.; A $\frac{2}{10}$ | VI.; V. $\frac{1}{5}$.

Ventrals black, one-third of the total length; the maxillary reaches somewhat beyond the vertical from the centre of the eye (Günth).

Wellington Harbour (Rich.)

I have seen no specimens.

Neptonemus.

Cleft of mouth moderate; snout obtusely conical; præoperculum obtusely crenulated; first dorsal continuous with seven feeble spines; no finlets; anal spines indistinct; pectorals much longer than ventrals; a series of minute teeth in the jaws; palate smooth.

New Zealand only.

31. NEPTONEMUS BRAMA. Gunth. C.M.

Warehou.

N. brama, Günth., II., 390.

D. 7 | $\frac{1}{27}$; A. $\frac{2}{21\text{-}24}$; L. Lat., 88; L. trans., 16/25.

Length three and three-fourths that of the head, or four and three-fourths that of the height; diameter of eye equal to length of snout; top of the head fleshy, upper profile convex; præoperculum emarginate; operculum with an obtuse point over the shoulder; pectorals pointed, reaching to third ray of the anal; caudal forked; lateral line curved to the end of the dorsal, thence straight.

Back and sides greenish silvery; belly white; snout and top of the head brownish; pectorals blackish; base of caudal reddish.

Cook Straits.

SCOMBERIDÆ.

Body elongate, compressed, naked or with very small scales; dorsal fin with the spinous portion separate, and much less developed than the soft; finlets in front of the caudal; ventrals thoracic; *tail keeled;* seven branchiostegals.

Scomber.

Dorsals separated by an interspace; five or six finlets; scales very small; teeth small on jaws, vomer, and palate; two slight ridges on each side of the root of the caudal.

Nearly all temperate and tropical seas.

32. SCOMBER AUSTRALASICUS. C. and V. C.M.

Mackarel.

S. australasicus, Günth., II., 359.

D. 10 | $\frac{1}{11\text{-}12}$ | V.; A. $\frac{1}{11}$ | V.; L. Lat., 160.

Length two and three-fourths that of the head, or four and three-fourths the height of the body; snout one-third of the length of the head, and nearly one and a half times the diameter of the eye; teeth distinct; caudal divided in the middle into an upper and lower lobe.

Back shining bluish green, with spots and oblique stripes of darker, the stripes sloping downwards and forwards; belly silvery.

Auckland, Wellington Harbour, Australia, and Amboyna.

Dr. Hector informs me that this species has an air bladder. Total length about 12 inches.

Pelamys.

The first dorsal extending on to the second; seven to nine finlets; scales of the pectoral regions forming a corslet; teeth of moderate strength; none on the vomer; a longitudinal keel on each side of the tail.

Seas of temperate and tropical regions.

33. PELAMYS CHILENSIS. C. and V.? C.M.

Tunny.

P. chilensis, Günth., II., 368.

D. 18 | $\frac{2}{12}$ | VIII.; A. $\frac{2}{10}$ | VII.

The length of the pectoral is one-seventh of the total.

Back bluish; belly silvery; five or six slightly oblique longitudinal streaks on the sides (Günth.)

Pacific Ocean.

I refer, provisionally, a skull that is in the Museum to this species. The head is $22\frac{1}{4}$ inches in length, and the snout 7 inches; the diameter of the eye is $2\frac{1}{2}$ inches, and the interorbital space 9 inches. There is a single row of short rather strong conical teeth in each jaw, none on the vomer; the palatine bones are gone; the maxillary extends to the centre of the eye; præoperculum and operculum entire, both fringed posteriorly.

Cook Straits.

TRACHINIDÆ.

Body elongate, low, naked or with scales; teeth in villiform bands, sometimes with pointed and conical canines; the infraorbital ring does not articulate with the præoperculum; *one or two dorsal fins, the spinous portion less developed than the soft;* anal similar to the soft dorsal; ventrals with one spine and five rays; head large and depressed; *eyes often directed upward.*

Kathetostoma.

Eyes on the upper surface of the head; cleft of the mouth vertical; head cuirassed with bony plates; body naked, or with very minute scales;

lateral line continuous; one dorsal; ventrals jugular; pectoral rays branched; villiform teeth on the jaws, vomer, and palate, without canines.

Australian seas.

34. KATHETOSTOMA MONOPTERYGIUM. Bleeker. C.M.

Cat Fish.

Uranoscopus maculatus, Rich., p. 54, pl. 33. *Anema monopterygium*, Günth., II., p. 230.

D. 18 – 20; A. 17 – 18.

Length three and three-fourths that of the head, which is eight times the diameter of the eye; interorbital space twice the diameter of the eye; body naked, or with minute scales above the lateral line; lateral line curved to the origin of the dorsal, thence straight close to the base of the fin to the commencement of the caudal, where it bends suddenly down and enters in the middle of the fin; a filament in the mouth below the tongue; a short barbel in the middle of the chin; a line of four pores on the inferior margin of the præoperculum; two short spines in front of the eye, and another on the shoulder.

Above, with the pectorals and caudal, brown or brownish black, with variously sized white spots; below white.

Sometimes 16 inches in total length.

New Zealand only.

The Colonial Museum possesses two fine specimens, in both of which I find the filament in the mouth as represented by Sir J. Richardson; I think, therefore, it should be removed from the genus *Anema* of Günther, and put into his genus *Kathetostoma*.

35. KATHETOSTOMA LÆVE. Bleeker. C.M.

K. lævе, Günth., II., 231.

D. 16 – 17; A. 17 – 18.

Length two and three-quarters that of the head, or three and three-quarters the height of the body; the length of the head is five times the diameter of the eye, which is rather less than the interorbital space; scales none; lateral line straight from the shoulder to the commencement of the caudal, then slightly bent down; top of the head and round the eyes rugose; interorbital space excavated; three short spines on the inferior margin of the præoperculum, two below the mandibula, and two

on the throat directed forward; humeral spine long and slender, directed upward and backward.

Above pale reddish purple, with yellowish spots; below and fins pale yellowish (in spirits).

A single specimen from Wellington Harbor, presented by H. Travers, Esq.

Australian seas.

36. KATHETOSTOMA FLUVIATILIS. sp. nov. C.M.

D. 16; A. 14; V. 1/5.

Length three and a quarter times that of the head, which is four and a half times the diameter of the eye; interorbital space not quite one and a half times the diameter of the eye; mouth very oblique, almost vertical; eyes sublateral; rough bony plates on the top of the head; interorbital space excavated; operculum and præoperculum entire; a small obtuse humeral spine; maxillary produced to the posterior margin of the eye; no filament in lower jaw; scales none; lateral line from the shoulder straight along the base of the dorsal to the caudal, where it turns suddenly down and enters at the centre of the fin.

Back light brown, with darker spots; sides and belly silvery, with a few minute black dots; cheeks silvery.

Total length of the specimen 1·7 inches.

Fresh water, Manawatu River, presented by Mr. Buller.

Bovichthys.

Body without scales; cleft of the mouth horizontal, with the upper jaw rather longer; eyes lateral, more or less directed upwards; two separate dorsals; ventrals jugular; lower pectoral rays simple; villiform teeth on the jaws, vomer, and palate, without canines; operculum with a strong spine; præorbital and præoperculum not armed; seven branchiostegals.

South Pacific, Antarctic Ocean.

37. BOVICHTHYS VARIEGATUS. Rich.? C.M.

B. variegatus, Rich., p. 56, pl. 34. Günth., II., 250.

D. 9 | 19; A. 19.

Length not quite three times that of the head, which is three and three quarters the diameter of the eye; interorbital space less than half the

diameter of the eye; soft dorsal not so high as the body beneath; base of the spinous dorsal very little more than half that of the soft.

Pale brown, with some black spots on the head, shoulders, and fins, and with five faintly marked blackish bars on the back, which do not extend below the lateral line.

Mouth of the Hutt River, presented by W. T. L. Travers, Esq.

Australia.

PERCIS.

Body cylindrical, covered with ctenoid scales; mouth oblique; eye lateral, directed upwards; dorsal one; ventrals a little before the pectorals, the lower rays of which are branched; villiform teeth in the jaws and canines; teeth on the vomer, none on the palate; lips thick; six branchiostegals.

From the Red Sea to the coasts of Australia and Polynesia.

38. PERCIS COLIAS. Forst. C.M.

Rock Cod.

Percis colias et nycthemera, Günth., II., 242.

D. $\frac{5}{20}$; A. 17; L. Lat., 62; L. Trans., 7/22.

LENGTH about three and a half times that of the head, which is from five to seven times the diameter of the eye, which is equal to the interorbital space; præoperculum entire; operculum with one or two small compressed spines; spinous portion of dorsal much lower than the soft; tail square.

Colors variable; back and sides dark green, marbled with brown; top of the head dark brown, with a patch of green over each eye; belly greyish white; fins pale greyish, more or less spotted with brown, especially the posterior part of the dorsal; immature specimens want the green color, but have the back and sides brown, more or less marbled with greyish white, and with more spots on the sides and fins *(nycthemera)*.

Abundant all round New Zealand, not found elsewhere.

I have examined a considerable number of specimens, but never have found the fin rays to agree with the number given by Forster, although some of them agreed exactly in color with the description given of *colias* in the Histoire Naturelle des Poissons. The largest specimen that I have seen was 21½ inches in total length, and weighed 4½lbs.

Skeleton prepared by Dr. Knox.

NOTOTHENIA.

Body rather compressed posteriorly, covered with scales; head depressed; mouth oblique, lower jaw longer; eye directed upwards; *lateral line interrupted*, the posterior portion continued to the caudal; two dorsals, *the spines flexible;* ventrals jugular; lower pectoral rays branched; both jaws with cardiform or villiform teeth; six branchiostegals.

Falkland Islands, Auckland Islands, and Kerguelen's Land.

39. NOTOTHENIA CORIICEPS. Rich.? C.M.

Flat-head.

N. coriiceps, Rich., p. 5., pl. 3. Günth., II., 261.

D. 5 | 29; A. 23; V. 6; L. Lat., 56.

LENGTH three and one-fourth the length of the head, which is one and one-fourth its breadth; mouth wide, oblique, with rather strong teeth in the jaws; interorbital space rather hollowed, the top of the head rough with papillæ; operculum with a semicircular notch in the upper part; præoperculum entire; pectorals situated rather far back; caudal rounded; scales cycloid; lateral line stops near the end of the second dorsal, but commences again immediately below and continues on to the caudal.

Uniform black (preserved by carbolic acid).

This specimen was obtained by Dr. Hector in Milford Sound; it is about 18 inches in total length. It differs from *coriiceps* in the number of rays as well as in the absence of pores on the head, snout, and præoperculum, the only ones that I can make out being three on each side of the lower jaw, and one near the upper posterior corner of the eye, but as the specimen has been preserved in carbolic acid and dried, it may not now be possible to distinguish them.

This species is found at Kerguelen's Land and the Auckland Islands.

40. NOTOTHENIA CORNUCOLA. Rich.

N. cornucola et marginata, Rich., pp. 8 and 18, pl. 11 and 12.
N. cornucola, Günth., II., 261.

D. 5 | 31 – 33; A. 27 – 29; L. Lat., 52.

HEIGHT of the body is five and a half times in the total length; the length of the head four times.

Brownish, marbled with darker; an oblique light band, edged with dark brown from below the eye to the lower limb of the præoperculum (Günth.)

Cape Howe, Falkland Islands, New Zealand (Gunth.)

I have seen no specimens.

COTTIDÆ.

Head and anterior portion of the body large and broad, posterior part compressed; *head cuirassed, the suborbital ring covering more or less of the cheeks, and articulating with the præoperculum;* spinous portion of dorsal less developed than the soft and than the anal; body naked or covered with scales, with free pectoral rays.

LEPIDOTRIGLA.

Head parallelopiped, with the upper surface and the sides entirely bony; body, with scales of moderate size, regularly arranged; three free pectoral filaments; villiform teeth in both the jaws and on the vomer; none on the palatine bones.

Mediterranean, East India, and Tasmania.

41. LEPIDOTRIGLA BRACHYOPTERA. sp. nov. C.M.

D. 8 | 16; A. 15; L. Lat., 63.

LENGTH is equal to three and one-fourth that of the head, or four times the height of the body; snout depressed, short, one-third the length of the head, and equal to the diameter of the eye, upper profile concave; præorbital produced beyond the snout, and emarginate at the end; interorbital space deeply concave; operculum produced backwards into a spine; two spines above it, and one long one on the shoulder; scales moderately ciliated, those of the lateral line not spined; along the base of the dorsal on each side a row of strongly spined scales; pectorals reach to the vertical from the third anal ray, filaments shorter; ventrals almost as long as the pectorals; caudal emarginate.

Above pale red; below yellow; throat and breast white; head silvery, with the rugosities yellowish; interior of pectorals black, margined with yellowish.

Obtained in Wellington Harbour, and presented by W. T. L. Travers, Esq.

TRIGLA.

Like the last, but with exceedingly small scales, those of the lateral line being sometimes larger.

Nearly all parts of the world except America, where only one European species is found at New York.

42. TRIGLA KUMU. Less. and Garn. C.M.

Gurnard.

T. kumu, Jenyns, p. 27. Günth., II., 204. *T. papilionacea*, C. and V., IV., 50.

D. 9 – 10 | 16 – 17 ; A. 15.

LENGTH equals four times that of the head ; interorbital space concave, less than the diameter of the eye ; snout elongate, with its upper profile straight ; præorbital produced beyond the snout, denticulated anteriorly ; operculum with two short flat spines, and a short flat humeral spine ; scales very small, those of the lateral line not armed ; along the base of the dorsal on each side a row of spined scales ; pectorals reach to the vertical from the tenth dorsal ray, ventrals much shorter.

Above olive, largely mottled with reddish ; below reddish white ; vertical fins, ventrals and pectoral filaments pale reddish ; caudal bright red ; outside of pectorals blackish green, with the rays reddish, inside olive green with the upper edge and tip light blue, and with the upper ray and lower edge near the root reddish ; an irregularly shaped, but sharply defined, black blotch near the lower margin, and several light blue spots on its margin.

Common. Australia, Cape of Good Hope, and China.

Skeleton prepared by Dr. Knox.

GOBIIDÆ.

Body elongate, low, naked or scaly ; two dorsals, the first less developed and composed of flexible spines ; ventrals sometimes united into a disc ; gill openings more or less narrow ; *a prominent papillæ near the vent ;* teeth generally small, sometimes with canines ; carnivorous.

GOBIUS.

Body scaly ; ventral fins united into a disc, which is not attached to the belly ; teeth in several series in the upper jaw ; gill openings of moderate width ; five branchiostegals.

All temperate and tropical regions.

43. GOBIUS LENTIGINOSUS. Rich.

G. lentiginosus, Rich., p. 3, pl. 1. Günth., III., 20.

D. 6 | $\frac{1}{10}$; A. $\frac{1}{9}$; L. Lat., 26.

Head about as high as broad; eyes very close together, of moderate size; snout moderately long, with the lower jaw prominent; head naked; teeth small.

Honey yellow, marbled and spotted with blackish brown and dotted with white; a dark spot at the root of the caudal; dorsal and caudal dotted with black; anal and ventrals immaculate (Günth.)

Bay of Islands (Günth.)

I have seen no specimens.

44. GOBIUS AMICIENCIS. C. and V.

G. amiciencis, Günth., III., 35.

D. 6 | $\frac{1}{10}$; A. $\frac{1}{9}$.

Body thick, its height being equal to the length of the head, and one-fourth of the total; head convex, as high as long; canine teeth; caudal rounded; ventral subcircular; scales of moderate size.

Brownish (Günth.)

Tongatabou; Carteret Harbour, New Zealand (Günth.)

I have seen no specimens, and doubt its occurrence here, as there is no such place as Carteret Harbour in New Zealand.

Eleotris.

Body subcylindrical, scaly; head rather large; eyes lateral; teeth small; ventrals not united.

Fresh water fishes of the Tropics.

45. ELEOTRIS GOBIOIDES. C. and V. C.M.

Bull-head.

E. gobioides, Rich., p. 4, pl. 2. Günth., III., p. 114. *E. basalis*, Gray.

D. 6 | $\frac{1}{10}$; A. $\frac{1}{9\text{-}10}$; L. Lat., 36 – 40 ; L. Trans., 9 – 11.

Length three and a quarter or three and a half times that of the head, or four and a half or five times the height of the body; interorbital space flat or concave; scales minutely ciliated.

Blackish brown, with a light colored vertical band across the root of the pectoral fins.

Common in rivers and lakes.

This species is exceedingly variable in the size of the eye, the size and shape of the interorbital space, and in the colors, being sometimes washed with yellow and sometimes entirely black. At first sight it would appear that at least three species could be made out, but after a careful examination of a large number of specimens from many parts of the country, I can find no constant distinction between them, some specimens exhibiting intermediate characters, connecting others which appear to be quite distinct. The proportion between the diameter of the eye to the interorbital space varies from one to one-half. Of *Eleotris radiata* there appears to be no description; it is said to have been taken at the mouth of the river Thames.

PEDICULATI.

Head and anterior part of the body very large, without scales; teeth in cardiform or villiform bands; spinous dorsal composed of a few more or less isolated spines or absent; ventrals jugular; carpal bones prolonged, forming a sort of arm for the pectorals; gill opening reduced to a small foramen situated in or near the axil; carnivorous.

Saccarius.

Head very large, high, compressed; cleft of the mouth subvertical; jaws and palate with cardiform teeth; body covered with minute spines; stomach very wide.

New Zealand only.

46. SACCARIUS LINEATUS. Gunth.

S. lineatus, Günth., III., 183.

D. 2 | 1 | 12; A. 7; C. 9; P. 10; V. 5.

Height of the body is contained two and two fifths in the total length; dorsal spines broadly webbed posteriorly, the two anterior ones united.

Ground color olive yellowish; head and body with numerous brown stripes, oblique on the head and trunk, vertical along the base of the dorsal and anal fins, longitudinal on the tail; vertical fins with two or three series of black ocellated spots (Günth.)

Sea of New Zealand (Günth.)

I have seen no specimens.

BLENNIIDÆ.

Body elongate, more or less cylindrical, naked or with small scales; *one, two, or three dorsal fins occupying nearly the whole back, as much or more developed than the soft;* anal long, ventrals jugular or absent; carnivorous.

TRYPTERYGIUM.

Not very elongate, covered with small scales; jaws with a band of villiform teeth; teeth on the palate; three dorsal fins, the two anterior of which are spinous; ventrals jugular, with two soft rays.

Mediterranean.

I have always found this genus to be marine.

47. TRYPTERYGIUM NIGRIPENNE. C. and V. C.M.

T. capito, Jenyns, p. 94, pl. 19. *T. nigripenne*, Günth., III., 277.

D. 5 – 6 | 18 – 19 | 13 – 14; A. 26.

A TENTACLE over the eye, which is sometimes simple, sometimes divided into two or four lobes; teeth on the vomer; length three and four fifths that of the head, which is three and three-eighth times the diameter of the eye; length of snout equal to the diameter of the eye; interorbital space less than half the diameter of the eye; lateral line follows the curvature of the back, and stops before the end of the second dorsal, not descending to the middle of the depth of the body; nasal tentacle simple.

White; orbital tentacle black; body reddish brown, mottled with darker, lighter below; first dorsal blackish, the others greyish, spotted with black.

Wellington Harbour.

48. TRYPTERYGIUM FORSTERI. C. and V.

T. forsteri, Günth., III., 278.

B. 6; D. 3 | 16 | 15; A. 24; V. 2.

A FRINGED tentacle above the orbit and at the nostril.

Brown, spotted with reddish; a semicircular blackish-blue golden-edged spot at the base of the pectoral (Forst.)

New Zealand?

I have seen no specimens.

49. TRYPTERYGIUM FENESTRATUM. Forst.

T. fenestratum, Günth., III., 278.

B. 6; D. 4. | 10 | 13; A. 24; V. 2.

A SIMPLE truncated tentacle above the orbit; another small one, fringed, at the nostril.

Brown, fins with transparent spots (Forst.)

New Zealand, mouths of the rivers.

I have seen no specimens.

50. TRYPTERYGIUM MEDIUM. Gunth. C.M.

T. medium, Günth., III., 278.

D. 4 | 15–16 | 12–13; A. 20–23; V. 2.

ORBITAL tentacle none, a small one at the nostril; length four times that of the head, which is three and a half times the diameter of the eye; length of snout equal to the diameter of the eye; interorbital space more than half the diameter of the eye; lateral line sloping obliquely downwards from the shoulder to the middle of the depth of the body, ceasing under the end of the second dorsal.

Back and sides olivaceous brown, marbled with darker; belly white; throat yellow; dorsals and caudal yellow, spotted with black on the rays; pectorals white, the lower rays olivaceous brown, the upper ones spotted with the same color.

Wellington Harbour.

51. TRYPTERYGIUM COMPRESSUM. sp. nov. C.M.

B. 6; D. 4 | 10 | 10; A. 20; V. 2; L. Lat., 38; L. Trans., 4/7.

LENGTH equal to three and four-fifths that of the head, which is equal to the height of the body, or three and three-fourths the diameter of the eye; body oval, compressed, covered with rather large scales; lateral line nearly straight, ceases below the end of the second dorsal; snout rounded, less than the diameter of the eye; pectorals equal in length to the caudal, which is equal to the length of the head.

Reddish orange, darker on the vertex; fins yellowish, more or less marked with black.

Wellington Harbour.

One specimen only, presented by W. T. L. Travers, Esq.

52. TRYPTERYGIUM VARIUM. Forst.

T. varium, Günth., III., 277.

B. 6; D. 5 | 24 | 14; A. 26; V. 2.

Transverse streaks across the opercles and breast; body dotted with brown; the first dorsal with a black spot, the second with a series of white spots along the base (Forst.)

Coast of the Southern Island of New Zealand.

I have seen no specimens.

Stichārium.

Body elongate, compressed, naked; *anterior part of the lateral line distinct*; small teeth in jaws and palate, no canines; dorsal long, single, almost entirely spinous; ventrals jugular, with two or three rays; caudal distinct, rounded; gill openings rather wide, the gill membranes broadly united below the throat, and quite free from the isthmus.

Australia.

53. STICHARIUM RUBRUM. sp. nov. C.M.

D. $\frac{40}{1}$; A. $\frac{2}{25}$; V. 2.

Length equal to five times that of the head, which is equal to the height of the body, or to one and four-fifths the breadth of the head; snout pointed, two-fifths of the length of the head; a simple truncated tentacle over the eye, and a small nasal one; upper profile of head straight and nearly horizontal, lower profile ascending; one dorsal, slightly notched about the fourth spine, joined by a membrane to the base of the caudal; anal free from the caudal; ventrals formed of two flexible rays; lateral line straight from the shoulder as far as the end of the pectorals, then suddenly bent down until it reaches the middle of the body, from whence it continues in an interrupted line half way to the caudal, where it ceases; dorsal commences immediately at the back of the head.

Rose color, sometimes m re or less spotted or banded with black on the sides of the head, body, and caudal; fins yellowish.

Several specimens from Wellington Harbour.

54. STICHARIUM FLAVESCENS. sp. nov. C.M.

B. 6; D. $\frac{38}{6}$; A. 30; V. 3; P. 12; C. 12.

Length four and three-fifths that of the head, or five and a quarter times the height of the body; length of the head one and two-fifths its

breadth, or four and one-third times the diameter of the eye; snout rounded, slightly shorter than the diameter of the eye; dorsal commences at a very short distance behind the head; lateral line sloping gently downwards, ceasing under the tenth dorsal spine; dorsal joined to the base of the caudal by a membrane.

Pale yellow, with two oblique reddish streaks on the præoperculum from the eye backwards.

Cook Straits, a single specimen, presented by Mr. Liardet.

Acanthoclinus.

Body elongate, compressed, with small scales; bands of small teeth on the jaws, vomer, palatine bones, and tongue; dorsal and anal long, the greater part of both composed of spines; caudal rounded; ventrals jugular, composed of one spine and three rays; *several lateral lines;* gill membranes united below the throat.

55. ACANTHOCLINUS LITTOREUS. Forst. C.M.

A. fuscus, Jenyns, p. 92, pl. 18. *A. littoreus*, Günth., III., 298. *Gadopsis marmoratus*, Cat. Col. Mus.

B. 6; D. $\frac{20}{4}$; A. $\frac{9\text{-}10}{3\text{-}4}$; V. $\frac{1}{3}$.

Length three and a half times that of the head, or four and a quarter times the height of the body; four lateral lines, the lowest joining the one next above it at the commencement of the anal; præoperculum rounded, with a line of pores round the margin.

Brownish olive, more or less marbled with black; a white band from the vertex to the snout, and a dark spot on the operculum; vertical fins edged with black; immature specimens are sometimes spotted with white.

Wellington Harbour.

TRACHYPTERIDÆ.

Body much elongated and strongly compressed; mouth small, and dentition feeble; one dorsal fin, occupying the whole length of the back, with a detached anterior portion, and composed of flexible rays; caudal rudimentary; ventrals thoracic; gill openings wide; bones soft.

Deep sea fishes.

REGALECUS.

Each ventral fin reduced to a long filament, dilated at the extremity; caudal rudimentary or absent.

Europe, Cape of Good Hope, India.

56. REGALECUS GLADIUS. Walb.?

Oar Fish.

R. gladius, Günth., III., 308.

DETACHED anterior portion of dorsal with few spines.

Light grey, purplish on the back; dorsal fin margined with red; head bluish grey.

Cast on shore at Nelson, and described by W. T. L. Travers, Esq.

The following is Dr. Günther's description of *R. gladius*:—

B. 6; D. 340; A. 0; P. 14; V. 1.

The length of the head equals the height of the body, which is contained five times and two-thirds in the distance of the vent from the snout; the snout is truncated, the cleft of the mouth vertical, and the upper jaw very protractile; a series of minute teeth in each of the jaws; the single ventral ray very long, terminating in a broad lobe, and another cutaneous flap on the second third of its length; the anterior twelve dorsal rays are produced, the first five forming a separate division over the eye; skin covered with small tubercles.

Mediterranean, Bermuda, Cape of Good Hope.

MUGILIDÆ.

Body oblong, covered with cycloid scales; no lateral line; mouth small or moderate, without or with feeble teeth; *two short dorsal fins, the first with four stiff spines;* anal rather longer than the second dorsal; *ventrals abdominal.*

Feed on soft organic substances or small animals.

MUGIL.

Cleft of mouth short, no teeth in the jaws; anterior margin of mandible sharp.

All temperate and tropical regions, passing part of the year in fresh water.

57. MUGIL PERUSII. C. and V.? C.M.

Mullet.

M. argenteus, Cat. Col. Mus. *M. perusii*, Günth., III., 422.

D. 4 | $\frac{1}{8}$; A. $\frac{3}{8}$; L. Lat., 40; L. Trans., 13.

Length four and two-fifths that of the head, or three and three-fifths the height of the body; interorbital space slightly convex, twice the diameter of the eye, which goes four and a quarter times into the length of the head; snout rather longer than the diameter of the eye; mouth broader than deep, angle formed by mandibles rather obtuse (100°); upper profile slightly arched; præorbital emarginate; upper lip not very thick; maxillæ not covered by præorbital; free space at the chin, between the mandibles, lanceolate; an adipose membrane covers one-half of the iris anteriorly and posteriorly; spinous dorsal half way between the snout and the tail, higher than the soft, which commences over the fourth ray of the anal; pectorals are about two-thirds of the length of the head, and when closed do not reach to the spinous dorsal, they are placed very slightly above the middle of the body; fins scaleless; a long pointed scale in the axil of the pectorals; second dorsal and anal of about equal heights, much less than the caudal, which is deeply emarginate, and uniform in color; about twenty-six scales between the snout and the dorsal.

Above plumbous blue, below silvery.

Abundant north of Auckland, and occasionally got as far south as Cook Straits. In the Waikato they go down to the sea to spawn in November, and return again in March. Our grey mullet seems to differ very little from the description given of *M. perusii*, except in the fins not being scaly, but the specimens I have examined were not fresh, and the scales may have been rubbed off. If it is not *perusii*, it will, I think, have to be made into a new species.

