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ADDITIONS TO THE FISH-FAUNA OF LORD HOWE
ISLAND, No. 4.

By EDGAR R. WAITE, F.L.S., Zoologist.

(Plates xvii.-xxiv., and fig. 32.)

In my last contribution I wrote¹:—"Towards the end of the year I hope to spend two or three weeks on Lord Howe Island, for the purpose of studying the fishes, and in a more thorough manner than was possible on the occasion of my short and unprepared visit in 1898."

After two days steaming from Sydney, I arrived at the island on 3rd December, 1902, by the S.S. "Tambo," together with Mr. A. R. McCulloch, who accompanied me as an assistant. It was our intention to return by the S.S. "Titus," due at the island about December 20th, but she did not put in an appearance until Christmas Day, and was then seen about nine miles outside the reef in a lumpy sea. Owing to the entire absence of any shelter, landing is difficult and dangerous in heavy weather, we were not therefore surprised when the vessel hoisted a signal and turning westward made for Sydney. I was thus, for the second time, left, contrary to my intentions. We finally got away by the "Tambo" on her return from the New Hebrides, arriving in Sydney on January 21st. What had thus been organised as a private holiday, in which my wife and son participated, encroached upon, and terminated in official time. Our enforced stay was not however a matter for regret as the general conditions proved much more propitious during the second period, and we were in consequence able to work more satisfactorily and with much better results.

Unfortunately at no time were the tides wholly favourable, we were thus unable to work the outermost portion of the reef, and it so fell that when the tides were lower, heavy weather interfered with collecting.

In addition to the usual fishing gear, nets, lines, traps, etc., we had an ample supply of explosives and poisons, and for permission to use these otherwise illegal methods, I wish to express my thanks to the Fishery Commissioners of New South Wales. I have also to thank Messrs. Keele and Cameron of the

¹ Waite—Rec. Aust. Mus., v., 1903, p. 20.

Harbour and Rivers Branch of the Works Department for the loan of an electric sparking machine. This obviated the use of a time-fuse in firing explosives, and rendered their use comfortable and harmless in comparatively inexperienced hands. In the South Sea Islands the natives are constantly using dynamite and frequently come to grief by their economy in firing with dangerously short fuses. A collector there may always rely on ready assistance. At Lord Howe Island, on the contrary, where there are no natives, a collector must manipulate his own explosives and thus finds an electric discharger, possibly cumbersome, but certainly, as I have said, comfortable.

In the matter of poisons I have to thank my esteemed correspondent, Dr. David S. Jordan, President of the Leland Stanford Jr. University, California, for valuable advice in their selection and method of application. In the rock pools their use was invaluable and, as the following pages will indicate, responsible for many of the novelties obtained.

In this connection also, a fine meshed net (prawn net) was of great service. The pools on the east side of the island frequently so communicate with one another as to form a chain, consisting of a series of deep pools connected by shallow passages. On selecting a pool for work, it was first necessary to close the passages, a net proving the best medium.

Fishes found in rock pools are broadly divisible into two classes, namely accidental and permanent. The former comprise those free swimming species which happen to be in the pool as the water recedes, and are thus imprisoned until the rise of the next tide. The pools always contained a fair number of these accidental denizens: when disturbed such fishes rush wildly about seeking some outlet they know not where, a characteristic I have elsewhere detailed.²

The rock-pool fishes proper, pass a very different existence, when surprised or incommoded by the poison, they at once hide themselves in a crevice, under a rock or among seaweed, or if the pool be one of a chain they may rush straight for a passage, and finding this barred make for a smaller one which perchance escaped our eye. They are so obviously at home and know every stone and angle in the pool that possibly numbers never leave the identical pool in which they were bred.

Although apparently of frail structure, these little fishes have wonderful powers of stemming the force of an intruding wave. This was especially noticeable in the case of *Glyphisodon* and *Parma*, easily watched by means of the water telescope: they certainly revelled in the tumbling waters, and though perhaps

² Waite—Proc. Linn. Soc. N.S. Wales, (2), ix., 1894, p. 217.

temporarily swept back, speedily regained their position. To the uninitiated I may mention that the water telescope or water glass, as it is also called, is simply a vessel with a glass bottom, which, when placed on the surface of the water, instantly stops the ripple and enables one to see clearly to considerable depths. A ripple on the water prevents the fishes from seeing upwards beyond the surface, just as it does our seeing below it. Similarly the water-glass provides a window for the fishes, a circumstance which was readily availed of; the beautiful Pomacentrids in especial, thrusting their snouts against the glass.

The introduction of poison into a pool produces a different behaviour among the various inhabitants. What I have previously called the accidental denizens such as *Mugil*, *Atherina*, *Kuhlia*, etc., died in the open. Rock fishes such as *Epinephelus*, *Girella*, etc., sought hiding places, vacated echinoderm-holes being favourites, for it may be mentioned that these Invertebrates are very sensitive to poison and leave their retreats with surprising alacrity, exceeded however by the crabs. Anemones close-up, loosen their hold and fall off the rock or weed. Blennies (*Salaria*s, *Petroscirtes*) promptly left the water where possible, and skipping over the rocks attempted to reach other pools. Eels gave us the most trouble; so openly is the coral rock massed together that it abounds in holes and crevices, which furnish hiding places or the means of escape for the sinuous eels. By breaking away the rock with a crowbar we secured a few examples, these being however but a small proportion of those seen.

The principal bait used by the islanders for line fishing is the larva of a large longicorn beetle, (*Agrianome gemella*, Pascoe) and no one would think of fishing without first obtaining a supply. These larvæ are found in dead, though still hard wood, and an axe is necessary for their extraction. They are extremely common and appeared to particularly infest the banyan trees. The grub when full grown is nearly as large as one's thumb and the skin only is used on the hook, the juicy contents being squeezed out, and used as "berley," (an Australian term for ground bait). Crabs also furnish bait and in consequence of its habit of running over the rocks above water mark, *Grapsus variegatus*, Fabricius, is the species usually obtained; the legs and shell are torn off and the body only placed on the hook.

In writing on the Flying Fish (*Exonastes rondeletii*) I mention the presence of sea birds on the Admiralty Islets. On the occasion of our visit, which was fortunately in the breeding season, the birds were present on and around the islets in countless myriads.

Though fishes teem in the waters, the amount consumed per day, and every day, must be measured by tons.

I should be extremely loth to advocate any wanton destruction, yet if Lord Howe Island is to become a fishing ground for New South Wales, the question of bird-life will be one to seriously engage attention. The date of our visit to the islets was December 10th, at which time the following species were breeding:—

Wide-Awake	...	<i>Sterna fuliginosa</i> , Gmelin.
Noddy	...	<i>Anous stolidus</i> , Linnæus.
Blue Billy	...	<i>Anous cinereus</i> , Gould.
Small Mutton Bird...		<i>Puffinus chlororhynchus</i> , Lesson.
Gannet	...	<i>Sula cyanops</i> , Sundevall.

The large Mutton Bird, *Puffinus carneipes*, Gould, and the Bo's'n Bird, *Phaeton rubricauda*, Boddaert, were also breeding on the main island. The determinations are made by Mr. A. J. North and the vernacular names are those employed by the islanders.

This contribution does not include notices of all the fishes obtained during our visit to the island, but those only which prove to be new to the fauna or upon which some observations were made. On the other hand, several species not obtained are mentioned mainly for the purpose of delineation. As a result it will be seen that nearly all the species known from the island are now figured.

A few of the accompanying illustrations are, as on previous occasions, my own productions, the greater number were however prepared by my assistant, Mr. A. R. McCulloch, whom I have specially trained for the work. The drawings were made under my immediate supervision and may therefore be relied upon for accuracy of detail and general proportion.

On October 20th, 1903, nine months after our return, the fine steamer "Ovalau," while proceeding from Norfolk Island to Lord Howe Island took fire, and following an explosion sunk off the latter island, in twelve fathoms. During the present month (January, 1904) certain salvage was effected by Captain J. Weston, dynamite being largely used for the work. The explosives killed many fishes, a selection of which was placed in the hands of Mrs. T. Nichols, who kindly preserved them for transmittal to the Trustees.

One known species is thus added to the fauna, and several specimens of other species, larger and finer than previously received, are included. The thanks of the Trustees are due to Mr. Weston for his kindness in thus collecting the fishes and bringing them to Sydney.

The following is an epitome of the contents of this contribution to the fauna.

The following seventeen known species have not been previously recorded from the island :—

- Carcharhinus menisorrh*, Valenciennes.
 **Gymnothorax thyrsoidea*, Richardson.
 „ *nubilus*, Richardson.
 „ *flavimarginatus*, Rüppell.
Trachinocephalus myops, Forster.
Myctophum phengodes, Lütken.
 „ *opalinum*, Goode and Bean.
 „ *hygomi*, Lütken.
 „ *reinhardtii*, Lütken.
 **Exonastes rondeletii*, Cuvier and Valenciennes.
Bathystethus cultratus, Forster.
Cubiceps gracilis, Lowe.
Epinephelus rhyncholepis, Bleeker.
Genyoroge bengalensis, Bloch.
Anampses diadematus, Rüppell.
Sebastopsis guamensis, Quoy and Gaimard.
Tripterygion nigripenne, Cuvier and Valenciennes.

The species marked with an asterisk respectively replace *Muræna afra*, Bloch, and *Exocætus dovii*, Gill, incorrectly identified from the island.

Ten species are described as new, those marked with an asterisk being regarded as types of new genera :—

- Muraenichthys nicholsæ*,
Gymnothorax chalazius,
Notoscopelus ejectus,
Dasyscopelus naufragus,
 **Xenogramma carinatum*,
Pseudomonacanthus analis,
 **Allogobius viridis*,
 **Limnichthys fasciatus*,
 **Lepadichthys frenatus*,
Tripterygion rufopileum,

In addition to the above the following are figured for the first time :—

- Æthoprora perspicillata*, Ogilby.
Howella brodiei, Ogilby.
Bathystethus cultratus, Forster.
Schedophilus maculatus, Günther.
Pogon chrysurus, Ogilby.
Girella cyanea, Macleay.
Aplodactylus etheridgii, Ogilby.

Parma polylepis, Günther.
Glyphisodon polyacanthus, Ogilby.
Gobius oculosoma, Ogilby.
Diplocrepis costatus, Ogilby.
Petroscirtes icelii, Ogilby.
Dinematichthys longifilis, Ogilby.

CARCHARHINUS MENISORRAH, *Valenciennes*.

Carcharias menisorrah, Valenciennes, in Müller and Henle, Plagiostomen, 1838, p. 46, pl. xvii.

Sharks, up to four feet in length, are by no means uncommon in the lagoon, but no one has been known to be attacked. While indulging in our early morning and occasional evening swim they were never seen nor thought of, but their presence was occasionally indicated at night by a long phosphorescent glow, when two examples about three feet in length were caught. Angling from the jetty for salmon (*Arripis trutta*, Bloch and Schneider), which afforded good sport, the whole shoal would suddenly disappear, and the presence of a shark would supply the reason, or if not actually seen, its proximity was sufficiently suggested. Outside the reef, sharks were very commonly seen and of much larger size than those within. One school, in attendance on the steamer while at anchor, numbered about thirty, individuals of which must have measured twelve feet in length. We caught several which proved to be of the same species as those taken inside the lagoon. They were pale ashy-grey above and lighter beneath, appearing most conspicuous in the deep blue water and visible when several fathoms below the surface.

With the exception of the next-named, *Carcharhinus menisorrah* was the only shark met with, though the inhabitants report an occasional Tiger Shark. Ogilby³ writes:—"I am convinced that *Galeocerdo rayneri* and *Carcharodon rondeletii* will prove to be the most abundant of the large sharks." The first-named, as I have indicated, very probably occurs off the island, but the latter should be removed from the list (until authenticated) in favour of the abundant species I now record.

C. menisorrah was recognised from Australia (Newholland) by Müller and Henle. The locality was however not included in the British Museum Catalogue, which probably accounts for its omission from Australian lists.

The islanders told me that, two or three miles outside the reef,

³ Ogilby—Aust. Mus. Mem., ii., 1889, p. 52.

sharks are to be found "in thousands." If so there should be opening for a good industry in sharks' fins. At present there is no boat on the island large enough to engage in such work except in the calmest weather, and as sudden squalls are not infrequent, it is not safe, at any time, to venture far from the shelter of the lagoon, in the small boats available.

