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STUDIES IN ICHTHYOLOGY.

No. 10.*

By

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(Plate ii, and Figures 1-5.)

Family CARCHARIIDÆ.

Genus *Carcharias* Rafinesque, 1810.

Carcharias arenarius Ogilby.

(Figure 1.)

Odontaspis cinerea Ramsay, Proc. Linn. Soc. N. S. Wales, v, 1, Aug., 1880, p. 96, footnote. *Nomen nudum ex* Macleay, MS.

Carcharias arenarius Ogilby, Ann. Qld. Mus. x, Nov. 1, 1911, p. 37. Moreton Bay, Queensland.

This species is the true Grey Nurse Shark of Australia, which has not hitherto been figured from a fresh specimen. Whilst on holidays at Bateman's Bay, New South Wales, in March, 1936, I saw a number of specimens caught by Mr. Zane Grey and his associates and also by local fishermen. The largest was about 9 ft. 9 in. over all, and was dirty pale brownish in colour; the smallest specimen was pale grey, with irregular light rusty spots. A specimen utilized by Mr. Grey in his cinema film was selected for drawing, and had the following characters:

Female. Total length, 9 ft. 4½ in. Depth about 18 in. Head, measured to first gill-slit, 22. Preocular length, 7½. Eye, 1. Snout, from upper lip, 5. Nostrils, 1½. Internarial space nearly 3½. Width of head just behind nostrils, 6. Symphysis of upper jaw to side of head, 3½. Length of one side of mouth, 7. Distance between outer labial folds, 10. Gill-slits about 7 in. wide, the last about 6, situated in advance of pectoral fin. No nictitating membrane or spiracles. Nine or ten functional teeth visible in front row of each side of both jaws in fresh specimen.¹ No median tooth. Labial folds rather ovals rounded. Median part of lower lip produced forward anteriorly. Body robust, the margins of the fins rounded. Predorsal length, 45 in. Base of first dorsal, 9. Interdorsal space, 15. Base of second dorsal, 7½. End of second dorsal to caudal, 7. Anal origin to base of caudal, 10. The origin of the anal fin is below the posterior part of the second dorsal

* For No. 9, see RECORDS OF THE AUSTRALIAN MUSEUM, Vol. xix, No. 4, September, 1935, p. 215.

¹ Cleaned jaws at Mr. Zane Grey's camp had the following formula:

Upper jaw—

14 very small, 8 { increasing in size } (gap), 1 small, 3 large { none at symphysis }, 3, 1 (gap), 8, 11.

Lower jaw—

10 very small, 9 { increasing in size }, 1 smaller { none at symphysis }, 1, 9, 10.

fin. Ventral origin to anal origin, 15. Base of ventral fin, 9. Pectoral origin to ventral origin, $30\frac{1}{2}$; to tip of snout, 29. Length of pectoral, 16; its base, $6\frac{1}{2}$. Height of anal fin, 8. Upper caudal lobe, 28; lower caudal lobe, 11. Caudal peduncle, $3\frac{1}{2}$ in. between end of anal and origin of lower caudal lobe, or 7 from end of second dorsal. No caudal keel, but a slight pit above. Depth of caudal peduncle, 5.

General colour light greyish-brown, white below. Eye pale dirty yellow to white, with very small black pupil.

Described and figured from a female specimen caught off Bateman's Bay, New South Wales, by Mr. Zane Grey, March 17, 1936.

It may be of interest to record that a smaller specimen of the present species, measuring 8 ft 11 inches at death, was kept in captivity for two years in the Aquarium at Taronga Zoological Park, Sydney. It has been replaced by two other examples, still living there, and sketches of one of these, with its attendant Pilot Fish, are included here.

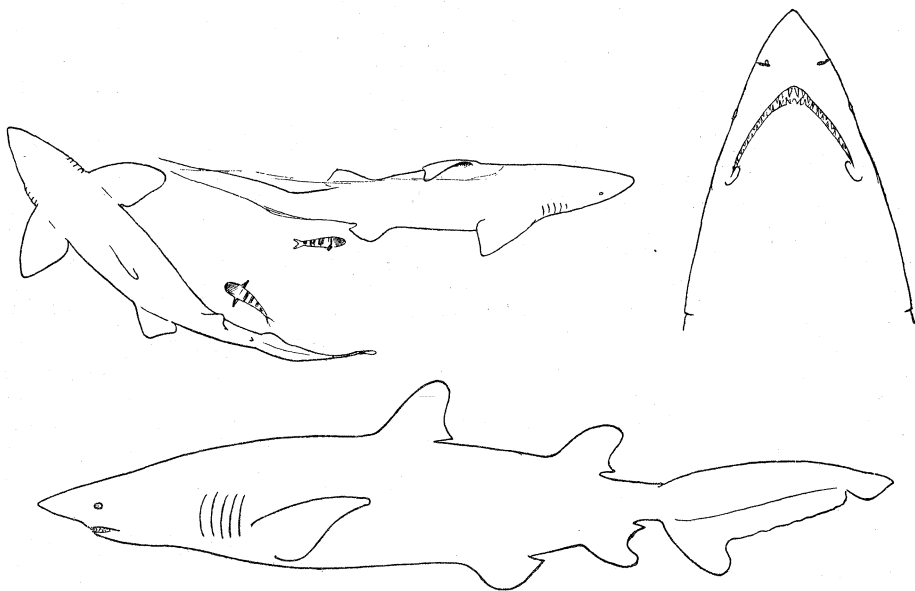


Fig. 1.—*Carcharias arenarius* Ogilby. A female specimen, 9 ft. $4\frac{1}{2}$ in. long, from Bateman's Bay, New South Wales. Also (above) two sketches of a living Sydney specimen, 9 ft. long, accompanied by Pilot Fish, in Taronga Park Aquarium.

G. P. Whitley, *del.*

Family SPHYRNIDÆ.

Genus *Sphyrna* Rafinesque, 1810.

Sphyrna lewini (Griffith).

Zygana lewini Griffith, Anim. Kingdom (Cuvier), x, 1834, p. 640, pl. 1. "Off the south coast of New Holland" = Sydney, N. S. Wales.

Sphyrna lewini Whitley, Mem. Qld. Mus., x, 4, June 30, 1934, p. 192, pl. xxviii (refs. and syn.—Moreton Bay, Queensland, specimen figured).

Several Hammerhead Sharks were caught at Bateman's Bay by Mr. Zane Grey and others, though none was as large as the record sized Australian specimen weighing 565 lb., which was caught earlier in 1936 at Bermagui. Some measurements of a Bateman's Bay specimen were as follows:

Length, 9 ft. $10\frac{1}{2}$ in. Width of head, 34 inches. Depth of hammer, 8 or nearly $6\frac{1}{2}$ near the eye, which is $1\frac{1}{2}$ in. in diameter. Gill-slits 3 to 4 in., the last two over the pectoral; the first is the longest, and is 6 in. from the last. Head, measured to last gill-slit, 2 ft. Depth of body, 18 in. Depth at middle of base of ventrals, $12\frac{1}{2}$. Pectoral fin, $17\frac{1}{2}$; its base, $7\frac{1}{2}$. Pectoral origin to ventral region, 36. Ventral, 5; its base, $5\frac{1}{2}$. End of ventral base to origin of anal, 10. Anal base, $4\frac{1}{2}$; its height, $6\frac{1}{4}$, and produced end, 5. End of anal base to lower caudal pit, $8\frac{1}{2}$. Upper caudal pit further back than lower. Lower lobe of caudal fin, 15. Depth of caudal fin at its middle, 7. Upper lobe of tail, from caudal pit, $30\frac{1}{2}$. Subcaudal lobe, 6. Depth of caudal peduncle, $4\frac{1}{2}$. Base of tail to end of second dorsal base, 9. Base and height of second of second dorsal fin about $3\frac{1}{2}$; produced end nearly 6. Second dorsal fin smaller than anal, originating over half the anal base and ending slightly behind end of anal base. Depth between the two fins nearly 8 in. Back rounded; form robust. Interdorsal space, 35 in. Base of first dorsal fin, $11\frac{3}{4}$; its height, 16, and posterior ray, 4. The origin of the first dorsal fin is about on a level with the posterior axil of the pectoral.

Colour ashy grey above, fading to pale yellowish below. Eye dull bluish. Orbit and part of nictitating membrane brown. Female.

This Bateman's Bay example had a rather longer caudal lobe, plumper body, and nostril grooves longer than those of the Moreton Bay specimen figured in 1934, but that was a younger female, and the two are obviously conspecific. The teeth become finely denticulated as the Hammerhead Shark grows older.

Family ALOPIIDÆ.

Genus *Alopias* Rafinesque, 1810.

Alopias greyi, sp. nov.

Thresher Sharks are usually identified from all parts of the world as *Alopias vulpinus* (Bonnaterre) or *vulpes* (Gmelin), but modern authors, by studying specimens more closely, have proved that several distinct species (if not genera) exist, and sometimes, as has been demonstrated in Formosa by Nakamura,² more than one species may occur in a restricted region. Phillipps³ has recently separated the typical Australian Thresher Shark from *vulpinus*, naming it *Alopias caudatus*; but still another species has been shown to occur in our seas by Mr. Zane Grey,⁴ who caught a specimen weighing about 314 lb. off Bermagui, New South Wales, on February 9, 1936. Mr. Grey has caught many examples of the true *A. vulpinus*, which he is therefore in a position to distinguish, and I agree with him that his Bermagui specimen apparently represents a new species, which I now name in his honour. The outstanding difference of *A. greyi* is its greenish instead of slaty coloration, and the eyes, which are modified for backward vision, are situated much further forward than in *A. vulpinus*. The total length was ten feet, of which the tail was said to be about half. Caudal peduncle thick, and dorsal and ventral

² Nakamura.—Mem. Fac. Sci. Taihoku Imp. Univ. (Formosa), xiv, 1, 1935, p. 2, pls. i-iii.