Two skeletons are in the Museum, prepared by Dr. Knox.

Agonostoma.

Cleft of the mouth extending nearly to the eye; small teeth in one or both of the jaws, and sometimes on the palate; the lower lip with the margin rounded, not sharp.

Fresh waters of the West Indies, Central America, Australia, Celebes, Mauritius, and the Comora Islands.

58. AGONOSTOMA FORSTERI. Bl. C.M.

Sea Mullet.

Mugil forsteri, Rich., p. 77, pl. 44. *Dajaus diemensis*, Rich., p. 37, pl. 26. Jenyns, p. 82. *A. forsteri et diemensis*, Cat. Col. Mus. *A. forsteri*, Günth., III., 465.

D. 4 | $\frac{1}{10}$; A. $\frac{3}{12}$; L. Lat., 55.

Length four and two-third times that of the head, or five and a half times the height of the body; interorbital space flat, one-third the length of the head; snout produced, one and a half times the diameter of the eye; præorbital serrated; dorsal half way between the snout and the tail; teeth on the jaws, vomer, and palate.

Back shining blue and green, below silvery white; fins yellowish brown, finely dotted with black; caudal blackish at the tip; iris yellow.

A skeleton is in the Museum, prepared by Dr. Knox.

Australia.

This fish never attains to so large a size as the last; it spawns in November. It is commonly called the Herring by fishermen, but it is better to reserve that name for a true Herring which is found on the coasts, and will probably be brought into the market as soon as deep sea trawling is introduced.

TRICHONOTIDÆ.

Body elongate, subcylindrical, scales moderate, cycloid; eyes directed upwards; teeth in villiform bands; one long dorsal fin with articulated not branched rays, and without a distinct spinous portion; anal long; ventrals jugular, with one spine and five rays; gill openings very wide; seven branchiostegals; carnivorous.

Hemerocœtes.

Head depressed, pointed; tail slightly compressed; mouth wide, upper jaw longer; teeth on the vomer, none on the palate; nostrils produced into tubes.

New Zealand only.

59. HEMEROCŒTES ACANTHORHYNCHUS. Forst. C.M.

H. acanthorhynchus, Rich., p. 123, pl. 54. Günth., III., 485.

D. 39 – 41; A. 36 – 37; L. Lat., 47.

Length three and three-fourths that of the head, or eight and three-fourths the height of the body; space between the eyes very narrow,

only one-fifth of the diameter of the eye; vent under the fourth dorsal ray; maxillary bone terminating anteriorly in a spine.

Reddish olive, or reddish purple, sometimes with six or seven darker bands on the back; ventrals, fore part of anal, and lower margin of pectorals reddish.

Wellington Harbour.

CENTRISCIDÆ.

Body compressed, oblong, or elevated; the anterior bones of the skull much produced, forming a tube, which terminates in a narrow mouth; teeth none; body with dermal ossifications; two dorsal fins, the spinous short, and with one of the spines strong; ventrals abdominal, small, or rudimentary.

CENTRISCUS.

Body covered with small rough scales; some bony strips on the side of the back, and on the margin of the thorax and abdomen; four branchiostegals.

England, Africa, Japan, and Australia.

60. CENTRISCUS HUMEROSUS. Rich. C.M.

Snipe Fish.

C. humerosus, Rich., p. 56, pl. 34. Günth., III., 522.

D. 7|15; A. 17.

LENGTH equal to two and two-fifths that of the head, or two and one-fourth times the height of the body; second dorsal spine very strong, nearly as long as the head, and with two rows of teeth on its posterior edge; suboperculum rough, with small spines on its inferior margin.

A dried specimen is in the Museum, from Cook Straits.

Australia.

FISTULARIDÆ.

Greatly elongated, anterior bones of the skull produced into a tube, which is terminated by a narrow mouth; scales none, or small; ventrals abdominal.

FISTULARIA.

Body scaleless; caudal forked, with the two middle rays produced into a filament; no free dorsal spines; teeth small.

Tropical parts of the Atlantic and Indian Oceans.

61. FISTULARIA SERRATA. Cuv. C.M.

F. serrata, Günth., III., 533.

D. 13–15; A. 13–15; P. 13; V. 6; C. 8|2|8.

Length two and three-fifths that of the head; length of the head more than ten times its greatest breadth; snout equals three-fourths of the length of the head; eye oval, its horizontal diameter being two and a half times the vertical; outer edge of the tube serrated; operculum striated, rounded below.

Brownish, paler below (dried).

Two dried specimens are in the Museum; they belonged to the New Zealand Society's collection.

China, Australia, and Andaman Islands.

NOTACANTHI.

Body elongate, with small scales; snout produced beyond the mouth; eyes lateral, of moderate size; dentition feeble; *dorsal fin composed of short free spines;* anal very long, anteriorly with many spines; ventrals abdominal, composed of more than five soft rays.

Seas of the arctic and temperate regions of both hemispheres.

Notacanthus.

Characters the same as of the family.

Arctic Seas, Mediterranean, and Australia.

62. NOTACANTHUS SEXSPINIS. Rich. C.M.

N. sexspinis, Rich., p. 54, pl. 32. Günth., III., 545.

D. 6–8|1; A. $\frac{12\text{-}15}{120}$; P. 12; V. $\frac{2}{7}$.

Length seven times that of the head, or ten times the height of the body at the ventrals; snout soft, about one-fourth of the length of the head; eye very variable in size; tail pointed; no caudal; ventrals completely united, placed in front of the first dorsal spine; pectorals small, pointed, less than half the length of the head; vent under the third and fourth dorsal spines; a single series of small cardiform teeth on each jaw, and on the vomer; gill membranes united under the throat.

Pale pink above, whitish below; inside of the mouth black; anal fin black.

Thrown up on the shore in considerable numbers after heavy gales.

Australia.

GOBIESOCIDÆ.

Body depressed anteriorly, naked; a single dorsal on the tail without spines; anal short; ventrals wide apart, with one spine hidden in the skin, and four or five rays, *a large adhesive apparatus between them*; carnivorous.

DIPLOCREPIS.

Snout somewhat pointed; posterior portion of adhesive disc, with the anterior margin free; *both jaws with incisors*, and other smaller teeth behind; gills three.

New Zealand only.

63. DIPLOCREPIS PUNICEUS. Rich. C.M.

Sucker.

Lepidogaster puniceus, Rich., p. 71, pl. 43. *D. puniceus*, Günth., III., 506.

D. 10–11; A. 4–5–.

LENGTH two and two-fifths that of the head; length of the head rather more than its breadth; interorbital space equal to the diameter of the eye; anterior nostril with a tentacle on the posterior edge; lower posterior angle of operculum produced backwards into a point covered with skin; mouth inferior.

Bright rose color, yellowish below.

Cook Straits, Wellington Harbour.

TRACHELOCHISMUS.

Snout rounded; *posterior portion of the adhesive disc suspended at the coracoid bones*, with the anterior margin free; jaws with a patch of small teeth in front, and with a series on the sides, no incisors; gills three and a half.

Fiji Islands.

64. TRACHELOCHISMUS PINNULATUS. Forst. C.M.

T. pinnulatus, Günth., III., 509.

D. 8; A. 7.

LENGTH rather more than two and a half times that of the head; length of the head nearly one and a half times its breadth; interorbital space nearly twice the diameter of the eye; both nostrils with short tentacles, the anterior ones being the longest.

Red or pink, marbled and longitudinally streaked on the back with olivaceous brown, occasionally spotted or banded with pale yellowish; throat and disc yellow; fins pink, spotted with yellowish.

Wellington Harbour.

65. TRACHELOCHISMUS GUTTULATUS. sp. nov. C.M.

D. 7; A. 8; C. 12.

Length rather more than two and a half times that of the head; length of the head about one and two-fifths its breadth; interorbital space twice the diameter of the eye; no tentacles on the nostrils.

Dark olive brown, with irregular spots of pale brownish yellow, below yellowish; iris red when alive, yellow when dead.

Wellington Harbour.

The ventrals overlap the pectorals, but are not connected with them; disc between them broader than long; the coracoids extend upwards beyond the middle of the base of the pectorals; dorsal and anal opposite; caudal free, rounded.

Order II. — ACANTHOPTERYGII PHARYNGOGNATHI.

Part of the rays of the dorsal, anal, and ventral fins not articulated, forming spines. The inferior pharyngeal bones coalesced, with or without a median longitudinal suture.

POMACENTRIDÆ.

Body compressed, more or less short, *covered with ctenoid scales;* dentition feeble; palate smooth; one dorsal, with the spinous portion as well developed as the soft; ventrals thoracic, with one spine and five rays.

Dascyllus.

Præoperculum serrated; teeth in a narrow band, with an outer series of somewhat larger ones; anal with two spines; the lateral line ceases below the soft dorsal; branchiostegals five.

From the eastern coasts of Africa to Polynesia.

66. DASCYLLUS ARUANUS. L.

D. aruanus, Günth., IV., 12.

D. $\frac{12}{12}$; A. $\frac{2}{12}$; L. Lat., 26–27; L. Trans., 3/9.

THREE black cross bands, the first descending obliquely from the origin of the spinous dorsal through the orbit to the chin, leaving a greyish patch on the forehead; the second slightly curved, from the sixth to ninth dorsal spines to the ventral fins, which are black; the third from the soft dorsal to the anal. Dorsal and anal fins black; caudal whitish (Günth.)

From the eastern coasts of Africa to Polynesia and New Zealand (Günth.)

I have seen no specimens.

LABRIDÆ.

Body oblong, *covered with cycloid scales;* one dorsal, with the spinous portion as well developed as the soft; ventrals thoracic, with one spine and five soft rays; palate without teeth.

LABRICHTHYS.

Body covered with large scales; snout more or less pointed; opercles scaly; lateral line continuous; teeth in the jaws in a single series, *with a posterior canine tooth* (absent in young specimens); formula of the fins, D. $\frac{9}{11}$; A. $\frac{3}{10}$.

Pacific, East Indian Archipelago.

67. LABRICHTHYS CELIDOTA. Forst. C.M.

Sea Perch.

Labrus celidotus, Rich., p. 53, pl. 31. *Labrichthys celidota*, Günth., IV., 113. *Labrus pœcilopleura*, C. and V.

D. $\frac{9}{11}$; A. $\frac{3}{10}$; L. Lat., 27; L. Trans., 3/9.

GREENISH grey, many of the scales tipped with brown; belly white, marked with pink or orange; a dusky band from behind the eye to the shoulder, and a black spot on the lateral line below the commencement of the soft dorsal; vertical fins more or less marked with orange; iris brown. Caudal rounded.

Common. Australia.

68. LABRICHTHYS BOTHRYOCOSMUS. Rich. C.M.

Wrasse.

Labrus bothryocosmus, Rich., p. 53, pl. 31. *Labrichthys bothryocosmus*, Günth., IV. 114.

D. $\frac{9}{11}$; A. $\frac{3}{10}$; L. Lat., 27; L. Trans., 3/9.

Sometimes with a pair of anterior canine teeth in the upper jaw; the three front teeth of the lower jaw longer than the others.

Reddish olive (in spirits); a cluster of blackish spots between the lateral line and the hind part of the spinous dorsal; dorsal and anal fins with a dusky longitudinal band. Caudal rounded.

Wellington Harbour; South Australia and Tasmania.

69. LABRICHTHYS PSITTACULA. Rich. C.M.

Parrot Fish.

Tautoga psittacula, Rich., p. 129, pl. 56. *L. psittacula*, Günth., IV., 114. *L. rubiginosus*, Cat. Col. Mus.

D. $\frac{9}{11}$; A. $\frac{3}{10}$; L. Lat., 27; L. Trans., 3/9.

Two anterior canine teeth in each of the jaws.

Head rose pink; throat, chin, and above the shoulders, whitish; body sometimes uniform red, sometimes pale pinkish yellow, each scale tipped with deep pink; dorsal and anal yellowish, edged with pale purple and with four or five rows of orange spots; caudal yellowish, margined with grey, and red at the base; iris pale rose; caudal lunulate.

Cook Straits, not uncommon; Tasmania.

Of *Julis? prasiophthalmus*, Solander, there appears to be no description.

Odax.

Cheeks and opercles scaly; scales of the body small; snout conical; dorsal spines flexible.

Coasts of Australia.

70. ODAX VITTATUS. Soland.

O. vittatus, Günth., IV., 242.

D. 34; A. 14.

Entirely brown, with a silver band from the mouth to the caudal, occasionally with small violet spots on the back and sides.

Dorsal fin lower in the middle.

Inhabits the sea at Mataruhow (?), New Zealand (Günth.)

I have seen no specimens.

CORIDODAX.

Head naked; a few scales behind the orbit; scales of the body small; lateral line continuous; snout of moderate extent; dorsal spines numerous, flexible.

New Zealand only.

71. CORIDODAX PULLUS. Forst. C.M.

Butter Fish.

C. pullus, Günth., IV., 243.

D. $\frac{17}{17}$; A. $\frac{3}{11}$; L. Lat., 80–90; L. Trans., 10/25.

THREE series of small scales behind the orbit; præoperculum entire; caudal square; dorsal and anal getting larger posteriorly; ventrals a little behind the pectorals; mouth small, maxillary not reaching to the anterior margin of the eye.

Above dark brown, with greyish streaks; belly grey, marbled with brown; fins dark brown, spotted with greenish grey; iris orange.

Cook Straits.

Order III.—ANACANTHINI.

Vertical and ventral fins without spinous rays; ventrals, if present, jugular or thoracic.

GADIDÆ.

BODY more or less elongate, covered with small smooth scales; one, two, or three dorsal fins; *one or two anal fins, with or without a barbel;* caudal separate; ventrals jugular.

GADUS.

Moderately elongate; three dorsal and two anal fins; ventrals narrow, composed of six or more rays; teeth in the upper jaw in a narrow band; teeth on the vomer, none on the palate; seven branchiostegals.

72. GADUS AUSTRALIS. sp. nov. C.M.

Haddock.

D. 11–12 | 19 | 22 ; A. 19 | 22 ; V. 7.

Length equal to four and one-third times that of the head, or seven and a half times the height of the body ; length of the head two and four-fifths that of the snout; diameter of the eye not much more than half the length of the snout ; lower jaw longer ; no barbel ; strong teeth in both jaws, the outer series being shorter and fixed, the inner longer and capable of being folded back ; strong teeth in a double series on the vomer, none on the palatine bones ; upper profile of head straight, snout conical ; head higher than broad ; maxillary extending to beyond the middle of the eye ; scales very small ; vent rather nearer to the snout than to the end of the tail, below the commencement of the second dorsal ; a space between the first and second dorsal, the second and third subcontinuous ; a short space between the anals ; proportions of the fins—

1 D.	2 D.	3 D.	1 A.	2 A.
1	2·7	1·9	2·4	2·1

Above purplish, sides, and belly silvery ; inside of the mouth white.

Thrown up on the coast by heavy storms.

It is said sometimes to attain a length of 4 feet.

Cook Straits.

Halargyreus.

Moderately elongate, covered with small scales ; two dorsal and two anal fins, the latter subcontinuous ; ventrals composed of several rays ; jaws with a band of minute villiform teeth of equal size ; palate smooth ; no barbel ; seven branchiostegals ; gill rakers of the outer branchial arch long.

Atlantic.

73. HALARGYREUS JOHNSONII. Gunth. C.M.

H. johnsonii, Günth., IV., 343.

D. 8 | 54 ; A. 24 | 20 ; V. 5.

Length equals four and three-fifths that of the head, or six and a quarter times the height of the body ; length of the head three and three-fourths that of the snout ; upper profile straight ; head higher than

broad; maxillary reaching to about the middle of the eye; a small bony tubercle at the symphysis of the lower jaw; diameter of the eye equal to length of the snout; vent rather nearer the snout than the end of the tail.

Pale reddish silvery, lighter below; interior of the mouth purplish black.

Total length about 10 inches.

Thrown up on the coasts during heavy gales.

Cook Straits; Madeira.

LOTELLA.

Body of moderate length; two dorsal fins and one anal; ventral fins with a flat base, and composed of several rays; teeth in the upper jaw in a band, with an outer series of larger ones; palate smooth; chin with a barbel; seven branchiostegals.

Japan.

74. LOTELLA RHACINUS. Forst. C.M.

Hake.

L. rhacinus, Günth., IV., 347.

D. 5 | 68; A. 62; V. 6.

LENGTH four times that of the head; upper jaw longer; ventrals pointed; dorsal and anal when laid flat overlap the commencement of the caudal; distance of the end of the dorsal from the end of the tail equal to one and a half times the depth of the body at the end of the dorsal.

Uniform blackish?

I have seen no fresh specimens.

Cook Straits.

75. LOTELLA BACCHUS. Forst. C.M.

Red Cod.

L. bacchus, Günth., IV., 347.

D. 10 | 41; A. 41; V. 6.

LENGTH four and a quarter times that of the head, or four and a half times the height of the body; upper jaw rather longer; ventrals pointed; dorsal and anal when laid flat do not overlap the commencement of the

caudal; distance of the end of the dorsal from the end of the tail equal to two and a half times the depth of the body at the end of the dorsal.

Reddish or greyish silvery, with fine brown reticulated markings on the back and sides; below and ventrals whitish; dorsal like the back; lower lip and barbel red; a black spot in the upper part of the axil of the pectorals; iris greyish white.

Wellington Harbour.

Pseudophycis.

Body of moderate length, with rather small scales; two dorsal fins and one anal; ventral fins with a very narrow styliform base, but composed of several rays; teeth in the jaws in a band, of equal size; palate smooth; chin with a barbel; seven branchiostegals.

New Zealand only.

76. PSEUDOPHYCIS BREVIUSCULUS. Rich. C.M.

Lota breviuscula, Rich., p. 61, pl. 38. *P. breviusculus*, Günth., IV., 350.

D. 8 | 46; A. 50; V. 5; L. Lat., 85.

The ventral fin does not extend to the vent; seven or eight series of scales between the anterior dorsal and the lateral line.

This species is represented in the Museum by a sketch by Mr. Buchanan. Dr. Hector informs me that it is very common in Dusky Bay.

I have seen no specimens.

OPHIDIIDÆ.

Body elongate, naked or scaly; vertical fins generally united into one; dorsal occupying the greater portion of the back; ventrals rudimentary, jugular; gill openings wide, the gill membranes not attached to the isthmus.

Genypterus.

Body elongate, compressed, covered with minute scales; ventral fins replaced by a pair of bifid filaments; teeth on the jaws, vomer, and palatine bones, the outer series in the jaws, and the single series of the palatines contain strong teeth; lower jaw received within the upper; vent situated at some distance behind the pectorals; seven or eight branchiostegals.

South Africa and South Pacific.

77. GENYPTERUS BLACODES. Forst. C.M.

Ling.

G. blacodes, Günth., IV., 379.

Length equal to seven times that of the head, or nearly ten times the height of the body; length of the head eight times the diameter of the eye; barbels (ventrals) with the outer filament longer, about one half the length of the head; head covered with a thick soft skin.

Back purplish, the rest reddish white marbled on the sides with reddish purple; silvery; vertical fins margined with white.

Common in the southern parts of the country, and attains a very large size.

The specimen from which this description was taken measured $3\frac{1}{2}$ feet in length, and was considered a small one.

Coasts of Chili and Peru.

FIERASFER.

Body produced into a very long and tapering tail, naked; vertical fins continuous, very low; no ventrals nor barbels; cardiform teeth on the jaws, vomer, and palatine bones, sometimes with canines; vent at the throat; gill openings wide; seven branchiostegals.

Europe, Indian Archipelago, Australia, New Zealand (Günth.)

No particular species of this genus is mentioned in Dr. Günther's Catalogue as coming from New Zealand.

MACRURIDÆ.

Body terminating in a long compressed tapering tail, covered with spiny, keeled, or striated scales; *one short anterior dorsal*, the second very long and continued to the end of the tail; anal similar to the second dorsal; ventrals thoracic or jugular, composed of several rays; six or seven branchiostegals.

Macrurus.

Scales of moderate size, keeled or spiny; snout produced, conical; mouth inferior; teeth in a band, villiform or cardiform, without larger ones in the outer series; palate smooth; ventrals nearly below the pectorals; a barbel.

Mediterranean and North Atlantic, Japan, Australia.

78. MACRURUS AUSTRALIS. Rich. C.M.

M. australis, Günth., IV.. 391.

D. 12 | 88 ; A. 87 ; V. 7 ; L. Lat. ca., 130 ; L. Trans., 4/15.

Length equal to four and a half times that of the head, which is equal to two and three-fourths that of the snout ; diameter of the eye rather less than the length of the snout; an obtuse ridge from the snout to the angle of the præoperculum ; vent situated below the end of the first dorsal.

Uniform pale brownish grey, rather paler below ; throat reddish ; anal white in front, dusky with small black dots behind, as also are the dorsals and pectorals ; iris silvery.

Wellington Harbour, one specimen only, November, 1871 ; Australia.

Coryphænoides.

Scales moderate, spiny or smooth ; snout short, with the cleft of the mouth lateral ; teeth in the upper jaw in a narrow band, those of the outer series larger than the others ; palate smooth ; ventrals below pectorals ; a barbel.

From Scandinavia to Madeira ; Australia.

79. CORYPHÆNOIDES NOVÆ ZELANDIÆ. Hect. C.M.

Hoki.

C. novæ zelandiæ, Hect., Trans. N.Z. Inst., III., 136.

D. 12 | 102 ; A. 92 ; V. 8.

Length equal to five and a half times that of the head, which is equal to three and one-fourth times the length of the snout, which is about equal to the diameter of the eye ; snout conical ; vent nearer the snout than the tail by twice the diameter of the eye, situated under about the fifteenth ray of the second dorsal ; scales spiny.

Above purplish with green reflexions, below white ; a pale brown patch from the eye to the pectoral fin.

Thrown up in large quantites on the shores of Cook Straits after heavy gales ; occasionally caught in Wellington Harbour.

80. CORYPHÆNOIDES DENTICULATUS. Rich. C.M.

Macrorus denticulatus, Rich., p. 53, pl. 32. *C. denticulatas*, Günth., IV., 396.

D. 11 | 100 ; A. 90 ; V. 9 ; C. 6 – 0.

Length five and three-fourths that of the head, which is four and three-fourths that of the snout ; diameter of the eye one and three-fourths

the length of the snout; snout short, flat in front, with three ridges on its upper surface, the centre one of which is highest; præoperculum with a sinuated ridge; scales spiny; lateral line arched, becoming straight below the commencement of the second dorsal.

Back pale grey; sides and belly silvery white; iris tinted with yellow.

Cook Straits, thrown up in immense quantities after heavy gales; South Australia.

PLEURONECTIDÆ.

Body strongly compressed, flat, with one of the two sides colored; both eyes on the colored side; dorsal and anal fins long, without division; gills four; carnivorous.

Brachypleura.

Mouth wide, the length of the maxillary being one-half that of the head; teeth pointed, curved, nearly equally developed on both sides; the anterior of the upper jaw enlarged and in two series, those of the lower jaw in a single series; vomerine teeth; eyes on the right side; dorsal commencing on the snout; scales moderate; lateral line straight.

New Zealand only.

81. BRACHYPLEURA NOVÆ ZELANDIÆ. Gunth.

B. novæ zelandiæ, Günth., IV., 419.

B. 6; D. 72; A. 28; L. Lat., 30.

Height of the body contained twice and a half in the length, the length of the head thrice and a quarter; snout with the lower jaw very prominent; vomer very prominent; eyes separated by a mere ridge, *the upper in advance of the lower.*

Coloration uniform (Günth.)

New Zealand.

I have seen no specimens.

Pseudorhombus.

Mouth wide, the length of the maxillary being more than one-third that of the head; teeth in both jaws in a single series, of unequal size; vomer and palate smooth; *eyes on the left side*; dorsal commencing on the snout; lateral line with a strong curve anteriorly; gill membranes united below the throat.

From the eastern coasts of Africa to the Pacific coasts of Central and South America; New York, Brazil.

82. PSEUDORHOMBUS SCAPHUS. Forst. C.M.

Brill.

D. 110 ; A. 93 ; L. Lat., 85.

Length equal to four and three fourths the length of the head, or two and three-fourths the height of the body ; lower jaw prominent ; teeth rather large, conical, pointed, the lateral ones of the upper jaw the shortest ; interorbital ridge very narrow, naked ; left or lower eye rather in advance of the upper ; dorsal commences before the eye ; scales ctenoid, those on the cheeks smaller ; curve of the lateral line flat above ; the greatest depth between the anal fin and the lateral line is rather less than the length of the head.

Coloration uniform, brownish above, white below.

Wellington Harbour.

I have never seen Forster's drawing or description, but from the remarks made by Gray and Richardson, when describing *Rhombus plebeius* (Dieff., N.Z., II, p. 222), I think there is very little doubt but that this is the fish that Forster described.

Rhombosolea.

Eyes on the right side, the lower in advance of the upper ; mouth unsymmetrical ; the length of the left maxillary less than one-third of that of the head ; teeth on the blind side only, where they form villiform bands ; dorsal commencing on the foremost part of the snout ; only one ventral, which is continuous with the anal ; scales small, cycloid ; lateral line stright ; gill membranes broadly united below the throat.

Australia, Tasmania.

83. RHOMBOSOLEA MONOPUS. Gunth. C.M.

Flounder. Patiki.

Rhombus plebeius, Rich., Dieff., N.Z., II., 222. *Rhombosolea monopus*, Günth., IV., 459. *R. monopus et tapirina*, Cat. Col. Mus.

B. 5 ; D. 59 – 61 ; A. 42 – 44 ; V. 6.

Length three and two-thirds that of the head, or one and four-fifths the height of the body.

Olivaceous brown, with reddish tints on the head and fins ; below greyish white.

Very common all round the coasts ; Australia.

A small flat-fish, also called Patiki by the Maoris, is found in some of the rivers; it is brown, with red blotches on the upper side. I do not know whether it is identical with this species or not.

PELTORHAMPHUS.

Eyes on the right side; mouth small, twisted towards the left side, toothless on the other; teeth minute, in two distant series on the left branches of the jaws; snout dilated, flat, sharp, bent downwards, hook-like; dorsal commencing on the foremost part of the snout; ventrals two, the right continuous with the anal, the left small; scales small, ctenoid; lateral line straight; gill membranes broadly united below the throat.

New Zealand and Norfolk Island.

84. PELTORHAMPHUS NOVÆ ZELANDIÆ. Gunth. C.M.

Sole.

P. novæ zelandiæ, Günth., IV., 461.

B. 5; D. 92–100; A. 57–64; V. dextr. 6; sin. 5; L. Lat., 78.

LENGTH three and one-fourth times that of the head, or two and four-fifths the height of the body; lower eye slightly in advance; anterior rays of the dorsal protrude beyond the membrane.

Olivaceous grey, dotted with black, and with two dark spots on the lateral line; caudal reddish.

Wellington Harbour, Norfolk Island.

Order IV.—PHYSOSTOMI.

All the fin rays articulated, only the first of the dorsal and pectoral fins is sometimes more or less ossified; ventrals, if present, abdominal, without a spine; air-bladder, if present, without a pneumatic duct.

SCOMBRESOCIDÆ.

Body covered with scales; a series of keeled scales along each side of the belly; *dorsal fin opposite the anal;* no adipose fin; lower pharyngeals united into a single bone.

SCOMBRESOX.

Both jaws prolonged into a long slender beak, each with a series of extremely minute teeth; body elongate, compressed, slender; scales deciduous; a number of detached finlets behind the anal and dorsal fins; gill openings very wide.

Atlantic, Chili, Japan.

The jaws are not produced in very young fishes, and during growth the lower jaw is much in advance of the upper.

85. SCOMBRESOX FORSTERI. C. and V. C.M.

Skipper.