ISISTIUS BRASILIENSIS, *Quoy and Gaimard.*

Scymnus brasiliensis, Quoy and Gaimard, Voy. "Uranic.," Zool., 1824, p. 198.

In 1900 I first recorded this species for the island⁴ and now chronicle a second example: this was caught by Mr. Robert Thompson, with hook and line, and handed to us by Mrs. Nichols. It is a female and somewhat smaller than the previous specimen, a male, measuring 342 mm. in length; it is similarly coloured and likewise possesses thirty-one teeth in the lower jaw.

I have followed authors in assigning the name to Quoy and Gaimard, though these writers credit it to Cuvier. Of the "Règne Animal" the only edition available to Quoy and Gaimard in 1824 was the first (1817), this does not contain the species and I have been unable to find it described in any other of Cuvier's writings. It is possibly an unpublished museum or manuscript name and should therefore be attributed to the authors who first described the species.

DASYATIS, *sp.*

Pulling across the lagoon one day, I noticed a large Sting Ray lying on the bottom in about a fathom of water. By means of the water-telescope I was able to see the ray very clearly. Some weeks later Mr. George Nichols while fishing in the lagoon, discovered a ray and by means of an oar, drove it beachwards for a considerable distance. After landing and returning with a harpoon, he was unfortunately not able to again locate the monster; in common with others he tells me that similar rays are not infrequently seen in the lagoon.

PLOTOSUS ANGUILLARIS, *Bloch.*

Platystacus anguillaris, Bloch, Nat. ausl. Fische, viii., 1794, p. 61.

When originally recorded from the island, this species was described as being abundant, a statement I can fully confirm.

At the north end of the lagoon are small masses of seaweed

⁴ Waite—Rec. Aust. Mus., iii., 1900, p. 195, figs. 1-2.

three or four feet in diameter, their fronds oscillate in the wash of the waves and at low tide are barely covered. Occasionally when wading through the water one such apparent mass of seaweed will be noticed to become active and pass slowly over the sand. After the first investigation of such phenomenon this moving mass is known to consist entirely of the striped cat-fish. Though the water telescope reveals the striking markings of the species, the unaided eye perceives the regular yellow stripes only as disconnected patches rendered irregular by the ever-present ripple on the water. The resemblance to the seaweed becomes thus so complete that I imagine great protection is obtained from the attacks of Gannets and other birds to whom the fish would fall an easy prey in such shallow water. The wavelet-broken lines on the fish, supply the reflections of light cast by the crinkled seaweed and render the illusion complete.

It may be that, in the water, the conspicuous markings are of "warning" import: such would secure immunity from the attacks of other fishes, but would scarcely apply to birds to whose eyes they would lose the warning appearance.

By wading behind one of these fish-masses they may easily be driven into very shallow water and caught with hand nets. They move slowly and keep in a compact mass separating only when the net is dashed against them, soon to re-unite. In large shallow pools, left by the receding tide, congregations of small individuals are common; when much harassed they hide in the seaweed, or scattering, conceal themselves under stones, shelters not provided on the sandy shores of the lagoon.

This fish is usually quoted as *Plotosus arab*, Forskal,⁵ but it may be noted that Forskal did not name it, the word "Arab," being merely a form of "Arabia" in reference to the native name *Boa* or *Buja*. Bleeker in 1863 first used the word *Arab* as a specific name, crediting it to Forskal, but Bloch had already named the fish *Platystacus anguillaris*, which should therefore be used; it is not jeopardised by *Silurus anguillaris*, Linnæus.

MURÆNICHTHYS NICHOLSÆ, *sp. nov.*

(Plate xvii, fig. 1.)

Head pointed, one eighth of the total length, a sac on the throat; anterior nostril in a tube close to the lip; owing to the presence of a number of large pores the position of the posterior nostril cannot be defined. Cleft of mouth one fourth the length of the head; eye situated above its posterior fourth, its diameter 2.5 in the length of the snout. Gill opening very small, round,

⁵ Forskal—Descr. Anim., 1775, p. xvi., no. 36.

situated in the lower half of the head but widely separated from its fellow. Teeth of both jaws stout, those of the upper in a double series. Upper jaw much the longer, a row of large distant pores along the margin of each lip and others on the top of the head; head and trunk together three-fourths the length of the tail. Body worm-like, tail somewhat compressed, its depth one-thirtieth of the total length. Lateral line median, running the whole length of the body and tail. Dorsal fin very low arising well in advance of the vent, but nearer to it than to the end of the snout, anal scarcely higher than the dorsal, uniting with that fin around the end of the tail.

Colours.—Very pale green when alive, colourless in formaline. Upper half of head and body and the whole tail, the lower part excepted, covered with small black dots, producing a grey appearance. Clusters of larger dots occur at intervals near the lateral line more pronounced on the tail and tending to form transverse bands.

Length of specimen 63 mm.

It was obtained from a poisoned rock-pool on the western side of the island.

Four species of the genus *Muraenichthys* have been recorded from Australian waters, *M. australis*, Macleay,⁶ *M. breviceps*, Günther,⁷ *M. macropterus*, Bleeker,⁸ and *M. gymnotus*, Bleeker.⁹ For the first named, Ogilby¹⁰ proposed a new genus *Scolecenchelys* in reference to its slender proportions: this species is known only from Port Jackson. In *M. breviceps* from Tasmania and *M. macropterus* from Amboyna and Victoria (*vide* Klunzinger) the dorsal fin arises nearer the head than the vent, while in *M. gymnotus* from Amboyna and Port Jackson it arises opposite to the vent. In *M. nicholsæ* the origin of the dorsal fin is nearer the vent than the head. Of all described species it most nearly approaches *M. gymnopterus*, Bleeker,¹¹ the fins are however, much lower, and in none do I find mention of the sac under the throat.

In grateful recognition of the many kindnesses received, I have pleasure in associating with this fish, the names of Mrs. T. Nichols and her daughters.

⁶ Macleay—Proc. Linn. Soc. N.S. Wales, vi., 1881, p. 272.

⁷ Günther—Ann. Mag. Nat. Hist., (4), xvii., 1876, p. 401.

⁸ Bleeker—Act. Soc. Sci. Indo. Neerl., ii., 1857, (Amboina ii.), p. 91.

⁹ Bleeker—*Loc. cit.*, p. 90.

¹⁰ Ogilby—Proc. Linn. Soc. N.S. Wales, xxii., 1897, p. 246.

¹¹ Bleeker—Verh. Bat. Gen., xxv., 1852, Muraen. and Symbr., p. 52.

GYMNOTHORAX THYRSOIDEA, *Richardson*.

Muraena thyrsoidea, Richardson, Voy. "Sulphur," Ichth., 1844, p. 111.

This is the commonest eel of the island and was originally recorded¹² as *Muraena afra*, Bloch. Being unable to reconcile it with that species, and not having an authentic example for comparison with the island form, I forwarded a specimen of the latter to Dr. G. A. Boulenger, who kindly writes:—"The fish you sent me differs much from *Gymnothorax afer* (specimens from the Niger, and others), which has a much longer snout, and longer sharper teeth. I refer it to *G. thyrsoidea*."

Günther associates the figure published by Richardson as *Muraena thyrsoidea*, with *Gymnothorax makassariensis*, Bleeker, and considers that Bleeker's *G. prosopeion* is a synonym of *G. thyrsoidea*. I may mention that the mucous which clothes the body of this eel is transparent, and no great colour change takes place during preservation.

As *Gymnothorax afer* has appeared in the literature of the island, and is also recorded from New South Wales, a few remarks on the mainland species, so identified, may not be out of place.

Gymnothorax afer was first recorded from Sydney by Günther,¹³ and subsequent writers have applied the name to our common green eel. I have never recognised *G. afer* on our coast, and refer the common species to *G. prasina*, Richardson.¹⁴ When first removed from the water it is always (as recorded by Richardson, and noted by others) of bright green colour, and, in tint, exactly resembles a common green seaweed (*Phyllospora comosa*, Agardh), found among the rocks which the eel frequents.

This green colour is entirely due to the mucous which covers the body, an interesting fact discovered by my assistant, Mr. A. R. McCulloch, when preserving a recent example. When the mucous is scraped away the brown colour so characteristic of preserved examples is revealed. The colour is produced by pigment and not by the presence of algæ in the slime, a fact ascertained by microscopical examination. The origin of the colour is not therefore comparable with that found on the sloth and discovered by Dr. H. C. Sorby to be due to the growth of parasitic algæ among the hairs.

The mimetic colour of the green eel can scarcely be regarded as protective, and should rather be considered as of aggressive import. I do not remember to have read of an analogous instance

¹² Ogilby—Aust. Mus. Mem., ii., 1889, p. 72.

¹³ Günther—Cat. Fish Brit. Mus., viii., 1870, p. 124.

¹⁴ Richardson—Voy. "Ereb. and Terr.," Fish., 1847, p. 93.

of colouration among fishes, and publish the interesting fact for the benefit of those collecting *data* on the subject of "Animal Coloration."

When the green mucous is removed, the body generally presents a brown colour, somewhat lighter on the head. An ill-defined dark streak passes from the snout on each side to behind the eye, the nostrils are margined with black and the angle of the mouth is dark. The longitudinal gular folds number four or five on each side. The body markings are confined to the lower half of the body and become obsolete behind the vent. They take the form of vertical dots which become deeper ventrally, the lower series form closely set transverse lines which extend across the abdomen.

Gymnothorax nubilus, *Richardson*.

Muraena nubila, Richardson, Voy. "Ereb. and Terr.," Fish., 1847, p. 81, pl. xlvii., figs. 6-10.

One specimen only of this species was obtained. It is a new record for the island and was first described from Norfolk Island. Marine eels are generally spoken of as snakes by the islanders and are much dreaded on account of the fearful wounds they inflict.

Gymnothorax flavimarginatus, *Rüppell*.

Muraena flavimarginata, Rüppell, Atlas, Reise Nord. Afrika, Fische, 1828, p. 119, pl. xxx., fig. 3.

This eel is recognised from Norfolk Island by Günther and an example, which I also identify with the species, we owe to Mr. W. S. Thompson. It has not been previously recorded from Lord Howe Island.

Gymnothorax chalazius, *sp. nov.*

(Plate xvii; fig. 2.)

Head compressed 8.3 in the total length. The gape is half the length of the head and the eye slightly less than half the snout. The teeth of the upper jaw are arranged in two series, an outer row of small sub-equal compressed teeth inclined backwards, there are twenty-eight in each ramus. Within these is a second row, those anterior to the front edge of the eye, nine in number on each side, are large, thrice the size of the outer teeth, stout and conical, their apices much bent backwards, they stand close to the outer row and are alternate with them. Posterior to the front edge of the eye, the inner series is widely separated from

the outer one, and consists of about nine spaced slender and almost straight teeth twice the length of those of the outer series. The anterior portion of the mouth is further provided with six long lance-like teeth, two in the mid line, of which the second is the largest tooth in the mouth, and two on each side alternate to the central ones. The vomerine series is not forked and comprises about twelve low conical teeth in a single series. The lower teeth are uniserial, similar to the outer row of the upper jaw, there are six large teeth (canines) anteriorly, corresponding to those of the upper jaw. With the exception of the vomerine teeth all are movable, the canines and inner upper teeth perfectly depressible. The converging extremities of the jaws prevent the mouth being closed at the sides.

The head and body are 2.2 in the total length, the tail 1.84 in the same. The dorsal fin begins in advance of the gill-opening and is not conspicuously elevated.

Colours.—Coffee brown all over except the under surface of the body which is yellowish. The dark parts, the fins included, are entirely ornamented with small white spots which anastomose somewhat on the cheeks, and are larger and more widely spaced on the tail. The posterior half of the head and the body, as far as the vent, bear about five rows of black spots, the upper ones as large as the eye, the lower ones much smaller.

Length of specimen 415 mm. A second example differs only in being somewhat smaller, 320 mm., and of rather lighter brown colour.

This species bears some resemblance to *Lycodontis parvibranchialis*, Fowler,¹⁵ but differs in having the white spots much smaller and in eight or nine rows, instead of four only: the spots also extend over the fins. In *G. chalazius* the black spots are much larger than the white ones and are confined to the head and trunk. In this species also, the eye is very much smaller and the mandibular teeth are in a single series, the gape of the mouth is half the distance of the tip of the snout from the gill opening, but in the Hawaiian species it is a third of the distance only.