³ Phillipps.—N. Zeal. Journ. Sci. Tech., xiii, 4, Feb., 1932, p. 226, fig. 1 (Victoria and New Zealand).

⁴ Grey.—Angling and Gun Sport (Sydney), i, 11, June, 1936, p. 9, and fig.

fins elevated. Photographs of the specimen appeared in the Sydney newspapers of February 12 to 14, but only the jaws were preserved, and these, I understand, are destined for the American Museum of Natural History, New York.

Family ALBULIDÆ.

Genus *Albula* Scopoli, 1777.

Albula Scopoli, Intr. Hist. Nat., 1777, p. 450. *Ex* Gronow, Zoophyl, i, 1763, p. 102, non-binomial. Haplotype, *Esox vulpes* Linné.

Butyrinus Lacépède, Hist. Nat. Poiss., v, 1803, p. 45. Haplotype, *B. bananus* Lacépède = *Esox vulpes* Linné. Also spelt *Butirinus* by Rüppell, 1837, and *Buturinus* by Cuvier and Valenciennes, 1846.

Glossodus Agassiz, Piscium Brasil (Spix), 1828, p. 48. Type, *Glossodus forskali* Agassiz = *Esox vulpes* Linné. Not seen.

Esunculus Kaup, Cat. Apodal Fish. Brit. Mus., 1856, p. 143. Haplotype, *E. costai* Kaup, supposed to be Mediterranean. Larval form.

Conorhynchus Gill, Cat. Fish E. Coast N. Amer. (Proc. Acad. Nat. Sci. Philad., 1861, supplement), 1861, p. 55. *Ex* Nozemann, 1757, pre-Linnean. Haplotype, *Butyrinus vulpes* Storer. Name preoccupied by *Conorhynchus* Bleeker, 1858, a genus of catfishes, and *Conorhynchus* Motschoulsky, 1860, a genus of Coleoptera.

Atopichthys Garman, Mem. Mus. Comp. Zool. Harvard, xxiv, 1899, p. 326. Logotype, *A. esunculus* Garman, selected in Jordan's Genera of Fishes, iv, 1920, p. 486. Larval form.

In my opinion, *Esunculus costai* Kaup, which was supposed to have come from the Mediterranean, but might well have come from elsewhere, is a larval *Albula*, and Kaup's generic name may be added to the synonymy of this genus. Regarded as a leptocephalus larva by its author, *Esunculus* was thought by Günther to be more like an Alepocephalid, and later authors have slavishly followed him.

Another genus, *Atopichthys*, was proposed by Garman for larval eels in general, but his first species, *A. esunculus*, with forked tail and having ventral fins (no eel has these), was selected as logotype. Garman's larva is obviously a larval *Albula* and not an Alepocephalid, as Jordan, Evermann, and Clark suggested in the latest North American Check-List.

Apart from Kaup and Garman, Gill,⁵ and Delsman and Hardenberg⁶ have given good figures of the *Esunculus* larva of *Albula*, and now Miss Hollister⁷ adds an account of its metamorphosis in her paper on "A Fish which Grows by Shrinking".

Albula vulpes Linné?

(Figure 2.)

A series of five larval fishes was labelled *Atopichthys* sp. in the Australian Museum collection, and stored with the leptocephalid larvæ of eels. The forked tails and small ventral fins showed, however, that they were not Apodes, and they are now identified as the *Esunculus* larvæ of *Albula*. The characters are rather difficult to make out, but the specimens are from 53 to 58 mm. in standard

⁵ Gill.—Smithson, Misc. Coll., xlvi, 1, 1905, p. 43, fig. 7.

⁶ Delsman and Hardenberg.—Indische Zeevisschen., 1934, p. 118, fig. 74.

⁷ Hollister.—Bull. N.Y. Zool. Soc., xxxix, 3, 1936, p. 104, and figs. And Zoologica, xxi, 1936, p. 268, figs. 21-39.

length, or up to about $2\frac{1}{2}$ inches over all. They appear to have 64 myomeres, excluding the hypural region, and more than 20 caudal rays, but the other fin formulæ are doubtful.

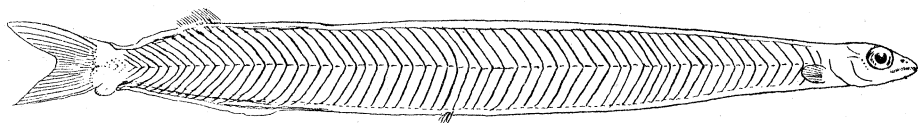


Fig. 2.—*Albula vulpes* Linné? A larval specimen, in the *Esunculus* or *Atopichthys* stage, 58 mm. long, from the New Hebrides.

G. P. Whitley, *del.*

The largest specimen is here figured. It has the head (5.5 mm.), about one-tenth, and the depth (7), which may have shrunk, about one-eighth of the standard length (58). The eye (2) is longer than the snout (1.6). Head, small, conic; the brain visible through the dorsal surface. Nostrils large. Mouth reaching to below eye and armed with a single series of anteriorly sloping teeth. There are a few, very fine, forwardly projecting teeth at the symphyses, but I cannot distinguish any on the palate. Tongue rounded. A few mucus pores on the head behind eyes.

Myomeres angular, with a dimple on each over the course of the vertebral column. Dorsal fin originating over 50th myotome, ventrals on the 32nd, and anus below 61st, the anal fin being rudimentary and situated under the last myomeres. Ventral fins originating about halfway between pectoral and root of tail. Caudal strongly forked.

Colour in spirit, pale brownish; eyes blue. A row of punctulations along course of alimentary canal and a few dots at root of tail.

Locality.—New Hebrides; collected by Dr. A. D. C. Cummins and Paymaster P. B. Stevens, R.N., of H.M.S. "Pegasus", many years ago. Austr. Mus. Regd. No. I.13794.

The number of myotomes varies little except that it may later be reduced with age.

A comparison of my figure with several others shows surprising similarity, demonstrated by the following table:

Specimen.	Myotomes.	Dorsal Origin over Myotome.	Ventral Fin or Air-Bladder at Myotome.	Anal Origin under Myotome.	Locality.	Authority.
<i>Esunculus costai</i>	69	54	33	63	Mediterranean ?	Kaup.
<i>Atopichthys esunculus</i> ..	70	54	32	70	Mexico.	Garman.
<i>Albula vulpes</i>	71	55	32	69 ?	California.	Gill.
" "	71	54	35	67	"	Delsman and Hardenberg.
<i>Albula</i> sp.	64	50	32	62	New Hebrides.	Whitley.

Family LEPTOCEPHALIDÆ.

Genus *Poutawa* Griffin, 1936.

Poutawa Griffin, Trans. Roy. Soc. N. Zeal., lxvi, 1936, p. 16. Haplotype, *Congrus habenatus* Richardson.

The late L. T. Griffin, of Auckland, proposed the above name for the Little Conger Eels of New Zealand and Australia, with *Congrus habenatus* Richardson as orthotype. The Australian form was named *Congromuræna longicauda* by Ramsay and Ogilby, but neither Mr. Griffin nor the present writer could discover unvarying characters which would separate the two specifically. A *Leptocephalus* larva recently collected near Sydney is apparently referable to *Poutawa habenata longicauda*.

***Poutawa habenata longicauda* (Ramsay and Ogilby).**

(Figure 3.)

Congrus habenatus Richardson, Zool. Voy. Erebus and Terror, Fish, 1848, p. 109, pl. 1, figs. 1-5. Cook Strait, New Zealand.

Congromuræna longicauda Ramsay and Ogilby, Proc. Linn. Soc. N. S. Wales (2), ii, March 21, 1884, p. 1022. Parramatta River, N. S. Wales. *Id.* Whitley, Abstr. Proc. Linn. Soc. N. S. Wales, 488, May 29, 1936, p. 2 (larva).

Poutawa habenata Griffin, Trans. Roy. Soc. N. Zeal., lxvi, 1936, p. 16, pl. vii, fig. 2; text-figs. 3-4.

On Sunday, May 24, 1936, I was fortunate enough to see, on Maroubra beach, Sydney, the *Leptocephalus* larva of an eel, its anterior end buried in the sand, where it had doubtless been washed up by the very heavy south-easterly seas at that time. There have been but few records of larval eels in Australasian waters, and, in view of the importance attached to researches on these animals in other parts of the world, the present specimen seems worthy of notice. Gill⁸ was apparently the first zoologist to realize the true nature of leptocephali, stating:

"I am almost certain that the typical *Leptocephali*, at least, are the young of *Congers*, and that *Leptocephalus morrisii* is the young of *Conger vulgaris*."

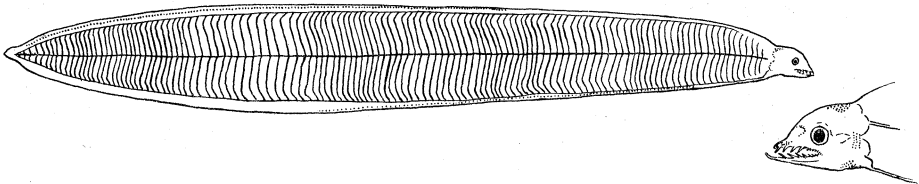


Fig. 3.—*Poutawa habenata longicauda* (Ramsay and Ogilby). A larval specimen, in the *Leptocephalus* stage, 70 mm. long, from Maroubra beach, near Sydney, New South Wales.