S. forsteri, Günth., VI., 258. *Belone*, Sp. Cat. Col. Mus.

D. 10 | V. ; A. 11 | VII. ; P. 15 ; V. 6.

LENGTH equal to four and a half times that of the head, or ten times the height of the body; length of the head about one and two-fifths that of the snout; lower jaw longer; base of ventrals half way between the root of the caudal and the anterior margin of the eye; upper pectoral ray very broad.

Above shining plumbous blue, below silvery white.

A single specimen, 12 inches long, is in the Museum, presented by H. Travers, Esq.

HEMIRAMPHUS.

The lower jaw prolonged into a long slender beak, the upper short, both with a narrow band of minute teeth; body elongate, slender; no finlets; gill openings very wide.

Seas in and near the Tropics.

Very young specimens have not the lower jaw prolonged.

86. HEMIRAMPHUS INTERMEDIUS. Cant. C.M.

Gar Fish.

H. intermedius, Günth., VI., 260.

D. 15 – 17 ; A. 18 – 20 ; P. 11.

LENGTH three times that of the head, or five and three-fifths the projection of the lower jaw beyond the upper; upper jaw rather longer than broad; base of the ventral fin situated half way between the base of the caudal and that of the pectoral; pectoral short; caudal emarginate.

Back dark greenish blue; sides with a silvery band; pectorals blackish.

Wellington and Auckland, abundant; Australia, China.

A skeleton in the Museum, prepared by Dr. Knox.

ARRHAMPHUS.

Like *Hemiramphus*, but the lower jaw is not produced into a beak; scales rather large; pectorals moderate.

Habitat —?

87. ARRHAMPHUS SCLEROLEPIS. Gunth.

A. sclerolepis, Günth., VI., 277.

D. 13; A. 15; L. Lat., 43.

BODY compressed, its greatest depth being contained six and a half times in the total; the length of the head is a little less than one-fourth of the same; dorsal and anal scaly at the base; sides with a well defined silvery band (Günth.)

Two examples of this fish, in the British Museum, are supposed to come from New Zealand, but their locality is uncertain.

I have seen no specimens.

EXOCŒTUS.

Jaws short; teeth minute; body oblong, with rather large scales; pectorals very long, an organ of flying; no finlets; gill openings very wide.

Tropics and temperate zones.

88. EXOCŒTUS MICROPTERUS. C. and V.?

Esox subpelluceus, Soland. ? *E. micropterus*, Günth., VI., 279.

D. 15; A. 14–16.

Two short barbels at the symphysis of the lower jaw; ventral fins short, not extending to the anal; pectorals short, only two-sevenths of the length; insertion of the ventral midway between the root of the caudal and the axil of the pectoral (Günth.)

Indian and Australian seas.

This, probably, is the bearded species of Flying Fish drawn by Solander, but I have seen no specimens.

89. EXOCŒTUS SPECULIGER. C. and V. C.M.

Flying Fish.

E. evolitas, Cat. Col. Mus. *E. speculiger*, Günth., VI., 287.

D. 10 – 12 ; A. 12 – 13 ; L. Lat., 50.

Length one and one-seventh times the length of the head, which is nearly three and three-fourths the length of the snout ; diameter of the eye one and one-third times the length of the snout, and rather less than the interorbital space ; depth of the head equal to the distance from the end of the snout to the hind margin of the orbit ; interorbital space concave ; no barbels ; the pectoral fin extends beyond the dorsal and anal, nearly to the rudimentary rays of the caudal ; ventrals nearly midway between the eye and the root of the caudal, extending to the end of the base of the anal.

Above purplish, below silvery white ; an oblique white band across the lower half of the pectorals, and with a broad whitish edge.

A specimen, 10 inches long, from the Bay of Islands.

Indian Ocean and Australia.

Very large Flying Fish are seen off the Great Barrier Island and the north coast of New Zealand.

STERNOPTYCHIDÆ.

Body naked, or with very thin deciduous scales ; no barbels ; adipose fin present ; *margin of the upper jaw formed by the maxillary and intermaxillary*, both of which are toothed ; opercular apparatus not completely developed ; gill opening very wide ; *a series of phosphorescent bodies along the lower parts.*

Deep sea fishes. Mediterranean and Atlantic.

Phosichthys. gen. nov.

Body rather elongated, compressed, without scales, but covered with a silvery pigment ; a series of phosphorescent spots along the lower side of the body and tail ; head compressed, with the bones thin ; cleft of the mouth wide, obliquely descending ; maxillary large, produced backward, and receiving the intermaxillary in the upper concave part of its margin ; some large teeth in both jaws, and a single row of curved

teeth on the palatine bones ; pectorals small ; dorsal in the centre of the body ; adipose fin small ; anal long ; caudal divided into three portions, the central one short and pointed ; branchiostegals numerous ; pseudobranchiæ none.

New Zealand.

90. PHOSICHTHYS ARGENTEUS. sp. nov. C.M.

B. 20 – 21 ; D. 13 ; A. 25 ; V. 8 ; P. 9.

Length equal to four and two-fifths that of the head, or five and two-fifths the height of the body ; length of the head three and three-fifths its breadth ; mouth very wide, the distance from the snout to the end of the maxillary being nearly as great as the height of the body ; eye in advance of the centre of the cleft, and its diameter rather less than the length of the snout ; teeth in the upper jaw small, cardiform, in a single series, with two long fangs in front on each side ; mandibulæ with seven long teeth on each side, some of which have a smaller moveable tooth just behind, and the hinder ones with small cardiform teeth between, in front there is an outside row of curved teeth ; teeth on the palatine bones, longer in front ; operculum weak, formed by three thin bony scale-like plates ; gill openings very wide ; pectorals placed very low down, in length about half the height of the body ; dorsal commencing about half way between the snout and the commencement of the caudal ; adipose fin half way between the end of the dorsal and the base of the caudal, in length about one-sixth the height of the body ; ventrals rather in front of the dorsal, and longer than the pectorals ; anal tapering off posteriorly and ending at a distance from the end of the tail rather less than twice the smallest depth of the body.

Back brownish grey ; sides silvery ; abdomen black, with numerous (40-45 on each side) silvery bands, above each of which is placed a phosphorescent organ slightly prominent on a black globular body ; fins white, transparent ; inside of the mouth black ; iris white.

Cook Straits, thrown on shore after heavy gales.

About 12 inches in total length.

Dr. Hector obtained a small fish in Milford Sound, which he thinks was a species of *Scopelus*. The drawing that he made at the time shows that it was a very different fish from the one here described, but I am unable to offer an opinion as to whether it belonged to this family or to the *Scopelidæ*.

HAPLOCHITONIDÆ.

Body naked or scaly; adipose fin present; margin of the upper jaw formed by the intermaxillary; opercular apparatus complete; barbels none; gill openings rather wide; pseudobranchiæ well developed.

Fresh water fishes from South America and South Australia.

PROTOTROCTES.

Body oval, slightly compressed; dorsal rather behind the ventrals, which are in the middle of the body, and composed of seven rays; adipose fin small; caudal emarginate; teeth minute, in a single series on the jaws, vomer, and palatine bones; gill openings rather wide; branchiostegals six.

Southern Australia.

91. PROTOTROCTES OXYRHYNCHUS. Gunth. C.M.

Grayling.

P. oxyrhynchus, Günth, P.Z.S., 1870. *Retropinna opokororo*, Hect., Trans. N.Z. Inst., III., 134.

D. 11 – 12; A. 18 – 19; L. Lat., 100; L. Trans., 19.

LENGTH six and three-fifths that of the head, or five times the height of the body; snout conical; lower jaw shorter.

Reddish brown, paler below, sometimes speckled with grey on the back; variable in color.

Waikato, Hutt, Maitai, Waimakariri, and Clutha.

A skeleton is in the Museum, prepared by Dr. Knox.

SALMONIDÆ.

Body covered with scales; head naked; margin of the upper jaw formed by the intermaxillaries mesially, and by the maxillaries laterally; belly rounded; a small adipose fin behind the dorsal.

Fresh waters of the temperate and arctic northern regions.

RETROPINNA.

Body covered with scales of moderate size; cleft of the mouth moderate or wide; teeth in a single series on the jaws, vomer, palatines, and pterygoids; tongue with a double series of hooked teeth; dorsal situated far backwards, above the vent; anal rather long; caudal forked.

Fresh waters of New Zealand only.

92. RETROPINNA RICHARDSONI. Gill. C.M.

Smelt.

Argentina retropinna, Rich., p. 121, pl. 52, (Young.) *R. richardsoni*, Günth, VI., p. 171. *Retropinna osmeroides*, Hect., Trans. N.Z. Inst., III., 134.

B. 6; D. 11–12; A. 17–20; P. 11; V. 6; L. Lat., 60–73.

Length four and a half times that of the head, or five and one-third times the height of the body; snout longer than the diameter of the eye in the adult, but shorter in immature specimens; mouth moderate, maxillary extending to behind the centre of the eye; posterior end enlarged and curved downwards; lower jaw longer; ventrals situated rather before the middle of the body.

Above pale grey, below white; a silvery band along the sides.

Common in rivers and lakes. In the Waikato they go down to the sea to spawn in April, and the young fish return in October, when, together with the young of *Galaxias attenuatus*, they are called White-bait. After comparing a large series of specimens of this fish from various parts of the country, I find that the form described by Dr. Hector as *R. osmeroides* is connected by so many intermediate links with *R. richardsoni*, that I have no doubt but that they are the same species. In the figure of *R. osmeroides* in the "Transactions of the New Zealand Institute," Vol. III., p. 134, the maxillary bone is not correctly drawn. The figure also in Vol. II., p. 84, of *Argentina retropinna* is the adult of *Retropinna richardsoni*.

GALAXIDÆ.

Body naked; belly rounded; no adipose fin; *dorsal situated far back, opposite to the anal.*

Galaxias.

A series of conical teeth in the jaws, on each palatine bone, and on each side of the tongue; those on the tongue hook-like.

Fresh waters of Australia, and the southern parts of South America.

93. GALAXIAS ALEPIDOTUS. Forst, C.M.

G. alepidotus, Rich., p. 77, Günth., VI., 208.

B. 10; D. 13; A. 11–15; P. 11; V. 7.

Length equal to four times that of the head, *which is equal to the height of the body;* diameter of the eye one-fifth of the length of the head,

and shorter than the snout; length of the pectoral more than one-half the distance of its root from the ventral, and the ventral terminates at a short distance from the vent; *the least depth of the tail is more than the distance between the dorsal and caudal fins.*

Blackish brown, with scattered, small, round, light colored spots or streaks. Attains a length of from 7 to 8 inches (Günth.)

I have seen no specimens.

94. GALAXIAS FASCIATUS. Gray. C.M.

Kokopu.

G. fasciatus, Rich., p. 77; Günth., VI., 209. *G. brocchus*, Rich., p. 76, pl. 43. *G. reticulatus*, Rich., p. 42.

B. 9; D. 11 – 12; A. 14 – 15; P. 13; V. 7.

Length four and a half times that of the head, *which is rather more than the height of the body;* diameter of the eye about one-fifth of the length of the head, and shorter than the snout; length of the pectoral more than one half the distance of its root from the ventrals, and the ventral terminates at a short distance from the vent; *the least depth of the tail equal to, or less than, the distance between the dorsal and caudal fins.*

Blackish or reddish brown, with undulated, more or less irregular, light colored cross bars.

River Thames, River Hutt, Lake Rotorua, Porirua, Chatham Islands, Auckland Islands.

Attains a length of 7½ inches.

A skeleton is in the Museum, prepared by Dr. Knox.

The figure of *Galaxias fasciatus* in the "Transactions of the New Zealand Institute," Vol. II., p. 84, is not that species, but *Galaxias attenuatus.*

95. GALAXIAS BREVIPINNIS. Gunth. C.M.

Gudgeon.

G. brevipinnis, Günth., VI., 213.

B. 7; D. II; A. 14; P. 13; V. 7.

Length five times that of the head, or seven and a half times the height of the body; diameter of the eye one-sixth of the length of the head, and much shorter than the snout; *length of the pectoral less than one-*

half the distance of its root from the ventral, and of the ventral more than one-half of its distance from the vent; the least depth of the tail is two-thirds of the distance between the dorsal and caudal fins.

Back dark brownish grey; sides and belly much paler, with irregular transverse markings of brownish grey on the sides; the whole body covered with minute black dots, the darker parts and bands being formed by their closer juxtaposition; sometimes yellowish; young yellowish olive, with numerous small round blackish spots on the body and fins.

Lake Coleridge, Lake Guyon.

Presented by W. T. L. Travers, Esq.

Attains a length of 5 to 6 inches.

96. GALAXIAS ATTENUATUS. Jenyns. C.M.

Minnow.

Mesites attenuatus, Jenyns, p. 121, pl. 22; *M. scriba*, Rich., p. 76. *M. maculatus*, Rich., p. 75, pl. 43. *G. attenuatus*, Günth., VI., 210.

B. 7; D. 9–11; A. 16–17; P. 12; V. 7.

Length five to five and a half times that of the head, or eight to ten times the height of the body; diameter of the eye one-fifth of the length of the head, equal, or nearly equal, to the snout; *length of the pectoral one-third of the distance of its root from the ventral, and the ventral only one-third of its distance from the anal;* the least depth of the tail is not quite one-half the distance between the dorsal and caudal fins.

Greenish yellow, more or less spotted with brown, each spot being composed of minute dots; top of the head generally darker than the rest of the body; operculum silvery.

Very variable, especially in the shape of the snout, the prominence of the eyes, and in the color, being sometimes almost without spots, and sometimes largely blotched on the back and sides with dark brown.

Abundant; Waikato, Lake Taupo, River Avon, Chatham Islands.

Attains a total length of $4\frac{1}{2}$ to 5 inches.

In the Waikato these fish go down to the sea to spawn in April or May, and the young return in September, October, and November, when, together with the young of *Retropinna richardsoni*, they are called Whitebait.

Tasmania, Falkland Islands, and southern parts of South America

Neochanna.

Like *Galaxias*, but with no ventral fins; snout rounded, each jaw with a series of equal, very small compressed teeth; palate toothless; a series of hook-like teeth on each side of the tongue.

New Zealand only.

97. NEOCHANNA APODA. Gunth. C.M.

Mud Fish.

N. apoda, Günth., Ann. and Mag. of Nat. Hist., 1867.

B. 7; D. 16; A. 17.

Length nearly four and a half times that of the head, or seven and a half times the length of the body; snout broad; eye small, about one-seventh of the length of the head; anterior nostrils produced into minute tubes; between the eye and the snout three pores, below the eye a line of three pores, from the gape to the end of the præoperculum three or four pores, and on the posterior margin of the præoperculum two pores; caudal rounded.

Darkish brown, with irregular transverse bands of yellowish white; below yellowish white; pectorals white; caudal, dorsal, and anal, white, with dark brown spots.

West coast of North and South Island.

A skeleton is in the Museum, prepared by Dr. Knox.

GONORHYNCHIDÆ.

Head and body entirely covered with spiny scales; mouth with barbels; margin of the upper jaw formed by the intermaxillary; no adipose fin; dorsal opposite the ventrals, and short like the anal; gill openings narrow.

Gonorhynchus.

Body elongate, subcylindrical; head pointed; snout conical, projecting beyond the mouth, which is inferior; a single barbel behind the end of the snout; two patches of obtuse teeth behind the palate, none in the jaws.

Cape of Good Hope, Australia, Japan.

98. GONORHYNCHUS GREYI. Rich. C.M.

Sand Eel.

Rhynchana greyi, Rich., pl. 29. *G. brevis*, Kner. Novara., Fisch., p. 342, taf. 16. *G. greyi*, Günth., VII., 373.

B. 4; D. 11–13; A. 9; V. 9.

Length five and one-seventh times that of the head, or ten and four-fifths the height of the body.

Back greyish brown, with minute black dots; a dark grey patch over each eye; scales on the sides pale purplish blue, edged with brown, and minutely dotted with black; belly reddish white; iris purplish brown.

Wellington Harbour, not uncommon; Cape of Good Hope, Australia, Japan, St. Paul's Island.

CLUPEIDÆ.

Body with scales; head naked; no barbels; abdomen frequently compressed into a serrated edge; margin of the upper jaw formed by the intermaxillaries mesially, and by the maxillaries laterally; no adipose fin; anal sometimes very long; gill openings wide; pseudobranchiæ large.

Engraulis.

Body oblong, compressed; snout more or less conical, projecting beyond the lower jaw; small teeth on the jaws, vomer, and palatine bones; intermaxillaries very small, hidden; anal fin long; mouth wide.

Temperate and tropical seas.

99. ENGRAULIS ENCRASICHOLUS. L.

Anchovy.

E. encrasicholus, var. *antipodum*, Günth., VII., 385.

B. 12–13; D. 16–17; A. 18–20; L. Lat., 48–50.

Length four times that of the head, or seven times the height of the body; snout pointed, projecting much beyond the lower jaw; maxillary very finely toothed; origin of the dorsal fin midway between the end of the snout and the root of the caudal; anal commencing at some distance behind the dorsal.

Sides and abdomen silvery, separated from the dark coloration of the back by a blackish stripe (Günth).

Coasts of Europe, Tasmania, New Zealand.

I have seen no specimens.

Clupea.

Body compressed, abdominal serrature extending forwards into the thoracic region; upper jaw not projecting beyond the lower; cleft of the mouth moderate; teeth none, or rudimentary; dorsal opposite the ventrals; caudal forked.

All parts of the globe.

100. CLUPEA SAGAX. Jenyns.

Pilchard or Sardine.

C. sagax, Jenyns, p. 134, Günth., VII., 443.

B. 7; D. 18; A. 18–19; L. Lat., 50–54; L. Trans., 13.

Length rather less than four times that of the head, or five times the height of the body; lower jaw slightly prominent; maxillary extending nearly to the middle of the eye; ventrals below the posterior half of the base of the first dorsal; abdominal serrature very indistinct; operculum with conspicuous radiating striæ decending towards the suboperculum; scales finely striated; a series of more or less distinct round blackish spots along the side (Günth.)

Pacific coasts of America, Japan, New Zealand.

I have seen no specimens.

Chanos.

Body oblong, compressed; abdomen flat; scales small, striated; lateral line distinct; snout depressed; mouth small, lower jaw with a small symphysial tubercle; no teeth; dorsal opposite the ventral; anal small, shorter than the dorsal; caudal deeply forked; gill membranes entirely united below; branchiostegals four; pseudobranchiæ well developed.

Indian and Pacific Oceans.

101. CHANOS SALMONEUS. Forst.

Herring.

Mugil salmoneus, Forst. *Lutodiera salmonea*, Rich., p. 58, pl. 36. *Chanos chloropterus*, Kner. Novara. Fisch., 341. *C. salmoneus*, Günth., VII., 473.

B. 4; D. 13–17; A. 9–10; L. Lat., 85–88; L. Trans., 13/16.

Uniform silvery (Günth.)

Tolaga Bay (Forst.)

I have seen no specimens.

Indian and Pacific Oceans.

MURÆNIDÆ.

Body elongate, cylindrical or band shaped, naked, or with rudimentary scales; no ventral fins; vertical fins confluent, or separated by the tip of the tail; sides of the upper jaw formed by the toothed maxillary at the sides, and the intermaxillary at the centre.

Anguilla.

Nostrils lateral; upper jaw not projecting; teeth small, forming bands; gill openings narrow at the base of the pectoral fins, *the dorsal fin commencing at a considerable distance from the occiput.*

Cosmopolitan.

102. ANGUILLA AUCKLANDII. Rich. C.M.

Eel. Tuna.

Anguilla aucklandii, Rich., p. 113, pl. 45, Günth., VIII., 33.

The length of the head is contained one and three-fifths in the distance between the gill openings and the origin of the dorsal fin, and rather more than twice in distance between the gill openings and the vent; dorsal commences at a distance before the vent, which is contained one and two-fifths in the length of the head; lower jaw longer; angle of the mouth behind the hind margin of the eye, which is much smaller than the snout; tail longer than the body in the proportion of eight to seven; *vomerine band of teeth tapering backwards, and extending as far, or nearly as far back as the maxillary teeth.*

Above dark greenish or greyish black, below light grey, paler on the chin and throat; iris yellow.

Abundant all over New Zealand, sometimes attaining to a length of 6 feet. In the Waikato large numbers of eels go down to the sea in February and March to breed, although many remain in fresh water all the year round. The young eels come up the river at the end of November, just after the Whitebait.

Auckland Islands.

Two skeletons, prepared by Dr. Knox, are in the Museum.

103. ANGUILLA LATIROSTRIS. Risso.

A. dieffenbachii, Gray. *A. latirostris*, Günth., VIII., 32.

The length of the head is contained once and a half or once and three-fourths in the distance of the gill openings from the origin of the dorsal fin, and twice and a half in its distance from the vent; distance between the commencement of the dorsal and anal fins shorter than the head; lips broad and fleshy; lower jaw prominent; angle of the mouth below the hind margin of the eye, which is rather small, much shorter than the snout; tail considerably longer than the body; mandibulary teeth in a single band, without longitudinal groove (Günth.)

New Zealand (British Museum); Europe, Nile, China, West Indies.

I have seen no specimens.

104. ANGUILLA AUSTRALIS. Rich. C.M.

A. australis, Rich., p. 112, pl. 45. Jenyns, p. 142. Günth., VIII., 36.

The length of the head is contained two and a half times in the distance between the gill openings and the vent; dorsal commences at a distance before the vent, which is contained five times in the length of the head; lower jaw rather longer; angle of the mouth rather behind the posterior angle of the eye; tail longer than the body in the proportion of eight to five and four-fifths; *vomerine band of teeth short, not quite reaching to the anterior margin of the eye.*

Olivaceous brown, white below; dorsal and anal whitish.

Hutt River, Whanganui River, Auckland Islands, Tasmania, Timor.

Conger.

Nostrils lateral; cleft of mouth wide, extending at least to below the middle of the eye; some of the teeth set so close as to form a cutting edge; no canines; vomerine band of teeth short; *dorsal commencing near the head, but behind the root of the pectoral;* gill openings large, near to the abdomen.

Seas of temperate and tropical regions.

105. CONGER VULGARIS. Cuv. C.M.

Conger Eel.

C. vulgaris, Günth., VIII., 38.

The dorsal fin begins a little behind the extremity of the pectorals; posterior nostril on a level with the upper margin of the eye; jaws nearly even in front; tail longer than the body in the proportion of three to two.

Sometimes dark grey above and paler below, sometimes pale brown above, largely mottled with white, below white; fins dark grey, immaculate.

Sometimes attains a weight of 35 lbs., and a length of 6 feet.

Common. Europe, St. Helena, South America, Indian Archipelago, Japan, Tasmania.

Congromuræna.

Nostrils lateral; cleft of the mouth narrow, not extending beyond the middle of the eye; all the teeth small and fine, not forming a cutting edge; vomerine band narrow, long; *dorsal commencing nearly above the gill openings;* posterior nostril opposite to the middle of the eye.

Tropical and subtropical seas.

106. CONGROMURÆNA HABENTATA. Rich. C.M.

Silver Eel.

Congrus habentatus, Rich., p. 109, pl. 50. Günth., VIII., 42.

Upper jaw much projecting beyond the lower; dorsal commencing immediately behind the base of the pectoral; tail longer than the body in the proportion of three to two.

Above pale greyish, below silvery white; vertical fins narrowly margined with black; iris white.

St. Paul's Island.

Ophichthys.

Nostrils labial; tongue not free; *extremity of the tail free;* teeth on the vomer as well as in the jaws.

107. OPHICHTHYS SERPENS. L. C.M.

Ophisurus novæ zelandiæ, Hect. *Ophisurus serpens*, Rich., p. 106. *Ophichthys serpens*, Günth., VIII., 65.

Length of the head contained four times in the distance between the gill openings and the vent; snout produced; cleft of mouth wide, half

as long as the head ; eye about one-third of the length of the snout ; the teeth on the intermaxillaries and on the vomer, and the anterior pair on the mandibles are canine ; dorsal commences behind the pectoral, which is about one-sixth of the length of the head ; body rather more than one half the length of the tail, or in the proportion of thirteen to twenty-one.

Greyish above, silvery below.

Mediterranean, Atlantic, Japan, Australia.

The skeleton of the specimen described by Dr. Hector, prepared by Dr. Knox, is in the Museum.

Order V.—LOPHOBRANCHII.

Gills not laminated, but composed of small rounded lobes attached to the branchial arches ; gill cover reduced to a large simple plate ; a dermal skeleton composed of numerous pieces arranged in segments ; snout produced ; mouth terminal, small, toothless.

SYNGNATHIDÆ.

Gill openings reduced to a very small opening near the upper posterior angle of the gill cover ; one soft dorsal fin ; no ventrals.

Syngnathus.

Tail not prehensile ; body with the ridges more or less distinct, *the dorsal edge of the trunk not continuous with that of the tail ;* caudal and pectoral fins present ; dorsal opposite to or near the vent ; males with an egg pouch on the tail.

Tropical and temperate regions.

108. SYNGNATHUS PELAGICUS. L.

S. pelagicus, Günth., VIII., 165.

D. 29 – 31 ; Osseous rings, 17 + 32 – 35.

The depth of the snout equals the distance of the front margin of the orbit from the root of the pectoral fin ; shields without spines ; lateral line interrupted ; tail longer than the body ; caudal pouch short, about half as long as the body.

Sides with white or silvery bands or spots, between which are brown bands; a brown band through the eye and along the snout (Günth).

New Zealand; Mediterranean, tropical parts of the Atlantic, Mauritius, China, Falkland Islands, South Australia.

I have seen no specimens.

ICHTHYOCAMPUS.

Tail not prehensile, furnished with a caudal fin; pectoral fins present; *dorsal edges of trunk and tail continuous*, but sometimes very indistinct; dorsal fin opposite or near to the vent; males with an egg pouch on the tail.

Indian and Australian seas.

109. ICHTHYOCAMPUS FILUM. Gunth. C.M.

Pipe Fish.

I. filum, Günth., VIII., 178.

D. 14; Osseous rings, 16 + 47 – 48.

HEAD and snout very short, the length of the former being from one-third to two-fifths of its distance from the vent; snout turned upwards, one-third the length of the head; head and body compressed, without ridges; length of the tail from two and two-fifths to two and two-thirds that of the head and body; pouch as long as the trunk; vent opposite to the middle of the dorsal fin.

Pale brown, with blackish cross-bars on the sutures of the trunk, reduced to spots on the tail, and sometimes also on the body; sometimes entirely brownish black.

Common. Australia.

DORYICHTHYS.

Tail not prehensile; *body with the ridges well developed;* pectoral and caudal fins present; dorsal fin opposite to the vent; *males with an egg pouch on the abdomen.*

Tropical seas.

110. DORYICHTHYS ELEVATUS. sp. nov. C.M.

D. 32; Osseous rings, 18 + 44.

SNOUT not quite half as long as the head; head and trunk together rather more than half the length of the tail; *the lateral line passes into the upper edge of the tail;* no spines; operculum with an oblique ridge slanting backward and upward; dorsal fin standing on two abdominal and seven caudal rings; pouch the whole length of the trunk.

Brown, marbled with lighter, darker on the snout; head spotted with white.

A single male specimen, $3\frac{1}{4}$ inches long, dredged in Wellington Harbour.

STIGMATOPHORA.

Tail not prehensile; no caudal fin; body depressed, with the ridges obsolete, those of the trunk being continuous with those of the tail; shields covered with soft skin; pectoral fins; tail tapering to a very fine point; males with an egg pouch on the tail.

Australian seas.

111. STIGMATOPHORA LONGIROSTRIS. sp. nov. C.M.

D. 66 – 67; Osseous rings, 21 + 72.

SNOUT nearly two and a half times as long as the remaining part of the head; operculum with a distinct median longitudinal ridge, but slightly developed in the young; tail more than twice as long as the trunk alone, but not twice as long as the trunk and head together; egg pouch shorter than the trunk, extending over twenty rings.

Above brown, with a single row on each side of black spots at the sutures of the rings of the trunk, not extending on to the tail; in the young the back is uniform light brown.

Wellington Harbour, common, attaining a length of 14 inches.