GONORHYNCHUS GONORHYNCHUS, *Linnaeus*.

Cyprinus gonorynchus, Linnæus, Syst. Nat., ed. xii., i., 1766, p. 528.

(Plate xvii; fig. 3.)

This fish is by no means uncommon, and has the habit of burying itself in the sand; it is, as far as I could learn, of some-

¹⁵ Fowler—Proc. Acad. Nat. Sci. Phil., 1900, p. 494, pl. xviii., fig 1.

what solitary habit, or at least is not found in large shoals. Of several specimens obtained, one is young and possesses an ornamentation different from the adult. It exactly resembles an unlocalised example found with New South Wales fishes in our store collection and also a young example which I identified for Mr. James S. Bray, of this city, and which I understood was taken at Narrabeen, off our coast, constituting a record for the State. These young fishes have the body of a pale sandy colour, with no trace of dark markings on the fins, so characteristic a feature of the adult. The lateral line is bounded immediately above and below by black spots, arranged in about sixty-five pairs, each spot is formed of an x-shaped figure. The lower row is continued forward to below the eye, but the upper row ceases far behind the head. There are also some small spots on the snout and a few large ones on the occipital region.

The umbilicus is found some little distance in front of the ventrals.

This is the fish *Gonorhynchus greyi* of Günther and authors generally. The generic name *Gonorynchus* was first given by Gronovius in 1763, but as his work is non-binomial the name cannot be used upon his authority. *Gonorhynchus* used in 1846 by both Cuvier and Valenciennes, and Temminck and Schlegel, is antedated by *Rhynchana*, Richardson, March, 1845. I find however that Cuvier republished the name in 1817, the reference to which has been omitted from Günther's and subsequent catalogues.

The first specific name, *gonorynchus*, is usually credited to Gmelin, but rejected on account of the *Scomber scomber* principle. Gmelin however but copied Linnæus who in 1766 fixed the name for all time, the synonymy therefore stands as follows:—

Genus GONORHYNCHUS, Cuvier, 1817.

Gonorynchus, Gronovius, Zoophyl., i., 1763, p. 55 (*non-binomial*).

Gonorhynchus, Cuvier, Règ. Anim., ed. i., 1817, p. 196.

Rhynchana, Richardson, Voy. "Ereb. and Terr.," Fish. 1845, p. 44.

Gonorhynchus, Cuvier and Valenciennes, Hist. Nat. Poiss., xix., 1846, p. 207; Temminck and Schlegel, Fauna Japon. Pisces, 1846, p. 217.

Species GONORYNCHUS, Linnæus.

Cyprinus gonorynchus, Linnæus, Syst. Nat., ed. xii., i., 1766, p. 528.

Gmelin, in Linnæus, Syst. Nat., ed. xiii., 1788, p. 1422. Bloch and

Schneider, Syst. Ichth., 1801, p. 443, pl. lxxviii., fig. 1 (*errore Con-*

orynchus).

Cobitis gonorynchus, Gronovius (ed. Gray), 1841, p. 41.

Rhynchana greyi, Richardson, *loc. cit.*, pl. xxix., figs. 1-6.

Gonorhynchus abbreviatus, Temminck and Schlegel, *loc. cit.*, pl. ciii.,

fig. 5.

- Gonorhynchus gronovii*, Cuvier and Valenciennes, *loc. cit.* p. 207, pl. dlxviii.
Gonorhynchus greyi, Cuvier and Valenciennes, *loc. cit.*, p. 212. Günther, *Cat. Fish. Brit. Mus.*, vii., 1868, p. 373.
Gonorhynchus brevis, Kner, *Reise Novara, Fische*, 1867, p. 342, pl. xvi., fig. 1.

TRACHINOCEPHALUS MYOPS, *Forster*.

Salmo myops, Forster, in Bloch and Schneider, *Syst. Ichth.*, 1801, p. 421.

Though not previously recorded from the island we were fortunate in securing two examples of this species; they were washed on to Blenkinthorpe Beach during heavy weather.

Family MYCTOPHIDÆ.

Working the lagoon beach in the early morning of 2nd January, we gathered a number of representatives of this family. They had been thrown up during the night, whether as a result of the stormy weather of the previous few days, or driven ashore by predaceous fish we were unable to ascertain. We visited the beach again at night in the hope of seeing examples alive, their presence revealed by their luminous organs, but were disappointed. On the following morning however we obtained a further supply; on both occasions the fishes came ashore in a very restricted space about the middle of the beach, and although we traversed the whole strand, we found none of the Myctophids very far from the main body. The Gempelids, as noted under *Machærope*, were, on the other hand, found scattered along nearly the whole beach. A large number of the fishes obtained were more or less mutilated by the attacks of Isopods (*Sphæroma*) which were present in thousands. Needless to say we collected all the fishes seen, in whatever condition.

With two exceptions, all the species are identified with described forms. Though large ocean tracts sunder the known habitats of some of the species, it is not to be forgotten that the continents set no bounds to the wanderings of pelagic forms.

My comparisons have been made with the utmost care and, in addition, I have had independent drawings made from the island material, and have compared them with those furnished respectively by Raffaele, Lütken, Goode and Bean, and others who have studied the members of the family.

In the case of one species, (*M. hygomi*) Prof. Dr. H. F. E. Jungersen, of Copenhagen, has obligingly compared one of our specimens with the type, and has not only verified the determination, but has also discovered that the figure is not quite accurate in features I indicated.

To Prof. Leon Vaillant, of Paris, I am indebted for some notes on *Dasyscopelus cuvieri*, Casteinau, resulting from an examination of the type specimen preserved in the Paris Museum. The information thus kindly supplied induces me to consider our specimen of *Dasyscopelus* as distinct from *D. cuvieri* with which I was at first inclined to identify it.

ÆTHOPRORA PERSPICILLATA, Ogilby.

Æthoprora perspicillata, Ogilby, Proc. Linn. Soc. N. S. Wales, xxiii., 1898, p. 36.

(Plate xviii., fig. 1.)

The type specimen was "badly mutilated, being almost broken in two just behind the termination of the anal fin, and also injured along the ventral surface." Under these circumstances a partial redescription is advisable, and the following remarks are based upon six examples in our collection.

The author's definition of the photophore groups does not coincide with my reading of them, I therefore enumerate them as follows:—

Mandibular.—Three.

Opercular.—Two, one behind the extremity of the gape; the other, larger, above.

Pectoral.—Three, an upper one on a scale below the lateral line, a median one at the base of the fin, and a lower one in advance of the latter.

Anterolateral.—Three, one low, in advance of the end of the pectoral fin, one above the front edge of the ventral fin, and the third slightly or much lower, its vertical position being variable.

Mediolateral.—Three, in a straight sub-vertical line, the upper one close to the lateral line.

Posterolateral.—One, close to the lateral line below the soft dorsal.

Thoracic.—Four, the first two well separated.

Ventral.—Four, the second and third well separated.

Anal.—6 + 5, the first and sixth raised above the line of the others, the posterior series in an even line.

Caudal.—Four, the first three equidistant the third being higher than the others, the fourth is further spaced and nearer to the lateral line.

In the original description the two lower mediolaterals are stated to be on nearly the same "horizontal" plane. This is possibly an error, for which vertical should be read.

Sundry discrepancies in the respective descriptions would favour the idea that our examples represent a species distinct from *Æ. perspicillata*; for example, no mention is made of the upper pectoral photophore and but two caudal pores are described. It must be remembered however that the type example is in poor condition and may not have exhibited all necessary features; in the absence of a figure, only a direct comparison with the type (in the author's possession) could determine these points.

I have therefore referred our examples to *Æ. perspicillata* and furnished a figure for the benefit of future workers.

Our largest specimen measures 88 mm. in length and is thus larger than the type, (62 mm.)

NOTOSCOPELUS¹⁶ EJECTUS, *sp. nov.*

(Plate xviii., fig. 2.)

D. 22; A. 19; V.i. 8; P. 12; C. 19; L. lat. 39; L.tr. 3 + 5.

Length of head 3.4, height of body 5.2 in the total length, eye 4.4 in the head, one half more than the length of the snout, and less than the interorbital space.

Preopercle very oblique, mouth large, slightly oblique, the cleft extending to far beyond the eye, almost to the margin of the preopercle. The origin of the dorsal is nearly one-third nearer the end of the snout than the base of the caudal; the length of its base is nearly equal to that of the head. The fifth ray is the longest and is a little more than the height of the body.

The anal commences beneath the seventeenth dorsal ray and terminates below the soft dorsal, its base is equal to the length of the longest dorsal rays and its longest rays one-fourth less. The ventral is situated beneath the anterior rays of the dorsal and is longer than the pectoral, the latter measuring but half the height of the body. The caudal is rather deeply forked, its length 2.6 and the least depth of the peduncle 3.0 in the length of the head.

Scales.—The body scales are entire but with radiate striæ, the margins irregular, those of the lateral line appear smaller, being more encroached upon than the ordinary series, they are medially indented.

¹⁶ *Notoscopelus*, Günther = *Macrostoma*, Risso, antedated by *Macrostomus* Wied.

The Photophores are arranged as follows :—

Opercular.—One, just behind the preopercular border and above the level of the maxilla.

Pectoral.—Three, two above and one at the lower base of the fin, these form a sub-vertical line.

Anterolateral.—One, posterior to the insertion of the dorsal fin.

Mediolateral.—Three, forming an obtuse angle.

Posterolateral.—Two, placed horizontally close together, beneath the adipose fin.

Thoracic.—Five, a very long interspace between the first and second.

Ventral.—Four, close together and occupying a median position between the ventral and anal fins.

Anal—8 + 5. The first below and the eighth above the line ; the second portion posterior to the anal fin.

Caudal.—Three, one beneath the termination of the lateral line and two, close together, near the lower profile.

Length of specimen 40.5 mm.

Goode and Bean write¹⁷:—"Steindachner, Vinciguerra, Raffaele, and Collett seem all disposed to recognise but one species of *Notoscopelus*. We think we have distinguished four, but possibly our series is not sufficiently complete to justify us in positive opinions." Still less am I in a position to discuss the question. The example above described possesses characters which appear to warrant specific recognition. It finds its nearest ally in *N. quercinus*, Goode and Bean, but differs therefrom in the following particulars:—the mediolateral photophores form a very obtuse angle instead of a "curved subvertical line," a difference at once apparent on comparing the two figures. In *N. quercinus* the anals are 8 + 8 and form an even series with a slight break only ; in *N. ejectus*, the break is large, the first and last pore of the anterior series deflected out of line and the second series formed of five pores only. The statement that one of the pre-caudals is very high up and between the flap of the operculum and the lateral line, occurs both in the generic and specific descriptions and some confusion is apparent ; though one of the caudal pores is high the upper pore of the pectoral series is evidently intended.

It may be noted that in the description of *N. castaneus*, Goode and Bean count the mediolateral pores as three, but figure one only.

¹⁷ Goode and Bean—U.S. Nat. Mus., Sp. Bull. 2, Oceanic Ichth., 1895, p. 84.

MYCTOPHUM PHENGODES, *Lütken*.

Scopelus phengodes, Lütken, Spolia Atlantica, ii., 1892, p. 253, fig. 11.

D. 13; A. 20; V. i. 8; P. 16; C. 19; L. lat. 38; L. tr. 2+3.

Length of head 3·4, height of body 1·4 in the total length. Eye 2·6 in the head, and one half more than the interorbital space. Snout less than half the diameter of the eye, obtusely pointed: preopercle quite vertical. Mouth slightly oblique, the lower jaw the longer, the maxilla reaches to below the hinder edge of the eye, Origin of dorsal nearer the end of the snout than base of the caudal, the length of its base one-seventh the total length. The fifth ray is the longest a little less than the height of the body. The anal commences in advance of the end of the dorsal and terminates behind the soft dorsal, its base is twice that of the dorsal, the fourth ray is the longest, an eighth shorter than the fifth dorsal. The ventral is situated vertically in front of the dorsal. The length of the pectoral is equal to the height of the body and reaches to below the ninth dorsal ray. The caudal is well forked and is one-third shorter than the head, the height of the peduncle is 3·6 in the length of the head.

Scales.—Cycloid, those of lateral line vertically enlarged.

The arrangement of the Photophores is as below:—

Mandibular.—Three.