G. P. Whitley, *del.*

The Maroubra specimen is elongate and strongly compressed, the body being transparent, smooth to the touch, and of somewhat gelatinous consistency.

The greatest depth (9.5 mm.), which occurs in the posterior half of the body, goes 7.3 times in the total length (70). The head is small, not quite 4 mm. long, and is deflected downwards. There is a neck-like constriction, nearly 3 mm. deep, before the leaf-shaped body.

Top of head dome-shaped, the muzzle pointed. A single series of long, thin, forwardly-directed teeth in each jaw, the foremost in the lower jaw being particularly prominent. The upper jaw is curved and the mouth extends to below eye. The nostrils cannot be satisfactorily distinguished. Eye large, non-telescopic, its vertical diameter greater than its horizontal and partly surrounded by

⁸ Gill.—Proc. Acad. Nat. Sci. Philad., 1864, p. 207.

rudimentary canals. The brain and gullet form opaque masses near the incipient gills, delimiting the head from the transparent body. The alimentary canal reaches backwards almost to half the length of the specimen; it is fairly straight and not festooned.

The backbone runs along the median line. There are 127 myomeres; the myocommas are not particularly angular. Posteriorly, the dorsal and anal fins are fairly high. Their origins are difficult to trace, but minute dots, suggesting incipient finrays, commence on the dorsal fin above the 45th myomere, but on the anal fin they extend forward to below the 13th myomere.

The dorsal, caudal, and anal fins are confluent, but there is a notch above and below the margin of the caudal. There appear to be no pectoral fins and, of course, no ventrals.

Colour in life, transparent milky-white, the head slightly more opaque; the eye blue with a silvery ring. In spirit the specimen became rather more opaque and minute black dots could be distinguished, under the microscope, on the jaws, gill-region, occiput, edges of dorsal and anal fins, and along the most posterior part of the backbone. No large spots on body.

Described and figured from a larva, 70 mm. long, from Maroubra, near Sydney, N. S. Wales. Australian Museum Reg. No. IA.6393.

My reason for regarding the Maroubra *Leptocephalus* as the larva of the Little Conger, *Poutawa habenata longicauda*, is that it agrees in myotome formula with a 90 mm. specimen of that species from off Cape Everard, Victoria, which has practically metamorphosed (Austr. Mus. Regd. No. IA.6263). Moreover, in general details, my specimen, when tested by keys to European species, always enters the sections relating to larvæ of the *Congermuræna* group, though it does not agree with any of the available illustrations published by Kaup, Bleeker, Schmidt, Weber, d'Ancona, Fowler, Deraniyagala, Bertin, and others.

Records of Australasian *Leptocephali*.

The first record of a glass eel or *Leptocephalus* larva in Australasian seas appears to be that of Dr. George Bennett, who, in his "Gatherings of a Naturalist in Australasia", London, 1860, p. 56, fig. 6, figured a long-snouted Atlantic form and noted others, adding: "Many different species, and probably genera, were also taken in the Australian seas." Günther⁹ merely notes, under *Leptocephalus morrisii*, the locality: "Australia. From the Haslar Collection."

Dr. Julius Haast¹⁰ read a paper "On the Occurrence of *Leptocephalus longirostris*, Kaup, on the Coast of New Zealand", recording:

"A specimen presented by Mr. John Grigg, of Long Beach station, to the Canterbury Museum, which was picked up on the Ninety-mile beach during the strong north-east storm towards the latter part of the month of August [1874]."

Another Neozelanic larva, identified as *Leptocephalus altus* Richardson, was briefly recorded by Hutton:¹¹

"Several specimens of this curious fish have been picked up on the Ocean beach at Dunedin."

The original *Leptocephalus altus* was described by Richardson¹² from a drawing made by Dr. Hooker, who failed to indicate the exact locality of the specimen, which may, therefore, not have been Australasian in origin.

⁹ Günther.—Cat. Fish. Brit. Mus., viii, 1870, p. 139.

¹⁰ Haast.—Trans. N.Z. Inst., vii, 1875, p. 238.

¹¹ Hutton.—Trans. N.Z. Inst., viii, 1876, p. 215.

¹² Richardson.—Zool. Voy. Erebus and Terror, Fish., 1845, p. 51, pl. xxx, figs. 8-10.

Macleay, in his Descriptive Catalogue of Australian Fishes, merely copied Günther's record of *Leptocephalus morrisii*.

In 1894, leptocephali were found near Sydney—at Maroubra, in March, and Dee Why, in May—and were recorded without detailed description by Waite.¹³ A little later, Ogilby¹⁴ gave the first description and figure of the local species in his paper "On a Larval Teleost from New South Wales". He had three specimens, one from La Perouse and two from Maroubra, which he regarded as quite distinct from the European *Leptocephalus morrisii*, as they had no caudal fins and had 148 to 150 myomeres. In check-lists these eel larvæ were entered as *Atopichthys* sp., employing the generic name proposed for all larval eels by Garman.¹⁵ However, Garman's name cannot be used, since the logotype of his genus *Atopichthys* is not an eel but a larval *Albula*, and it would be better to use the name *Leptocephalus* for glass eels whose adults are not known. Apart from *Leptocephalus* and its synonyms, many eel larvæ have been generically named.

Anderton¹⁶ wrote: "I have taken *Leptocephali* in the winter months on the beaches near Dunedin, but do not know of what species it was the larval form."

McCulloch's 1929 Check-List included the known Australian records under *Atopichthys altus* (Richardson).

When the "Dana" Expedition was here in 1928, numbers of leptocephali were caught in the Tasman Sea. With the exception of the "duck-billed" *Nessorhamphus ingolfianus* (Schmidt),¹⁷ these specimens do not appear to have been worked out, but I understand that *Anguilla* was not represented amongst them.

Bruun (Dana Rept., ix, 1937, p. 13, pl. i) has just described a new *Leptocephalus* larva, from east of New Zealand, as *Synaphobranchus danae*.

The Australian Museum has several specimens of leptocephali, obviously pertaining to various genera and species, from New South Wales, Lord Howe Island, and even Queensland, from which State no *Leptocephalus* has hitherto been recorded. The Queensland larva was collected at McCulloch Reef, near Cairns, by the late W. E. J. Paradise, who made the following field note:

"At night, during the first week of October, 1923, among the outer reefs [between 17° and 18° S. Lat.—G.P.W.], large numbers of glass eels two or three inches long appeared on the surface and long toms [*Strongylura*] were often found devouring them."

Unfortunately, only one specimen was preserved. It is quite different from all my N. S. Wales larvæ, and appears to belong to some other family of eels. Austr. Mus. Regd. No. IA.2363. Length, 79 mm.; *circa*, 112 myomeres.

For the sake of completeness, I may mention, in this *résumé* of Australasian records, that Waite¹⁸ listed a glass eel, 9.5 mm. long, from off Drygalski Island, Antarctica, in 20 fathoms; 21 January, 1914, and also¹⁹ noted from the Kermadec Islands several small leptocephali regarded as *Congrellus*, and a number of larvæ of different genera of eels.

Leptocephali have also been recorded from New Guinea and various parts of the Pacific Ocean.

¹³ Waite.—Proc. Linn. Soc. N.S. Wales (2), ix, 1894, p. 225.

¹⁴ Ogilby.—Proc. Linn. Soc. N.S. Wales, xxii, 1897, p. 158, and fig.

¹⁵ Garman.—Mem. Mus. Comp. Zool. Harvard, xxiv, 1899, p. 326.

¹⁶ Anderton, Bull. N.Z. Board Sci. Art, ii, 1921, p. 71.

¹⁷ *Leptocephalus ingolfianus* Schmidt, Vidensk. Medd. Dansk. nat. Foren., lxxiv, 1912, p. 49, pl. iii, fig. 8 (Sargasso Sea and Azores) = *Nessorhamphus ingolfianus* Schmidt, Vidensk. Medd. Dansk. nat. Foren., xc, Dec. 22, 1930, p. 373, pls. iv-v, and Nature, cxxvii, March 21, 1931, p. 445, and fig.

¹⁸ Waite.—Sci. Rept. Austr. Antarct. Exped (c), iii, Fishes, 1916, p. 13.

¹⁹ Waite.—Trans. N.Z. Inst., xlii, 1910, p. 374.

Genus *Exonautes* Jordan and Evermann, 1896.

Exonautes Jordan and Evermann, Rept. U.S. Fish. Comm., 1895, Append. 5, Dec. 28, 1896, p. 322. Orthotype, *Exocætus exsiliens* Muller = *Exocæthus exsiliens* Linné, Mantissa, ii, 1771, p. 529, from Carolina.

Procypsilurus Bruun, Dana Report, vi, 1935, p. 84. Orthotype, *Cypsilurus exsiliens* (Linné, 1771).

These two generic names, having the same type species, must be regarded as synonyms.

Genus *Exonautes katoptron* (Bleeker).

Exocætus katoptron Bleeker, Nat. Tydschr. Dierk., iii, 1865, p. 115. *Id.* Bleeker, Atl. Ichth., vi, 1871, p. 72, pl. ccxlvii, fig. 3. Sumatra.

? *Exocætus robustus* Günther, Cat. Fish. Brit. Mus., vi, 1866, p. 289. Australia.

Cypsilurus katoptron Jordan and Seale, Bull. U.S. Bur. Fish., xxv, 1905 (1906), p. 211, fig. 16.

Cypsilurus katoptron McCulloch, Rec. W. Austr. Mus., i, 1912, p. 84.