SOLENOGNATHUS.

Tail prehensile; body compressed, deeper than broad; *shields hard rugose;* pectoral fins; tail shorter than the body; no caudal fin.

Chinese and Australian seas.

112. SOLENOGNATHUS SPINOSISSIMUS. Gunth. C.M.

S. spinosissimus, Günth., VIII., 195.

P. 23 – 24; D. 38; Osseous rings, 25 + 53.

DORSAL surface slightly convex; shields rough, with small spines, the centre of each with a cluster of larger ones; the whole of the head and snout spiny, larger on the margins of the orbits; snout about one and a half times as long as the rest of the head; dorsal situated on the tail, commencing one ring behind the vent.

A single dried and bleached specimen, 14 inches long.

Tasmania.

HIPPOCAMPUS.

Tail prehensile ; no caudal fin ; trunk compressed, composed of from ten to twelve rings ; shields with more or less prominent tubercles; occiput compressed into a crest ; pectoral fins ; males with an egg sack at the base of the tail.

All temperate and tropical seas.

113. HIPPOCAMPUS ABDOMINALIS. Less. C.M.

Sea Horse.

H. abdominalis, Günth., VIII., 199.

D. 28 – 31.

TUBERCLES not much developed and very obtuse ; length of the snout equal to, or rather more than the distance between the posterior margin of the orbit and gill openings (shorter in young specimens) ; dorsal fin extends over six or seven rings.

Uniform blackish brown, or with lighter rings on the tail ; small black spots on the head.

Australian seas.

Order VI.—PLECTOGNATHI.

Teleosteous fishes, with ossifications of the skin in the form of scutes or spines ; sometimes naked ; gills pectinate, a narrow gill opening in front of the pectoral fins ; skeleton incompletely ossified, with the vertebræ in small number ; mouth narrow ; the bones of the upper jaw generally firmly united ; a soft dorsal opposite to the anal, and sometimes elements of a spinous dorsal ; ventrals absent or reduced to spines.

SCLERODERMI.

Snout somewhat produced ; jaws armed with distinct teeth in small number ; skin with scutes, or rough ; the elements of a spinous dorsal and ventral generally present.

MONACANTHUS.

Body compressed, covered with very small rough scales ; upper jaw with a double series of incisor-like teeth, six in the outer, and four in

the inner series; lower jaw with six similar teeth in a single series; *the first dorsal fin reduced to a single strong spine*, behind which is sometimes another rudimentary spine; ventrals reduced to an osseous appendage; no barbel.

Tropical and subtropical seas.

114. MONACANTHUS CONVEXIROSTRIS. Gunth. C.M.

Leather Jacket.

M. rudis, Cat. Col. Mus. *M. convexirostris*, Günth., VIII., 248.

D. 31 – 37; A. 32 – 35.

Body covered with small spiny but very distinct scales; length two and one-fifth times the height; snout rather produced, more than one-half of the height of the body, the upper profile straight, or slightly convex; *gill openings under the centre of the eye, extending almost as far as its anterior margin; pectoral fin below the eye;* dorsal spine placed over the hinder half of the eye, strong, much shorter than the head, armed both behind and in front with a double series of barbs, those in front being smaller and more irregular; ventral spine barbed, no spines on the tail.

Back reddish brown; below pale yellowish brown.

Common in Wellington Harbour; Tasmania.

Balister scaber, Forster, from Queen Charlotte Sound was most likely this species, but Dr. Günther says that the drawing is more like *M. peronii*, in which the males have a band of spines on each side of the tail, between the dorsal and anal fins, and the pectoral fin placed further back.

Ostracion.

The integuments of the body are modified into a carapace composed of juxtaposed hexagonal osseous scutes, the snout, bases of the fins, and hind part of the tail being covered by soft skin; mouth small, each jaw with a single series of small slender teeth; one short dorsal, without spine, opposite to the short anal; no ventrals.

Seas of tropical and subtropical regions.

115. OSTRACION FORNASINI. Bianc.? C.M.

Trunk Fish.

O. quadricornis, Cat. Col. Mus. *O. fornasini*, Günth., VIII., 264.

Carapace four ridged, the lower surface being considerably broader than the upper; a pair of long conical spines, as long as the snout, in

front of the orbits, pointing forward and slightly upward, and very slightly divergent; a large oblique triangular compressed spine in the middle of the back; no spine on the lateral dorsal ridge; ventral ridge terminating behind in a strong straight spine pointing backward and slightly outward; interorbital space deeply concave; breadth of the upper part of the carapace is to the lower as one to one and three-quarters.

Brown, with irregular metallic slate blue spots and streaks.

Two dried specimens are in the Colonial Museum—one from Dunedin Harbour, presented by Mrs. Balfour, the other from Wellington Harbour, presented by Mr. Masters. They are about $3\frac{1}{3}$ inches in length.

Indian Ocean and Archipelago.

GYMNODONTES.

Body more or less shortened; the bones of the upper and lower jaw confluent, forming a beak with a trenchant edge, without teeth, with or without a median suture; a soft dorsal and anal near the caudal; no spinous dorsal; pectorals, no ventrals.

Tetrodon.

Both jaws divided by a median suture; body with or without small dermal ossifications; dorsal and anal fins short; abdomen dilatable into a large sac.

Tropical and subtropical seas; some species in rivers.

116. TETRODON RICHEI. Freminv. C.M.

Globe Fish.

T. hamiltoni, Cat. Col. Mus. *T. richei*, Günth., VIII., 285.

Body from the lips densely covered with minute spines; caudal peduncle, smooth; snout obtuse, rather shorter than the interorbital space, which is convex; eye about half way between snout and gill opening; nasal cavity large.

Above light brown, with large rounded spots of black; top of the head more or less transversely banded with black; below whitish; fins yellowish white; the upper basal corner of the caudal, and the base of the pectorals, blackish.

Two dried specimens are in the Colonial Museum, from Dunedin Harbour, presented by Mrs. Balfour.

South Australia.

CHILOMYCTERUS.

Jaws without median suture; body covered with dermal ossifications, all, or most of which, consist of three horizontal roots and a stiff, erect, immovable spine; nasal tentacle either simple and with a pair of lateral openings, or the upper part divided into two flattened portions; abdomen dilatable into a large sac.

Tropical and subtropical seas.

117. CHILOMYCTERUS JACULIFERUS. Cuv. C.M.

Porcupine Fish.

Diodon, Sp. Cat. Col. Mus. *C. jaculiferus*, Günth., VIII., 313.

D. 16; A. 15.

Two spines above the orbit, none in the middle of the forehead; five spines from the parietal spine to the side of the dorsal fin; supraorbital, dorsal, post-dorsal, and post-pectoral spines very long; those on the lower parts small; interorbital space flat; the roots of four spines surround the tail.

Above olivaceous brown, with fine curved anastomosing lines of white; chin the same, but paler; belly and sides white; fins pale olivaceous brown; in front of the pectorals one large or two smaller black blotches, with two or three small spots of bright yellow; behind the pectorals several undefined black blotches, more or less marked with bright yellow; iris yellow. Common.

ORTHAGORISCUS.

Jaws without median suture; tail extremely short, truncate; vertical fins more or less confluent; body compressed, short, covered with a rough or tessellated skin not capable of being expanded by air; no ventral fins; an accessory opercular gill.

Tropical and temperate regions.

118. ORTHAGORISCUS TRUNCATUS. Lacep.

Sun Fish.

O. truncatus, Günth., VIII., 319.

D. 17; A. 19; C. 16; P. 12.

THE height of the body is rather more (stuffed specimen) than half the length; skin divided into minute hexagonal scutellæ, finely granulated, and with a central point.

Atlantic, Pacific.

A fine specimen of this fish, caught in Auckland Harbour, is in the Auckland Museum ; it has also been obtained off the coasts of Otago.

SUB-CLASS IV.—CHONDROPTERYGII.*

Skeleton cartilaginous ; skull without sutures ; caudal fin with a produced upper lobe ; generally several gill openings ; males with prehensile organs attached to the ventral fins.

Order I.—HOLOCEPHALA.

One external gill opening only, covered by a fold of the skin ; four branchial clefts within the gill cavity ; jaws coalescent with the skull.

CHIMÆRIDÆ.

Body elongate ; pectoral fins free ; anterior dorsal above the pectorals ; mouth inferior ; dental organs confluent into two pairs of laminæ in the upper jaw, and into one pair in the lower ; no spiracles ; males with a peculiar prehensile organ on the upper part of the snout.

Callorhynchus.

Snout with a cartilaginous prominence, terminating in a cutaneous flap ; two dorsals, the anterior with a strong and long spine ; extremity of the tail distinctly turned upwards, with a fin along its lower edge, but without one above ; anal fin close to the caudal, short and deep.

Southern Pacific, Cape of Good Hope.

119. CALLORHYNCHUS ANTARCTICUS. Lacep. C.M.

Elephant Fish.

C. antarcticus, Günth., VIII., 351.

Second dorsal fin elevated in front ; pectorals very large.

Adult with an obscure blackish lateral band ; young with the upper parts black, and with whitish bands and spots.

Range same as that of the genus.

* Sub-classes II. and III. are not found in New Zealand.

Order II.—PLAGIOSTOMATA.

From five to seven gill openings; jaws distinct from the skull.

Sub-order.—SELACHOIDEI.—Sharks.

Body more or less cylindrical, gradually passing into the tail; gill openings lateral.

CARCHARIIDÆ.

Eye with a nictitating membrane; mouth crescent-shaped, inferior; two dorsals, the first opposite to the space between the pectoral and ventral fins, without a spine; an anal fin.

Carcharias.

A pit at the root of the caudal; no spiracles; the labial fold does not extend much beyond the angle of the mouth; snout produced; teeth with a single sharp cusp, more or less dilated, and triangular.

Seas of the temperate and tropical regions.

120. CARCHARIAS BRACHYURUS. Gunth.

Blue Shark.

C. melanopterus, Cat. Col. Mus. ? *C. brachyurus*, Günth., VIII., 369.

Snout rather pointed, the distance between the end and the mouth being more than the length of the mouth, and about two-thirds its width; teeth in the upper jaw oblique, serrated on both margins, and with a deep notch on the outer margin; teeth of the lower jaw narrow, erect, lanceolate, serrated, on a broad two-rooted base; pectorals narrow, pointed, falciform; dorsal rather nearer to the pectorals than the ventrals; second dorsal very small; origin of the anal opposite to that of the second dorsal, and midway between the ventral and caudal.

Color uniform (Günth.)

New Zealand (British Museum), Australia.

I have seen no specimens.

Acanthias.

Two dorsals, each with a spine; teeth equal in both jaws, rather small, their point is so much turned aside that the inner margin of the tooth forms the cutting edge; spiracles rather wide, immediately behind the eye; gill openings narrow.

Temperate seas of both hemispheres.

121. ACANTHIAS VULGARIS. Risso. C.M.

Spined Dog Fish.

Squalus maculatus, Park. *A. vulgaris*, Günth., VIII., 418.

ORIGIN of the dorsal opposite to or behind the posterior angle of the pectoral; dorsal spines not grooved laterally; snout produced.

Grey, with large white spots that fade after death.

Common; female about 3 feet in length, males 2 feet.

Temperate seas of both hemispheres.

ZYGÆNA.

Caudal with a single notch, a pit at its commencement; anterior part of the head broad, flattened, and laterally elongated; eyes at the extremities of the lobes; teeth of both jaws similar, oblique, with notch.

Temperate and tropical seas.

122. ZYGÆNA MALLEUS. Risso.

Hammer-headed Shark.

Z. malleus, Günth., VIII., 381.

THE length of the hinder margin of one side of the hammer is nearly equal to its width near the eye; nostril close to the eye, prolonged into a groove running along nearly the entire front margin of the head.

Tropical and subtropical seas.

The descriptions of the Maoris leave no doubt but that a Hammer-headed Shark (Mangopare) is found off the coasts of New Zealand, and it will, probably, be found to be this species which has been obtained in South Australia and the Fiji Islands.

MUSTELUS.

Second dorsal fin not much smaller than the first; no pit at the root of the caudal; spiracles small behind the eyes; mouth with well developed labial folds; teeth small, numerous, similar in both jaws, arranged like pavement, obtuse, or with very indistinct cusps.

Temperate and tropical seas.

123. MUSTELUS ANTARCTICUS. Gunth. C.M.

Smooth Hound.

M. antarcticus, Günth., VIII., 387.

SNOUT rather obtuse, the length of its præoral portion about equal to the distance between the angles of the mouth; upper teeth with a

rather cutting edge, but without prominent cusp; origin of dorsal behind the inner posterior angle of the pectoral; posterior portions of both dorsals and anal produced, deeper than the central portion; lower lobe of caudal sinuated, central portion the lowest; second dorsal nearly equal to the first, and terminating over the centre of the anal

Above ash grey, usually more or less spotted with white, below pale greyish white.

Common, much eaten by the Maoris; South Pacific.

LAMNIDÆ.

Two dorsals, the first opposite to the space between the pectorals and ventrals; without spine; an anal fin; no nictitating membrane; mouth crescent-shaped, inferior; nostrils not confluent with the mouth; gill openings generally wide; spiracles none, or minute.

Lamna.

Second dorsal and anal very small; a pit at the root of the caudal, which has the lower lobe much developed; side of the tail with a keel; no spiracles; mouth wide; teeth large, lanceolate, not serrated, sometimes with additional basal cusps; gill openings very wide.

Temperate and tropical seas.

124. LAMNA GLAUCA. Mull. and Henle. C.M.

Tiger Shark. Mako.

Scymnus, Sp. Cat. Col. Mus. *L. glauca*, Günth., VIII., 391.

Præoral portion of snout as long as the longitudinal axis of the cleft of the mouth, pointed; angle of the mouth midway between the gill opening and nostril; teeth $\frac{13}{13}$ on each side, long, lanceolate, with sharp lateral edges, without basal cusps; the third tooth on each side of the upper jaw is much smaller than those next to it; dorsal fin opposite to the middle of the interspace between pectoral and ventral; pectorals falciform (Günth.)

Cape of Good Hope, Japan.

The shark from which the Maoris obtain the teeth with which they decorate their ears, is, probably, this species, but I have seen teeth only.

CARCHARODON.

Second dorsal and anal very small; a pit at the root of the caudal, which has the lower lobe well developed; side of the tail with a keel; spiracles minute; teeth large, flat, erect, triangular, serrated.

Temperate and tropical seas.

125. CARCHARODON RONDELETII. Mull. C.M.

White Shark.

Carcharias Maoo, Cat. Col. Mus. *C. rondeletii*, Günth., VIII., 392.

THE third tooth on each side of the upper jaw is conspicuously smaller than the second and fourth; teeth $\frac{12}{11}$ on each side; the second dorsal fin in advance of the anal (Günth.)

A pair of jaws, 20 inches in the gape, of this species is in the Colonial Museum; the teeth in the upper jaw are 1·3 inch in length and 1·1 inch in breadth at the base, not including the root.

From the Mediterranean to Australia.

ALOPECIAS.

Caudal of extraordinary length, with a pit at its root; the second dorsal and anal very small; spiracles minute, behind the eye; teeth equal in both jaws, of moderate size, flat, triangular, not serrated.

Temperate and tropical seas.

126. ALOPECIAS VULPES. Gml. C.M.

Thresher.

A. vulpes, Günth., VIII., 393.

THE third tooth on each side of the upper jaw much smaller than the others; pectorals large, falciform.

This species is represented in the Colonial Museum by two photographs of a specimen obtained in Blind Bay.

Mediterranean, Atlantic, Cape of Good Hope.

NOTIDANIDÆ.

Characters of the single genus.

NOTIDANUS.

One dorsal fin only, without spine, opposite to the anal; no pit at the root of the caudal fin; no nictitating membrane; spiracles small, on the side of the neck; no labial fold; mouth crescent-shaped; dentition

unequal in the jaws; in the upper jaw one or two pairs of awl-shaped teeth, the following six being broader and provided with cusps, one of which is much the strongest; lower jaw with six large comb-like teeth on each side, beside the smaller posterior teeth; six or seven wide gill openings.

Temperate and tropical seas.

127. NOTIDANUS INDICUS. Cuv. C.M.

Perlon.

N. indicus, Günth., VIII., 398.

Snout short and rounded; cleft of the mouth broader than long; a single median pointed tooth in the upper jaw, both it and the tooth on each side of it single; the lower median tooth with lateral cusps, but without central cusps; the first cusp of the lower teeth is much stronger than the others, and serrated on its outer margin.

This species is represented in the Colonial Museum by a pair of jaws presented by Mr. King.

From the Cape of Good Hope to Australia and California.

SCYLLIIDÆ.

The first dorsal fin above or behind the ventrals, without spine; an anal fin; no nictitating membrane; spiracle always distinct; mouth inferior; teeth small, several series being generally in function.

Scyllium.

The origin of the anal fin is always in advance of that of the second dorsal; spiracle behind the eye; nasal cavity separate from the mouth; teeth small, with a middle longer cusp, and generally one or two small lateral cusps, arranged in numerous series; upper edge of the caudal fin not serrated.

Temperate and tropical seas.

128. SCYLLIUM LATICEPS. Dumeril. C.M.

Dog Fish.

S. laticeps, Günth., VIII., 404.

The nasal valves are not confluent, and separated from each other by a very broad interspace, without prominent cirrus; no labial fold; teeth very small, tricuspid; head very broad, depressed; end of the anal fin

nearly opposite to the end of the dorsal; anal a little longer than the dorsal, the length of its base being nearly equal to its distance from the caudal.

Brownish, marbled with darker (Günth.)

Tasmania.

I refer to this species a fish caught by Dr. Hector in Dusky Bay, a sketch of which is in the Colonial Museum.

CESTRACIONTIDÆ.

Characters of the single genus.

Cestracion.

Two dorsals with spines, the first opposite to the space between the pectorals and ventrals, the second in advance of the anal; nostrils and buccal cavity confluent; mouth rather narrow, the upper lip divided into seven lobes, the lower with a fold; spiracles small, below the posterior part of the eye; gill openings rather narrow; dentition similar in both jaws, viz., small obtuse teeth in front, which, in young individuals, are pointed, and provided with from three to five cusps; lateral teeth large, pad-like, twice as broad as long, arranged in oblique series, one series being formed by much larger teeth than those in the other series.

Pacific and East Indian Archipelago.

129. CESTRACION PHILIPPI. Lacep.

Port Jackson Shark.

C. Philippi, Günth., VIII., 415.

Anal fin terminating at a considerable distance from the root of the caudal; origin of the first dorsal immediately behind the root of the pectorals; supraorbital ridges low, gradually disappearing on the side of the occiput.

Body with more or less distinct dark cross bands, the first of which crosses the interorbital space and orbit (Günth.)

New Zealand (British Museum), Australia, Indian Archipelago, Japan.

I have seen no specimens.

SPINACIDÆ.

Two dorsal fins, sometimes with spines; no anal; mouth but slightly arched; a long deep straight oblique groove on each side of the mouth; spiracles present; gill openings narrow; pectoral fins not notched at their origin.

GALEUS.

Caudal fin with a single notch; no pit at the commencement of the caudal fin; spiracles small; mouth crescent-shaped; teeth equal in both jaws, oblique, with notch and serrature.

Temperate and tropical seas.

130. GALEUS CANIS. L. C.M.

Tope.

G. canis, Günth., VIII., 379.

A SHORT labial fold on both jaws; teeth $\frac{34}{34}$; the second dorsal fin only one-third the size of the first, and somewhat in advance of the anal; length of the tail nearly equal to the distance between the two dorsals.

Uniform greyish, lighter below.

Common; grows to about 8 feet in length.

Temperate and tropical seas.

EUPROTOMICRUS.

Dorsals without spines, the first very small at a short distance from the ventrals, the second much longer; skin uniformly granular; nostrils near to the extremity of the snout, which is not depressed, obtusely conical; upper teeth small, conical, the lower much larger, triangular, slightly oblique, not serrated, in moderate number; spiracles wide; gill openings very narrow.

Indian Ocean.

131. EUPROTOMICRUS. sp. C.M.

A PAIR of jaws are in the Colonial Museum which appear to belong to this genus, but the teeth of the lower jaw are sometimes finely serrated; the teeth are $\frac{14}{15}$ on each side, and in about five series.

Sub-order.—BATOIDEI.—Rays.

Gill openings ventral; body depressed, forming a flat disc; spiracles present; no anal fin.

RHINOBATIDÆ.

Tail strong and long, with two well developed dorsal fins; a caudal and a longitudinal fold on each side; disc not excessively dilated, the rayed portion of the pectoral fins not being continued to the snout; no electrical organ.

Rhinobatus.

Body gradually passing into the tail; cranial cartilage produced into a long rostral process, the space between the process and the pectoral fin being filled by a membrane; spiracles wide, behind the eye; nostrils oblique, wide; *anterior nasal valves not confluent;* teeth obtuse, with an indistinct transverse ridge; dorsal fins without spine, both at a great distance behind the ventral fins; caudal without lower lobe.

Tropical and subtropical seas.

132. RHINOBATUS BANKSII. Mull. and Henle.

R. banksii, Günth., VIII., 446.

The anterior nasal valve is continued towards the median line by a short fold, which, however, is far from reaching that of the other side; the distance between the inner angles of the nostrils is more than the length of a nostril; snout produced; mouth arched; the median teeth of the lower jaw larger and more prominent than the lateral; a series of small tubercles along the middle of the back, and two short rows on each shoulder (Günth.)

New Zealand (Rich.), Australia (Günth.)

I have seen no specimens.

Trygonorhina.

Like *Rhinobatus*, but the anterior nasal valves are broad, and confluent into a broad quadrangular flap, with a free margin overhanging the mouth.

Australia.

133. TRYGONORHINA FASCIATA. Mull. and Henle.

T. fasciata, Günth., VIII. 448.

Snout rather short, the distance between its extremity and the mouth being not much more than the distance between the outer angles of the

nostrils ; a series of distinct obtuse tubercles along the median line of the back ; some similar tubercles above the eye and on the shoulder (Günth.)

New Zealand (Rich.), South Australia.

I have seen no specimens.

TORPEDINIDÆ.

Trunk broad, smooth ; tail with rayed dorsal and anal fins, and a longitudinal fold along each side ; anterior nasal valves confluent into a quadrangular lobe ; an electrical organ between the pectoral fins and the head.

Torpedo.

Disc subcircular ; tail distinct ; two dorsal fins on the tail, without spine ; caudal well developed ; ventrals separate ; teeth pointed ; spiracles at a short distance behind the eyes.

Mediterranean, Atlantic, and Indian Oceans.

134. TORPEDO FAIRCHILDI. sp. nov. C.M.

Torpedo.

Torpedo marmorata, Cat. Col. Mus.

Spiracles not fringed, situated at about their own diameter behind the eyes ; first dorsal over the ventrals, with the posterior edges of both in a line, about one and a half times the size of the second ; mandibulary teeth not quite reaching to the angles of the mouth ; tail shorter than the body.

Uniform greyish black above, whitish beneath.

This specimen, which was 34 inches in length, and 24 inches in breadth across the head, was caught by Captain Fairchild, of the colonial steamer 'Luna,' stranded on the mud inside Napier Harbour, in February, 1868. I was fortunate enough to see it, and to take the foregoing description of it while it was alive. The skin is now in the Colonial Museum ; the natives called it Whai-ngenge ; it differs from both *hebetans* and *narce* in the position of the first dorsal, as well as in other minor points, and from all the other species by not having the spiracles fringed.

RAJIDÆ.

Disc broad, rhombic, generally with asperities or spines ; tail with a longitudinal fold on each side ; the pectorals extend to the snout ; no serrated caudal spine.

RAJA.

Tail very distinct from the disc; two dorsal fins on the tail; caudal small or rudimentary; *each ventral fin divided into two by a deep notch;* nasal valves separated in the middle, where they are without a free margin; teeth obtuse or pointed; pectorals not extending to the extremity of the snout; the sexes differ in the form of the teeth, and in the dermal spines.

Seas of both hemispheres.

135. RAJA NASUTA. Soland. C.M.

Skate.

R. nasuta, Günth., VIII., 469.

MALE.—Back nearly smooth, with a few scattered asperities; a patch of sharp hooked spines near the centre, and another at the anterior basal corner of the pectorals; anterior edge of the pectorals with small hooked spines; tail with a single row of blunt ribbed spines, with smaller ones between them; snout produced, acute; anterior lateral profile deeply emarginate; interorbital space concave, about one-third of the length of the snout; mouth crescent-shaped; teeth long, curved, and pointed, except the posterior ones, which are blunt; dorsals nearly equal, distance between them equal to the base of the first.

FEMALE.—Back rough, belly smooth; five to six spines over each eye, one to three on the back over the shoulders; no hooked spines on the pectorals, except some small ones on the anterior edge; tail with three rows of spines, one on the top and one on each side, those on the top continuing up the back as far as the end of the ventrals; teeth smaller than in the male.

Above brown, marbled or spotted with darker, below white; edges of pectorals tinged with reddish; small round black dots before the mouth.

Common. The female here described is undoubtedly *R. nasuta;* I am not sure that the male belongs to the same species, but as the only specimen that I have seen of it was a small dried individual, picked up on the shore, I consider it safer for the present to refer it to *R. nasuta* also.

TRYGONIDÆ.

Pectoral fins continued uninterruptedly to, and confluent at the extremity of the snout; tail long and slender, without vertical fins, but generally armed with a strong serrated spine.

TRYGON.

Body smooth or with tubercles; tail armed with a long arrow-shaped spine, serrated on each side; pectorals united in front; nasal valves coalescent into a quadrangular flap; teeth flattened.

Seas of temperate and tropical regions.

136. TRYGON THALASSIA Columna.? C.M.

Stingaree.

Tæniura lymma, Cat. Col. Mus. *T. thalassia*, Günth., VIII., 477.

TAIL with a cutaneous fold along the lower side, the depth of the fold being nearly as high as the tail; tail much longer than the body; anterior profile obtuse; large conical thorns, in greater or less number, inserted on a round radiated base, are distributed along the middle of the back, on the scapulary and other regions, and especially on the tail, where they occupy the sides as well as the upper surface; even the cutaneous fold is covered with smaller stellate ossifications (Günth.)

Adriatic, Atlantic? Pacific.

A dried tail, 22 inches in length, is in the Colonial Museum, which answers exactly to the foregoing description, except that in front of the larger spine there is a second smaller one, also serrated, and not quite one-third of the length of the larger, and in front of this a large blunt obtuse spine on a round radiated base like the smaller ones on the sides; the upper and lower surfaces of the tail, except near the end, are smooth. It will, probably, turn out to be a distinct species.

137. TRYGON KUHLII. Mull and Henle.

T. kuhlii, Günth., VIII., 479.

TAIL with a distinct cutaneous fold above and below, about one-half longer than the disc; the margins of the snout form an obtuse angle; body entirely smooth, or with a series of spines, pointing backwards, along the median line of the back to the caudal spine; only two appendages at the bottom of the mouth, behind the teeth; upper parts with some scattered bluish black-edged ocelli (Günth.)

Auckland (Kner. Novara. Expd.); Indian Ocean and Archipelago.

I have seen no specimens.

MYLIOBATIDÆ.

Disc very broad in consequence of the great development of the pectoral fins, which, however, leave the sides of the head free, and reappear at the extremity of the snout as a pair of detached (cephalic) fins.

MYLIOBATIS.

Nasal valves coalescent into a quadrangular flap; teeth hexagonal, large, flat, tessellated, those in the middle much broader than long; several narrower series on each side; tail very long and thin, with a dorsal fin near its root; generally a serrated spine behind the fin.

Temperate and tropical seas.

138. MYLIOBATIS AQUILA. L.

Whip Ray.

M. nieuhofii, Cat. Col. Mus. *M. aquila*, Günth., VIII., 489.

BODY entirely smooth; the skinny prolongation of the snout is obtuse, and but moderately produced; median teeth of the upper jaw from four to six times as broad as long; the insertion of the dorsal fin is behind or opposite the extremity of the ventral fins; orbit with scarcely a trace of a projection above.