Opercular.—Two, the upper on the lower level of the eye, the lower, which is in advance, below the level of the maxilla.

Anterolateral.—One, above hinder insertion of ventral.

Mediolateral.—Three, in straight oblique line directed forwards below.

Posterolateral.—One, above last pore of anterior anals.

Thoracic.—Five.

Ventral.—Four.

Anal.—7 + 8 (in all examples).

Caudal.—Two, somewhat apart.

Supercaudal (present in three examples only).—Large, occupying seven scales.

Infracaudal (present in one example only).—Small, occupying two scales.

Four examples sub-equal in length and measuring 105 mm.

As far as known this is a southern species ranging from 5° 30' W. Long. to 98° E. Long. and reappearing at Lord Howe Island.

MYCTOPHUM OPALINUM, *Goode and Bean.*

Myctophum opalinum, Goode and Bean, *Oceanic Ichth.* 1895, p. 72, fig. 81.

A single example, 95 mm. in length, so very nearly agrees with this species, known from the Western Atlantic, that I cannot regard it as distinct. The following points however call for remark. The origin of the dorsal is stated to be midway between the snout and the adipose fin, in our example the extremity of that fin is the point attained, and it is so figured by the authors. Though correctly described, but two mediolateral photophores are figured; the omission is rectified by Jordan and Evermann in their more recent work.¹⁸ Six supercaudal scales are luminous in our specimen.

M. aurolaterdatum, Garman,¹⁹ though much resembling this species, differs by having smaller scales, which though stated to be larger on the lateral line are figured smaller than those of the ordinary series.

MYCTOPHUM HYGOMII, *Lütken.*

Scopelus hygomii, Lütken, *Spolia Atlantica*, ii., 1892, p. 256, fig. 15.

Of this species we obtained over fifty examples, many of which are however in but indifferent condition. The only feature in which they at all differ from Lütken's figure is in respect to the hinder anterolateral photophore which is somewhat more ventral in position and thus agrees with *M. remiger*, Goode and Bean,²⁰ regarded as probably identical with *M. hygomii*.

The vertebræ number $15 + 21 = 36$, and 72 mm. is the maximum length attained.

A small number of our specimens have the last supercaudal scale luminous and in one or two examples the last infra-caudal scale also, but the two conditions do not occur in the same specimen.

In consequence of the differences above noted, I sent an example to the Copenhagen Museum for comparison with the type, and Prof. Hector F. E. Jungersen has kindly written to me as follows:—"I have compared your specimen with the original type specimen of *Scopelus hygomii*, Lütken, and I have not been able to find the least difference between them: there can be no doubt about their identity. As to figure 15 of Lütken's work

¹⁸ Jordan and Evermann—*Bull. U.S. Nat. Mus.*, 47, iv., 1900, pl. xcii., fig. 247.

¹⁹ Garman—*Mem. Mus. Comp. Zool. Harvard*, xxiv., 1899, p. 267, pl. lv., fig. 3.

²⁰ Goode and Bean—*U.S. Nat. Mus., Sp. Bull.*, 2, *Oceanic Ichth.*, 1895, p. 74, fig. 84.

there is some slight incorrectness in the position of some of the photophores compared with the type specimen itself, which may have caused your doubt."

The previously recorded range of the species was from 22° 20' W. Long. to 81° E. Long.

MYCTOPHUM REINHARDTII, *Lütken*.

Scopelus reinhardtii, Lütken, *Spolia Atlantica*, ii., 1892, p. 257, fig. 16.

Two examples are identified with this species, measuring 45 mm. and 35 mm. respectively; the larger specimen has a luminous plate, composed of three scales, on the lower side of the caudal peduncle and the smaller, a similar plate above. The two examples studied by Lütken were similarly adorned.

The following slight difference is observable, in the arrangement of the photophores, between our specimens and the figure. Of the mediolateral series, the anterior pore is below the level of the median one and not on the same horizontal as in the type. Of the two posterolaterals the lower is not nearer to an anal pore than to the upper one as figured by Lütken.

The radial formulæ is :—

D. 14; A. 22; P. 14; V.i. 8; C. 19.

The rays in the dorsal and anal are therefore in greater number than in the Atlantic specimens. The general proportions are the same and I cannot consider that the slight differences indicated, merit specific recognition. It is to be noted however that *M. reinhardtii* has not previously been identified south of the equator, nor in the Eastern Hemisphere. It is possible therefore that direct comparison might reveal differences not indicated in the description.

DASYSCOPELUS NAUFRAGUS, *sp. nov.*

(Plate xviii, fig. 3.)

D. 13; A. 18; V.i. 8; P. 14; C. 19; L. lat. 38; L. tr. 2 + 3.

Length of head 4.0, height of body 4.7 in the total length. Eye 2.6 in the head and a little more than the interorbital width; snout short, two-fifths the width of the eye; preopercle subvertical. Mouth slightly oblique the cleft extending to beyond the hinder edge of the eye. Origin of dorsal much nearer tip of snout than base of caudal, the length of its base less than one-seventh the length of the fish. The fifth ray is the longest, a little less than the height of the body; the anal commences behind the dorsal and terminates beneath the soft dorsal,

its base more than one-half longer than the dorsal, the fourth ray is the longest, one-fourth shorter than the fifth dorsal. The ventral is placed in front of the dorsal. The length of the pectoral is equal to the height of the dorsal fin, and reaches to below its eighth ray, it is narrow and sub-median in position. The caudal is one fourth shorter than the head, and is well forked, the peduncle is slender, its depth three and a half times in the length of the head.

Scales of head large and thin, scales of the body ctenoid, those of the lateral line less so and slightly enlarged.

The Photophores are as follows:—

Opercular.—One, just behind the preopercular border and slightly below the level of the lower edge of the eye.

Pectoral.—Three, one at the lower base of the fin, one mid-way between its upper base and the lateral line immediately behind the operculum, and an inferior one in advance of the others.

Anterolateral.—One, above the hinder insertion of the ventral fin.

Mediolateral.—Three, forming an obtuse angle.

Posterolateral.—One, above the last pore of the anterior anals and close to the lateral line.

Thoracic.—Five, the fifth immediately in front of the ventral fin.

Ventral.—Four, the first immediately behind the fin.

Anal.—Normally 7 + 6, varying to 6-8 + 5-7.

Caudal.—Two, approximate, below the lateral line.

Twenty-five specimens, the largest of which measures 62 mm. in length.

This species is closely allied to *D. asper*, Richardson,²¹ but differs by having three scales between the anterolateral and the lower mediolateral photophores, instead of one only: by having the anals differently divided, the posterolateral situated over the last instead of the third last anterior anals and by not having the upper caudal photophore placed at the end of the lateral line. In *D. naufragus* the adipose fin is low with a very broad base. Goode and Bean²² represent *D. asper* as having the fin long and narrow, the condition also of *D. pristilepis*, Gilbert and Cramer,²³ to which our species is also nearly allied, but differs in having the scales of the lateral line ctenoid, in a more forward position of the ventral fin and by a difference in the

²¹ Richardson—Voy. "Ereb. and Terr.," Fish., 1845, p. 41, pl. xxvii.

²² Goode and Bean—U.S. Nat. Mus., Sp. Bull., 2, Oceanic Ichth., 1895, p. 92, pl. xxviii., fig. 106.

²³ Gilbert and Cramer—Proc. U.S. Nat. Mus., xix., 1897, p. 412, pl. xxxix., fig. 1.

arrangement of the pectoral, thoracic, and anal photophores. Judging by the illustration, the Hawaiian species has a differently shaped head in which the eye cuts the profile.

In respect to *Scopelus cuvieri*, Castelnau,²⁴ which Lütken recognised as of the genus *Dasyscopelus* I sought the assistance of Prof. Leon Vaillant who kindly examined the type in the Paris Museum. The reply to my questions, seriatim, enables me to publish the following particulars additional to the original description.

The mediolateral photophores form a straight line, the central pore being further removed from the upper than from the lower one.

There are four ventral photophores on the right side of the fish and five on the left, though the absence of a scale on the former, where a pore would be situated, indicates five as the normal number. Lütken also counted five in the type, a circumstance which led to his writing:—"It thus comes close to *S. spinosus*, Std. but must be another species, provided the five ventrals as noted by me are not accidental abnormalities, or perchance a mistake on my part. I have otherwise never found that number outside the *Lampanyctus-Nyctophus* group."²⁵

The tail is imperfect, the total length is about 90 mm.

EXONAUTES RONDELETHI, *Cuvier and Valenciennes*.

Exocætus rondeletii, Cuvier and Valenciennes, Hist. Nat. Poiss., xix., 1846, p. 115, pl. dlxii.

A flying fish has been recorded²⁶ from the island, under the name *Exocætus dovii*, Gill, (= *E. rufipinnis*, Cuvier and Valenciennes). An examination of the specimen thus determined, proves it to be of the same species as those obtained by myself.

Exonautes rondeletii is characterised by having the first two pectoral rays simple, the second about half longer than the first; the third ray divided and the fourth and fifth longest. In *E. rufipinnis* the first pectoral ray only, is simple, and the third and fourth are longest.

In the memoir quoted, it is mentioned that Flying Fishes occur occasionally in the nets, together with *Scombrosox forsteri*, among the garfishes. We were not fortunate enough to secure examples in this way and though they were commonly seen around the island we did not obtain living specimens.

²⁴ Castelnau—Proc. Zool. Soc. Vict., ii., 1873, p. 106.

²⁵ Lütken—Spolia Atlantica., ii., 1892, p. 242.

²⁶ Ogilby—Aust. Mus. Mem., ii., 1889, p. 71.

The way in which we obtained the Flying Fishes was no less unexpected than interesting. The Admiralty Islets which lie within a twenty minutes pull of the main island, and on the north-east side, are the breeding grounds of myriads of sea birds.

Though I do not now propose to describe the habits of the birds, I may mention that whereas the Terns left their nests when we were within an arm's length of them, the Gannets sat close upon their eggs or young.

In defence of their charge they attempted to drive off visitors with vicious blows of their powerful beaks. Failing this they offered ransom by depositing their latest catch at the intruder's feet. In such instances, and they were many, large flying-fish were voided, and one accommodating Gannet presented me with a couple.

HOWELLA BRODIEI, *Ogilby*.

Howella brodiei, Ogilby, Proc. Linn. Soc. N.S. Wales, xxiii., 1899, p. 735.

(Plate xviii., fig. 4.)

The type specimen is the only example so far known, and for the opportunity of figuring it I have to thank the author, on whose recommendation it was lent to me by the Curator of the Queensland Museum.

Some ambiguity in the original description of the position of the anal fin, would be more clearly expressed as:—Anal originating very slightly behind the anterior insertion of the second dorsal fin.

XENOGRAMMA CARINATUM, *gen. et sp. nov.*

To Mr. Campbell Stevens, Postmaster at Lord Howe Island, I owe the opportunity of making known this remarkable and interesting fish. Mr. Stevens noticed it alive and awash on the lagoon beach, and threw it out of reach of the waves: it was thus secured in almost perfect condition, and handed to me as a curiosity.

This fish proves to be the type of a new genus, which may be thus defined:—

XENOGRAMMA, *gen. nov.*

Family GEMPYLIDÆ.

Body fusiform, moderately elongate, somewhat compressed, rounded below. Head conical, compressed behind, preopercle unarmed, branchiostegals seven, gill rakers rudimentary, jaws nearly equal with strong sharp teeth, much larger and fang-like in the mandible: vomer and palatines toothed, tongue smooth. The first dorsal fin low, uniform with about nine weak spines, not widely separated from the soft portion, the anterior lobe of which is well developed; six finlets. Anal fin with two spines

and five finlets. Ventrals moderate, thoracic, no detached spine behind the vent; pectorals sub-median. Tail well-developed, strongly keeled. Scales small thin cycloid adherent, with scalelets, no corselet. Lateral line remarkably tortuous; vertebrae about thirty.

XENOGRAMMA CARINATUM, *sp. nov.*

(Plate xix., fig. 1.)