McCulloch has noted a flying fish from Fremantle, W. Australia, which is said to differ from Jordan and Seale's figure in having a slightly larger eye, and 13 instead of 14 dorsal rays, thereby agreeing with *katoptron*. It differed from Günther's *robustus* in having the interorbital concave instead of flat, and in the more posterior situation of the ventrals. A similar specimen is described hereunder.

D.14, A.11, P.1+14, V.6, C.15. About 50 transverse rows of scales and about 30? predorsal scales. L. tr. ?.

Head (52 mm.) 24%, snout (12.5) 57.8%, eye (18) 8.3%, interorbital (16) 7.4%, pectoral (147) 68%, ventral (72) 33%, predorsal length (154) 71.3%, breadth of body (26) 12%, depth (34) 15.7%, height of dorsal (28) 13%, preventral length (126) 58.3%, preanal length (172) 79.6% of standard length (216). Total length about 11 inches, the caudal tips being broken.

A four-winged flying fish with the head pointed, the lower jaw being longer than the upper. Interorbital sunken. Jaws toothed. No palatine teeth. Anal origin behind that of dorsal. Pectorals not reaching root of tail. Ventrals reaching end of anal base, their first two rays short and thickened. Their origin is nearer the base of the tail than the nostril.

Colour after long preservation in spirit, brownish. Pectorals dark brown, with a broad median hyaline area. Ventrals with a large dark distal blotch. Dorsal and anal plain.

Described from a specimen about 11 inches in total length from near Perth, Western Australia; collected by A. Abjornsen in 1910. Austr. Mus. Regd. No. I.11343.

This is doubtless the species recorded from De Witts Land, Western Australia, as *Exocætus spilopus* by Cuvier and Valenciennes, and more closely agrees with *Exocætus robustus* Günther, except for some proportions.

Family SUDIDÆ.

Genus *Paralepis* Bosc, 1818.

Paralepis Bosc, Nouv. Dict. Hist. Nat., Ed. 2, xxiv, Sept., 1818, p. 520. Latinization of "Les *Paralepis*" Cuvier, Règne Anim., Ed. 1, ii, "1817" = Dec., 1816, pp. xi and 289, vernac. Tautotype, "*le Coregone paralepis*" Cuvier, vernac. *ex* Risso

MS. = *Coregonus paralepis* Fleming, Philos. Zool., ii, 1822, p. 393, *ex* Risso
 MS. = *Paralepis coregonoides* Risso, 1820 (*vide* Sherborn). *Id.* Risso, Journ.
 de Physique, xci, Oct., 1820, p. 253; *vide* Sherborn, Index Anim. (2), 1929,
 p. 4749. *Id.* Schinz, Thierreich (Cuvier), ii, 1822, p. 467. *Id.* Risso, Hist.
 Nat. Europe Merid., iii, 1826, p. 472. *Id.* Cuvier and Valenciennes, Hist. Nat.
 Poiss., iii, 1829, p. 488, and of later authors.

This generic name was first introduced in vernacular form by Cuvier, but Bosc was evidently the first to latinize it, and he thus becomes the author of the genus. The genotype is *Paralepis coregonoides* Risso, as shown in the above synonymy.

Family LUTJANIDÆ.

Genus *Lutjanus* Bloch, 1790.

Lutjanus longmani, sp. nov.

D.xi/15; A.iii/9; L.lat. circa 45.

Head, measured from chin ($4\frac{1}{2}$ inches) 2·7, depth of body (nearly 5) 2·5 in standard length ($12\frac{1}{2}$). Eye less than the broadly convex interorbital, which is 4·5 in head. No fossa between eyes and nostrils. Anterior profile of head oblique, not strongly convex.

Lower jaw the longer. Maxillary smooth, without supplementary bone, but followed by a short slit behind the rictus. A single canine, rather larger than its fellow, on each side of upper jaw, forms part of a single series there, but most of the teeth are almost hidden by the coriaceous parts of the lips. A dozen or so small spaced canines in a single series on each side of the lower jaw. Vomerine and palatine teeth in patches shaped much as in *Lutjanus coatesi* Whitley,²⁰ except that the boomerang-shaped vomerine patch, which has no backward extension, is comparatively larger. Tongue smooth, ovably rounded.

Preoperculum with shallow notch, its margin finely denticulated above and serrated below the notch. No prominent interopercular boss. Opercles, excepting preopercular limb, scaly. Suborbital, preorbital, and rest of head, naked. Pseudo-branchiæ present.

General characters as in *Lutjanus coatesi*.

Scale-rows following the curve of the back. Predorsal scales not extending over top of head.

Dorsal and anal lobes not produced. Caudal truncate.

Colour in life, fairly uniform rosy pinkish, entirely without spots or bars of any other colour. Eye vivid red, with a dense black pupil.

Locality.—Off Lindeman Island, North Queensland, August 5, 1935. Coll. G. P. Whitley. The species was commonly caught by line fishing. Described from the holotype, a specimen a little over a foot long. Austr. Mus. Regd. No. IA.6584.

The Red Emperor of the fishermen and Wirrainbaya of the Whitsunday Passage aborigines. Named in honour of Mr. H. A. Longman, Director of the Queensland Museum, in appreciation of his continual help in placing at the writer's disposal very many unique and rare fishes in the collections under his charge.

²⁰ Whitley.—Mem. Qld. Mus., x, 1934, p. 177, fig. 1.

Family GIRELLIDÆ.

Genus *Girella* Gray, 1835.*Girella tricuspidata* (Quoy and Gaimard).

- Boops tricuspidatus* Quoy and Gaimard, Voy. Uranie. Zool., 1824, p. 296. Shark Bay, Western Australia.
- Doidyxodon australis* Thominot, Bull. Soc. Philom. Paris (7), v, 1881, p. 142. *Ex* Guichenot MS. Australia (Verreaux).
- Aplodon margaritifera* Thominot, Bull. Soc. Philom. Paris (7), vii, 1883, p. 142. *Ex* Aug. Dumeril MS. Port Phillip, Victoria (Müller).
- Aplodon castelnaui* Thominot, Bull. Soc. Philom. Paris (7), vii, 1883, p. 142. Australia (Castelnau).
- Aplodon sulcatus* Thominot, Bull. Soc. Philom. Paris (7), vii, 1883, p. 143. *Ex* Guichenot MS. Port Phillip, Victoria (Müller).
- Girella tricuspidata* McCulloch, Rec. Austr. Mus., xiii, 2, 1920, p. 60, pl. xiv, fig. 1, and Austr. Mus. Mem., v, 1929, p. 239.

My friend, Mr. Anthony Musgrave, entomologist of the Australian Museum, during a recent trip round the world, kindly arranged for typewritten or photostat copies to be made of some descriptions of Australasian fishes in rare books which were not available in Australia. Copies of papers by French authors in the *Bulletin de la Société Philomatique de Paris* were particularly helpful to me in determining the identity of some Girellid and Seriolid fishes. As one result, therefore, I am able to add four specific names proposed by Thominot to the synonymy of the Ludrick or Blackfish, *Girella tricuspidata*, as tabulated above. Further synonyms and an excellent figure were given by McCulloch (*loc. cit.*). South Australia was inadvertently omitted from the range of this species in the Australian Check-List (1929).

Family THUNNIDÆ.

Genus *Neothunnus* Kishinouye, 1923.

- Neothunnus* Kishinouye, Journ. Coll. Agri. Univ. Tokyo, viii, 3, March 30, 1923, pp. 433 and 445. Logotype, *Thynnus macropterus* Temminck and Schlegel, selected by Norman, Zool. Record, lx, 1923 (1924), Pisces, p. 33.

The Yellow-fin Tuna, which forms an important article of commerce in Japan and California, is now demonstrated to occur off the coast of New South Wales.

Neothunnus macropterus (Temminck and Schlegel).

(Plate ii, fig. 1.)

- Thynnus macropterus* Temminck and Schlegel, Fauna Japonica, Pisces, 1844, p. 98, pl. li. South-western Japan.
- Pelamys macropterus* Bleeker, Nat. Tijdschr. Dierk., ii, 1865, p. 285, and Versl. Akad. Amsterdam, xviii, 1879, p. 15.
- Orcynus macropterus* Kitahara, Journ. Fisher. Bur. vi, 1897, p. 2, pl. ii, fig. 3—*vide* Kishinouye, 1923.
- Germo macropterus* Jordan and Seale, Bull. U.S. Fish. Comm., xxv, 1905 (1906), p. 228. *Id.* Jordan and Jordan, Mem. Carneg. Mus., x, 1, 1922, p. 32.
- Neothunnus macropterus* Kishinouye, Journ. Coll. Agric. Univ. Tokyo, viii, 3, 1923, p. 446, figs. 13, 19, 23, 45 and 51. *Id.* D. S. Jordan, Natural History, xxv, 4, 1925, p. 344 and lowest fig. *Id.* E. K. Jordan, Proc. U.S. Nat. Mus., lxxvi, 1925,

p. 13. *Id.* Jordan and Hubbs, Mem. Carneg. Mus., x, 2, 1925, p. 219. *Id.* Jordan and Evermann, Occas. Pap. Calif. Acad. Sci., xii, 1926, p. 20, pl. iii, fig. 3, and pl. v. *Id.* Corwin, Bull. Div. Fish and Game Calif., xxii, 1930, p. 89 (bibliography). *Id.* Ponsford, Wide World, Oct., 1932, p. 472. *Id.* Herre, Fish. Herre Exped., 1934, p. 6, and Zool. Ser. Field Mus. Nat. Hist., xxi, 1936, p. 106.