Coloration uniform (Günth.)

New Zealand (Banks); Mediterranean, Atlantic, and Australian seas.

I have seen no specimens.

SUB-CLASS V.—CYCLOSTOMATA.

SKELETON cartilaginous, without ribs or real jaws; skull not separate from the vertebral column; six or seven gills on each side; mouth surrounded by a circular or subcircular lip, suctorial.

PETROMYZONTIDÆ.

Body eel-shaped, naked; mouth with teeth; nasal aperture in the middle of the upper side of the head.

Temperate regions of both hemispheres.

GEOTRIA.

Dorsal fins two, the posterior separate from the caudal; maxillary lamina with four sharp flat lobes; a pair of long pointed lingual teeth.

South Australia and Chile.

139. GEOTRIA CHILENSIS. Gray.

Lamprey.

Hiptatrema dombeyii, Cat. Col. Mus. *G. chilensis*, Günth., VIII., 509.

SKIN on the throat not much dilated; the outer lobes of the maxillary dental lamina are broad, with a sharp convex edge, the inner narrow and pointed; mandibulary lamina crescent-shaped, with numerous obtuse points; Suctorial teeth in numerous series, so close together that the teeth have the appearance of imbricated scales; a series of larger broad scale-like teeth round the mandibulary lamina; suctorial disc not dilated, circular; first and second dorsal fins widely separate from each other.

Back greenish; sides and abdomen silvery (Günth.)

New Zealand; Chili, Swan River.

A specimen is in the Auckland Museum, from the Whanganui River; it is 22·8 inches in length, and has slight indications of a gular pouch. This species is also found in the Waikato.

MYXINIDÆ.

Body eel-shaped, naked; nasal aperture above the mouth, quite at the extremity of the head, which is provided with four pairs of barbels; mouth without lips; one median tooth on the palate, and two comb-like series of teeth on the tongue; branchial apertures at a great distance from the head; marine.

BDELLOSTOMA.

Six or more external branchial apertures on each side, each leading by a separate duct to a branchial sac.

Southern coasts of the southern hemisphere.

140. BDELLOSTOMA CIRRHATUM. Forst. C.M.

Hag.

Myxine glutinosa, Cat. Col. Mus. *B. cirrhatum*, Günth., VIII., 511.

SIX or seven gill openings on each side; twelve or thirteen teeth in the anterior series, the three foremost confluent at their base; eleven teeth in the posterior series.

Reddish brown, white round the mouth.

Common. South Africa, Australia (Krefft.)

SUB-CLASS VI.—LEPTOCARDII.

No brain; pulsating sinuses instead of a heart; no jaws; respiratory cavity confluent with the abdominal cavity; branchial clefts in great number, the water being expelled by an opening in front of the vent.

CIRROSTOMI.

Characters of the single genus.

Branchiostoma.

Body elongate, scaleless, compressed, limbless; mouth a longitudinal fissure, with subrigid cirri on each side, inferior; vent at a short distance from the extremity of the tail; a low rayless fin-like fold runs along the back, round the tail, past the vent, to the respiratory aperture; eye rudimentary.

Temperate regions of the northern and southern hemispheres.

141. BRANCHIOSTOMA LANCEOLATUM. Yarrell. C.M. Lancelet.

Amphioxus lanceolatus, Cat. Col. Mus. *B. lanceolatum*, Günth., VIII., 513.

Length nine and a half times the height, tapering both ways, but more rapidly towards the head; body nearly three times as long as tail (vent to end).

Opaque, black (in spirits), with chevroned lines on the sides sloping backward, and upward or downward from a line that runs nearer the dorsal than the ventral surface; fins translucent, olivaceous brown.

Two specimens, both 1·9 inches long, and 0·2 inch high, are in the Museum, obtained at Poverty Bay.

FISHES INTRODUCED

BY

EUROPEAN SETTLERS.

Order I.—ACANTHOPTERYGII.

PERCIDÆ.

For characters see *ante*, p. 1.

Perca.

All the teeth villiform, without canines; teeth on the palatine bones; tongue smooth; two dorsals; anal with two spines; operculum spiniferous; præoperculum and præorbital serrated; scales small, ctenoid; head naked above; seven branchiostegals.

1. PERCA FLUVIATILIS. L.

Perch.

P. fluviatilis, Günth., I., 58.

D. $14-15\,|\,\frac{1-2}{13-14}$; A. $\frac{2}{8-9}$.

Total length equal to three and three-fourths the height of the body; inferior edge of the operculum entire, or very weakly denticulated; inferior edge of præoperculum with a few strong spinous teeth, directed forwards; operculum smooth; more than seventy transverse rows of scales; transverse line $\frac{9}{19}$.

A large black mark on the posterior part of the first dorsal fin (Günth.)

Canterbury, Otago, Nelson, Wellington. Introduced from Tasmania; originally from England.

Order IV.—PHYSOSTOMI.

SALMONIDÆ.

For characters, see *ante*, p. 57.

Salmo.

Body covered with small scales; cleft of the mouth wide; teeth well developed, conical in the jaw bones, on the vomer, and palatines, and on the tongue, none on the pterygoid bones; anal short, with less than fourteen rays; dorsal above, or rather in advance of the ventrals.

The caudal fin changes with age, and sexual development of the fish, the young having it more deeply emarginate. In males the lower jaw is more developed than in females, and sometimes curved upwards into a hook.

2. SALMO SALAR. L.

Salmon.

S. salar, Günth., VI., 11.

B. 11–12; D. 14; A. 11; P. 14; V. 9; L. Lat., 120; L. Trans., $\frac{22-26}{19-22}$.

The hind part of the body elongate, and covered with relatively large scales, *there being constantly eleven, or sometimes twelve in a transverse series;* maxillary as long as, or shorter than the snout in specimens above 20 inches in length.

Attaining to a length of from 4 to 5 feet; female mature at a length of about 15 inches.

Young with about eleven dusky cross-bars; half-grown and old specimens silvery, with small black spots in small number; spawning males with numerous large red and black spots, some of the red spots confluent into more or less extensive patches, especially on the belly (Günth.)

The young of the first and second year are called Parr or Smolt; on their first return from the sea they are called Grilse or Salmon-peal.

Southland and Otago. Introduced from Scotland.

3. SALMO TRUTTA. Flem.

Sea Trout or Salmon Trout.

S. trutta, Günth., VI., 22.

B. 11 ; D. 13 ; A. 11 ; P. 15 ; V. 9 ; L. Lat., 120 ; L. Trans., $\frac{24-24}{36-36}$.

Maxillary longer than the snout, extending to below the posterior margin of the orbit in adult examples, and to behind the middle of the eye in specimens 6 inches long (Parr state), always rather slender and feeble ; tail not elongate, covered with thin, short, rounded scales, like the body ; there are fourteen or fifteen scales in a transverse series, running from behind the adipose fin obliquely forwards to the lateral line.

Attaining to a length of about 3 feet ; female mature at a length of from 10 to 12 inches.

Young with nine or ten dusky cross-bars, half-grown ones (Grilse state) with the top of the dorsal and pectoral, and with the hind margin of the caudal black ; silvery, sometimes immaculate, generally with more or less numerous x-like spots ; spots on the head and dorsal fin round, and readily disappearing (Günth.)

Otago and Southland. Introduced from Scotland.

4. SALMO FARIO. L.

Trout.

S. fario, Günth., VI., 59.

D. 13 – 14 ; A. 10 – 11 ; P. 13 ; V. 9 ; L. Lat., 120 ; L. Trans., 26/30.

Maxillary much longer than the snout, extending already to below the hinder margin of the orbit in specimens of 8 or 9 inches in length, very strong and dilated ; the hind part of the body is short and rather high ; there are about sixteen scales in a transverse series descending from behind the adipose fin obliquely backwards to the lateral line.

Attaining to a length of 30 inches ; female mature at a length of 8 inches.

Body, head, and dorsal fin generally with numerous red and black spots ; a part of the latter have generally a light edge ; these black spots are either round or more irregular in shape, composed of x-shaped marks ; anterior margin of the dorsal and anal, and the outer one of the ventrals, generally yellowish (Günth.)

Young with about eight dusky cross-bars.

All the Provinces. Introduced from Tasmania; originally from England. I believe that it is the variety *ansonii*, of Dr. Günther, that has been introduced into this country.

A specimen, caught in the Maitai river, is in the Colonial Museum; it is three years old, 23 inches in length, and weighed 6 lbs.

CYPRINIDÆ.

Body with scales; head naked; margin of the upper jaw formed by the intermaxillaries; belly rounded; no adipose fin; mouth toothless; lower pharyngeal bones well developed, provided with teeth; air-bladder constricted.

Carassius.

Scales large; dorsal long; anal short, with a serrated osseous ray; snout rounded, obtuse; dorsal commencing above ventrals; no barbels; pharyngeal teeth compressed in a single series, 4 – 4.

5. CARASSIUS VULGARIS. Nordman.

Prussian Carp.

C. vulgaris, Günth., VII., 29.

D. $\frac{3}{15\text{-}18}$; A. $\frac{3}{5\text{-}6}$; P. 13 – 14; L. Lat., 31 – 35; L. Trans., $\frac{7\text{-}8}{5\text{-}6}$.

Dorsal and anal fins with the stiff ray rather feeble, and finely serrated; caudal emarginate.

Auckland. Introduced from Tasmania; originally from Europe.

The English Carp (*Cyprinus carpio*) has four barbels.

6. CARASSIUS AURATUS. L.

Gold Fish.

C. auratus, Günth., VII., 32.

D. 19; A. 8; L. Lat., 26; L. Trans., 12.

Dorsal and anal fins with the stiff ray rather strong and coarsely serrated; caudal emarginate.

Color various, golden or silvery.

All the provinces. Originally from China.

TINCA.

Scales small, deeply imbedded in the thick skin; dorsal short, without spine; anal short; caudal subtruncated; a barbel at the angle of the mouth.

7. TINCA VULGARIS. Cuv.

Tench.

T. vulgaris, Günth., VII., 264.

D. 11–12; A. 9–10; V. 10–11; L. Lat., 90–105; L. Trans., $\frac{30\text{-}32}{18\text{-}22}$.

BARBELS very short; all the fins rounded; origin of the dorsal rather behind that of the ventrals.

Canterbury and Otago. Introduced from Tasmania; originally from England.

NOTES ON THE EDIBLE FISHES

OF

NEW ZEALAND.

BY

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

NOTES ON THE EDIBLE FISHES

OF

NEW ZEALAND.

The knowledge we possess respecting the Natural History of the fishes around the New Zealand coast is very imperfect, as our opportunities for observation have hitherto been confined to the shallow waters of harbours, or to the vicinity of rocky promontories.

Of the deep sea fish, and those which frequent banks and shoals at a distance from the coast, nothing has been ascertained by exploration, and the existence of several important species that frequent such localities is only known from specimens which have been cast on the shore during heavy storms. Those most familiar to us are, therefore, either shallow water or rock fish, so that their distribution round the coast must depend greatly on the temperature of the superficial currents, and the character of the sea bottom in proximity to the shore line. The influence of the latter condition is familiar to all fishermen, the rocky parts of the coast furnishing different kinds of fish from those found in the shelving sandy bights and shallow inlets; but the invisible boundaries created in the open sea by sudden changes in the temperature of the ocean define the range of many species of fish, in a way which is not less important.

This is effected chiefly by regulating the distribution of their favourite kinds of food. Thus, swarms of Medusæ, Mollusca, and larval Crustacea, crowd the seas round our coast during the summer months, attracting shoals of small fishes, which again are pursued by those of predacious habits, so that many kinds visit our shores at that season, which are absent during the colder months of the year. Many valuable fishes which, from their occurrence in large migratory shoals are of greatest commercial importance, appear to feed chiefly on those lower forms of marine life which have only an ephemeral existence dependent on the character of the

coastal currents. In the northern hemisphere it is now ascertained that the herring* is restricted to those parts of the sea in which the temperature is never less than 54°, nor higher than 58° Fahr., a range so limited that it obviously must relate to the existence of some delicate marine animal that forms the food of the fish. The study of the ocean currents that sweep our coasts is therefore invested with great practical interest, as it will enable us to infer from the experience gained in other parts of the world, the character of the marine life which stocks our seas. Unfortunately, the data respecting the direction and average temperature of the sea round the coast of New Zealand is still very imperfect, but the results obtained from a series of observations extending over twelve months during 1868, and made chiefly with a view of ascertaining how far these seas are adapted to the salmon, afford general indications of some value.

From these observations it appears that the coldest part of the sea round New Zealand is on the south-east coast of Otago, where the temperature of the surface-water ranges from 48° in winter to 57° in summer, corresponding averages for the atmosphere being 43° to 58°. The cold current thus indicated, which probably exercises a good effect on the quality of the fish besides limiting the range of a few species, appears to extend its influence up the east coast as far as Cook Straits; but on the west side of the islands the average winter temperature of the sea was found to be decidedly higher, and equal to that experienced 6° of latitude further to the north on the east coast. In the extreme south the summer temperature does not, however, rise to a corresponding extent, but on the whole there is evidence that the warm equatorial current, which is known to skirt the east coast of Australia, and has been likened to a southern counterpart of the gulf stream of the Atlantic,† must be directed against the west coast of New Zealand, tending to equalize the temperature in that region. In support of this view I may mention that while the red whale-feed (*Palæmon*), and multitudes of Medusoid forms, are seen in summer on every part of the coast of New Zealand, in winter, on the extreme south-west coast during calm weather, the sea is occasionally rendered almost gelatinous over large areas by myriads of Salpæ, and among them the large tubular *Pyrosoma*, which is properly an inhabitant of tropical seas. In 1863, on 22nd July, I saw the phosphorescent displays of these great commu-

* Richardson, "Yarrell's Fishes," Vol. II., p. 634.

† Commodore Wilkes, "U.S. Exploring Expedition."

nities of *Pyrosomæ* quite as wonderfully developed near the entrance to the sounds on the west coast of Otago as Bennet describes them to be under the equator.* The temperature of the surface water of the sea on that occasion was 57°, while the highest temperature of the air for the day was only 48° Fahr.

On the north-east coast of New Zealand, as far south as the Bay of Plenty, there are further evidences of a current from the north to be found in the abundance of the Flying Fish, the occasional visits of the true Nautilus, and also of the Argonaut or Paper Nautilus. Gigantic pods of a leguminous plant that grows on the Fijis are also frequently cast up in the same way that West Indian seeds are thrown on the coast of Scotland by the Gulf Stream. This current, although it reaches New Zealand, does not however appear to pass down the east coast, as there is abundant proof of the existence of a steady drift from New Zealand to the eastward, by which sawn logs, telegraph poles, and on one occasion, I am informed by Mr. H. Travers, a number of totara sleepers that broke adrift from Pigeon Bay during the earthquake wave in 1868, have been cast up on the Chatham Islands, which lie 450 miles east of Banks Peninsula. These islands appear, as it were, to lie in an eddy to the leeward of New Zealand, as a much larger proportion of pumice stone and driftwood, floating to the eastward, finds a resting place there than the relative size of the two groups of islands would lead us to expect.

It is, most probably, this tropical current sweeping from the East Cape to the Chatham Islands that gives rise to what the whalers call the "Banks," which is a favourite feeding ground for the sperm whale. The depth of water in this area has not been explored however, and it is considered doubtful if there is really a shallow bank, or anything more than a tract of ocean which is unusually rich in marine life.†

It may be stated incidentally that the investigation of the currents in these seas possesses much interest for the ethnologist, and for the zoologist in other branches than Ichthyology, as the diffusion of the

* "Wanderings of a Naturalist," p. 40. Part of this warm current must sweep the south coast of Australia, for Bennet also met with *Pyrosoma* on one occasion in winter at the western entrance to Bass Straits, along with other inter-tropical species, and remarks its being unusual in such high latitudes; and Professor Huxley obtained his only specimen in the same latitude, south-west of Australia, in the month of June.

† "Dieffenbach's N.Z.," Vol. I., p. 46.

human race and lower forms of animal life from island to island of the Polynesian group must have been greatly influenced by their agency. If the assistance of the naval officers on the station were secured, with the splendid opportunities they possess for observation, much valuable data on this interesting subject would soon be obtained.

A few words on the kinds of fishes which are associated together in different parts of the European seas will well enable the reader to realise by comparison the character of the fisheries which are most natural to this country. The sea on the western coast of Europe has been divided* into three provinces by the character of its marine fauna, two of which possess extremely distinct characters. The most northern is the Boreal province, in which there are few species of fish, but great abundance of individuals, their pursuit affording the sole employment of large communities of fishermen. In this province the Salmon skirts the coast line and enters the rivers; Herrings abound in the surface waters during their proper season; in fifteen to fifty fathoms water the Cod and the Hake are plentiful; while from that depth to 100 fathoms Holibut, Whiting, Pollack, Ling, and Tusk, employ thousands of men in most adventurous and perilous fisheries, which are conducted in the deep sea, far from land.

The most dissimilar province from the Boreal is the Lusitanian, which includes all the southern European seas, and is characterised by the profusion of Sea Perches, like our Kahawai and Hapuku—Sparoids, like the Snapper, and Scomberoid fishes, which include the Mackerel, Flying Fish, the Tunny, the John Dory, together with Gurnets and Mullets of various kinds, all of which are without representatives in the extreme north. On the other hand, we remark the absence from this marine province of the Salmon and all the many species of the Cod kind, which are so plentiful in the former. The Herring kind is common to both provinces, but is represented in the south by several different species, of which the Pilchard is the most abundant.

The third province is that which has a mixed or intermediate character between the foregoing; being, in fact, a neutral ground into which the northern fish are attracted during the winter season, while the southern genera are represented there during the summer months. This region of the European seas, which is termed the Celtic province by Professor Forbes, includes the British seas, and is practically the most bountiful in supplying varied and excellent kinds of fish throughout the year.

* Professor E. Forbes, "Natural History of European Seas."

In it the Turbot, Flounder, Sole, Cod, Haddock, and Whiting reach the greatest perfection, while the Herrings and the Salmon among the northern forms, and the Mackerel, Sea Bream, Pilchard, and Red Mullet from the south, combine to confer a well merited fame on the fisheries of the British seas.

If we now compare the assemblage of fishes which we find in the New Zealand seas with those in the European region, we find that, on the whole, they represent the characteristic forms of the southern or Lusitanian province, or, in other words, that our New Zealand fishes resemble those which are found on the coast between Madeira and the Bay of Biscay more than those which are caught about the north of Scotland. If we contrast the thirty-three sea fishes that are fit to be used as food in New Zealand, we have among the constant residents on all parts of our coast, the Hapuku, Tarakihi, Trevally, Moki, Aua, Rock Cod, Wrasse, and Patiki; and while the Snapper, Mullet, and Gurnet are only met with in the north, the Trumpeter, Butter Fish, and Red Cod are confined to the south. But with the exception of the Patiki, or Flounder, and the Red Cod, none of these are representatives of fishes that are common even in the south of Britain, while from the more northern seas similar fishes are altogether absent.

In addition to those which remain throughout the year a very large number of the fishes on the New Zealand coast, owing to its geographical position, are pelagic in their habits, and roam over a wide range of ocean, visiting our shores only irregularly in pursuit of food. Of the edible fishes of this class, by far the largest number are visitors from warmer latitudes, such as the Frost Fish, Barracoota, Horse Mackerel, King Fish, Dory, Warehou, Mackerel, and Gar Fish, while only the Ling, Hake, Haddock, and a few other fishes, which are rare, and worthless as food, are among those of more southern types which reach the New Zealand coast in their migrations.

There is, however, no reason to complain of any want of useful variety in the New Zealand fishes as compared with Britain, for we find that out of 208 species of fishes enumerated as occurring in the British seas, including many which are extremely rare or only occasional visitors, only forty are considered to have a marketable value. In New Zealand, notwithstanding our very imperfect knowledge, especially with regard to the gregarious tribes, which there is reason to believe inhabit shoals at some distance from land, out of 130 sea fishes, of which thirty are only

known to us by report, we have nearly as many varieties used for food as are brought to market in the British Islands.

Of the 140 species enumerated in the foregoing Catalogue, sixty-seven species are, so far as we know, peculiar to New Zealand; seventy-five are common to the coasts of Australia or Tasmania, while ten species are found in New Zealand and other places, but not in the Australian seas. New Zealand Ichthyology thus presents a very distinct character, the thorough deciphering of which affords a wide field for future observation and scientific investigation.

1. Hapuku.

The first on the list of marketable fishes is the Hapuku or Whapuku of the Maoris (*Oligorus gigas*), or Habuka, as the name is generally pronounced by Europeans, who in the south apply the name Groper to the same fish. It is also occasionally called the Cod fish, which is altogether erroneous, as it is more properly the representative of the Sea Perch (*Seranus*) of European seas.

This fish has a peculiar interest from its close affinity to the famous "Murray Cod" (*O. Maquariensis*) which inhabits the rivers in the interior of the Australian Continent. The Hapuku, however, never enters fresh water, but is a deep sea fish, though not generally captured far from the coast. Round exposed rocky capes and islands that rise in twenty to fifty fathoms water, with patches of sandy bottom, appear to be the favourite feeding and spawning ground of this fish during the season, and on nearly every part of the New Zealand coast where such conditions prevail the Hapuku may be obtained from November to May at the proper time of the tide. During the winter season they are seldom caught, as they probably leave the coast for deeper water. In the month of July I have, however, caught many of them far up the sounds on the west coast of Otago, in fifty to sixty fathoms of water, showing that it is rather a change in the depth of water than distance from the coast which they seek by this migration. Hapuku fishing is excellent sport, the average weight of the fish being about 45lbs., but occasionally large specimens reaching to 130lbs. weight are caught. The head and shoulder cut of this fish is most dainty food, but the flesh of the remainder is rather coarse and stringy; it is, however, well adapted for pickling, and may yet become a valuable article of commerce. The Hapuku fishing in the northern parts of the Colony is thus described by an early settler.

"I had some little experience with the Hapuku. For the first two years and a half after I came to the country I was lying idle, sojourning at Wangarei Heads, waiting to get land for myself and passengers, and opening the way for others to follow; and during those two years and a half I made nineteen voyages, in a small boat I had brought with me from Nova Scotia, to the Hen and Chickens, fishing Hapuku for family use, as well as to kill time, or for pleasure if you like, and seldom, unless interrupted by storms, missed making fine hauls of that superior fish; on one trip particularly I took fifty-two Hapukus home, and caught one with my own hands that weighed 90lbs., and I met with persons who had seen larger still. If a person like myself, going out when fancy led me, without any experience of the tides, appetite or habits of the fish, could catch such large lots in so short a time, what would an experienced fisherman catch, who would be for months stationed at the place.

"I made these trips in all seasons of the year, and had ample chance of observation; and I can say that, notwithstanding my long connection with fisheries in Nova Scotia for a series of years, I never saw in that country the sea more alive with fish than I have seen around the Hen and Chickens, where in fine weather were constant shoals of fish, stretching as far off as the eye could see in every direction, and on a calm day myriads of various sorts could be observed passing and repassing under my boat. I often said then, that I did not know of a better project in New Zealand than a fishing station, if judiciously managed; and, were it not for my time of life, and the interest I had in the people who came with me to the country, seeing them, with myself, adrift and astray in a new and distracted colony, without land to settle on—old as I was, in all probability I would have set a fishery a-going. For I do not only believe, but I know, that there is an inexhaustible source of national wealth, swarming unmolested round these islands, and on sunken rocks not yet discovered, that will yet be a profitable resource to the laborious fisherman, and contribute largely to the aggregate prosperity of the country. In my own humble view, our present mineral wealth is nothing now to what it will be in the time to come, yet I believe that the fisheries of this country will surpass it in wealth, permanency, and stability."*

The examination of a fine specimen of this fish since the first part of

* Memorandum on Coast Fisheries to the Joint Committee on Colonial Industries, 1871, by John Munro, Esq., M.H.R.

this work was printed enables me to give its characters in more detail than Captain Hutton was enabled to do with the imperfect specimens at his command. Pl. I. fig. 1 is an outline of this specimen, which is now placed in the Museum. It weighed 50lbs., and measured 44 inches in length.

If this is the same fish as is described by Professor Owen, the armed tongue, double pointed operculum, and large number of pyloric cæca, will no doubt remove it from the group in which it has been provisionally placed by Dr. Günther.

Among fishes sketched on the west coast of Otago in 1863, I find, however, one that was named Whapuku by the Maoris, which differs in several important points, so that two distinct fishes may be included under this name.

[*Oligorus gigas*, Owen. B. 7 ; D. $\frac{11}{12}$; A. $\frac{3}{9}$; L. C. 130 ; L. t. 60 ; C. py. 70+.

Length two and three-quarters that of the head ; height one-quarter less than length of head, which is three and one-fifth times length of snout, and eight times diameter of the eye. Spinous dorsal low, fifth spine the highest, equals in length the height, and is twice the length of the soft dorsal, with which it is continuous. Anal is beneath the soft dorsal, but only two-thirds its length, both being rounded and scaled at the base. Pectoral rounded, with one simple, and sixteen divided rays. Ventral triangular beneath, and one-sixth shorter than pectoral, having the spine rather stout. Caudal truncate, with a thick fleshy base and twenty rays. Head depressed and obliquely elongate, the lower jaw projecting. Nasal apertures large, three-fifths back on the snout. Pseudo-branchiæ large, tongue armed with an oval patch of villiform teeth. Jaws with narrow bands of cardiform teeth ; pharangeal teeth also cardiform. Vomerine patch triangular ; palatine elongate, both villiform. Distance between orbits less than one-fourth, and height at first margin of orbit three-eighths length of head.

The skull is slightly convex on top, with recurved ridge over the orbit and one lateral ; occipital crest is feeble, and does not extend forwards. Præorbital expanded, slightly denticulate at lower margin ; sub-orbital narrow, with an internal process supporting the eye-ball. Upper maxillary expanded behind, with a very stout styliform base, supplementary bone to upper margin. Operculum with two blunt squamous points separated by a notch, upper point feeble, lower point terminating a distinct but low ridge. Præoperculum with feeble serrations ; sub-operculum and inter-operculum with rounded margins, also serrated in parts. Œsophagus one-half the length of the stomach, which is an elongated sac, with thick wall strongly rugose, and pink on the internal surface ; length equals the head ; liver equals the stomach in length ; gall bladder at the end of a fine duct of nearly same length ; pancreatic cæca very numerous, forming a large collar-shaped mass round the pylorus. Intestine four times the length of the stomach, in three longitudinal folds and a short sigmoid flexure. Female generative organ bifurcate half its length, which is equal to that of stomach, the ova being undeveloped but

numerous. Swimming bladder larger than the stomach, distended to a diameter of one-fourth its length.

Dimensions of specimen caught 8th February, 1872, in Wellington Harbour, now in the Museum; weight 60lbs. :—

Total length	44 inches.
Less caudal	4 ,,
Height	12 ,,
Length of head	16 ,,
Snout	5 ,,
Snout to dorsal	15·5 ,,
Spinous portion	13 ,,
Soft dorsal	6·5 ,,
Anal	4·5 ,,
Caudal, width at origin	5·5 ,,
Width at 3 inches in advance	3·5 ,,
Pectoral (length)	6·5 ,,
Ventral ,,	5· ,,

—*J.H.*]

2.—Kahawai.

This fish (*Arripis salar*) is frequently termed the native Salmon, from its elegant form and lively habits, in which it resembles the true Salmon. During the summer months these fish—which reach the weight of 7lbs., but are more usual from 2 to 3lbs., visit the coast in great shoals, especially frequenting the mouths of streams. They afford good sport to the angler, as they rise to an artificial fly, and are readily taken at sea with spoon bait. When of large size the flesh is rather dry and tasteless, but the young fish, when under 1lb. in weight, and quite fresh, are very delicate and well flavoured, especially when boiled in water acidulated with vinegar. In the early stage of their growth they are spotted on the sides like trout, but with fainter colours. It is one of the early fishes in spring, at which season it follows voraciously the young fry of the Aua, or Sea Mullet. In the autumn Mr. Ingles reports that they follow the "Grit," or Whale-feed, which is chiefly a small Shrimp that swarms in the sea at that season to such an extent that it extends as far as the eye can reach, and may be shovelled up into boats so as to form a most valuable manure. The Kahawai appears to be a migratory fish, avoiding only that portion of the coast that is washed by the cold south-east current. Pl. I. fig. 2 is reduced one-fifth from the size of a full grown Kahawai caught in December.