D. ix. 18 + 16; A. ii. 12 + 5; V. i. 5; P. 15; C. 17 + 4.

Head 3·6, height of body 4·1, in the total length. Horizontal diameter of eye 5·2 in the head, and less than the vertical diameter which is one-third greater; interocular (bony) width, one-seventh more than the horizontal diameter of the eye, slightly convex. Snout broad, depressed, its length 2·7 in the head. Nostrils separated, the posterior a vertical slit midway between the edge of the eye and the anterior one, which is small and vertically oval, lying a little nearer the end of the snout than the middle of the eye. The maxilla is slightly broadened and rounded behind, and extends to just below the anterior margin of the eye.

Teeth.—The edge of the premaxillary is beset with short strong teeth, the anterior ones slightly larger, those behind smaller; four, larger, fang-like teeth on the roof of the mouth anteriorly. The teeth on the vomer and palatines are each in a single row, similar to those of the premaxillary; those of the former arranged crescentrically. The mandible is deep and powerful, the teeth large and fang-like, there are ten on each side, of which the first and last are smallest. The opercles are thin, flexible, and unarmed. Pseudobranchiæ well developed, gill rakers represented by a few short, weak spines near the angle.

Fins.—The first dorsal fin arises over the base of the pectoral, and consists of nine weak, short, sub-equal spines, of which the central three are longest, half the diameter of the eye in length; they may be completely concealed in a narrow groove. The soft dorsal is highest in front, the fifth ray being longest and 2·3 in the head. The anal spines are not separate from the soft portion which resembles the soft dorsal, but is shorter and lower. The dorsal is followed by six finlets, the anal by five. The ventral spine is placed a little in front of the pectoral, its length 3·4 in the head, the first ray 2·4 in the same; the greater part of the fin can be received by a broad groove. The pectoral fin is a little longer than the ventral, and has a rounded lower margin; its upper rays are the longest, the third being 2·2 in the head. Caudal fin deeply forked with a slender peduncle, the

least height of which is 1.4 in the eye, it is flattened above and below; the lateral keel is large and prominent and there are also two small oblique ridges near the base of the rays.

Scales.—The snout, upper part of head, maxilla, and mandible are naked; the rest of the head furnished with small smooth cycloid scales. The scales on the body are similar, but each carries a row of small scalelets which give it a rough appearance; the scales are irregularly arranged. The lateral line is at first straight and near to the dorsal profile, with which it is concurrent to below the seventh and eighth spines, it then descends vertically to within a similar distance of the ventral surface which it follows for a short distance; it next rises to a point above the mid line beneath the lobe of the dorsal, whence it immediately again descends to a corresponding position in respect to the anal; it again rises, less abruptly to above the mid line, which it finally attains slightly in advance of the caudal keel.

Colours.—Head dark brown, with silvery patches on the lower opercles, inside of mouth black. Body brown, but appearing of a much lighter tint, owing to the presence of the scalelets, which form a rivulate pattern: on the lower surface the scalelets quite hide the ground colour, giving a yellow appearance to these parts. All the fins dusky, the outer base of the pectoral yellow.

Length, 575 mm.

The normal condition of the ventral fins, the complete scaling of the body, the small number of dorsal spines and the presence of more than two finlets each in the dorsal and anal fins; together with the single and strangely tortuous lateral line and the keeled caudal, render this fish an unmistakable form.

The only species which may be discussed in connection with *X. carinatum* appears to be *Thyrsites niger*, Poey,²⁷ whose work, however, is not accessible to me. Of this species Goode and Bean²⁸ write:—"Jordan and Evermann propose the new generic name *Escolar* for *Thyrsitops violaceus*, Bean. They also are of the opinion that *Thyrsites niger*, Poey, is of the same species. Since this was described from a fragment, we have not taken it into consideration in our studies." In passing, it may be noted that Jordan and Evermann,²⁹ use *Bipinnula* for *T. violaceus*, and respecting *T. niger* write:—"Known only from a fragment of the tail of a specimen weighing about 100 pounds. Caudal peduncle with a distinct keel. Scales thin, smooth, and

²⁷ Poey—Enumeratio Pisc. Cubens, 1875. p. 74.

²⁸ Goode and Bean—U.S. Nat. Mus., Sp. Bull., 2, Oceanic Ichth., 1895. p. 519.

²⁹ Jordan and Evermann—Bull. U.S. Nat. Mus. 47, i., 1876, p. 879. (footnote.)

roundish, not spinose. Color everywhere intense black. Last rays of dorsal apparently detached. Flesh white, exquisite in flavor, as in *Ruvettus pretiosus*. Havana. (Poey). Thrown on shore by a storm. This is probably not a *Thyrsites*, nor a *Bipinnula*, as the caudal peduncle has no keel in either genus." 4

The question arises:—Can a species described from a mere fragment be admitted, or resuscitated in case a second example, apparently of the same species, be obtained? Though a portion of the tail may coincide, how are we to know that the remainder of the fish does so? Goode and Bean, as before indicated, decline to recognise Poey's species, and I argue they had good reasons for so doing. As far as may be ascertained from the description, the fragment of *T. niger* is very similar to the caudal portion of *X. carinatum*.

I desire to express my thanks to Dr. F. P. Sandes, Demonstrator in Anatomy at the Sydney University, for radiographs of the fish, enabling me to ascertain the number and condition of the vertebræ, without mutilating the unique specimen.

MACHÆROPE LATISPINIS, *Ogilby*.

Machærope latispinis, Ogilby, Proc. Linn. Soc. N.S. Wales, xxiii., 1899, p. 737.

Many examples of this species in breeding condition were cast on to the lagoon beach on January 2nd and 3rd, in company with members of the Myctophidæ as already noted. To the published descriptions I may add that the vertebræ number $10 + 25 = 35$.

CARANX GEORGIANUS, *Cuvier and Valenciennes*.

Caranx georgianus, Cuvier and Valenciennes, Hist. Nat. Poiss., ix., 1833, p. 85.

The Trevally is a common island species, young examples being freely taken with a seine net in the lagoon. Larger specimens up to thirty inches in length are caught outside the reef while we had an interesting experience of them on the reef itself. On one occasion while wading knee-deep during a receding tide we were considerably scared by the presence, within a dozen yards of us, of what appeared to be two or three sharks, indicated by the fins being out of water. After cautiously reconnoitring with a large fish spear, in hand, we discovered the supposed sharks to be a small school of Trevally. They were feeding on the reef in a sub-vertical position, the depth of water not being sufficient to submerge the whole of the tail, the upper lobe of which showed above the surface.

BATHYSTETHUS CULTRATUS, *Forster*.

Sciæna cultrata, Forster, MS., 1774.

Cichla cultrata, Bloch and Schneider, Syst. Ichth., 1801, p. 343.

Seriola cultrata, Richardson, Ann. Mag. Nat. Hist., (i.), xi., 1843, p. 169, fig. (front view of head); Bleeker, Verh. Kon. Akad. Wetens., ii., 1855, p. 10.³⁰

Platystethus cultratum, Günther, Cat. Fish. Brit. Mus., ii., 1860, p. 391; Ogilby, Aust. Mus. Mem., ii., 1889, p. 61.

Platystethus guentheri, Ogilby, Proc. Zool. Soc., 1889, p. 157.

Bathystethus cultratus, Gill, Mem. Nat. Acad. Sci. Washington, vi., 1893, pp. 95, 123.

(Plate xix., fig. 2.)

Though several species of "Plathystethus" (invalid for fishes) have been described none are congeneric with *B. cultratus*. This fish was originally described from Norfolk Island and has since been recorded from Lord Howe Island.

We found it to be comparatively common there, and well-known to the natives who call it "The Herring." It was always to be found in the large and deep rock pools on the north end of the island, and was especially noticeable on account of its deep blue colour. The islanders tell me that it sometimes occurs off the coasts in large schools.

As above noted, Richardson figured a front view of the head of this fish, the illustration being a copy of a drawing by Forster. As this is of small practical value, I supply the accompanying illustration made from a Norfolk Island example, the type locality.

In addition to Forster's short description, and Schneider's augmentation thereof, we have that by Richardson made from Forster's drawing, and next an independent description by Günther together with generic diagnosis.

In 1889 Ogilby examined three specimens from Lord Howe Island, and on account of certain disagreements from Günther's description, suggested *Platystethus guentheri* as a name to embrace them. Having examples from both islands I have made a careful comparison, and find them to be identical; with the exception of the ocular diameter the discrepancies noted are un-

³⁰ I am indebted to Dr. F. A. Jentink, of Leyden, for the list of Norfolk Island fishes contained in Bleeker's paper.

important, but upon this special stress is laid. In fresh specimens and also in those carefully prepared, notably in formaline, the eye is surrounded with fleshy tissue, which makes it appear much smaller than those placed in strong alcohol. Ogilby's fishes were treated in the latter manner, and the tissues have contracted back almost to the bone; in all examples the bony orbit is of the same relative size. To the same agency may be traced the differences noted in the width of the inter-orbital space.

In assigning the fish to the genus *Seriola*, Richardson and Bleeker referred it to the Carangidæ. It was removed therefrom by Günther when formulating the genus *Platystethus* and placed with the Scombridæ, apparently because its vertebræ, counted as twenty-five, were one in excess of the number he allowed in the Carangidæ. As however he identified it with his group *Nomeina*, modern writers would probably regard it is a member of the Stromateidæ.

One of the characters of this latter family is the presence of teeth in the cesophagus, a feature which I have ascertained is not found in *Bathystethus*. The vertebræ number $10 + 14 = 24$ so that I reinstate it in the family Carangidæ.

BRAMA RAI, Bloch.

Sparus raii, Bloch, Nat. amsl. Fische., v., 1791, p. 95.

I recorded this species for the island from a single example obtained in 1889, and though I cannot add anything to our knowledge of this pelagic form, it is pleasing to be able to report that we obtained three additional specimens in perfect condition.

CUBICEPS GRACILIS, Lowe.

Seriola (Cubiceps) gracilis, Lowe, Proc. Zool. Soc., xi., 1843, p. 82.

The subject of this notice is an example four inches in length; it was washed on to the beach and, with the exception of slight damage to some of the dorsal spines and the loss of most of the scales, is in good condition. I cannot dissociate it from *C. gracilis*, Lowe, and in the case of a pelagic species do not consider distribution alone sufficient warrant for the creation of a species.

Our specimen is fairly represented by Günther's figure (A)³¹ but is of more even depth, not tapering so gradually towards the tail. In fig. C a median depression, present in our example, is possibly rendered as a lateral line, the line itself probably occupying a normal position.

³¹ Günther—Chall. Rep., Zool., xxxi., Pelagic Fishes, 1889, p. 11, pl. ii., figs. A-C.

The species was previously known from the Mediterranean, Madeira, and the Azores; in identifying it from Lord Howe Island I considerably extend the known distribution of the genus. In addition to the before-named localities representatives are recorded from The Cape, the Red Sea and the Moluccas.

The following is a description of the specimen.

D. xi. i. 21; A. iii. 21; V. i. 5; P. 20; C. 17 + 12; L. lat. 52.

Length of head 3·6, height of body 3·1, in the total length. The snout is five-sevenths the diameter of the eye, which is 3·2 in the length of the head and equalled by the interorbital space. The nostrils of each side are close together and nearer to the end of the snout than the eye. The jaws are equal and bear a single row of small teeth; similar teeth occur on the vomer, and a minute series on the tongue. The maxilla barely extends to below the front edge of the eye and may be concealed for its entire length by the preorbital.

The dorsal commences considerably behind the head, the sixth (?) spine is the longest and one-half the head in length; the anterior rays are longest, slightly shorter than the longest spine. The anal is similar to the soft dorsal but has a more posterior insertion. The pectorals are long, equal to the height of the body or one-fifth longer than the head. The ventrals are inserted behind the pectorals, their length half that of the head. The height of the caudal peduncle is equal to the diameter of the eye, the caudal is deeply forked and shorter than the head.

The scales are deciduous and for the greater part lost, there are five rows above the lateral line, this runs high and concurrently with the dorsal contour.

Colours.—Generally deep brown above and silvery beneath, the throat barred with brown, dorsal fin dusky, the others colourless.

Length 99 mm.

SCHEDOPHILUS MACULATUS, *Günther*.

Schedophilus maculatus, Günther, Cat. Fish. Brit. Mus., ii., 1860, p. 412

(Plate xx. fig. 1.)

I first recorded this species for the island in 1894 and have little further to add. I however embrace the opportunity of illustrating the species as it has not been previously figured. The example selected is 110 mm. in length.