Mr. Emil Morhardt kindly presented me with the accompanying photograph of the only known Australian specimen of this species, which was caught about thirty miles off Bermagui, New South Wales, by Mr. Zane Grey on February 26, 1936. The fish, which was not preserved, weighed 91 lb., and its fins and finlets were bright yellow. Other examples of this Tuna were seen leaping from the water at the time. This gregarious and migratory species has been recorded from Japan, Hawaii, the Philippines, East Indies, parts of Oceania, Galapagos, California, etc. For references to literature, see Miss Corwin's "Bibliography of the Tunas" (*loc. cit.*, 1930). Specimens in New Zealand museums are labelled *N. itosibi* Jordan and Evermann, a Hawaiian variety.

Family ISTIOPHORIDÆ.

Genus *Marlina* Grey, 1928.

Marlina Grey, Natural History, xxviii, 1, 1928, p. 47. Haplotype, the New Zealand form of *M. mitsukurii* = *Makaira zelandica* Jordan and Evermann.

This genus embraces the Striped Marlin Swordfishes which are well known in New Zealand, Japan, and other parts of the world, but have only recently been discovered to be quite common off the southern coasts of New South Wales in the early months of the year.

Marlina zelandica (Jordan and Evermann).

(Plate ii, fig. 3.)

Makaira zelandica Jordan and Evermann, Occas. Pap. Calif. Acad. Sci., xii, Sept. 30, 1926, p. 65, pl. xix, fig. 2. Bay of Islands, New Zealand.

Marlina zelandica Whitley, Fishes N. S. Wales (McCulloch), Ed. 3, July 9, 1934, No. 409a. Montague Is., N.S.W.—new record for Australia.

"*Striped Marlin*" of authors, N.S.W. Rod Fishers' Soc. Gazettes, 1935-37; Angling and Gun Sport, 1935-37; Sydney Mail, Feb. 5, 1936, p. 10 and fig., and in Australian newspapers.

The Striped Marlin has figured prominently in New Zealand publications, so only Australian specimens are dealt with here. They are evidently conspecific with the Bay of Islands type, such discrepancies as are noted being doubtless due to individual variation. The first example of the species actually caught in Australia was taken near Montague Island, New South Wales, on February 12, 1934; its head is still preserved at Anthony Hordern & Sons Ltd., Sydney. In the following year and early in 1936-7, local anglers secured further specimens off the southern coastline of New South Wales, and Mr. Zane Grey, who visited Australia specially for big game fishing, caught his first Striped Marlin here on January 13, 1936. Many were thenceforward obtained, and a complete list of captures to date has been printed in the June, 1936, numbers of the N.S.W. Rod Fishers' Soc. Gazette and in Angling and Gun Sport, published in Sydney. Finally, on April 27, 1936, Mr. Grey caught a Striped Marlin of 172 lb. off Port Jackson, the most northerly Australian record. Mr. Grey and his compatriots kindly allowed me to examine their catches when I was holidaying at Bateman's Bay

in March, 1936. The swords had been sawn off some of the specimens and the bony orbits removed to make inkstands and other souvenirs, but in this species the eye is constantly contained about $11\frac{1}{2}$ times in the length of the snout or sword. Opinions differ as to the value of the flesh as food. Personally I considered baked fillets of Striped Marlin were rather dry and coarse, somewhat like Kingfish (*Cybium*), but a first-class chef might be able to make a tasty dish from it, or the species should be suitable for smoking. The following notes were made from fresh specimens:

Specimen A.—Br.7; D.xlii (counting fused anterior spines as one)/9, the last ray flattened; A.xiii/6, last flattened; P.i/17; V.1 (all the rays having fused inseparably). The number of caudal rays could not be determined superficially. General facies as shown in the figure. Spaced scales on cheeks. Tip of tongue rounded. Teeth persistent. Length nearly 8 feet from tip of lower jaw to end of middle caudal rays. Depth of body 15 inches, at origin of first anal 13, tapering to about $7\frac{1}{2}$ between second dorsal and second anal fins. Height of first dorsal nearly 18. Base of first dorsal about 4 ft. 2 in. Origin of dorsal to base of twelfth spine 10. Length of twelfth spine $3\frac{1}{2}$. Base of second dorsal 4, its height $3\frac{3}{4}$, its last ray 6. Height of first anal fin 12, its base a little longer. Second anal a little smaller than second dorsal. Origin of first anal to that of second anal 16. Only a couple of inches of interdorsal space. Pectoral $20\frac{1}{2}$. Tip of adpressed pectoral to anal origin about $11\frac{1}{2}$. Right ventral fin $13\frac{1}{2}$. Left ventral fin 10. Upper caudal lobe 26. Lower caudal lobe $23\frac{1}{2}$. Distance between caudal tips 38. Length of median part of tail 8. Caudal keels 3. Caudal peduncle 7 above and 8 below. The tip of the lower jaw is on a horizontal level with the upper part of the operculum and the upper half of the eye. Body robust, somewhat compressed laterally. The greatest depth is between the dorsal sheath and the ventral fins. A groove along middle of belly reaching from ventral fins almost to the vent, which is some distance in advance of the anal fin. The high dorsal lobe is formed by the first eight spines or so. The twelfth spine is about one-fifth of the distance along the base of the fin, and is the first of the low spines continuing to the end. First anal fin triangular, its last spines short and in a groove; anal base little longer than its height. Base of second anal fin a trifle in advance of that of second dorsal.

General colour after death greyish or steel-blue, becoming silvery or white ventrally. Body crossed by about thirteen irregular short bars, some of which tend to break up into spots. On the back near the base of the dorsal fin there is brilliant blue iridescence and the spinous dorsal fin is milky blue to dark blue, also with iridescence. Some peacock blue on the last ray of the second dorsal, which is dull blue-grey.

Specimen B.—Caught by Mr. Grey, March 17, 1936. In most respects like *A*, but the head measurements may be noted, together with some variations. Sword, measured from orbit, 26 inches. It sticks up and points a little to the right (taxidermists tell me that no swordfish has the sword pointing exactly forwards, and that the fins, sticking out at various angles, prohibit mounting them in a small space). Orbit $2\frac{1}{4}$ inches vertically and horizontally. Pupil $1\frac{1}{16}$. Interorbital $6\frac{1}{2}$. Eye to nostril $1\frac{1}{3}$. Nostril less than $\frac{1}{2}$ in. Distance between nostrils $5\frac{3}{8}$. Lower jaw's tip nearly 15 in. from the end of maxillary. Sword nearly 16 in. beyond end of lower jaw. Top of eye to upper profile of head 1 inch between parallels. Lower ocular margin to upper edge of maxillary $\frac{3}{4}$. Length of maxillary groove

4½; it extends 2 inches behind the vertical of the posterior margin of the eye. Orbit to angle of preoperculum 6. No rugose area behind operculum as in Jordan and Evermann's figure. Postorbital length 9½. Upper corner of operculum to origin of dorsal fin 5½. Height of spinous dorsal 17. Origin of first dorsal in advance of that of pectoral, which is again anterior to the ventrals. Gill-membranes united across the rather broad isthmus. Distance between pectoral fins 7. Each pectoral fin has one flat spine and eighteen rays. Length of pectoral 17½. Thus the pectoral is only a little longer than the dorsal lobe; it is of a dirty greyish or brown colour (not black). No sharply defined boundary between light and dark portions of flanks. In proportions of sword and rest of head, dorsal and pectoral lengths, and colour of dorsal fin, this specimen does *not* agree with Jordan and Evermann's key characters and seems nearer the Japanese *M. mitsukurii*. The ventral fins were asymmetrical, measuring 10 and 10½ inches, and were inserted 28 inches from the vent.

Other Specimens.—Another example of the Striped Marlin had eight branchiostegal rays and a very small rugose patch behind the gill-opening. Practically every specimen had parasitic crustacea (*Caligus* sp.) attached to the flanks, generally clustered near the anal fin, where the integument was somewhat abraded.

The largest Bateman's Bay specimen seen by me weighed 250 lb., and had a sword of 2 ft. 3¼ in., and eye nearly 2½ in. Two others, caught by Mr. R. Fagan, were 200 lb. in weight, with swords 25 in. and eye 2¼. The largest Striped Marlin so far caught in Australia was the Bermagui specimen hooked by Mr. Zane Grey in February, 1936, the weight of which was said to be 385 lb., but much larger examples have been caught in New Zealand, where the record fish was 13½ feet long and weighed 820 lb. A female caught in the Bay of Islands, New Zealand, on February 28, 1935, was recorded²¹ as having well filled ovaries, but it is disappointing to observe how the game fishermen discard the carcasses of their captures without examining their stomach contents or reproductive organs. None of the Bateman's Bay marlin seen by me was in roe, but their stomachs contained Leatherjackets (*Nelus vittatus*) and other fishes (*Trachurus*, etc.). The Striped Marlin inhabits open ocean waters, so that when rain and floods made the inshore waters too fresh and disturbed, anglers had to travel more than 14 miles out to sea before encountering any swordfish.

Family ISTIOPHORIDÆ.

Genus *Istiophorus* Lacépède, 1802.

Istiophorus albicans (Latreille).

Makaira albicans Latreille, Nouv. Dict. Hist. Nat., Ed. 1, xxiv, March 7, 1804, p. 104. Latinization of "le Makaira blanchâtre" Bosc, *ibid.*, Vol. xiii, Aug. 12, 1803, p. 558. Vernacular name for a sailfish figured in Marcgrave's *Brazil*, p. 171.

Histiophorus americanus Cuvier and Valenciennes, Hist. Nat. Poiss., viii, '1831', = Jan., 1832, p. 303. Likewise based on Marcgrave's figure.