4. Red Snapper.

(*Scorpis Hectori*). This is described as a new species by Captain Hutton, and is not unfrequently caught in the sounds on the west coast of Otago, although only one specimen, obtained when I was on board H.M.S. 'Clio' in April, 1871, has been preserved. It is generally called the Red Snapper by seamen who are acquainted with the fish of the coast, the colour being a uniform bright red, with a few dark streaks on the fins and a black spot on the side. The length of the figured specimen is 12 inches, but when I was in Milford Sound in 1863 several much larger specimens were obtained in Anita Bay. It has been lithographed, as it would no doubt be an edible fish, although I do not remember our trying the experiment.

In the group of fishes next to the foregoing is the much prized Red Mullet, which is represented in the New Zealand seas by a fish that has not been seen of late years (No. 5, *Upeneoides Vlamingii*). The specimen of this fish mentioned in the list was obtained in Queen Charlotte Sound, and if it at all approaches the Red Mullet of the Mediterranean in delicacy it would be a very desirable addition to our marketable fishes.

7. Snapper.

There are few fishes better known in the northern parts of the Colony than the Snapper (*Pagrus unicolor*). This name, by which it is best known, is adopted from Australia, its Maori name Tamure being seldom used by Europeans. It represents in these seas the Braize of the European markets, and is remarkable for its singularly abrupt profile and the brilliant metallic lustre of its scales. The Snapper is not reported to occur south of the Kaikoura Peninsula, the fish which usually goes by that name in the Dunedin market being the Tarakihi. The Snapper frequents shallow water, and is generally caught with the net in Wellington Harbour, but the natives may often be seen catching them with a hook and line in the surf on exposed sandy beaches when the wind is off shore. In clear shallow bays troops of this fish may be observed rooting up shell-fish that are buried in the sandy bottom, and crushing them with their powerfully armed jaws. 5lbs. is the weight of an average sized Snapper in Wellington market, but they are frequently obtained four times that size. It is a handsome fish for the table, and when boiled may be eaten either hot or cold. Pl. II, fig. 7 is the reduced outline of a specimen 24 inches long, caught in Wellington Harbour in the month of December.

10. Tarakihi.

(*Chilodactylus macropteros*). This is a very common fish in the market, and comes in as early as September. Two sizes are generally sold during the spring months—the smaller ones, three or four to the pound, being the best—the flesh of the larger fish, which are 3 to 6lbs. weight, being considered rather tasteless. Throughout the whole year the Tarakihi may be caught with the hook in ten to twenty-five fathoms water with a sandy bottom. It is at once distinguished from either of the following fish, which it resembles in shape, by the long finger-like ray of its pectoral fin. Pl. II. fig. 10 is an outline reduced one-tenth from a specimen caught in October.

The next fish in the catalogue (*C. spectabilis*) is known only from a single specimen, but Mr. Liardet informs me that it is not uncommon, and reaches a large size.

12. Trumpeter.

The Trumpeter (*Latris hecateia*), which is the Tasmanian name for the same fish, and which the natives call Kohikohi, is the best flavoured of any of our fishes, and, though abundant, is so extremely local in its habits, remaining continually on certain patches of feeding ground, that it is only rarely brought to market. It feeds on a sandy bottom in twenty-five to thirty-five fathoms water, preferring banks or shoals. It is caught with the hook, and if the proper fishing ground is once found, a large haul of these fish, averaging about 6lbs. each, is soon obtained. The areas which they frequent are very limited, and require to be carefully marked. During six months' experience on the west coast of Otago, the greater part of which time we subsisted on fish, only two spots were discovered where we caught this much prized variety. It was formerly supposed to be peculiar to Tasmania, but has lately been found on banks near the Victorian coast, from which the Melbourne market is supplied. The Kaikoura Peninsula appears to be a favourite ground for this valuable fish, Mr. Ingles stating that there the proper ground is three miles off Point Keene in thirty-two fathoms, the exact patches being laid down by private marks ; but that they are also caught off almost every point in the peninsula as long as the depth of water is over sixteen fathoms, and that they range from 6 to 30lbs. weight. In shape the Trumpeter is like the Moki, but is easily distinguished from it by the longitudinal bands of colour and smaller mouth, which is better armed with teeth than in that species. Whether fresh or smoked, the Trumpeter always commands a

good price, yet it is rarely seen in any market, except in Dunedin. Pl. II. fig. 12 is the outline of a fine specimen, 26 inches long, that was caught in Preservation Inlet in 1863.

13. Moki.

The Moki (*Latris ciliaris*) is an abundant fish in the Wellington market, and, though occasionally seen at all seasons, is most common and in best condition during spring and early summer. It rarely takes bait, but is chiefly caught with the net. The quality of this fish is very varied and much affected by the nature of the feeding ground, for though usually rich and well flavoured, it is frequently, even during the proper season, insipid, and with the strong rank taste that characterises it when out of season. It is found on all rocky points of the New Zealand coast, the usual size being from 2 to 4lbs., but it sometimes reaches 19lbs. weight. The Moki is admirably adapted for preserving, and when properly cured and smoked will keep for a much longer time than most other fish when prepared in that manner. When in good condition the flesh of the Moki is very rich, and well adapted for being cooked by roasting or baking, which is the favourite method of preparing this fish among the natives in the south. There appears to be a marked difference in the size of the head and in the tumidity of the mouth in the specimens of the Moki brought to market about midsummer, making two well marked varieties that are supposed by some to be different sexes. Pl. III. fig. 13 is from a large-headed specimen, which is the kind least esteemed. It was caught at the entrance of Wellington Harbour in November, and weighed 16lbs., being 24 inches long.

14. Sea Perch.

The Pohuiakaroa (*Sebastes percoides*), though not figured deserves mention, as it is a small fish representing in these seas the genus to which the Norway Haddock belongs. It is one of the most frequent and troublesome fish, caught in a moderate depth of water round the coast and especially in rocky harbours, being almost worthless as food, and armed with so many sharp spines that it is a difficult task to detach it from the hook. It is the proper *Sea Perch* of these waters, that name having been by mistake applied in the Catalogue to a small Wrasse (No. 67), which is generally called the Spotty or Poddly. *Scorpæna cruenta* (No. 15) is a very similar looking fish to the above, but not so frequently

met with, except in the sounds on the West Coast, where it abounds on steep banks formed where the mountain torrents discharge into deep water.

19. Frost Fish.

The Frost Fish, or Hiku of the Maoris (*Lepidopus caudatus*), is esteemed the most delicious fish in New Zealand. It is most commonly found cast up after cold frosty nights on sandy beaches that are exposed to the long roll of ocean swell, and is not in this country obtained by any kind of fishing. A very similar fish occurs, however, on the south coast of England, and, according to Yarrell, is occasionally found entangled in nets. The usual length of this fish is about 4 feet, but from its compressed form it weighs only about 4lbs. The Frost Fish is more frequently brought to market in Dunedin than elsewhere in this Colony, and generally fetches 2s. 6d. per lb., but during the winter months a considerable number are picked up on the beach between the Otaki and Manawatu, and brought to Wellington by the coach-drivers. On a still frosty morning in Breaksea Sound on the west coast of Otago, I once saw what we thought to be a Frost Fish skimming the sea in a tortuous course with its back fin rippling the water, and evidently feeding on some prey that it obtained near the surface; but nothing is definitely known of the habits of this singular fish, or why it should be cast up on the land, the probability being that on the calm nights when the sea is smooth it pursues its prey too close to the shore, and is left by the long swell during ebb tide. The specimen drawn, Pl. III. fig. 19, was taken at White's Bay in July, and measured 46 inches in length.

20. Barracoota.

A very common fish, allied to the foregoing, but inferior to it in quality as food, is well known throughout the colonies as the Barracoota (*Thyrsites atun*), which name is no doubt borrowed from the Baracouda Pike of the tropical parts of the Atlantic. This fish is a favourite with the Maoris, who call it the Manga or Maka. They are obtained at all seasons, but abound in the spring and autumn, and are easily caught with a short piece of red wood having a nail driven through it for a hook. This rude tackle is passed rapidly through the water alongside the canoe or boat by a short line and rod, and is eagerly grasped by the fish, which is then jerked inboard. The usual length of the Barracoota is 3 feet, and its weight 5lbs. Its flesh is white and flaky, and by

some is thought to resemble that of the Cod. In the early days of the Otago settlement, when the colonists depended solely on the Maoris for the supply of fish, it was very extensively used. It dries well, and is thus preserved in large quantities by the natives. When pickled and smoked it is excellent food, and preferable even to the fresh fish. Dried Barracoota, or Snook as it is called, is imported into the Mauritius and Batavia as a regular article of commerce, being worth over £17 per ton. Pl. XX. fig. 20 is a drawing of the Barracoota one-ninth the natural size.

23. Horse Mackerel.

This is the Hauture of the natives, and the Scad of the northern hemisphere (*Trachurus trachurus*). It has a very wide range, being common to the seas of Britain and New Zealand. This fish appears in Wellington Harbour about the end of November, and is one of the commonest offered for sale throughout the summer. Its form is somewhat like the true Mackerel, but the line of armed plates along each side at once distinguishes it from the more valuable and rarer fish. Immense shoals of Scads are occasionally driven on the beaches round the harbour, apparently by their impetuosity when following their prey into shallow water. Their usual length is about 13 inches, but occasionally they are of much larger size, there being probably two distinct forms included under this specific name, which, in that case should only apply to the larger kind. This fish is not mentioned as occurring in the southern provinces, but I noted a few on the West Coast at Martin Bay, and it is probable that the Mackerel stated to be so plentiful in the north of Auckland is also this fish. Pl. III. fig. 23 is the Horse Mackerel reduced to one-fourth its natural size.

24. Trevally.

The Arara of the Maoris, or the Trevally or Cavalli of the fishermen (*Caranx georgianus*), is a highly esteemed fish that is very common in every part of the colony during the summer months, but is in best condition at the commencement and close of the season. Its sides are partially armed with keeled spines like those of the Horse Mackerel, but its brilliant yellow tints and deep compressed body readily distinguish it. The flesh is very delicate, but less so in the larger sized fish, about 12 inches in length being the best size for the table. The Trevally frequents shallow water and feeds among the rocks, so that it may sometimes be caught by the hand at low water. It is quoted by Richardson that this

fish, which he says is the Skipjack of the sealers, used to be a staple article of food with the natives, who assembled on fine calm days and drove the fish into weirs formed of branches of trees, which they stretched across the shallow bays. In Auckland it is sometimes called the Yellow Tail, but this name appears to be also used for another species, probably the King Fish, which is next on the list. Pl. IV. fig. 24 is from a specimen that measured 21 inches in length.

25. Haku.

The Haku of the natives is the King Fish (*Seriola lalandii*) of Wellington and the Yellow Tail of Australia. In the months of January and February in each year large shoals of this fish visit Cook Straits and occasionally enter Wellington Harbour. They are generally of two distinct sizes, the smaller about 6lbs. weight and 20 inches long, and the larger about 4 feet in length and weighing about 40lbs. The flesh is very rich and well flavoured, but like all fishes of this class must be eaten quite fresh. These fish are often caught in Moki nets, to which they do great damage. They also drive on exposed beaches, several of them being generally cast up together. The natives value them very highly, and eagerly search the coast for them at the proper season, and have been known to carry choice specimens far into the interior as gifts to friends. This species has a wide range, being found on the high seas of the Atlantic. In New Zealand it is not mentioned as having been seen further south than Cook Strait, but in all probability it must occur along the whole length of the west side of the island. In its habits it is migratory and gregarious, like the Tunny. The latter fish has, however, a proper representative in these seas (*Pelamys Chilensis*), which, judging by the head of a specimen that was caught in Cook Strait, and now in the Museum, must attain to a length of between 8 and 9 feet. The drawing, Pl. IV. fig. 25, is from a specimen of the King Fish, 42 inches in length, caught in Wellington Harbour last January.

27. John Dory.

(*Zeus faber*). A large specimen of this delicious fish was caught at the anchorage under the island of Kapiti in September, 1870, and I have also seen it cast up on the beach near Tauranga in the month of April. It is frequently obtained in Australia, and is considered identical with the Dory of Europe, which is a migratory fish most

common on the south coast of England during the winter season. I may mention as a guide to those who wish to secure this delicate fish, that it is of similar predaceous habits to the Barracoota, living on the fry of other fish. The weight of the specimen figured, Pl. IV. fig. 27, was 6lbs., the length being 22 inches. Small specimens ½lb. in weight are not unfrequently brought to market in February.

28. Boar Fish.

The term Boar Fish (*Cyttus australis*) has been applied to a fish of which several specimens were cast up on the shore of Cook Strait during the south-east gale of November last. They resemble the Dory somewhat in form and size, but are easily distinguished by the rough skin and the absence of the round black spot on the side. As this fish is reported to be very inferior to the Dory as food, these characters should be attended to in order to avoid disappointment. This species abounds in the Melbourne market, according to Professor McCoy,* but only of small size, and he applies the name Boar Fish to a different species (*Histiopteris recurvirostris*, Rich.). Pl. V. fig. 28 is reduced one-sixth from a specimen cast up in Cook Strait.

31. Warehou.

The Sea Bream (*Neptonemus Brama*) is a fish deservedly prized by the natives. In Wellington it appears in the market in October, and continues at intervals during the whole summer, but the largest specimens are seen in the north during the winter. It cannot be considered a common fish, especially in the south, and according to the natives, it is very irregular in its visits to the coast. Those brought to Wellington weigh from 1 to 3lbs., but in the north, outside Hokianga Harbour, they are sometimes obtained 3 feet in length, in which case their weight would not be less than 25 or 30lbs. The flesh of the Warehou is rich with a very delicate flavour, and they deserve to be preferred to the Tarakihi and young Moki, along with which they are generally sold in the market. Pl. V. fig. 31 is reduced one-sixth from a specimen caught in Wellington Harbour last December.

32. Mackerel.

This valuable fish (*Scomber australasicus*) is only known to me from two large hauls which were made in Wellington Harbour about the 15th December, 1870, but it appears to be the fish that is called by the natives

* "Zoology of Victoria," Official Record of the Exhibition of 1867, p. 11.

Tawa-tawa. In colour, size, and form it closely approaches the common Mackerel of England, and is very superior in delicacy to the Scad or Horse Mackerel, which is commonly called the Mackerel in New Zealand. As the Mackerel is a migratory fish, making periodical visits to the coast from deep water, it will, no doubt, become better known when regular fisheries are established. In Europe the Mackerel is obtained throughout the year, but is most abundant in early summer, and is caught either with a hook or drift-nets. The drawing, Pl. V. fig. 32, is from a specimen that measured 12 inches in length.

38. Rock Cod.

This (*Percis colias*) is the Coal Fish of Captain Cook and Blue Cod of the settlers in the South, and the Pakirikiri of the Maoris, and is the most commonly caught fish among rocks on the coast. When quite fresh it is wanting in firmness, but if slightly salted for twenty-four hours it is greatly improved in quality. In the neighbourhood of rocks, in from ten to fifteen fathoms of water, is the best fishing ground for the Rock Cod, but they are also caught inside harbours, and even far up the sounds on the West Coast; keeping at about ten fathoms below the surface alongside of the great submarine precipices that descend vertically for more than 1,000 feet. They are, however, rarely brought to market, although they may be caught at any period of the year. Their full size is about 5lbs. weight. The beautiful tints of this fish, which are very brilliant when fresh caught, soon fade to a dull grey. Occasionally they are distinctly party-coloured, and even nearly white all over.

42. Gurnard.

The Red Gurnard or Kumukumu (*Trigla kumu*) is very abundant during the summer months in the harbours in the north, and full nets are sometimes drawn near Wellington with no other fish in them. The full grown fish weighs about 4lbs., but all sizes are used as food, the smaller ones being preferred. The flesh is firm and white, but rather dry and deficient in flavour. The grunting noise which this beautifully coloured fish makes when caught, should be mentioned, as it is a great source of amusement to amateur fishermen. Pl. VI. fig. 42 is reduced one-fourth from an ordinary sized specimen in the Wellington market.

57. Kanae.

The Grey Mullet (*Mugil Perusii*) is a very familiar fish to residents in the northern parts of the colony, where it forms a staple article of

food among the natives at certain seasons, and is the commonest fish sold in Auckland. Kanae have occasionally been obtained on the west coast as far south as Porirua, at the north entrance of Cook Strait, but have not been seen in Wellington Harbour, probably because a rocky coast and deep water is not suitable to their habits. The Kanae frequents the tidal rivers, going out to sea in summer and returning in the winter in immense numbers. They are captured generally with nets, but they also take the bait. The natives frequently capture them on still moonlight nights by paddling their canoes close to the banks of the streams; the fish are startled by the beat of the paddle, and leaping up fall into the canoe. This Mullet excels all other New Zealand fishes in richness, and is now dried and smoked in large quantities for sale in Auckland. The drawing, Pl. VI. fig. 57, is from a specimen obtained in Auckland that measured 20 inches in length.

58. Sea Mullet.

The Makawhiti or Aua of the Maoris (*Agonostoma Forsteri*), Pl. V. fig. 21, is a common fish obtained at all seasons of the year by fishing from the wharves in the harbours. It is commonly called Herring, from its general resemblance in size and form to that fish, but is easily recognised from the true Herring by having two fins on the back, the first of which has only four rays. I particularly mention this, as in some years what is supposed to be this fish visits the coast in enormous shoals like the Herring of the British seas. Queen Charlotte Sound seems to be the place most frequently visited by these migratory shoals, which appear at the beginning of winter. The Picton Herring, a dried fish commonly known throughout the colony, is the Aua preserved by smoking. Pl. VI. fig. 58 is from one of the larger sized specimens that are occasionally got, and measured 11 inches in length. The more common size is 7 inches long, and of a dark greenish tint and more slender herring-like form.

71. Butter Fish.

The Marare of the natives, known as the Kelp Fish among the fishermen and the Butter Fish in the market (*Coridodax pullus*), is the fish most commonly sold in Wellington during the winter months. It has rather a forbidding appearance, having a dark coloured slimy skin and inelegant form; it is nevertheless very good food, the flesh being exceedingly short in the grain and well flavoured without being rich, every part of the fish being singularly deficient in oil. It is always

advisable to remove the skin from this fish as soon as cooked, as if allowed to remain in contact with the flesh it imparts to it a disagreeable taste. Its usual weight is from 4 to 5lbs., and the largest specimens measure about 20 inches long. Dr. Knox states that this fish is commonly caught among the long kelp with a bag net, and that it is most abundant round the island of Mana, where the kelp plants are of gigantic size, with stems 2 to 3 feet in diameter, and so firmly attached to the bottom that they are used as moorings for small vessels during heavy gales, and that the Butter Fish, with its ample fins, glides about among the slimy foliage of these submarine forests.* I am informed by Mr. W. Russell that of late years large quantities of the Butter Fish are caught in Foveaux Strait and brought to market in Invercargill, so that it will probably be found on all parts of the coast where kelp grows. The bones of the Marare are singular, from their being of a bright green colour, which Dr. Knox finds is so persistent as to resist prolonged maceration, bleaching, and even boiling. It feeds on zoophytes, scraping them from the surface of the kelp with its curiously formed teeth, which are curved plates, one in the upper and two in the lower jaw, with sharp cutting edges that cut like scissors. Pl. VII. fig. 71 is from a specimen 18 inches in length.

72. Haddock.

The fish to which the familiar name of Haddock has been applied (*Gadus australis*) is a new species, described by Captain Hutton from a few specimens that were cast up on the shore of Cook Strait after a heavy south-east gale. The drawing, Pl. VII fig. 72, is one-sixth the natural size, but it is said by the fishermen to reach over 4 feet in length, and would be a most valuable addition to our market if its ordinary habitat were ascertained. I also obtained a specimen of this fish among a number of Red Cod caught in Bruce Bay, on the West Coast, in 1866.

75. Red Cod.

Also called the Yellow Tail and the Haddock, (*Lotella bacchus*) is a well known fish on some parts of the coast, being the species that is cured and sold as the Findon Haddock at Port Chalmers. It is a handsome fish, with a brilliant play of metallic colours when alive. The usual size is about 24 inches in length, and weight 4 to 5lbs. They

* *Trans.* N.Z., Vol. III., p. 131.

are generally obtained with the hook where there is a sandy bottom, in ten to fifteen fathoms water. They are occasionally netted in Wellington Harbour, and, though rarely got on the exposed parts of a rocky coast, are caught in abundance from vessels lying at anchor in the roadsteads off Hokitika and Greymouth. Pl. VII. fig. 75 is from a specimen caught in Wellington Harbour 2 feet in length.

No. 74 (*Lotella rhacinus*), a closely allied species, having a larger head and longer fins, has been termed the Hake, but it is apparently a rare fish, and only small sized specimens have been seen.

No. 76 is another fish of the Cod kind (*Pseudophycis breviusculus*), with a deeper body than the foregoing and more delicate flesh, resembling that of the Whiting. It has only been obtained on the west coast of Otago, where a few specimens were caught with the hook in fifteen fathoms water off Anchor Island in Dusky Bay, weighing about 5lbs., one of which is drawn one-sixth natural size in Pl. VIII. fig. 76.

77. Ling.

(*Genypterus blacoides*). This fish, also known as the Cloudy Bay Cod, is exceedingly common in Cook Strait, and on other parts of the coast to the southward. It is, however, seldom brought to market, not being as much appreciated for food as it deserves. It is a large fish, reaching occasionally 5 feet in length, weighs 15 to 20lbs., and has a white flaky flesh that takes salt well, and, being easily freed from bone, is well adapted for curing in the same manner as the Cod fish of commerce. It is in best condition in the beginning of winter. This is one of the fish that is cast up on the beaches outside Wellington Harbour after heavy gales in extraordinary profusion. It is very voracious, with powerful well armed jaws, and takes the bait greedily, so that large numbers can be readily caught. Pl. VIII. fig. 77 is reduced to one-ninth the natural size of this fish.

The three following fish have been seen only on rare occasions, and, so far as can be gathered from the fishermen, are not good for food.

No. 78 (*Macrurus australis*) is a singularly formed fish with a conical head and projecting snout, and skin covered with rough scales. Only one specimen, 18 inches in length (Pl. VIII. fig. 78), caught in Wellington Harbour has been got in New Zealand, but it is known on the south coast of Australia.

No. 79 (*Coryphænoides Novæ Zelandiæ*) was first described by me from a single specimen got in Wellington Harbour in 1870, but during

the November gale of 1871 an immense number were thrown up on the coast. Its long thin body and silvery scales has led to its being mistaken for the Frost Fish, from which it is easily distinguished by the form of the mouth, large eye, and tapering tail. Pl. VIII. fig. 79 is from a specimen 21 inches in length.

No. 80 (*Coryphænoides denticulatus*) appears only to have been known previous to the same gale from mutilated specimens found on the coast of South Australia, but on that occasion a large number were thrown up. It is a smaller fish than the preceding, and distinguished by the forward position of the vent and the spines on the head. Pl. VIII. fig. 80.

Flat Fishes.

Four kinds of flat fishes are described in the Catalogue, but one of them has not been seen, and of the others that which has been termed Brill, on account of its being the only one of our flat fish with the eyes on the left side of the head (No. 82, *Pseudorhombus scaphus*), is of small size, and is so full of bones that it cannot be eaten with any comfort. Pl. IX. fig. 82 is from a specimen 12 inches long.

No. 83, the Patiki (*Rhombosolea monopus*), is very common in the shallow bays and tidal estuaries on every part of the coast, and, though it varies much in quality, is everywhere highly esteemed both by natives and Europeans. They are generally obtained with the net, but on the shallow mud flats the natives capture them with a long slender spear, choosing the night time, and each carrying a lighted torch or a pan of flaming kauri gum on the shoulder, which attracts the fish and enables them to be observed and impaled as they glide over the bottom. The usual weight of this delicate fish is from ½ to 2lbs., but they are frequently obtained of a much larger size. Pl. IX. fig. 83 is reduced one-fourth from a specimen of the most common size sold in Wellington. Occasionally a large flat fish, said to resemble the Patiki, has been brought to market and sold as Turbot, but, from native information, it is probable that several distinct species yet remain to be discovered by the Pakeha fishermen.

The New Zealand Sole (*Peltorhamphus*) is an inferior table fish to the preceding, and not equal to the English Sole in flavour. It is not so common as the Patiki, and for that reason alone is more in request, and commands a better price in the market. The sole is caught along with

other flat fishes, and is easily distinguished by its oval shape and curious hooked fleshy snout which conceals the mouth on its upper side. Pl. IX. fig. 84, is one-fifth the natural size.

85. Gar Fish.

This name is applied both to the Skipper (*Scombresox Forsteri*) and to the Ihi or Half Beak (*Hemiramphus intermedius*), which are allied fishes representing those of the same names in the British seas. The representatives of the former genus, however, though common in England, appear to be rare in these seas, while the Half Beak, which is of rare occurrence in the British seas, is common all round New Zealand, and is the ordinary Gar Fish that is so highly appreciated, especially in Auckland and Dunedin, where they are more frequently seen than elsewhere, and are sold in the market at from 2s. to 3s. per dozen. Their length is about 12 inches. Angling for Gar Fish in Auckland Harbour, where it is known as the Piper, is thus graphically described by the writer of a letter which appeared in a recent number of the "Field":—"I have caught him in quantities in the harbour of Suez, at Aden, in New Zealand, and I have speared him by torchlight inside the coral reefs in the Society Islands, and everywhere I have found him a most excellent and delicate fish; indeed, once at Suez I remember the Ayahs almost fighting for them as I drew them in, recognizing their excellence, and evidently used to them in India. In many parts of New Zealand they swarm in the estuaries at certain seasons of the year, and may be caught three and four at a time with a light stiffish rod and fine tackle. I look on the Piper as *the* float fish of New Zealand, for, though you may have plenty of fun with others here and there, he is the only one who really requires a float to keep his bait in proper position. His bait, to begin with, is a tiny bit of beef or mutton, wherewith you catch, most probably, a so-called 'Herring,' which is not a Herring at all, but which serves your purpose. Scaling him and cutting a wee triangular bit out of his side, and hooking it so as to make it play nicely, you fish till you catch a Piper, and then you cut little triangular bits out of *his* side to entrap his brethren. The Pipers are 'jest awfu' cannibals,' and you will be often informed on Auckland wharf that 'Pipers is deeth on Piper.'*" Pl. IX. fig. 86 represents the Half Beak reduced one-third from the natural size.

* "The Field," London, November 25, 1871.

98. Sand Eel.

(*Gonorhynchus Greyi*). This curiously formed fish is remarkable for its eel-like shape and projecting snout, from beneath which its mouth protrudes like a sucker. It is caught with the net on the shallow banks near the entrance to the Hutt River, and is generally brought to market in summer along with the common Gar Fish or Half Beak. I have never heard of its being caught in other parts of the colony, but as it has a wide range in the southern seas, it is likely to occur elsewhere. The flesh of the Sand Eel is firm, of a white colour, and very delicate flavour. It is in no way related to the Eel family, but was placed by Richardson, who first described the fish, as closely allied to the Carps. The drawing, Pl. X. fig. 98, is from a specimen of ordinary size, measuring 16 inches in length.

Another fish, caught in considerable numbers in Wellington Harbour (*Hemerocœtes acanthorhynchus* No. 59), chiefly with the hook from the jetty, is often also called the Sand Eel, but is inferior to the last-mentioned fish both in flavour and size. Both fishes are coloured with varied red, purple, and blue markings, and are remarkably beautiful when alive.