In 1889 Günther recognised the identity of his genus *Hyperoglyphe* with the previously described *Leirus*, Lowe, and wrote:³²—“*Hyperoglyphe*, therefore, should be eliminated from the

³² Günther—Chall. Rep., Zool., xxxi., Pelagic Fishes, 1889, p. 10.

Perch-like fishes, and placed as a synonym of *Lirus* immediately after *Schedophilus*." Regan³³ goes further, and unites *Schedophilus*, Cocco, with *Leirus*, but follows Günther in spelling the word "*Lirus*." *Leirus*, Lowe, in 1833 is antedated in Coleoptera by Megerle v. Mühlfeld, 1823. *Mopus*, Cocco, appears, as far as I know, only on the authority of Bonaparte, 1841, and if so is quite out of date. *Schedophilus*, Cocco, 1834, therefore seems to be the correct name of the genus. Regan removes from the Stromateidæ, *Icosteus*, Lockington, and *Leichthys*, Jordan and Gilbert, remarking on the obscurity of their affinities. The presence of ventral fins is one of the characters of these two genera, yet Goode and Bean³⁴ figure a fish purporting to be *Leichthys lockingtoni* without ventral fins, this figure is reproduced by Jordan and Evermann³⁵ under the same name without comment. The latter authors also figure, on the same page, an example of *Schedophilus medusophagus*, Cocco, which differs widely from the adult of this species. As is well-known pelagic fishes often undergo considerable metamorphoses and though the adult is described, the figure may represent an immature stage, though this is not indicated by the usual "inch-mark." It is to be further noted that the spines on the interoperculum described and figured, as present in the young, by Lütken,³⁶ and retained in the adult, are not shown, and the head is represented as wholly scaly.

KUHLIA TÆNIURA, Cuvier and Valenciennes.

Dules tæniurus, Cuvier and Valenciennes, Hist. Nat. Poiss., iii., 1829, p. 114.

We found the young of this little fish to be very common in all the rock pools of the island. It is very quick in its movements and difficult to catch with a hand net. The older fish are plentiful in the open waters and frequent the sandy shores in shoals. They take the hook readily and are known to the islanders under the appropriate name of "Flagtail."

APOGON NORFOLCENSIS, Ogilby.

Apogon norfolcensis, Ogilby, Proc. Linn. Soc. N.S. Wales, (2.), ii., 1868, p. 990.

The Big-eye is the commonest fish in the lagoon, and proves

³³ Regan—Ann. Mag. Nat. Hist., (7), x., 1902, p. 195.

³⁴ Goode and Bean—U.S. Nat. Mus., Sp. Bull., 2, Oceanic Ichth., 1895, p. 216, fig. 226.

³⁵ Jordan and Evermann—Bull. U.S. Nat. Mus. 47, i., 1896, p. 969, pl. cli., fig. 406.

³⁶ Lütken—Spolia Atlantica, Videns. Sel. Skr. xii., 1880, p. 118, pl. ii., fig. 9.

of great annoyance, taking the bait intended for larger fish. The water telescope revealed this species in great numbers, it was immediately distinguishable by a conspicuous white stripe in the upper half of the eye. This disappears in preserved examples and is thus not represented in my figure.³⁷ The pectoral fin is coloured red in a small proportion of specimens only.

APOGON CHRYSURUS, *Ogilby*.

Apogon chrysurus, Ogilby, Aust. Mus. Mem., ii., 1889, p. 54.

(Plate xx., fig. 2.)

This species was not obtained, and the original specimens are still the only ones known. The type example is here figured.

EPINEPHELUS RHYNCHOLEPIS, *Bleeker*.

Serranus rhyncholepis, Bleeker, Nat. Tijdschr. Ned. Ind., iii., 1852, p. 749.

While line fishing in the lagoon, we obtained a fish which, though stated to be extremely rare, was recognised by the islanders. It is to be identified with *E. rhyncholepis*, previously known only from Celebes and Timor. As originally described, the ground colour is uniform brown, each scale with a white (pale blue) spot. In a second and smaller example, since forwarded by Mrs. Nichols, the ground colour is pale brown with darker markings disposed as follows:—The fore part of the head is dark and an irregular bar passes from behind the eye to above the opercle and a broader one from beneath the eye obliquely backwards across the angle of the opercle, where a few irregular blotches also occur. The lower part of the head is dark, with three large white spots along each ramus of the lower jaw. The body bears five bars directed obliquely forward, the first immediately in front of the dorsal fin; this unites with the post-ocular band and is preceded by two large blotches on the occipital region. The second body band arises at the base of the iv-vi dorsal spines, passes behind the opercle and broadens below, there uniting with the third band which originates at the base of the last three dorsal spines. The next band is less regular, arises beneath the middle of the soft dorsal and ventrally extends from the vent to the end of the anal: the last band is across the caudal peduncle. The lower surface of the fish is generally dark coloured (owing to the width of the bands) the chest especially; there is a large black spot on the isthmus, preceded by one and followed by two paired large white spots, and one or two smaller

³⁷ Waite—Rec. Aust. Mus., iv., 1901, p. 41, pl. vi.

ones: there is also a large oblong spot on each side of the chest, a smaller one at the base of, and others below, the pectoral. The dorsal fin is formed with lobules as described, but is blotched in some agreement with the body bands; the soft dorsal has two rows of sub-marginal white spots and the anal has a yellow margin: the pectoral has a broad sub-basal and a narrow marginal brown bar; the ventrals are black; the caudal is also marked, two irregular bars being traceable.

The specimens measure 250 mm. and 200 mm. respectively.

EPINEPHELUS FASCIATUS, Forskal.

Perca fasciata, Forskal, Descr. Anim., 1775, p. 40.

Of this species, previously known from the island by a single example, we obtained two specimens on the line, the larger of which was in roe. When first taken from the water the body is a delicate salmon colour, and the transverse semi-bands are pink. The pectoral fin is lemon yellow, the ventral, soft dorsal and anal are orange, the two latter margined with white. The dark colour on the dorsal spines does not extend to the end of the membrane, the extreme tip being pink.

GENYOROGA BENGALENSIS, Bloch.

Holocentrus bengalensis, Bloch, Nat. aysl. Fische, iv., 1790, p. 102.

This species is represented by a single specimen, 225 mm. in length, obtained during operations at the wreck of the "Ovalau." It is known from Port Jackson but has not previously been received from the island.

LETHRINUS OPERCULARIS, Cuvier and Valenciennes.

Lethrinus opercularis, Cuvier and Valenciennes, Hist. Nat. Poiss., vi., 1830, p. 289.

This species is the Schnapper of the island and can always be obtained by lines in the deeper water. The Schnapper of the mainland *Pagrosomus auratus*, Forster,³⁸ is rare and is in fact almost unknown at Lord Howe Island.

³⁸ *Sparosomus*, Gill, (*Mem. Nat. Acad. Sci. Washington*, vi., 1893, p. 123) may be regarded as preoccupied by *Sparosoma*, Sauvage, 1883, and is duly noted in the "Zoological Record" (1893, p. 22.) *Pagrosoma*, Gill, defined on p. 98 of the above mentioned work and overlooked by its author on p. 123 has therefore precedence, but is omitted from the "Zoological Record." If however *Sparosomus* and *Sparosoma* are accounted distinct names, the former should be used for our fish in preference to *Pagrosoma* as I have already published it (*Aust. Mus. Mem.*, iv., 1899, p. 82).

Lethrinus opercularis is said to be common and much prized at Norfolk Island where it is called "The Oo-oo Trumpeter."

GIRELLA CYANEA, *Macleay*.

Girella cyanea, Macleay, Proc. Linn. Soc. N. S. Wales, v., 1881, p. 409.

(Plate xx., fig. 3.)

The Blue-fish is the staple food fish of the island and is generally caught with hand lines off the rocks; a shoal of perhaps fifty individuals or more may be seen in a deep gulch, the colour of those in the deeper water appearing of the most intense blue, while those near the surface or just drawn from the water are the colour of the sky, but the beautiful tint fades before the fish is dead. The young abound in all the rock pools but all are dusky in colour, the characteristic blue not appearing until the fish is five or six inches in length. The Blue-fish is a good species for smoking and curing, and recent consignments realised twenty-eight shillings net per hundredweight in the Sydney market.

The inhabitants told me of some large yellow fishes occasionally seen and named Guinea-fish. One specimen only is known to have been taken, with crab for bait. This may be a variety of the Blue-fish, but I have at present no means of knowing.

This species has not been previously figured.

CÆSIOSOMA ÆQUIPINNIS, *Richardson*.

Scorpiæ æquipinnis, Richardson, Voy. "Ereb. and Terr.," Fish., 1848, p. 121.

The Sweep of New South Wales is known as the Hard-bellied Blue Fish on the island, and its colouration is even more striking than that of *Girella cyanea* owing to its being of a lighter and brighter hue. It is very common and easily caught.

CIRRHITICHTHYS SPLENDENS, *Ogilby*.

Cirrhitichthys splendens, Ogilby, Aust. Mus. Mem., ii., 1889, p. 58, pl. ii.

We brought away two examples of this marvellously arrayed fish, caught among rocks with hook and line. Though we may, at different times, have received a dozen examples from the island, it is accounted rare, and scarcely known to the colonists.

APLODACTYLUS ETHERIDGII, *Ogilby*.

Haplodactylus etheridgii, Ogilby, Aust. Mus. Mem., ii., 1889, p. 57.

(Plate xxi)

Two or three specimens only have been received since the

species was first described. We obtained a nice example in a poisoned rock-pool and from this the accompanying illustration is prepared (See Note, p. 186).

AMPHIPRION MELANOPUS, *Bleeker*.

Amphiprion melanopus, Bleeker, Nat. Tijdschr. Ned. Ind., iii., 1852 (Amboina ii.), p. 561.

Among numerous other fishes, a large rock-pool contained several examples of an *Amphiprion*. These were extremely conspicuous, being apparently of deep black colour with pure white tail. On obtaining specimens this was indeed seen to be the case, one example only showing a limited streak on the opercle, not nearly so extensive as figured by Bleeker.³⁹ This species has been already recorded from the island and I have examined the specimens thus identified; they absolutely agree with those since obtained.

POMACENTRUS FASCIOLATUS, *Ogilby*.

Pomacentrus nigricans, Quoy and Gaimard, Voy. "Uranie," Zool., 1825, p. 399 (not *Holocentrus nigricans*, Lacépède).

Pomacentrus fasciolatus, Ogilby, Aust. Mus. Mem., ii., 1889, p. 64.

Eupomacentrus marginatus, Jenkins, Bull. U.S. Fish Comm., xix., 1901, (1899,) p. 391, fig. 5.

The author of the name indicated the similarity of the species to *P. scolopseus* (*P. scolopsis*) Quoy and Gaimard, but remarked upon the constancy in the number of dorsal spines as constituting specific distinction. The identity of the Lord Howe Island examples with *P. nigricans*, Quoy and Gaimard, is here suggested, the name being, however, preoccupied by Lacépède. Jenkins has also identified specimens from Honolulu, with *P. nigricans* and if my conclusions are correct the name *E. marginatus* must be sunk in favour of the prior *P. fasciolatus*. The respective descriptions do not differ materially: the length of the head in that of the body is given as 4.50 to 4.75 in *P. fasciolatus*, the caudal being included. In *E. marginatus* it is rendered as 2.66 exclusive of the caudal; this is obviously a misprint, possibly for 3.66 the illustration exhibiting the latter proportion.

The invariable number of dorsal spines is thirteen, and over fifty examples have been examined.

Many young of this species have the membrane of the first six dorsal spines tipped with orange, a most conspicuous feature during life; nearly all the young possess a large black spot on the ii-vi dorsal spines, but in none have I seen a spot on the rays.

³⁹ Bleeker—Atl. Ichth., ix., 1877, pl. cccci., fig. 7.

The teeth being in a single series dissociates the species from typical members of *Pomacentrus*, while the incompletely scaled snout and lower jaw seem to indicate affinity with *Amblypomacentrus*, Bleeker, which is possibly synonymous with *Parapomacentrus*, Bleeker, into which *Eupomacentrus*, Bleeker, may also have to be merged.

This, the only "*Pomacentrus*" recorded from the island, is the commonest member of the family met with, and was found in great numbers in every suitable rock-pool.

PARMA POLYLEPIS, Günther.

Parma polylepis, Günther, Brit. Mus. Cat. Fish., iv., 1862, p. 59.

(Plate xxii.)