Makaira albicans is the earliest name for an American swordfish and replaces the later *Histiophorus americanus*. Latreille's name has been overlooked by authors and is not in Sherborn's "Index Animalium". The present species was

²¹ Lindauer.—Nature, Nov. 16, 1935, p. 797.

recently added to the British fauna by Norman,²² and should now be known as *Istiophorus albicans* (Latreille).

Family GOBIIDÆ.

Genus *Ellogobius* Whitley, 1933.

Ellogobius Whitley, Rec. Austr. Mus., xix, 1933, p. 92. Orthotype, *Gobius stigmaticus* De Vis.

Small dull-coloured gobies of normal facies found in shallow muddy creeks along the eastern Australian coastline. The head is naked or else with a few scales on the operculum. The teeth are villiform. There are no barbels or fleshy lobes on the head, and none of the pectoral rays is free and silk-like. Six dorsal spines. Caudal fin rounded. Body covered with ctenoid scales which are largest posteriorly and are in more than forty transverse rows.

Ellogobius abascantus, sp. nov.

(Figure 4.)

D.vi/8(9); A.10; P.16; V.i/5; C.15. Sc. circa 52 on left side and 60 on right.

L.tr. circa 15.

Head (10 mm.) 3.8, depth of body (5.5) about 7 in standard length (38). Eye (2) subequal to snout (2) and about 5 in head.

Head broadly rounded when viewed from above, bluntly rounded from the side. Eyes moderate, superolateral. Interorbital broad, sunken. Nostrils tiny, circular, the anterior over upper lip. Skin of head naked; mucous papillæ reduced or absent. Snout terminal, blunt, subequal to eye. Mouth rather large, reaching to below posterior part of eye. Lips sinuate. Each jaw is furnished with a band of fine villiform teeth. A broad velum maxillare. Tongue with a very shallow notch anteriorly. Gill openings separated by a wide isthmus.

Form of body subcylindrical anteriorly, becoming compressed posteriorly. The ventral surface of the thorax is sunken and rather concave. Body covered with cycloid scales, which are small anteriorly but become larger on the caudal peduncle. There appear to be no scales on the back before the dorsal fin, nor on the breast or pectoral base. A prominent anal papilla. A few upright mucous ridges behind the pectoral fins. Depth of caudal peduncle less than half length of head.

First dorsal with six flexible spines. Second dorsal and anal similar and opposite to one another. Pectorals and caudal rounded, shorter than head. No

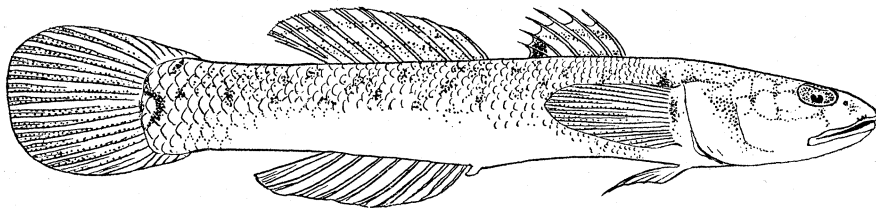


Fig. 4.—*Ellogobius abascantus* Whitley. Holotype, 38 mm. in standard length, from Bateman's Bay, N. S. Wales.

G. P. Whitley, *del.*

²² Norman.—Nat. Hist. Mag., ii, 9, 1927, p. 32 and figs.; Journ. Mar. Biol. Assoc. U.K. (n.s.), xvi, 1, 1929, p. 67, 2 figs.

silk-like upper pectoral rays. Ventrals not adnate to body, but united to one another and with a frenum.

Colour, in alcohol, very pale dirty yellow or cream, overlain by numerous indistinct and broken sooty blotches on the upper half of the fish. A reticulated pattern of fuscous chromatophores behind the eye. A dark blotch on operculum, one on the posterior dorsal spines, and, most conspicuous of all, an irregular blackish blotch at root of caudal fin. Most fin-rays with a double series of fine black dots. A pale orange smudge along thorax ventrally. Eyes and snout dull bluish.

Described and figured from the holotype of the species, the largest of three specimens, 38 mm. in standard length or about $1\frac{3}{4}$ inches over all. Austr. Mus. Regd. No. IA.6850.

Locality.—A very shallow brackish creek near the Hanging Rock camping ground at Bateman's Bay, New South Wales, March 22, 1936. Collected by G. P. Whitley. Holotype and paratypes.

A small *Favonigobius* and an *Anguilla australis* were caught at the same time.

In McCulloch and Ogilby's revision of some Australian fishes of the family Gobiidae, this species comes nearest the one they name *Mugilogobius devisi*²³ from Moreton Bay, Queensland, but differs in fin formula, more diffuse coloration, and more elongate form, besides having smaller scales. *Mugilogobius devisi* McCulloch and Ogilby is equivalent to *Ellogobius stigmaticus* (De Vis), the orthotype of this genus, and I have examined the original type specimens.

A specimen of my new form, *E. abascantus*, was collected by Mr. M. E. Gray in a stormwater channel in a mangrove swamp at Hen and Chickens Bay, Concord, near Sydney, N. S. Wales, on September 4, 1935. Austr. Mus. Regd. No. IA.6508. It has about 60 transverse rows of scales and the body markings form about ten fairly regular lateral blotches.

Apparently *E. stigmaticus* is the northern and *E. abascantus* the southern Peronian representative of the genus. I have collected boldly marked *E. stigmaticus* at Lindeman Island, Queensland (IA.6559-60).

Genus *Obtortiphagus* Whitley, 1933.

Obtortiphagus Whitley, Rec. Austr. Mus., xix, 1, Aug. 2, 1933, p. 90. Orthotype, *O. koumansii* Whitley.

Obtortiphagus koumansii Whitley.

Obtortiphagus koumansii Whitley, Rec. Austr. Mus., xix, 1, Aug. 2, 1933, p. 90, pl. xi, fig. 3. Hayman Island, Queensland. Holotype (No. IA.2027) in Austr. Mus., Sydney.

Calligobius ocellatus Herre, Field Mus. Nat. Hist. (Zool.), xviii, 12, Feb. 15, 1935, p. 422 et *ibid.*, xxi, April 15, 1936, p. 362, fig. 23. Ovalau Island, Fiji Islands. Holotype (No. 17363) in Field Museum of Natural History, Chicago.

The species recently described from Fiji by Herre seems closely allied to *Obtortiphagus koumansii*; it has somewhat smaller scales than the Australian form and slightly different colour-markings, but these may be variable. The two are certainly congeneric and very probably conspecific. Herre placed his fish in

²³ McCulloch and Ogilby.—Rec. Austr. Mus., xii, 10, July 14, 1919, p. 223, pl. xxxvi, fig. 2.

the genus *Callogobius* Bleeker, 1874, from which *Obtortiphagus* shows the following salient differences:

- A. Head with papillæ in prominent ridges; similar ridges are also on sides of body. Interorbital fairly broad. Scales large, cycloid, or only ctenoid posteriorly. Ventral fins with frenum weakly developed *Callogobius*, s. str.
- AA. Head with short inconspicuous rows of papillæ; no ridges on sides of body. Interorbital narrow. Scales small, ctenoid. Ventrals infundibuliform *Obtortiphagus*

GELIDIDÆ, fam. nov.

A family of fishes of obscure relationship to others, but remotely resembling the Percophidiformes. From these, it is easily distinguished by means of the fine weak dentition, the almost scaleless head, and very large eyes. In superficiality it suggests an elongate Apogonoid which has developed the fleshy texture of some of the deep-sea Iniomi.

Gelidus, gen. nov.

Orthotype, *Gelidus antarcticus* (Boulenger).

Head pointed, compressed, with thin papery bones. Maxillary extending obliquely almost to below middle of eye, its posterior margin broadly truncate. Premaxillary long and narrow, the length of its processes equal to half the diameter of the eye. Lower jaw slightly the longer. Bands of fine hooked teeth on jaws, largest at premaxillary symphysis and on sides of mandibles. Vomer and palatines without teeth. Tongue thick and fleshy, toothless, and obliquely truncate anteriorly. Chin horseshoe-shaped from below; some large pores below lower jaw. Nostrils subcircular, close together on each side of the snout. Eyes very large, their diameter greater than interorbital space. Opercular bones thin and papery, crossed by very fine striæ. One or two vestigial cycloid scales on cheeks near eye. Seven branchiostegal rays. Gill-membranes united across the narrow isthmus. Gill-rakers long and narrow, about eighteen on lower half of first branchial arch. Pseudobranchiæ present. Large pores along preopercular margin and nuchal region. Ten predorsal scales, not reaching eyes.

Body elongate, compressed, tapering posteriorly to a constricted caudal peduncle and a rather square caudal root. It was evidently covered by large cycloid scales, but most of these, being deciduous, have left only scale-pockets to show their size and extent. There are scales on the breast and the base of the pectorals, but none on the fins. Lateral line extending from near opercular flap to tail along middle of sides. Two dorsal fins, the first composed of seven weak spines; the second fin very long, but not so long as the anal. Vent in anterior half of fish. Pectorals pointed, about half length of head. Ventrals situated well forward, consisting of a spine and five long rays. Caudal apparently forked. This new generic name is proposed to replace *Pleuragramma* Boulenger²⁴ pre-occupied by *Pleurogrammus* Gill,²⁵ another genus of fishes. The type species of *Gelidus* was originally described as *Pleuragramma antarcticum* by Boulenger, who placed it in the Leptoscopidæ, with which it appears to have no relationship whatever; hence my new family name. For helpful advice as to the specific identity of this fish I am indebted to Dr. Carl Hubbs, of Michigan, and Dr. J. T. Nichols and Miss F. LaMonte, of New York.