100. Pilchard, or Sardine. *Parahi*

(*Clupea sagax*), Pl. XI. fig. 100. This is the true representative of the Herring kind in these seas, and it is reported to visit the east coast of Otago every year in February and March. On the last occasion it was observed that the shoal was migrating southwards, and extended as far as the eye could reach, followed by a multitude of Gulls, Mutton Birds, Barracoota, and Porpoises. So densely packed were they that by dipping a pitcher in the sea "it would contain half fish, so that if larger boats and suitable nets were employed thousands of tons could be caught."* The fish referred to was identified as the above species from mutilated specimens that were forwarded by Mr. W. D. Murison, and judging from which they appear to be 6 or 7 inches in length, or similar in size to the Sardine of the Mediterranean. The figure given is, however, from a drawing of this species in a standard work. Another fish of the same family, reported to occur in New Zealand, and exceedingly abundant in Victoria according to Professor McCoy, is the Anchovy (*Engraulis encrasicholus*), being identical with the well-known Anchovy of commerce. This fish is easily distinguished from

* "Otago Daily Times."

the Pilchard by its long head and projecting upper jaw and deeply cut mouth. Pl. XI. fig. 99 is a drawing of the English Anchovy, inserted for comparison, in order to assist in the identification of the fish. Its usual length is 5 inches.

A third fish allied to the Herring (*Chanos salmonea*, (Pl. XI. fig. 101) which is stated to occur in New Zealand, has also been figured from Richardson's work, but there is some doubt of the locality being correct. At any rate this fish is hardly entitled to the popular name of Herring which is applied to it in the Catalogue, as it has neither the abundance nor the familiar form of that fish.

114. Leather Jacket

This remarkably shaped fish (*Monocanthus convexirostris*) is very common in Wellington Harbour, and on other parts of the coast is not unfrequent. Though usually cast aside as worthless it has really palatable flesh when the tough skin, from which it receives its trivial name, is removed. The Maori name for this fish is Kiriri. In other countries members of this genus are called Trigger Fishes, from the power which they possess of suddenly erecting the stiff spine on the back with a snap that holds it rigid without further effort. The usual size of the Leather Jacket is about 11 inches long, Pl. XII. fig. 114 being one-third the natural size.

Sharks.

The Maoris are large consumers of Sharks, or Mango as they term them, of various species, but chiefly the Smooth-hound (*Mustellus antarcticus*), Dog-fish of two species (*Scyllium laticeps* and *Acanthias vulgaris*), and the Tope (*Galeus canis*). All of these may be seen at certain seasons at any Maori settlement by the sea-side, hanging on poles to dry in thousands, and rendering the neighbourhood extremely unpleasant. The species most valued is, however, the Smooth-hound, which is the only Shark that is properly edible, as it lives on Shell-fish and Crabs, and has the same clean-feeding habits as the Skate. In the Hebrides and north of Scotland the flesh of this harmless little Shark is considered to be a great delicacy, but I have never heard of its being eaten by the white settlers in the colony.

It has been, however, drawn with the edible fishes, so that it may be readily distinguished from other Sharks, which, not being so particular in their diet, are unfit for food. It will be found drawn to one-ninth the natural size, in Pl. XII. fig. 123.

Rays.

This is a group of fishes not so much appreciated for food as they deserve, and which, though not uncommon, are hardly ever brought to market, at least in Wellington. The Skate (*Raja nasuta*), closely approaches the fish of the same name which in Scotland is a favourite in the market during the winter months, and is caught in 5 to 10 fathoms water, wherever the bottom is sandy ; but, like other flat-shaped fishes, would be most easily taken with a traul. The New Zealand Electric Ray (*Torpedo Fairchildii*), though not so far as I know ever used for food, has been figured, Pl. XII fig. 134, as it is an interesting addition to our Fauna, named after the collector, Capt. Fairchild, of the Colonial Government gun-boat 'Luna,' to whom the Museum is indebted for many valuable additions of natural history, obtained by fishing and dredging on all parts of the coast.

To this family of fishes also belongs the formidable Stingaree, or Wairepo of the Maoris (*Trigon thalassia*), which is greatly prized as food among the natives, and in some parts of the coast attains to the most enormous size. It has been recently discovered—by the writer of the animated article in the "Field," on "Fishing in New Zealand," which has already been quoted—that 'Stingareeing' can be made to afford sport of a most exciting kind. His capture of a moderate sized one is thus told :—

"The tide is nearly at its lowest, and the brown waving *Laminaria* beds are beginning to show ; there is no wind, plenty of light, but a slight sea mist prevents it being too glaring. One in the bow of the dingy, and one to paddle gently on round the first rocky point. There goes an Eagle Ray (*Myliobates*), and there another and another, more flying than swimming ; but the nearest turns at the motion of the arm, and the whole school fan out to sea with the most graceful motion of their wings imaginable, and after two or three strong beats they shoot along about a foot under the water, like kites. Never mind, more to come ! Look ahead ! Amongst the heaving seaweed there are the mighty black fins working up and down, just above the water, with a strange waving motion—a real black Trygon ! Warily, warily the boat is propelled towards him, the sculler sitting face to bow, and the grainer, with the end of the line clove-hitched above his left elbow, two or three feet, according to the balance of the grains, laid along the staff, and included in the grasp of his right hand (most important ; without that,

you will never make a good shot), in readiness to strike. Mind your line is well coiled. Warily, warily! Now the vast black mass begins to slide off the weeds. Gently! not too great a hurry! Wait till you see the scowling face within two feet of the boat, and let him have it well forward.

"'Habet! Back all sharp!' and a rush and a drag that cuts your arm. Get between him and the deep sea! There he sulks down at the bottom, grasping the rock with his enormous fins. Patience; get hold of the staff, and drive the points further into him. There! you have got the worst of that round—a thwack on the side of your head from the staff that makes it sing again! Never mind, he is heading towards that sandy bay. Let him pull the boat himself. Now the water is shoaling, Splash, puff; I had no idea it was so deep; up to my armpits, by jove! Squatter on, shallower and shallower, till, after one or two trials, you get the shaft in your hands. Now, look out! There is a foot-long spine in that lashing tail, and if it touches you, Auckland Hospital or lock-jaw. Prise down the staff; shove him upwards; put the other grains into him; and up the sandy shore he slides, blowing and snorting like a grampus, fighting to the last. Run him up, run him up, and bring an oar; stick it across his tail, bear upon it from both sides, and give me the tomahawk! Snick! and the enormous mass is done for; we have a spear ten inches long, and bait enough for a day.

"'Whew! What a fight! Let us have a rest and a pipe. What does he weigh? Some 90lb.'"

"One of the numerous curses of civilization is the way in which iron has driven the spear of the Stingaree out of the market, without properly supplying its place. In Samoa these Ray stings are in high repute still, not only for spear heads (in which case only an inch or two is used, lightly fastened to the staff, so as to leave the point to fester in the flesh), but, they say, as a quaint means of getting rid of an obnoxious chief. You break off some inch or so from the sharp end of the sting, and stick it in a peculiar way in the sleeping-mat. The obnoxious chief casts himself down to rest, possibly well filled with kava, and the first small barb penetrates his skin; slightly distressed, he turns round again, and a second one enters; and so, tossing and tumbling, he passes the night, till the whole is safe within his ribs, working up like an awn of barley. Soon after he dies with symptoms of general dropsy, with but little external marks to tell the reason why. I know not whether this be true or no; but I do know that it was told me by a Samoan chief,

whilst looking over my collection of stings, and more particularly gloating over those of the Eagle Ray."

FRESH WATER FISHES.

The fresh waters of New Zealand are inhabited by only a few kinds of fish, as compared with most other countries, and they are mostly of small size. Nevertheless, from their abundance at certain seasons, some species are of considerable importance as sources of food, and in a few cases possess more interest for the angler than is usually conceded to them.

The two first species I have to mention deserve the attention of observers from their close affinity to the Salmon and Trout, which are now being rapidly acclimatized in the streams throughout the colony.

91. Upokororo.

The above is the native name of the Grayling (*Prototroctes oxyrhynchus*), a fish that has been long familiar to the settlers in certain districts, but which does not appear to have been obtained by any of the earlier collectors of the fishes of New Zealand, and remained undescribed till last year, when specimens were forwarded by the Westland Naturalists' Society, to Mr. F. Buckland, who eventually requested Dr. Günther's opinion about them. He recognised it to be a closely allied species to a fish from the fresh waters of Australia, discovered in 1862, and which he had placed in the same family with a salmonoid fish (*Haplochiton*), that inhabits the cold fresh waters of Terra del Fuego, the Falkland Islands, and the southern parts of the American continent. Respecting the relationship of these genera to each other, Dr. Günther states that the Australian and New Zealand fish stand in the same relation to those of South America, as the genus *Coregonus* (of which the White Fish of the American lakes, and the Vendace of Scotland are examples) does to the true Salmon, and that, "however the Southern *Haplochitonidæ* may differ from the *Salmonidæ* in the structure of the jaws, and intestinal tract, it is a most remarkable fact that the fresh waters of the southern hemisphere are inhabited by two genera with adipose fins, so extremely similar in outward appearance to the northern Salmonoids.*"

In ignorance of Dr. Günther's researches, I described the Upokororo from specimens obtained in the Hutt River, in January, 1870, and made

* "Proceedings Zoological Society," London, 10th March, 1870.

the mistake of placing it in the only genus of Salmonoid fishes then known to occur in New Zealand, and which is not found elsewhere (*Retropinna*). * With reference to the Australian congener of the Upokororo, Professor McCoy remarks, "the Yarra Yarra, and some other of the rivers near the southern coast, contain in great abundance a beautiful and active fish, excellent for the table, and affording capital sport to the angler. By ichthyologists following the classification of Cuvier, it would be referred to the *Salmonidæ*, the adipose second dorsal fin being well marked, and so much does it resemble the Grayling in the cucumber smell when caught, in general appearance, habits, mode of rising to the fly, and playing, as well as in flavour, that anglers are in the habit of calling it now the Australian Grayling. Its close resemblance in food and habits to the true *Salmonidæ* helped the Acclimatisation Society to argue that certain of our rivers would serve for the experiment of acclimatising the European Salmon and Trout, and as experience has since shown successfully. It is vulgarly also called the 'Yarra Herring,' and is the *Prototroctes maræna*." This description applies to the New Zealand Upokororo, except that it does not possess the "cucumber smell," which, however, is as strongly marked in our other and proper Salmonoid (*Retropinna*), as it is in the English Smelt (*Osmerus eperlanus*). The Upokororo appears to inhabit clear running streams in all parts of the colony, and I believe that the very large fish locally called Trout, which are sometimes cast up on the beaches of the great inland lakes of Otago, also belong to this species. These probably reach 6 or 8lbs. in weight, but the usual size of this fish is under 1lb. weight and from 10 to 12 inches in length, but I have seen no specimens less than 7 inches.

At certain seasons they assemble in the streams in immense shoals, and the fact of their being often seen near the mouths of rivers has given rise to the idea that the Upokororo is a sea-going fish that enters the fresh water for the purpose of spawning. In my former account of this fish I adopted this view, and quoted a statement to the same effect by Mr. W. T. L. Travers, F.L.S., but further inquiry leads me to think that these fish are constantly resident in the fresh water, and that their annual migration does not extend beyond the commencement of the brackish water. I find that Mr. Travers did not himself see these fish in the salt water, and that the specimens he caught in the Maitai Stream were considerably above the limit of the tidal influence. The fishermen

* *Trans.* N. Z. Institute, Vol. III, p. 134.

on the rivers of the West Coast, who supply the large townships with fish obtained chiefly in the salt and brackish water within the river bars, appear to be very confident that the Grayling as they term it, does not enter the salt water, and on the same subject I have the following from Mr. C. Hursthouse, of Taranaki :—"The Upokororo, which you describe as a sea-visiting fish, is not such here. I made its esteemed acquaintance years ago in our little *belle rivière*, Waiwaikaiho. Natives, however, told us that it is solely an inhabitant of fresh water, that it spawns high up the streams, and that though always present in the pools along their courses, they come down in great numbers during floods. The only one ever found here in salt water was a dead one picked up at the mouth of the Henui, after a heavy spate. Our most skilful brother of the rod, Mr. J. H. Smith, who, as shown by his diary, caught last year 1,152 of these fish in 58 fishing days, taking in one day 93, thinks that Upokororo would no more voluntarily get into salt water than into hot water. Here, with our rude tackle, they don't rise at the artificial fly, but greedily bite at the small red worm which is only found under dry stock droppings; the common garden worm has never tempted one."

As it is very probable that by many observers the large sized Smelt (*Retropinna*), which we shall find is a fish common to both fresh and salt water, is mistaken for the Upokororo (perhaps in Australia, as well as in this colony), the question is one that still requires further investigation, and it will be a most interesting fact if it is established—that this fish which is so universally distributed in New Zealand, and has close allies in South America and Australia, cannot survive in sea water. Mr. Travers observed this fish in the Matai River in the early part of October; and I have specimens from the Hutt River, full of spawn, obtained in the month of January; while on the West Coast they are said to be caught several months later in the season, and even in winter. The Upokororo is readily recognised from the Smelt, which is the only other fish in our streams with a fleshy second dorsal, by its small tumid mouth, shorter lower jaw, and minute teeth, closely placed together like a comb round the jaws. They vary very much in richness of colour, from a general silvery hue and brownish on the back, while others are dark speckled brown on back, and rich yellow, almost golden tint on the belly. Pl. X. fig. 91 is from a fine specimen obtained from the Hutt River, that measured 12 inches in length.

92. Smelt.

This delicate little fish, which belongs to the true *Salmonidæ*, was first described by Richardson, from specimens which were obtained at the Bay of Islands with a net, and therefore I infer in the salt water, but it is at certain seasons one of the most common of our fresh water fishes. In my paper on the New Zealand Salmonoids, I distinguished two species of the Smelt, the Inanga and the proper Smelt, which have been again united by Captain Hutton under the original species *Retropinna Richardsoni*. I am still, however, inclined to maintain that *R. osmeroides* should be recognised as a distinct form until more definite proof can be adduced that it is merely a different stage in the growth of the first described species. My first acquaintance with these fish was in 1863, at the mouth of the Kaduka River, on the west coast of Otago, where in the month of September both kinds were obtained, the larger variety (*R. osmeroides*) following the flood-tide in numerous shoals into all the little streams to which the brackish water penetrated, leaping out of the water in a very lively fashion—the Maoris catching them as the tide fell by closing weirs made of flax net across the small creeks. Their length was from 4 to 7 inches, and they took bait voraciously. The smaller fish (*R. Richardsoni*) averaging 2 inches in length, on the other hand, chiefly appeared round the sides of the vessel in swarms at ebb-tide, when the water was quite fresh, and were caught with bag nets. Later in the season, during the month of November, the same fish was found in quantities in the Kakapo Lake, where the water is always quite fresh, but along with the smaller ones were many of larger size, averaging 4 inches in length, and having the appearance of adult fish, without showing any of the characters of the larger form. In the Blackwater, which is a tributary of the Buller River, 20 miles from the sea, I am informed that a fish which answers to *R. Osmeroides* is abundant from February till June, and is caught in large quantities with a net at night-fall, but that the smaller fish, which was described to me as the Whitebait with a silver line on the sides, arrives in October in closely packed shoals that advance steadily upstream against the rapids. Captain Hutton states that in the Waikato these fish go down to the sea to spawn in April, and that the young fish return again in October, but among the specimens he collected both forms can be distinguished, although some specimens of each are of equal size. In a collection of fishes obtained from Taupo Lake I also find a small sized form of the Smelt, which,

though differing in some respects from those found in the Waikato, has decidedly the characters of *R. osmeroides*. Specimens caught 16 miles up the Wanganui River in the month of November also have the characters of *R. osmeroides*. They are 5 inches in length, and full of roe. In the above collections, which comprise all the specimens in the Museum, it is always easy to distinguish the fish which answers to Richardson's very minute description. They are of all sizes up to 4 inches, when I consider they are adult, having a rather deep-shaped body, yellow colour, with a silver streak on the side, a short conical snout and very large eye. In the largest specimens the length of the body is less than four times that of the head, and less than five times the height of the body. The cleft of the mouth is small, and the teeth are very minute. The form of the stomach corresponds with Richardson's description, being like a fleshy tube with a bend dividing it into an œsophageal and pyloric branch. On the other hand, the specimens of *R. osmeroides* have the external appearance of a true English Smelt, the body being more elongated than the former species, especially in the case of the specimens from Taupo Lake. The colour (in spirits) of the Taupo specimens is also different from the others, being a brown grey, with the silver band on the side very indistinct, whilst the other specimens are yellow. In other respects they have the same distinguishing characters from the type of *R. Richardsoni*, which are, an elongated snout, deeply cleft mouth, powerful jaws, and strong teeth. The stomach is also different in form, being a blind sac with the œsophageal and pyloric orifices close together. As these differences are of considerable importance, I think it will be of advantage for observers in recording the habits of these fish in the meantime to distinguish between the two forms, even if they should ultimately prove to be the same species.

Both the large and the small Smelts form delicious food, the smallest size when about 2 inches in length, being one of several young fish that are called Whitebait. The large specimens, 7 inches in length, were called Aua by the natives, which is also one name for the small Sea-Mullet. The sketch of this fish given at Pl. X. fig. 92 agrees in general form and character rather with the larger form of this fish (*R. Osmeroides*) than with the adult of the type described by Richardson.

94. Kokopu.

This is the general Maori name for several very common fishes in the New Zealand streams and lakes, belonging to a family concerning which

Dr. Günther makes the following interesting remarks :—"The family of *Galaxidæ* was formed by the late Johannes Müller for a single genus, *Galaxias*—scaleless fresh-water fishes from the temperate zone of the southern hemisphere, which, with regard to the development and position of their fins, remind us of the Pikes of the northern hemisphere, but in other respects resemble the Salmonoids, to which they have been compared by Müller. Also, the settlers of at least some parts of New Zealand have dignified the larger kinds with the name of 'Trout,' or or 'Rock-trout.' However, they cannot be regarded as the southern representatives of the Salmonoids, inasmuch as recent researches have shown that this latter family is represented in the southern hemisphere by other much more closely allied genera (*Haplochiton* and *Prototroctes*). If we look for the representatives of the *Galaxidæ* in other zones, perhaps the African *Mormyridæ* and the Arctic *Esocidæ* are those which may be mentioned with the greatest propriety.

"Up to the present time only twelve species of *Galaxias* are known. Their geographical distribution is a point to which the greatest interest attaches. We find the genus most developed in New Zealand, where five species occur, and these are the largest of the whole group. Westwards it extends to New South Wales with three, and to Van Diemen's Land with two species. Another is said to be an inhabitant of the creeks of Queensland; but this is doubtful. Eastwards the same genus is met with again in the southernmost parts of America (Falkland Islands, Patagonia, Terra del Fuego), whence three species are known; and finally, a minute form is said to occur in Chile. The occurrence of the same natural genus of fresh-water fishes in Australia, New Zealand, and South America, would appear to be significant enough, and must be the more so when we find that even one and the same species (*Galaxias attenuatus*) inhabits the fresh waters of countries separated at present by the South Pacific Ocean."*

Two species of this fish have been figured as they are most frequently met with, and illustrate the greatest variety of external form which the genus presents in New Zealand.

G. fasciatus, Pl. X. fig. 94, is the Kokopu proper, reduced to one-half the natural size of the specimens most frequently caught, but they are sometimes very much larger. It is a fat sluggish fish found lurking under stones and rotten logs in all the streams in the colony, however small, where not running over a clear or stony bottom. They afford

* "Ann. and Mag. of Natural History," November, 1867.

very tame sport, but are fair eating, resembling the Eel in flavour.

The other species (*G. attenuatus*), which has been figured of the natural size on Pl. X. fig. 96, it is proposed to distinguish as the New Zealand Minnow. It is a little fish constantly seen in most lakes and clear running streams, with very much the same habits as the English Minnow. At certain seasons the young fry swarms in incredible numbers, and forms the Whitebait of New Zealand,* but is a very poor substitute for the little Herring that is so well known at Greenwich by that name. At Taupo Lake and other places in the interior small fish which the Maoris collectively term Inanga, but which are chiefly of the species now referred to, form the food of the natives for many months in the year, and are obtained in such abundance as to yield an ample supply both for daily use and to preserve for other seasons.

These small fish are caught where streams enter the lake, with fine-meshed nets woven of green flax. Several bushels of them are frequently caught at one time, and are immediately piled on hot stones and covered with mats and earth for half-an-hour or so, in the usual manner of Maori cookery, but without the addition of any water. Thus prepared, if not for immediate use, they are firmly packed in tightly plaited baskets, and in this state will keep for months, at least sufficiently well to suit the Maori taste, which is not fastidious.

The chief season for the Inanga at Taupo is from October to January, but as late as March all sizes can be found. It may be useful to give a list of the different fishes the Maoris distinguish in the Taupo district, which are as follows :—

Kokopu.—Common in all rivers and the lake.

Rawai.—A large kind of Kokopu, $\frac{1}{2}$ a lb in weight, found only in the lake.

Manguawai.—A large fish. In rivers only.

Ngoho-ngoho.—A large sized Kokopu with bands of colour on the sides.

Matiwhitu.—A red Kokopu.

Hawai.—A black Kokopu ; probably the Bullhead (*Eleotris*), which is a common inhabitant of all streams in New Zealand.

Koaro.—Not found in Taupo Lake, but only in Rotoaira.

Para.—A small fish found near the sources of the Wanganui River. It is less than 2 inches long when adult.

* Dr. Powell. *Trans.* N. Z. Inst., Vol. II., p. 84.

97. Mud Fish.

A most curious fish, allied to the foregoing, is the Mud Fish (*Neochanna apoda*), the interest attaching to which was first recognised by Sir George Grey, who obtained specimens at Hokitika which were forwarded to Dr. Günther in 1867, with the following notes, supplied to me by Mr. Schaw, Warden of the district:—

The fish were first found 4 feet from the surface in a stiff clay imbedding roots of trees, the locality being 37 feet above the level of the river, and three miles from the sea, and having at one time been the backwater of the river during floods. The township of Kanieri is now built upon it, but little more than two years since it was a swamp covered with dense forest. The surface clay rests on a deep deposit of gravel, which has been pierced in all directions by the goldminers, so that no surface or river water can collect, and the original swamp has disappeared. Mr. Schaw examined many specimens as they were found, and assures me that they were obtained imbedded in the clay, and that, although when first extracted they moved freely if placed in water, they soon get sluggish and die.

The specimens vary from 3 to 7 inches in length.

Dr. Günther regards this fish as "a degraded form of the more highly developed type of *Galaxias*," but differing among other points in the absence of ventral fins and the rudimentary character of the eye. By the latter character he states that "*Neochanna* is distinguished in a remarkable manner from the true *Galaxias*, which appear to inhabit more open and clear waters (those from Terra del Fuego are found in 'Alpine' lakes), and have the eyes fully developed; while the almost rudimentary eyes of *Neochanna* indicate clearly that it lives habitually in mud or swampy places. It is not surprising that the specimens obtained were killed by the sudden immersion in clear water; perhaps they might have survived if the change had been made in a more gradual manner.

"All *Galaxias* are extremely fat, so that it is impossible to handle them, even for a very short time, without the fat penetrating through the skin and soiling everything which comes into contact with them. I was much surprised to find this also to be the case in our specimen of *Neochanna* (which I should have supposed to have undergone a protracted trial of fasting), and still more so when the stomach proved to be distended with food which appeared to consist of the semi-digested remains of the *larvæ* of a small dipterous insect.

"In conclusion I would draw attention to the remarkable fact that in numerous groups of fishes which live in mud, or are even enabled to pass a longer or shorter time in soil periodically dried and hardened during the hot season, forms occur entirely devoid of, or with only rudimentary ventral fins. The chief function of these fins is to balance the body of the fish whilst swimming; and it is evident that in fishes moving during a great part of their life over swampy ground, or through more or less consistent mud, this function of the ventral fins ceases, and that nature can readily dispense with these organs altogether."*

Since the discovery of the specimens described by Dr. Günther others have been found at Hokitika, and also at Rangitikei in the North Island, by the Hon. Mr. Fox, and many of these I have succeeded in keeping alive for several months in pure water, and found the eyes of specimens of all sizes were soon fully developed, and that the sense of sight became quite as acute as in other fishes.

Wherever this curious fish has been found it is always buried in the mud, and it is singular that it should have such a wide distribution if it does not also exist in the neighbouring rivers.

With reference to the absence of the ventral fins in this fish, I may mention that in every case the specimens in confinement have sickened after some months, and for many weeks before they die they display an inability to remain at the bottom of the tank, which is their usual place, but float gently to the surface, tail first, in the most helpless fashion, as if they were only able to maintain a horizontal position by a constant effort with the tail, which at last wearies them out. Pl. X. fig. 97 is one-half the natural size of the fish.

Eels.

Several species of the Eel are found in the New Zealand rivers, those figured in Pl. XI. figs. 102 and 104 (*Anguilla aucklandi*, and *A. australis*), being the most common. The former grows to a very large size, and is largely used by the natives and persons living in the remote districts for food, but is rarely sold in the towns. The quality of the flesh of the Eel differs greatly in different streams, and there are some singular facts respecting its distribution which are not yet fully understood. Thus, Eels are not found in Taupo Lake, although they are common in streams only a few miles distant that flow direct to the sea by the Rangitaiki River. The natives have repeatedly carried Eels across this gap in the hope of acclimatising them to the waters of the lake, but they are never again seen. Mr. W. T. L. Travers has directed attention to a similar

* "Annals of Nat. Hist.," Nov. 1867.

circumstance in certain rivers of the South Island, * under conditions which indicate that the Eel cannot survive without free access to the sea. Respecting the existence of an obstruction in the course of the Waikato that will prevent the Eel ascending and descending from Taupo Lake, Mr Maling, who is surveying in that district, has written to Mr. Travers as follows:—"In looking over the *Transactions* of N.Z. Institute, I see that you make inquiries about Eels being found in rivers below rapids, and not above them. From my own observations I think it is absolutely requisite for that fish to have access to the sea. There are three notable instances of it near here. 1st. In the Waikato River Eels are found as far as Maungatautari Falls, and in all the streams that flow into it below them. 2nd. In the Kaituna River, which drains Rotorua and Rotoiti Lakes, Eels are caught as far as the falls below the Taheke, and no further. 3rd. They are caught in Lake Tarawera, but not in Rotokakahi, the waters of which run into Tarawera Lake, but have a perpendicular fall in one place of over 100 feet. The natives also say that unless the fish can get to the sea it will not be found. Rapids, unless of great length, and the waters much confined, are not sufficient to prevent them ascending; and I have also met them on land where vegetation is rank, and wet with dew or rain. It is my own opinion that Eels spawn near the mouths of rivers, as I have several times seen immense shoals of young ones, not more than 3 inches in length, ascending rivers near their confluence with the sea." The existence of this bar in the Waikato must surely also affect the other species of fish found in Taupo Lake, and will thus enable us to distinguish the fishes that do not require to visit the salt water.

In addition to the fresh-water Eels we have two species of Conger, the Silver Eel, of small size found in Wellington Harbour (*Congromuræna habentata*, fig. 106), and the other the common Conger Eel (*Congrus vulgaris*, fig. 105) which is found in all seas. The latter is well known to the natives as the Ngoio, and attains a very large size. It is frequently caught outside the harbour of Wellington and brought to market, but is not much esteemed as food.

Most of the larger rivers in New Zealand are visited early in the summer by shoals of Lampreys, which are stated to be excessively delicate and well-flavoured. It is of some interest to know that the same species of Lamprey visits the rivers of Chili and Western Australia. They are greatly esteemed by the natives, who call them Piharau, and used to pot them in oil in large quantities.

* *Trans.* N. Z. Inst., Vol. III., p. 120.

ADDENDA.

Sprat.