I use the name *Parma*, Günther, on the supposition that its members are generically distinct from the type of *Hypposypops*, Gill. The latter genus was instituted in 1861 for *Glyphisodon rubicundus*, Girard, but in 1862, Günther proposed the new name *Parma* and placed *G. rubicundus* in the genus, although already assigned by Gill to *Hypposypops*. The reasons for so doing are expressed as follows:—"This genus (*Hypposypops*) is founded on characters entirely different from those of *Parma*, and its limits agree so little with those of the latter, that it would cause only confusion if I were to adopt the name."

The Sailor Fish is common in all the rock-pools, adult examples frequenting the larger and deeper pools and hiding beneath the overhanging ledges.

Ogilby⁴⁰ describes it as being a variable species in colouration. Of a large number of specimens examined the variations detected are due to age. In the young the snout is somewhat pointed and the head is without rugosities. As age advances the snout becomes more and more vertical until, in old specimens, the profile is little removed from the perpendicular, the snout is then very rugose roughly forming two low vertical ridges which terminate above the level of the eyes, each in a rugose boss; a similar but larger pair of bosses is developed at the upper anterior angle of each eye.

The colouration in the young (of 35 mm.) is a creamy ground with three vertical cross bands; the first from the occiput and first dorsal spine, to the base of the pectoral; the second across the middle of the body, and the third from the viii-xiii dorsal spines to the anal, fading towards the tail. A dark line, blue in life, arises on each side of the snout, and passes above the eye to the first dorsal spine; another from the upper hinder angle of

⁴⁰ Ogilby—Aust. Mus. Mem., ii., 1889, p. 66.

the eye to the origin of the lateral line, and another below the eye, breaking into spots on the opercles. A jet black spot as large as the eye and surrounded by a blue line occurs at the base of the four last dorsal spines, encroaching on the body as far as the lateral line. The fins are dusky, the first, and elongate ventral ray, black. In larger examples (of 90 mm.) the ground colour becomes darker and the bands intensified, the lines on the head have disappeared though the black spot on the dorsal fin is still apparent. An indication of the bosses in front of the eyes is discernable. In adult specimens (250 mm.) the ground colour becomes so dark as to render the cross bands and black spot almost indistinguishable: the fins are correspondingly darkened, the colour of the whole fish appearing a nearly uniform brownish-black. In some cases the head and fore part of the body remain yellowish-brown.

GLYPHISODON SAXATILIS, *Linnaeus*.

Chatodon saxatilis, Linnaeus, Syst. Nat. (ed. x.), 1758, p. 276.

Once only was this species met with; in a rock-pool at Middle Beach we encountered a shoal of small individuals some of which were secured. They measure but 20 mm. in length and when alive were of vivid green colour: in some the tail is of uniform tint, in others the upper and lower rays are brown. All have the characteristic five cross bands. The species has been recorded under the name *Glyphidodon celestinus*, Cuvier and Valenciennes.

GLYPHISODON POLYACANTHUS, *Ogilby*.

Glyphidodon polyacanthus, Ogilby, Aust. Mus. Mem., ii., 1889, p. 65.

(Plate xxiii., fig. 1.)

Both young and adult examples were freely obtained in rock-pools, the former being perhaps one of the most strikingly coloured fishes met with. When alive the ground colour is brilliant orange and the naso-dorsal blue line is very broad, as is also that surrounding the dorsal ocellus; these lines narrow with age, become broken into dots and finally disappear, while the ground colour turns uniformly dark brown. The figure represents a half-grown individual.

GLYPHISODON ANTJERIUS, *Cuvier and Valenciennes*.

Glyphisodon antjerius, Cuvier and Valenciennes, Hist. Nat. Poiss., v., 1830, p. 481.

In recording *G. brownriggii*, Bennett, from the island in 1894,⁴¹

⁴¹ Waite—Proc. Linn. Soc. N.S. Wales, (2), ix., 1894, p. 219.

I followed Bleeker, Günther, and Day in regarding this species and *G. antjerius* as synonymous. I now prefer to recognise them as distinct, and assign the island form to the latter species, characterised by having only one dorsal ocellus, and that situated at the base of the posterior dorsal spines. This species differs from *G. polyacanthus*, Ogilby, by having the normal number of thirteen dorsal spines.

From a study, in conjunction with Mr. McCulloch, of many members of the family, received mainly from the New Hebrides, I cannot subscribe to Day's statement⁴² that colour variations "are not merely due to age." Further needful investigation into the genus *Glyphisodon* will probably show that many of the so-called varieties of *G. brownriggii* are in reality valid species, undergoing changes with age, but otherwise constant.

Cuvier and Valenciennes' short description was based only upon a drawing sent from Java by Kuhl and Von Hasselt, to whom they credit the specific name. It may be noted that the radial formula is not given and subsequent writers have apparently considered it to be the same as in *G. brownriggii*. If I am correct in assigning our examples to *G. antjerius*, the species is certainly distinct. They yield the following characters:—

D. xiii. 9; A. ii. 15; V. i. 5; P. 22; C. 15.

and have thus nine more dorsal rays than counted by Bennett, or six more than rendered by other writers.

THALASSOMA TRILOBATUM, Lacépède.

Labrus trilobatus, Lacépède, Hist. Nat. Poiss., iii., 1802, p. 454.

Julis umbrostygma, Rüppell, Neue Wirbelt., Fische, 1837, p. 11, pl. iii., fig. 2.

An examination of the nice series collected, enables me to identify Rüppell's species as a younger stage of *T. trilobatum*. To the already long synonymy, *T. berendti*, Seale,⁴³ from Honolulu, should be added. In small specimens the longitudinal colour lines appear only as clusters of dark vertical marks, there being six clusters in each row, of which there are three; one at the base of the dorsal, one along the centre of the body, and a third from the base of the pectoral to the lower part of the tail. The dorsal and anal fins each bear three bands, one basal, one median and one marginal, the marginal bands disappear with age and the median one becomes

⁴² Day—Fishes India, 1877, p. 387.

⁴³ Seale—Occ. Papers Bernice Pauahi Bishop Mus., i., 1901, p. 15, fig. 7.

sub-marginal. The opercular lines are not at first apparent, and when developed are not so wide as they ultimately become. The tail is, in the younger stages, rounded, and assumes a truncate shape before reaching the trilobed condition of the adult.

The behaviour of this fish renders it liable to be caught by hand. The reefs at the northern and southern extremities of the lagoon are very even and level, and are consequently quickly exposed and covered at the ebb and flow of the tide. So loth does the fish seem to leave the reef, that it becomes half exposed by the receding tide, and then exhibits much commotion when disturbed. As we waded along the reef every few steps was marked by the floundering action and subsequent rush of one of these fishes. They are also among the first fishes to appear with the incoming tide. Numbers remain in the larger pools between tide marks, while on the eastern side of the island we obtained young examples in the rock-pools.

CORIS PICTA, Bloch and Schneider.

Labrus pictus, Bloch and Schneider, Syst. Ichth., 1801, p. 251, pl. lv.

The water telescope showed this beautiful fish to be common immediately outside the reef, where, by dropping a bait, a dozen would be in view within a few minutes.

ANAMPSES DIADEMATUS, Rüppell.

Anampses diadematus, Rüppell, Neue Wirbelt., Fische, 1835, p. 21, pl. vi., fig. 3.

With this species I associate an example obtained while wading on the South Reef. When alive it was of dark green colour, with vertical pearl-coloured marks on each scale. It bears the characteristic blue lines on the head but the interocular band is absent, in which respect it agrees with Günther's figure "A."⁴⁴ The specimen measures 270 mm. in length, and constitutes a record for the island.

ANAMPSES ELEGANS, Ogilby.

Anampses elegans, Ogilby, Aust. Mus. Mem., ii., 1889, p. 67.

Anampses variolatus, Ogilby, *loc. cit.*

In our examples, of which we have two, preserved in formaline, the ground colour is green with the upper half of the head and body darker and greyer; a deep grey band passes across the front of the snout and through the eye on to the oper-

⁴⁴ Günther—Fische Südsee, vii., 1881, pl. cxxxix.

culum, where it descends and forms a large blotch of purplish hue; rather widely spaced dark-green spots occur on the upper part of the head and opercle and behind the eye. Scales on the body with longitudinal lines, fainter, but distinct, on the lower parts, a blue spot on each scale. Both dorsal and anal fins spotted with green, each with a black yellow-edged spot at the base of the hinder rays; the caudal is yellow with green markings and a clear margin; the pectoral is yellow basally, otherwise colourless, it has a blue line across the muscular base. In the smaller example the markings on the upper part of the back form transverse bands and in this specimen only, is an anal spot present: both the spots and bands are possibly indications of immaturity. I have examined the type specimens and in the smaller examples can still see indications of the spot on the dorsal fin. Though much colour has now disappeared from the type of *A. variolatus*, of the same author, I regard it as a younger stage of the same species, the rows of scales though rendered as 4/10 and 6/11 respectively do not differ in number, the first-named figures being correct.

PACHYNATHUS CAPISTRATUS, *Shaw*.

Balistes capistratus, Shaw, Gen. Zool., v., 1804, p. 417.

I previously identified this species from the island from the examination of an old and discoloured specimen. In the consignment just received from Mrs. Nichols, I am pleased to find a large and well preserved example. It was obtained by dynamite, exploded at the wreckage of the "Ovalau."

In "Nature" (10th Dec., 1903, p. 126), Prof. W. A. Herdman reports that Mr. James Hornell has discovered that a species of *Balistes* is a host of the endoparasitic worm, the larva of which is the nucleus of the pearl of the Cingalese oyster. The final host of the worm is *Trygon (Dasyatis)* which feeds upon *Balistes*.

PSEUDOMONACANTHUS ANALIS, *sp. nov.*

(Fig. 32.)

D. ii. 34; A. 31; P. 12; C. 12.

Length of head 3.5, height of body at the vent 2.7, length of caudal 4.5 in the total. The eye is moderate, 3.3 in the length of the head and less than the interorbital space: it lies midway between the dorsal rays and the snout.

The gill opening is oblique, placed under the anterior half of the eye; it is longer than the eye and is separated therefrom by a space less than an eye-diameter. The nostrils are close together, separated from the eye by a third of its diameter: they are simple pores with skinny margins.

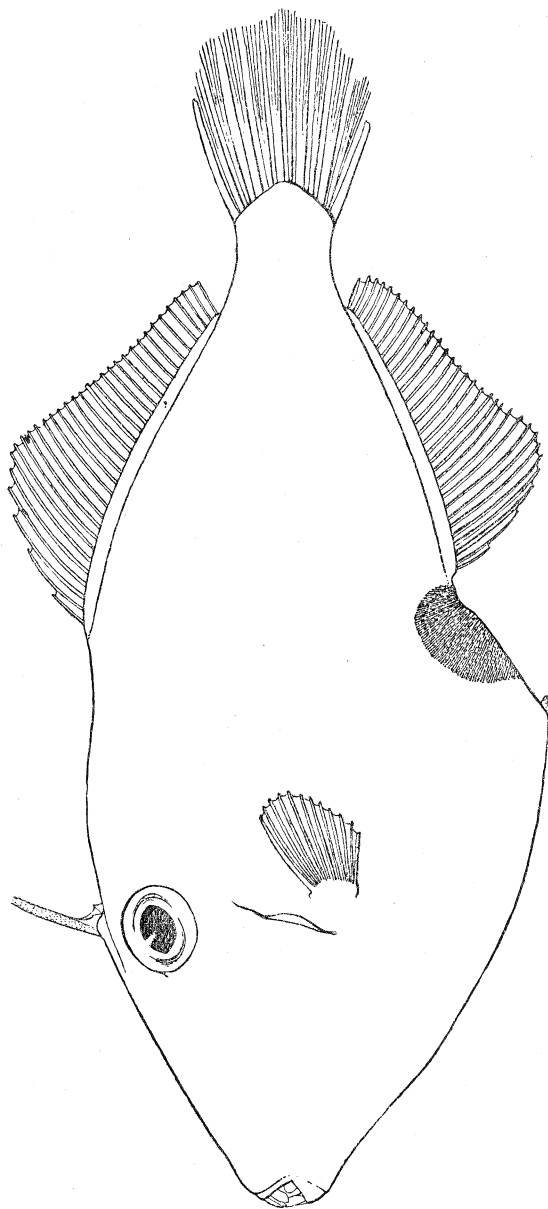


Fig. 32.—*Pseudomonacanthus analis*, Waite. Three-fourths natural size.