²⁴Boulenger, Rept. Coll. Nat. Hist. Southern Cross, Pisces, 1902, p. 187. Haplotype, *P. antarcticum* Boulenger.

²⁵Gill, Proc. Acad. Nat. Sci. Philad., 1861, p. 166 (Hexagrammidæ).

Gelidus antarcticus (Boulenger).

(Figure 5.)

Pleuragramma antarcticum Boulenger, Rept. Coll. Nat. Hist. Southern Cross, Pisces, 1902, p. 187, pl. Victoria Land. *Id.* Boulenger, Cambr. Nat. Hist., 1904, p. 705. *Id.* Regan, Trans. Roy. Soc. Edinb., xlix, 2, 1913, p. 264, and Brit. Antarct. Terra Nova Exped., Zool., i, 1, 1914, p. 6, *et ibid.*, i, 4, 1916, p. 131, pl. ii, figs. 3-6. *Id.* Totton, Proc. Zool. Soc. Lond., 1914, p. 251, pls. i-ii (caudal devel.). *Id.* Waite, Austr. Antarct. Exped. Fish., 1916, p. 22. *Id.* Nichols and LaMonte, Amer. Mus. Novit., 839, 1936, p. 1.

Br.7; D.vii/35; A.38; P.21; V.i/5; C.13. Sc. circa 50. L.tr.5/1/7 or 8?. Ten predorsal scales.

Head, allowing for some apparent shrinkage of the snout (47 mm. long), 3.7 in length without caudal fin (174); depth of body (25) nearly 7 in same. Eye (15) 3.1, snout (12) nearly 4, interorbital space (9) 5.2, maxillary (19) 2.4 in head. Last anal ray minute.

General characters as described for the genus.

Colour, after preservation, pale yellowish, with dark areas of large scattered black chromatophores along back and middle of sides. Eye and viscera dark blue. Top of head brownish. Some of the fin-rays and most of the caudal root infuscated.

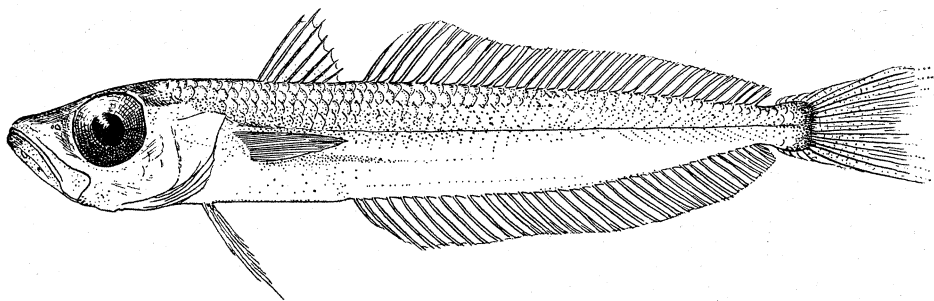


Fig. 5.—*Gelidus antarcticus* (Boulenger). A specimen, 174 mm. in standard length, from Bay of Whales, Antarctica.

G. P. Whitley, *del.*

Described and figured from a specimen 174 mm. in length without caudal, or about eight inches over all.

Locality.—Bay of Whales, Antarctica; taken, with others, from the stomach of a Weddell Seal (Byrd Expedition).

Family BLENNIIDÆ.

Genus *Blennius* Linné?

Blennius maoricus Kner.

Blennius maoricus Kner, Sitzungsber. Akad. Wissen. Wien., li, 1, 1865, p. 503, and Reise "Novara", Zool., i, Fische (2), 1865, p. 195, pl. viii, fig. 3. Auckland, New Zealand.

This Blenny was described and figured by Kner in 1865, and does not appear to have been discussed since. Its type locality was given as Auckland, yet the species does not appear in any of the several lists of New Zealand fishes. Possibly the record was erroneous.

Family CHEILODACTYLIDÆ.

Genus *Sciænoides* Richardson, 1843.*Sciænoides valenciennesi*, sp. nov.

Cheilodactylus carponemus Cuvier and Valenciennes, Hist. Nat. Poiss., v, July, 1830, p. 362, pl. cxxviii. Australian specimens only. Not *C. carponemus* Cuvier, Règne Anim., Ed. 2, ii, 1829, p. 177, a new name for *Cichla macroptera* Bloch and Schneider, which is a different species of *Sciænoides* from New Zealand.

The Western Australian Morwong usually called *carponemus* requires a new name, as above, and King George's Sound is selected as type locality of *Sciænoides valenciennesi*, nom. nov. The name *Sciænoides aspersus* (Richardson) may be employed for the Hobart form mentioned by Cuvier and Valenciennes.

Family OPISTOGNATHIDÆ.

Genus *Tandya* Whitley, 1930.

Tandya Whitley, Mem. Qld. Mus., x, 1, August 28, 1930, p. 19. Orthotype, *Opisthognathus maculatus* Alleyne and Macleay.

Tandya latitabunda, sp. nov.

(Plate ii, fig. 2.)

Tandya sp. ? Roughley, Wonders of the Great Barrier Reef, 1936, p. 272, pl. xlix, fig. 1. (Capricorn Group, Queensland.)

Br.6. D.xii/18; A.i/15; P.i/20; V.i/5; C.12. L. lat. reduced, circa 50. About 80 transverse rows of scales between shoulder and hypural joint. L.tr. 0 + 5/1/26, near end of lateral line, or 9 + 9 on caudal peduncle. 16 gill-rakers on lower limb of first branchial arch.

Head (82 mm.) 2.6, depth of body (68.5) 3.1, depth of caudal peduncle (25) 8.6 in standard length (215). Interorbital (6) 3.6, preorbital (4.5) nearly 5 in the eye (22), which is 3.7 in head.

Height of anal fin (33) subequal to that of soft dorsal (34) and less than length of pectoral (40) or caudal, measured from hypural joint (46).

Head bulbous, naked; upper profile evenly convex, lower flat. Mouth cavernous, the maxillaries extending about halfway along the postorbital part of the head, all the supplemental bone lying well behind the eye; there is no backward lamina as in *Opisthognathus*.²⁶ The eyes are very large, almost circular, and separated by a concave interorbital. Anterior nostrils with a broad posterior flap; posterior nostrils with low rims. A single row of spaced canines, some almost 3 mm. long, in both jaws, thirty more or less on each side of each jaw. Behind these is a second row of a few peg-like teeth near middle of jaws, but there are no villiform teeth, nor any teeth at all at the symphyses, or on the vomer, palatines and tongue. There are, however, more peg-like teeth on the bones at the entrance of the pharynx. Mandibular rami roundedly elevated. Opercles unarmed, the preopercular margin rounded and the opercle ending in an acute flap. Gill-openings wide, their membranes united across the narrow isthmus. Gill-rakers slender and finely denticulated, the longest about equal to diameter of pupil.

Body compressed, slightly tapering. Except near the anterior dorsal spines and the nuchal region and on the breast and around the paired fins, it is covered

²⁶ *Opisthognathus* Cuvier, Règne Animal, Ed. 1, ii, "1817" = Dec., 1816, p. 252. Haplotype, *O. sonnerati* Cuvier, from "la mer des Indes".

by close-set cycloid scales which are firmly embedded. The lateral line is weakly developed as a row of about fifty scales extending from the upper angle of the gill-opening along the top of the sides to below the anterior slit dorsal rays. The anal region is naked, with puckered skin, and there is a fairly prominent papilla.

Dorsal fin originating over the upper angle of the gill-opening. The spines are simple, weak, not bifurcated and are shorter than the rays which form a rounded soft dorsal fin. Anal similar to soft dorsal. Some of the rays have small cysts on their sides, perhaps caused by parasites. Pectorals and caudal broadly rounded. Ventral fins approximate, jugular, their rays rather thickened and finger-like.

Colour after preservation in alcohol: Head mostly smoky greyish-brown, darkest anteriorly, not spotted. Fuscous areas on jaw membranes and inside the mouth, except that the tongue is white. An oblique brown streak below opercular flap. Eyes dark bluish. Teeth white.

Ground-colour of body dirty white or yellowish, the scales densely infuscated by large brown chromatophores. There is a large blackish ocellus on the shoulder, with a white or yellow centre and ring around it. This is followed on the body by several smaller oval or bean-shaped black blotches, each surrounded by a light area. Five similar marks extend along the base of the dorsal fin and the back, and their superior whitish auras contrast with the smoky margins of the dorsal fin. A dark blotch above and below the caudal peduncle, and some smaller similar marks on caudal. Anal fin uniform smoky except for a small dark blotch on last ray. Paired fins lighter greyish or yellowish, uniform, except that tips of ventral rays are dusky.

Described and figured from the unique holotype, a specimen 215 mm. in standard length or $10\frac{1}{4}$ inches overall. Australian Museum Regd. No. IA.6958.

Locality.—Port Newry, north of Mackay, Queensland. Purchased from Mr. Charles Volskou, of Mackay.

This new species is allied to the genotype, *Opisthognathus maculatus* Alleyne and Macleay,²⁷ which has been fully dealt with by Ogilby²⁸ in his excellent revision of Opisthognathidæ, but differs as follows, as shown by direct comparison:

- A. Teeth in several rows. Head spotted. Lateral line extending to below 10th dorsal ray. Depth about one-fourth of standard length. Body with many small spots .. Holotype of *Batrachus punctatulus* Ramsay = *Tandya maculata* (A. & M.)
- AA. Teeth in a single row, except for a few supernumerary ones. Head not spotted. L.lat. extending to below 4th or 5th dorsal ray. Depth about one-third of standard length. Body with a few large dark blotches
- Holotype of *Tandya latitabunda*, sp. nov.