Since the notes on the Pilchard (p. 119) were printed, a Herring cast up on the beach in Foveaux Strait has been collected by Captain Hutton, and a second smaller specimen of the same fish obtained near to Wellington. It proves to be a different fish from *Clupea sagax*, and hardly distinguishable from the European Sprat, having a patch of teeth on the tongue, and the prominent abdominal serrations which distinguish this fish, and differing from it chiefly in the dorsal fin being placed further back.

Clupea Sprattus, *var.* antipodum.

New Zealand Sprat.

B. 7; D. 16; V. 7; A. 16; C. 24; L. Lat. 48; L. T. 13.

Head four and one-third times in the length, and less than the height; first ray of dorsal equidistant from centre of eye and root of caudal; ventrals beneath the anterior base of dorsal; eleven distinct abdominal serrations behind ventrals; mouth small, with lower jaw prominent. Maxillary expanded, extends to beneath anterior margin of orbit; opercles smooth (larger specimen with reticulate veins on præoperculum, but not striate), posterior margin with a blunt notch; tongue with an oval patch of teeth, and teeth also on palate. Gillrakers fine, close set, and shorter than diameter of eye. Scales large, regular, smooth.

Colour (from smaller specimens) silvery, darkish on back, with patches of minute spots, the sides in certain lights also show eleven bright stripes. Pigment spots scattered over the snout, and in two regular lines on lower jaw.

Length of larger specimen, 6 inches; of smaller, 3·3 inches.—*J.H.*

LIST OF PLATES.

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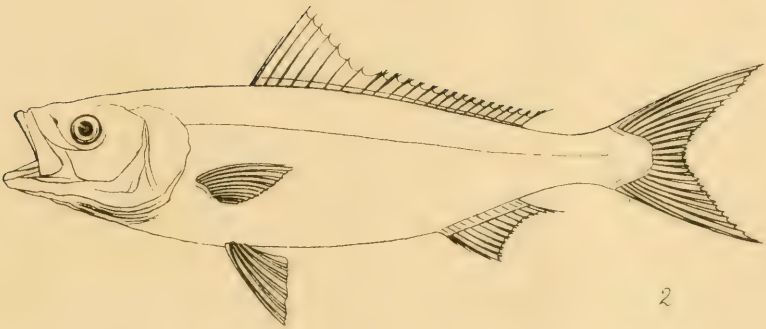

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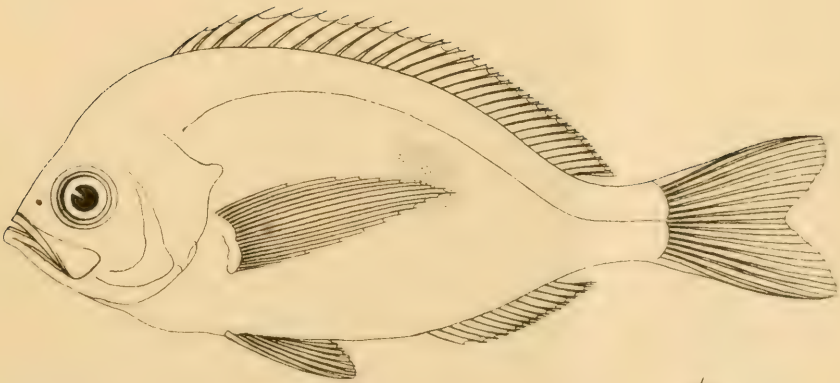

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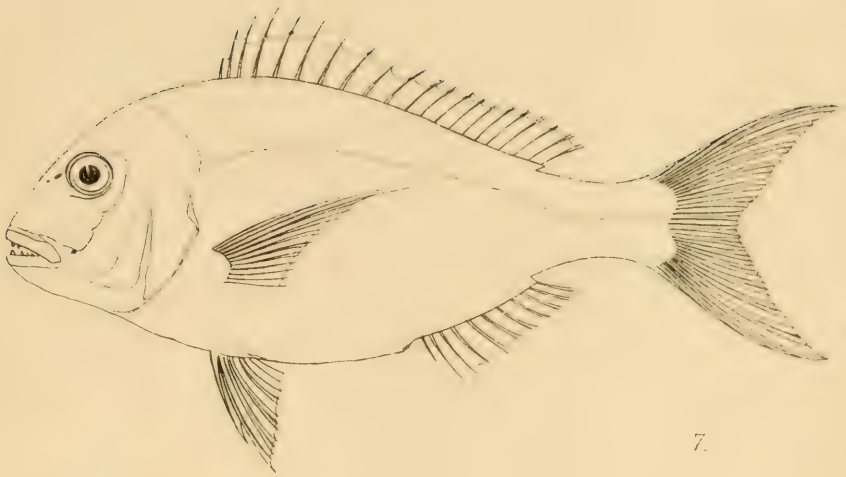

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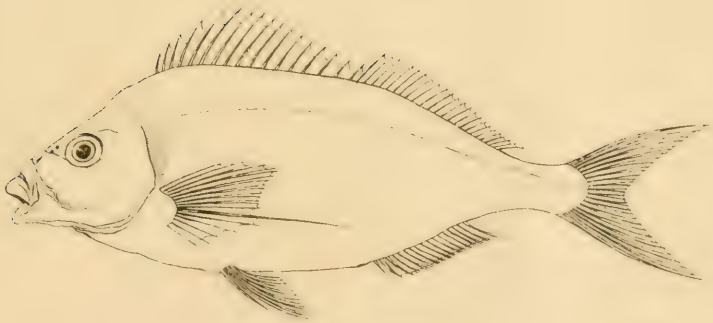

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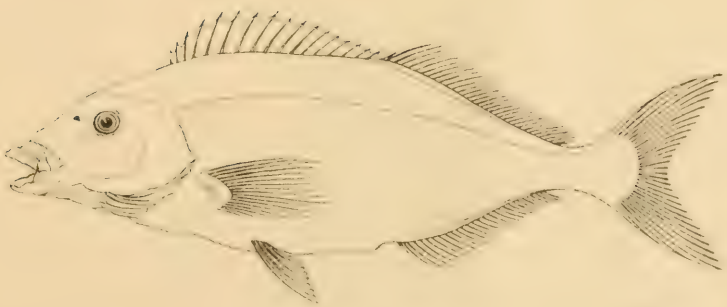

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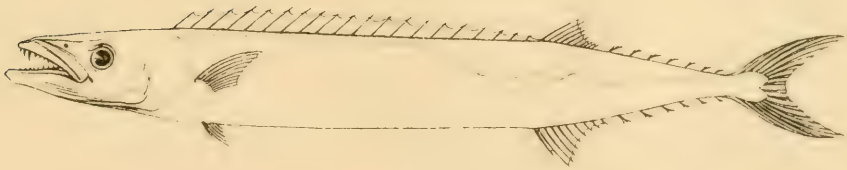

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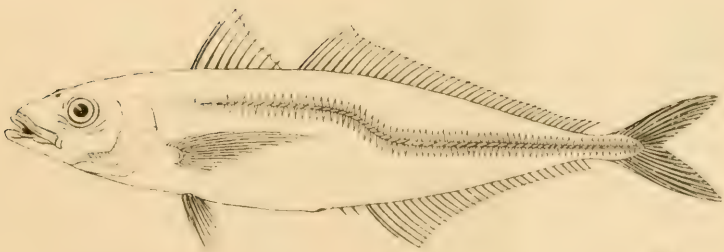

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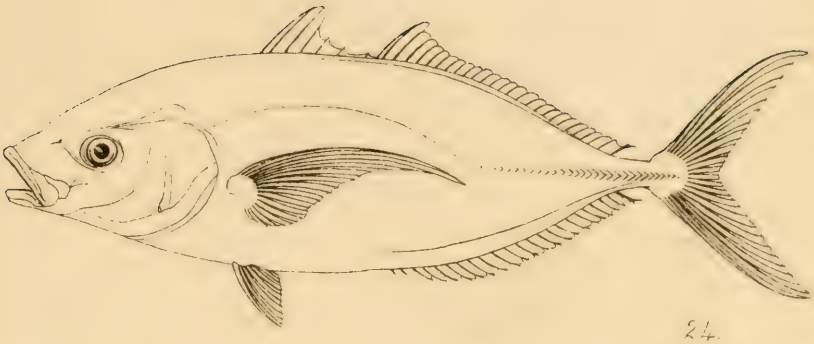

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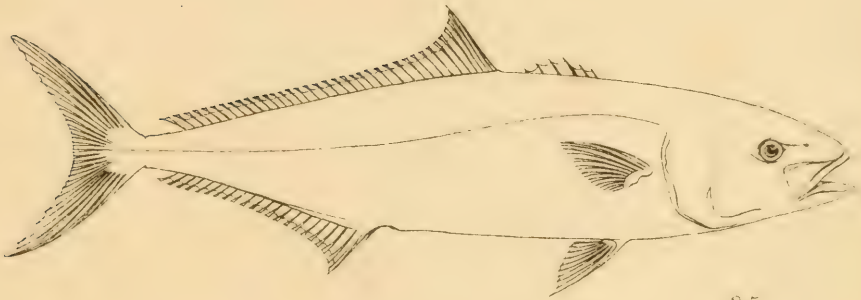

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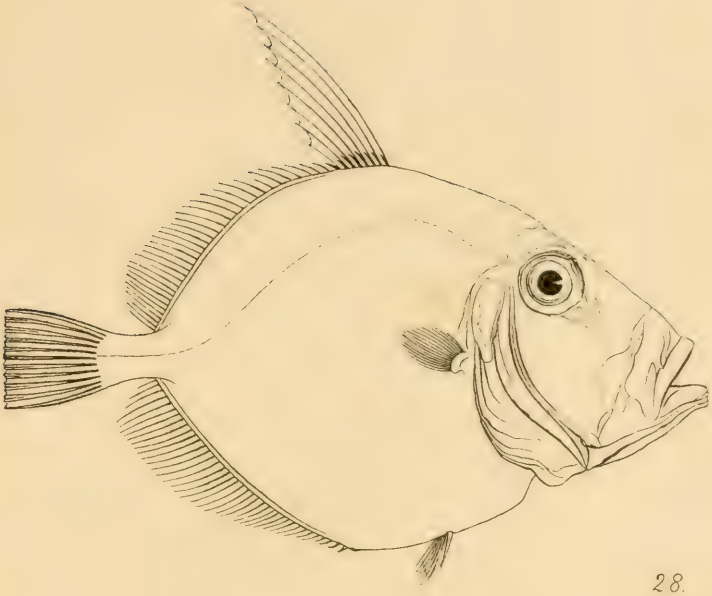

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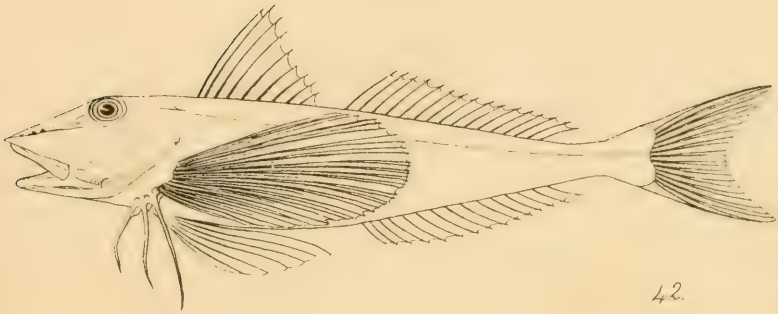

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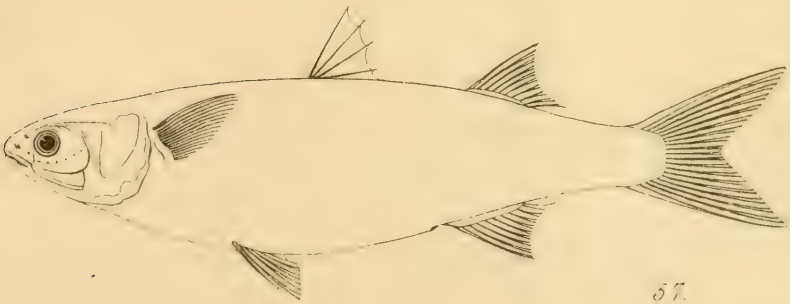

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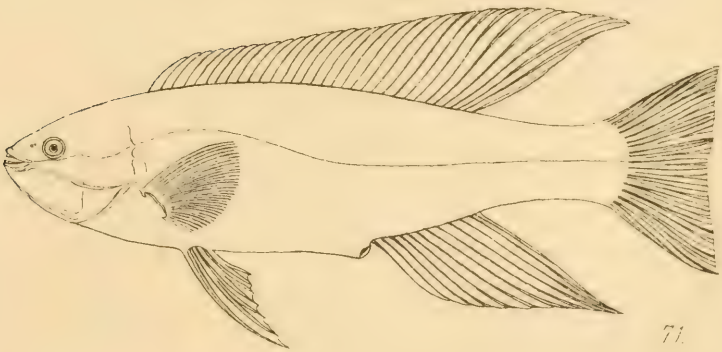

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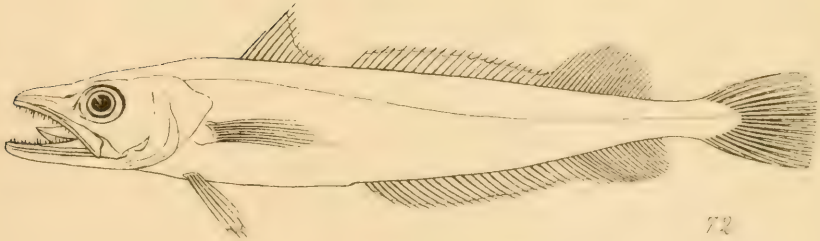

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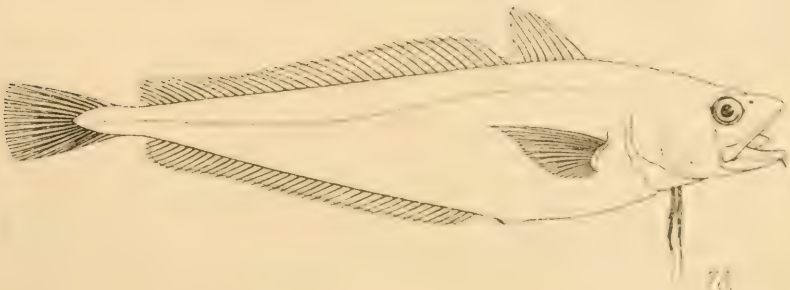

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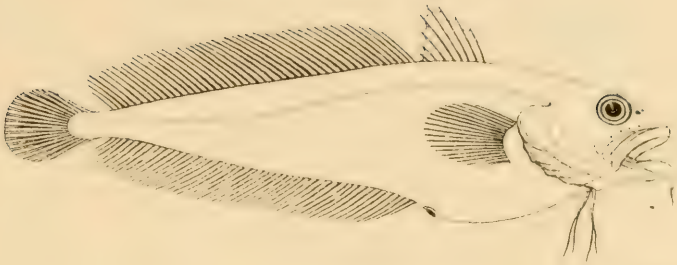

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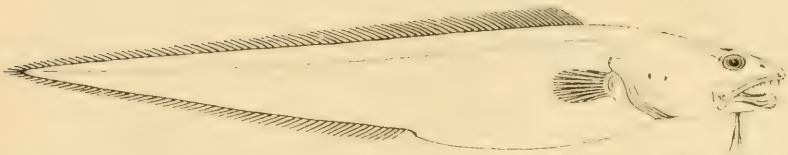

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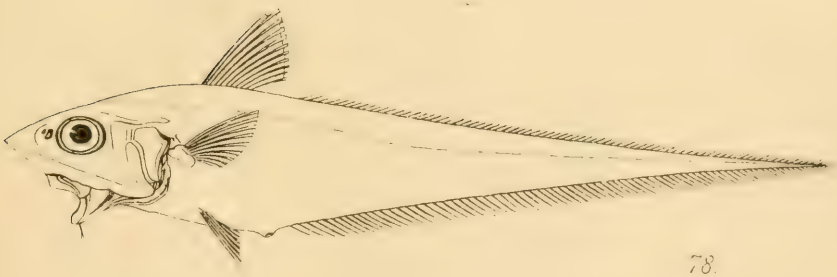

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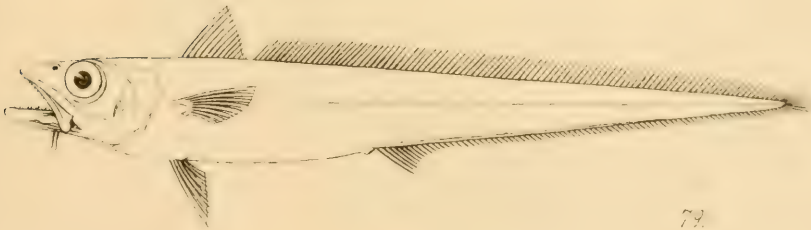

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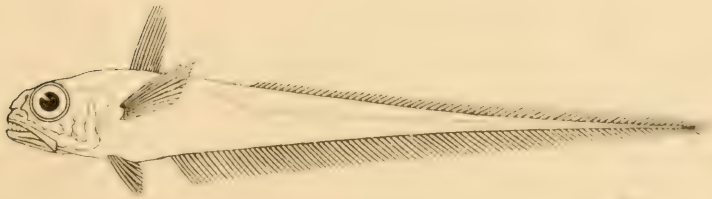

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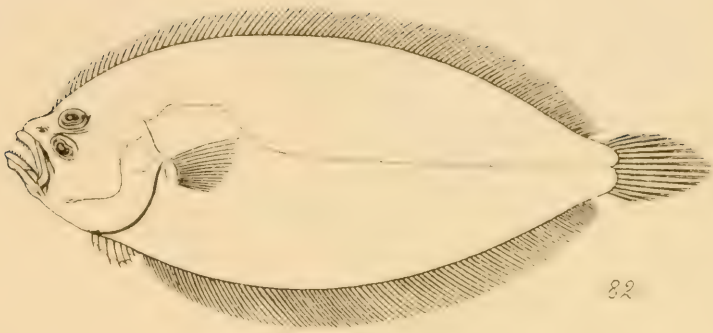

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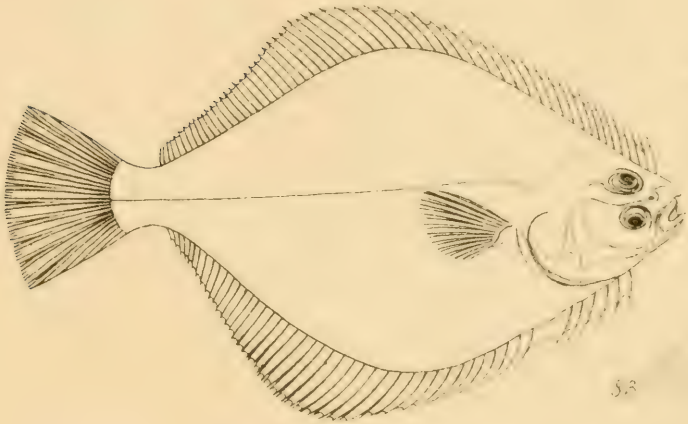

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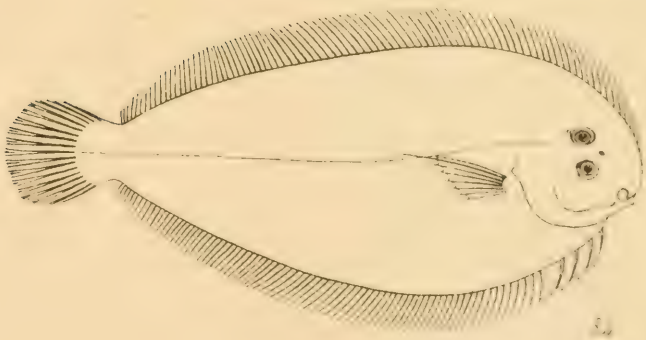

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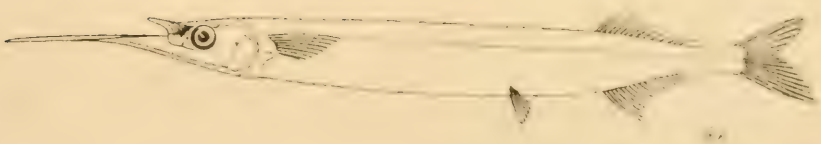

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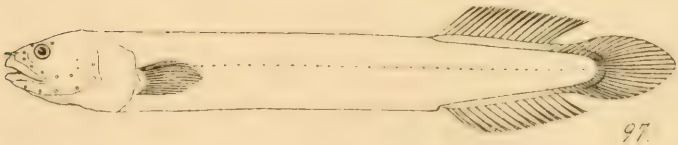

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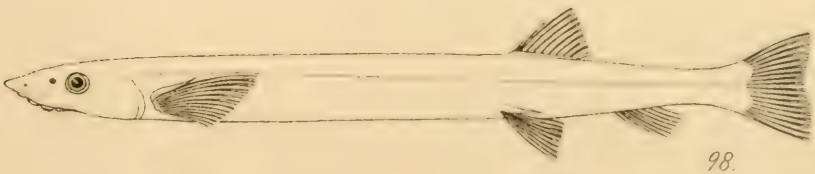

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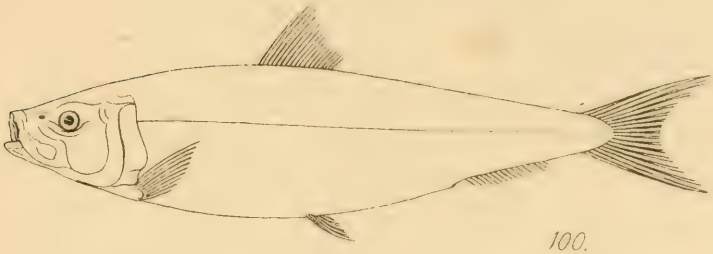

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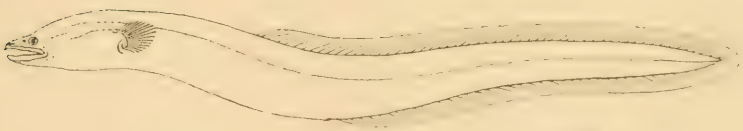

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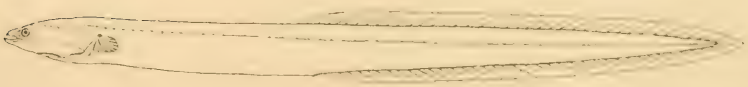

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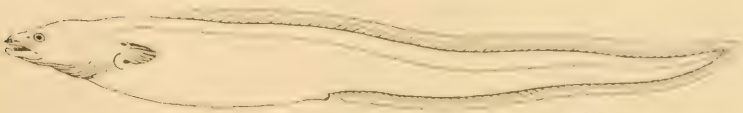

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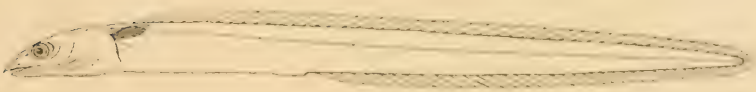

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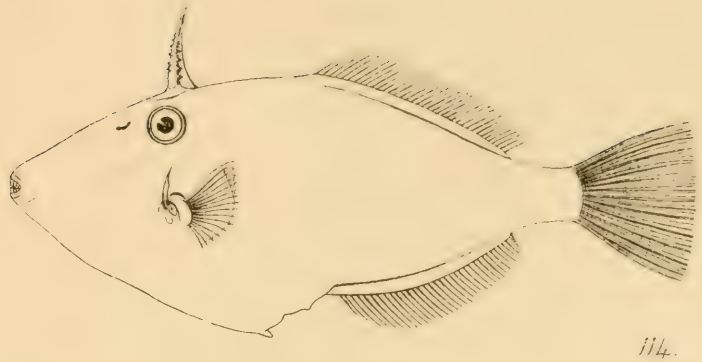

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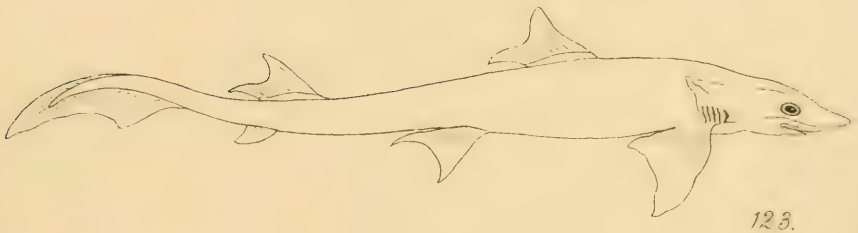

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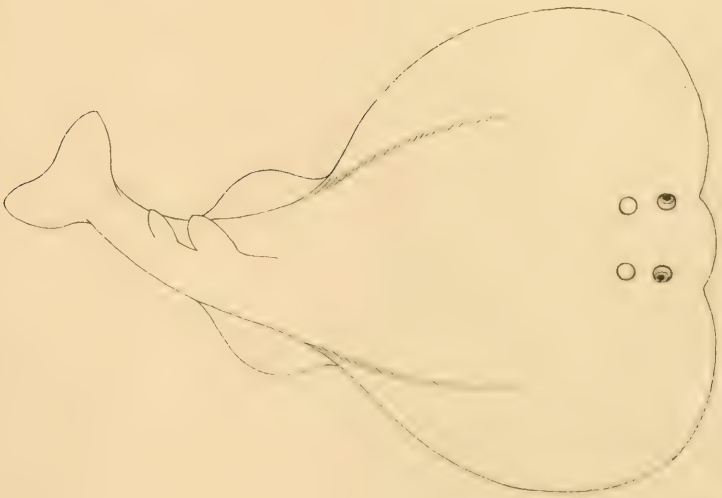

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List of Publications of the Geological Survey Department.

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2. Geological Report on LOWER WAIKATO DISTRICT, with Maps and Sections, 1867. By Captain Hutton, F.G.S. 1s.
3. Geological Report on THAMES GOLD FIELDS, 1867. By Captain Hutton, F.G.S. 6d.
4. Progress of GEOLOGICAL SURVEY of NEW ZEALAND, during 1866–7, with Sections. By Dr. Hector, F.R.S. 1s. 6d.
5. Progress of GEOLOGICAL SURVEY of NEW ZEALAND, during 1868–9, with Sections by Dr. Hector, F.R.S., including Reports on Barrier Island, Okarita District, East Cape, Thames Gold Fields, and Kawau Islands, with Maps and Sections. [Out of Print.]
6. Geological REPORTS for 1870–1, [including Reports on Coromandel and Thames Gold Fields, Amuri and Waipara Districts, Malvern Hills, Nelson Province, etc., with Maps and Sections. 2s. 6d.
7. Progress of GEOLOGICAL SURVEY of NEW ZEALAND, 1871, with Geological Maps of the Colony and Sections. By Dr. Hector, F.R.S. (In the press.)
8. MUSEUM and LABORATORY REPORT for 1866–7. By Dr. Hector. 6d.
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13. METEOROLOGICAL REPORT for 1868, with Abstract of all Returns for New Zealand prior to that date. 1s.
14. METEOROLOGICAL REPORT for 1869–70. 1s.
15. BOTANICAL NOTES on the KAIKOURA MOUNTAINS and MOUNT EGMONT. 1867. By J. Buchanan. [Out of Print.]
16. CATALOGUE OF COLONIAL MUSEUM, 1870. 6d.
17. Catalogue of the BIRDS of NEW ZEALAND, with Diagnoses of the Species. By Captain Hutton, F.G.S. 1s. 6d.
18. On the FISHES of NEW ZEALAND—Catalogue by Captain Hutton; Edible Fishes (with 12 plates) by Dr. Hector. 5s.

Other Scientific Works relating to New Zealand.

1. NEW ZEALAND EXHIBITION, 1865. Jurors Reports and Awards. 5s.
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3. HANDBOOK of the NEW ZEALAND FLORA. By Dr. Hooker. 42s.
4. TRANSACTIONS of the NEW ZEALAND INSTITUTE, Vol. I. [Out of Print.]
5. ,, ,, ,, ,, ,, II. 21s.
6. ,, ,, ,, ,, ,, III. 21s.
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Hay (H. Delisle). New Zealand Food Fish
Field v. 63, p. 637, May 10/84.