Family PARAPERCIDÆ.

Genus *Enigmapercis* Whitley, 1936.

Orthotype *Enigmapercis reducta*, Whitley.

A genus of small fishes of the series Percophidiformes, in which the spinous dorsal fin is reduced to a couple of small spines connected to the back by membrane and well separated from the soft dorsal fin. It differs from *Acanthaphritis* Günther²⁹ in these respects and in having a lower soft dorsal, pointed caudal,

²⁷ Alleyne and Macleay.—Proc. Linn. Soc. N. S. Wales, i, Feb., 1877, p. 280, pl. ix, fig. 3.

²⁸ Ogilby.—Mem. Qld. Mus., vii, 1920, p. 27, pl. iii.

²⁹ Günther.—Rept. Voy. Challenger, Zool. i, 6, 1880, p. 43. Haplotype, *A. grandisquamis* Günther, from the Ki Islands.

longer snout, etc., as described below. *Pteropsaron* Jordan and Snyder³⁰ and *Osoopsaron* Jordan and Starks³¹ are similarly distinct.

Enigmapercis reducta Whitley.

Enigmapercis reducta Whitley, Proc. Roy. Zool. Soc. N. S. Wales, 1935-6 (Aug. 25, 1936), p. 19 (prelim. description).

Br.7. D.ii/18; A.24; P.16; V.i/5; C.11. L.lat.37. L.tr.2/1/4. Predorsal sc. 12.

Head (16mm.) 3·4, depth of body (6) 9 in standard length (55). Eye (3) equal to snout (3), 2 in upper jaw (6). Pectoral fin (13) equal to caudal (13). Ventral fin (7) slightly longer than longest dorsal ray (6·5), which is again longer than the average anal ray (6).

Head depressed, the snout somewhat pointed. Top of head not bony. Mouth not steeply oblique. The premaxillary is flattened and projects over the lower jaw. The maxillary reaches backwards to below the anterior half of the eye, its extremity being slightly excavated.

A single narrow row of very fine acute teeth in each jaw and on the palatines. They appear to extend over the vomer, where they are very minute.

A velum maxillare present. Tongue spatulate.

Snout truncate anteriorly when viewed from above; from a lateral view the physiognomy is rather like that of a *Callionymus*. Nostrils circular, relatively large, superior. Eyes ovate, superior, separated by a very narrow interorbital groove. Preoperculum rounded, entire, with a few mucous tubes near its margin. Operculum with a rounded backward flap. Cheeks, opercles and vertex scaly. Gill-rakers apparently vestigial. Gill-membranes attached to the narrow isthmus.

Body elongate, rounded anteriorly and compressed posteriorly, where it tapers slightly. It is covered with very large cycloid scales. There is a complete, single, median lateral line consisting of scales with a simple tube and a shield-shaped marginal notch.

First dorsal reduced to a small fin of two spines, of which the first is longer and stronger than the second. There are four scales along the interdorsal space. The soft dorsal fin is much higher than the spinous and consists of one simple and seventeen branched rays. The anal fin commences below the posterior part of the spinous dorsal and consists of branched rays throughout, the majority of them being feather-like. Upper pectoral rays short, the fourth and fifth very long and the others diminishing in length. The pectorals are quite distinct from the ventral fins which are well separated, their fourth rays longest. Caudal fin pointed.

The ground-colour is white to pale yellowish, with an irregular very pale milky bar along the middle of each side. There are about seven yellowish to pale brown cross-bars over the back, where each scale is brown or orange-edged and the last cross-band is dark brown, forming a conspicuous blotch on the upper half of the caudal peduncle. On the upper part of the sides of the body, roughly corresponding with the dorsal cross-bars, is a series of rich brown irregular blotches, and below the lateral line are about five very indistinct small yellow blotches. The head is mottled brownish above and, like the body, white below, but with some faint yellow on cheeks. Fins mostly whitish or with faint washes

³⁰ Jordan and Snyder.—Proc. U.S. Nat. Mus., xxiv, 1902, p. 470. Orthotype, *P. evolans* Jordan and Snyder, from Japan.

³¹ Jordan and Starks.—Bull. U.S. Fish. Comm., xxii, 1904, p. 600. Orthotype, *Pteropsaron verecundum* Jordan and Snyder, from Japan.

of yellow, but the spinous dorsal is mostly black and the caudal is transversely banded with yellow and pale brown. Eye metallic bluish.

Described from the holotype, a specimen 55 mm. in standard length, or $2\frac{3}{4}$ inches overall.

Locality.—Off Long Reef, Collaroy, New South Wales. Dredged in 14 fathoms on a gravel and shell bottom, by Messrs. C. F. and John Laseron, August 9, 1936. Australian Museum Regd. No. IA.7024.

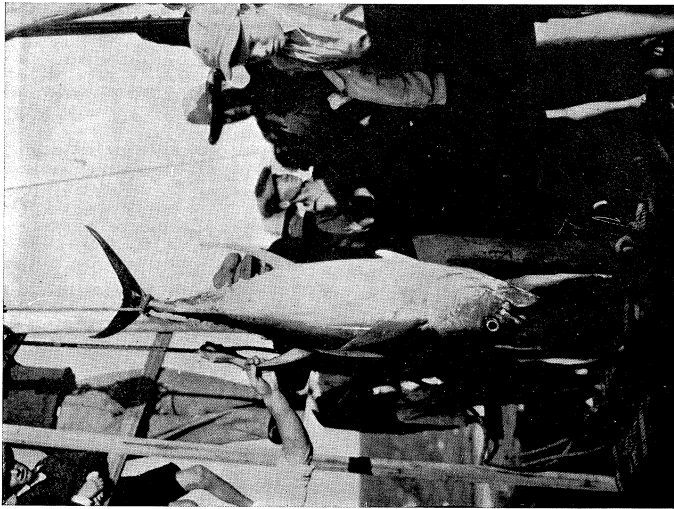
This specimen was brought to the Museum alive in a small bottle, together with dredged gravel and shells, which it imitated in coloration to a surprising degree. It lay on the bottom and, to increase the disguise, placed some of the shells on its head and shoulders by flicking with its pectoral fins. It was very hardy, living for a surprising time even in formalin. The coloration described above was taken from the living fish.

EXPLANATION OF PLATE II.

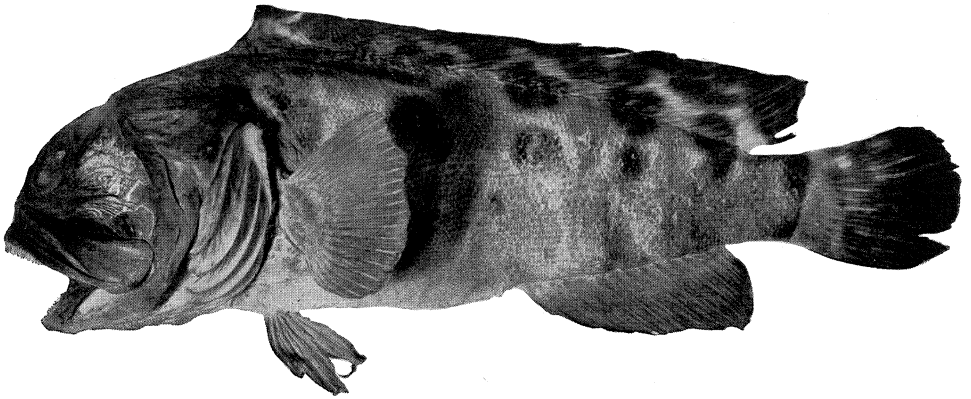
Fig. 1.—*Neothunnus macropterus* (Temminck and Schlegel). A specimen, 91 lb. in weight, from off Bermagui, New South Wales.

Fig. 2.—*Tandya latitabunda* Whitley. Holotype, 215 mm. in standard length, from Port Newry, Queensland.

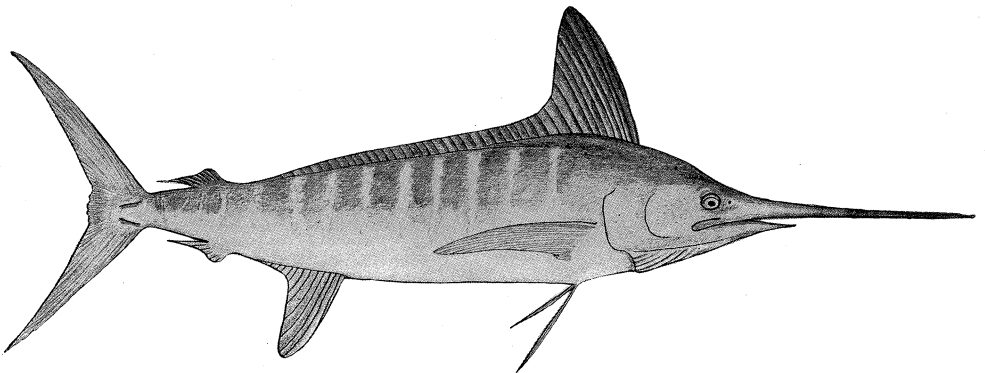
Fig. 3.—*Marlina zelandica* (Jordan and Evermann). A specimen, nearly 8 feet long (measured from tip of lower jaw to end of middle caudal rays), from off Bateman's Bay, N. S. Wales.



1



2



3

EMIL MORHARDT, photo (1).
G. C. CLUTTON, photo (2).
G. P. WHITLEY, *del.* (3).