Head deeper than long, its upper profile scarcely convex, as is also its continuation to the dorsal rays. The body is elongate, strongly compressed and the ventral process is not greatly extensible. The dorsal spine is without barbs and is broken, it stands above the middle of the eye and midway between the end of the snout and the soft dorsal fin: the rays are similar to those of the anal, they commence in advance of that fin. The vertical from the ventral process lies nearer to the dorsal rays than to the spine. The ventral spine is simply roughened without distinct points. The pectoral is inserted in advance of the hinder edge of the eye. The caudal is short and rounded, the peduncle bears neither spines nor bristles, and its height is rather more than the diameter of the eye.

Skin everywhere rough, with distinct scales, each bearing a number of fine points on its edge.

Colours.—Head and body umber brown, end of snout blackish; a large black well-defined area surrounds the vent. All the fins blue, the pectoral and caudal intensely and uniformly so.

Total length 220 mm.

Since writing the above, I have received from Mr. C. T. Regan, his paper on the classification of the Plectognathi, wherein he describes a species from Melbourne, under the name *P. degeni*,⁴⁵ which is closely allied to *Pseudomonacanthus modestus*, Günther, *P. ayraudi*, Günther, and *P. septentrionalis*, Günther, but differs from all by the absence of barbs on the dorsal spine.

SEBASTOPSIS GUAMENSIS, *Quoy and Gaimard*.

Scorpcena guamensis, Quoy and Gaimard, Voy. "Uranie," Zool., 1824 p. 326.

One example was taken of this species, not previously known from the island, it measures 107 mm. in length. *Sebastes scaber*, Ramsay and Ogilby,⁴⁶ also belongs to the genus *Sebastopsis* and is a species distinct from *S. guamensis*.

COCOTROPUS ALTIPINNIS, *Waite*.

Cocotropus altipinnis, Waite, Rec. Aust. Mus., v., 1903, p. 41, pl. v., fig. 2.

At the time of writing upon *Cocotropus*, I had not seen the works of Klunzinger,⁴⁷ nor of Kossmann and Räuber,⁴⁸ both of

⁴⁵ Regan—Proc. Zool. Soc., 1902, p. 299, pl. xxiv., fig. 1.

⁴⁶ Ramsay and Ogilby.—Proc. Linn. Soc. N.S. Wales, x., 1886, p. 577.

⁴⁷ Klunzinger—Fische roth. Meer., i., 1884, p. 74

⁴⁸ Kossmann and Räuber—Reise roth. Meer., Fische., 1876, p. 395, pl. ii., fig. 6.

which have since become available. The author first-named places *Tetraroge gallus*, Kossmann and Räuber, in the genus *Cocotropus*; the species is not included in my synopsis of the species, and I therefore furnish the following points for comparison, as deduced from the authors' description.

Cocotropus gallus, Kossmann and Räuber.

D. xiii. 9; A. ii. 6.

Length of head 3, height of body 3.8. Dorsal fin commences over middle of eye. Second spine longest, 1.25 in height of body? (plate ii. is absent in my copy).

Hab.—Red Sea.

GOBIUS ÆOLOSONA, *Ogilby*.

Gobius æolosoma, Ogilby, Aust. Mus. Mem., ii., 1889, p. 61.

(Plate xxiii., fig. 2.)

This goby was found to be quite common in the rock-pools, and was the only member of the genus taken. The largest examples measure 72 mm. in length. With a good series in hand, it is possible to augment the original description somewhat.

D. vi. i. 9-10; A. i. 8; V. i. 5; P. 18-20.

The snout is a little shorter than the eye. The pectoral fin is shorter than the head and has the upper three to five rays split to their bases and "silk-like." The ventrals vary in length, reaching to the vent in their greatest development. In the male the anal papilla is pointed, in the female slightly bifid. Though the middle rays of the caudal are the longest they are not sufficiently produced to give a wedge-shaped contour to the fin as described.

Examples taken were in full breeding condition, the eggs being bright orange in colour. A male is selected for the accompanying illustration.

ALLOGOBIUS, *gen. nov.*

Family GOBIIDÆ.

Body oblong and compressed with large imbricate minutely ctenoid scales. Head large, broad, and slightly compressed, naked, without barbels. Eyes large, anterior, not approximate, opercles unarmed. Mouth oblique, rather large. A row of conical teeth in both jaws with canines. A large patch of canines within the symphysis of the lower jaw. Tongue entire. Branchiostegals five. Gill opening small, lateral, the membranes broadly attached to the isthmus. Dorsal fin with six plus one

slender spines and about ten rays. Anal short. Ventral fins not united, with one spine and four separate rays. Pectoral without free rays. Caudal fin rounded. Skull without distinct median keel. Vertebrae $10 + 15 = 25$.

This genus differs from the typical members of the family by having but four ventral rays.

From those with the same character, namely, *Oxymetopon*, *Trypauchen* and their allies, it may be distinguished by the short vertical fins and the smaller number of vertebrae.

ALLOGOBIUS VIRIDIS, *sp. nov.*

(Plate xxiii., fig. 3)

B. v; D. vi i. 10; A. i. 8; V. i. 4; P. 17-18; C. 13; Sc. 25; Sc. tr. 8.

The head is large, slightly compressed, and 3.7 in the total length. The height of the body is 4.4 in the same, and equal to the length of the caudal. Eyes large, anterior, lateral, one-third of a diameter apart; they just attain the profile of the head and are one-fourth its length. Snout obtuse equal to two-thirds the diameter of the eye. Body oblong, compressed, covered with large minutely ctenoid scales, with the exception of the portions in front of the dorsal and ventral fins. Head naked.

The first dorsal spine is filamentous in the male, of twice and a third the length of the second which is 1.7 in that of the head; the remaining spines successively decrease and the membrane of the last reaches the origin of the second fin. The soft dorsal is higher posteriorly, the ninth ray being equal to the second spine. The anal arises beneath the second dorsal ray and the last ray is beneath the penultimate ray of the dorsal. The ventrals are well separated, the inner rays longest and more than the height of the body, reaching the vent: they are unconnected and feather-like, the vanes being developed only on the anterior aspect of each ray. The pectorals are pointed. The nine upper rays are simple, the first divided ray is the longest, being slightly longer or shorter than the head, and attaining to about the first dorsal ray. The caudal fin is rounded. The peduncle is deep and strongly compressed, its depth less than its length.

The anal papilla, in the male, forms an incomplete cup, open in front, its margins extremely digitate; in the female it is simpler, conical in shape, with two digitate processes only.

Colours.—The ground tint is green, the body crossed with seven somewhat darker bands less than an eye-diameter in width: the anterior band commences at the first dorsal spine, the second between the fifth and sixth, two below the second dorsal, and three on the caudal peduncle, the last of which bears

a large black spot: the five last bands are darkest beneath. The head markings are brown, bright red in life, and consist of large spots extending over the whole head, smaller on the snout and below, and forming bars across the occiput. The first dorsal is dusky, especially towards the margin, the second dorsal and caudal bear brown spots which on the latter tend to form bars, the colouration of the fins however is subject to variation. Most of the scales bear a vertical row of small brown spots.

Length, 40 mm.

This small species was very common in the rock-pools and in breeding condition when obtained. The eggs are large and green in colour.

LIMNICHTHYS, gen. nov.

Family TRICHONOTIDÆ.

Head depressed, pointed, body sub-cylindrical anteriorly, tail compressed, cleft of mouth wide, nearly horizontal, jaws equal; eyes directed upwards; scales moderate, cycloid, lateral line continuous. One dorsal fin shorter than the anal; ventrals jugular with one spine and five rays, the rays of all the fins, the caudal excepted, are simple. Gill openings very wide. Branchiostegals seven. Villiform teeth in the jaws and on the palatines. None on the vomer. Vertebrae 13 + 27 = 40.

This genus is sufficiently distinguished from other members of the family by the dorsal fin being inserted behind the origin of the anal. In *Creedia*, which should perhaps also be referred to the family, the dorsal fin is short and situated above the middle of the anal, the lateral line is ventral in position and of peculiar formation.

LIMNICHTHYS FASCIATUS, sp. nov.

(Plate xxiii., fig. 4.)

B. vii; D. 25-26; A. 27-29; V. i. 5; P. 13; C. 12 + 4; L. lat. 40; L. tr. 3 + 5.

The head is depressed and triangular, 4·8; height of the body, at the first anal ray, 7·2; and the caudal 5·0 in the length of the body. Eyes half a diameter apart, directed upwards, interrupting the profile of the head, 5·5 in its length, and equal to that of the snout: anterior nostril in a tube near the end of the snout, posterior nostril simple, close in front of the eye. The upper lip is pointed and produced into a skinny process nearly as long as the eye (illustrated in the figure.)

Body elongate, subcylindrical in front, passing into the compressed tail. Head naked; body with rather large adherent cycloid scales, lateral line sub-median in position, but running

posteriorly lower on the body; it is very conspicuous, and each scale, to the thirteenth, has an entire margin and bears a large simple tube, thence the free margin of each scale is trilobed, the centre lobe being much longer than the lateral ones.

The dorsal fin arises its own length behind the tip of the snout, and extends nearly to the base of the caudal. The first ray is one-third longer than the diameter of the eye and the following successively increase in length to the seventh, which is half the length of the head. Thence they gradually decrease in length, the last being once and a half the diameter of the eye. The anal fin arises three rays in advance of the dorsal, and extends a little further backward, it is similar to the dorsal, though its posterior rays are longer. The ventrals are short and are inserted in advance of the pectorals; the latter are pointed and do not reach to the first anal ray; the caudal is rounded, its peduncle less than half the height of the body; the rays are divided, those of all the other fins simple.

Colours.—Ground colour creamy with black markings, a black band connects the eyes and passes towards the angle of the mouth, though this is sometimes absent. The body bears eight transverse bars; they are placed at equal intervals, the first is above the opercle, the last at the base of the caudal: the four anterior bands are broadened above and form each a triangular figure, the following bands are widened below and, uniting, produce a broad longitudinal line which constitutes the most striking colour feature of the fish. Fins colourless.

Length, 43 mm.

Though small, our examples are fully adult many being in full roe, the ova are large and of yellow colour.

These little fishes are common in the rock-pools, but owing to their secretive habits were not observed until driven from their retreats by poison.

DIPLOCREPIS COSTATUS, *Ogilby*.

Diplocrepis costatus, *Ogilby*, Proc. Linn. Soc. N. S. Wales, x., 1885, p. 270.

(Plate xxiv., fig. 1.)

Two examples of this species were originally recorded from New South Wales and other two were subsequently recognised from Lord Howe Island. By means of poison we collected a nice series from the rock-pools, and at the time noted that they were of brown colour with darker cross markings on the dorsal surface. All markings have disappeared under preservation of the specimens, so that I am unable to describe the ornamentation.

The accompanying illustration represents the type specimen much enlarged.

LEPADICHTHYS, gen. nov.

Family GOBIESOCIDÆ.

Head moderately broad and depressed; body, anteriorly slightly depressed, posteriorly deep and strongly compressed, naked; opercle without apparent spine. Gills, three. Gill membranes united and attached to the isthmus. Incisor teeth in both jaws in a single series, no teeth on the vomer or palatines. Sucking disc of moderate size, the posterior portion without free margin. Dorsal and anal fins long, the former with about sixteen, the latter with about thirteen rays. Vertebrae $14 + 20 = 34$.

Of the two main divisions of the family, founded on the character of the sucking disc, this new genus agrees with *Gobiesox* and its allies, rather than with the *Lepadogaster* group. Fundamentally it more nearly approaches the latter, the number of vertebrae being identical. The long vertical fins are also well in agreement, but the gills are fewer in number. It differs from *Gobiesox* by having the gill membranes attached to the isthmus, and also from other genera of the group by its longer vertical fins.

LEPADICHTHYS FRENATUS, sp. nov.

(Plate xxiv., fig. 2.)

D. 16; A. 13; P. 29; V. i. 4; C. $17 + 8 = 10$.

Length of head 3.4, width 5.6; height of body 6.5, width 6.8 in the total length. The snout is broad and depressed 3.4 in the length of the head; the mouth is small and terminal, its cleft less than two-thirds the distance from the tip of the snout to the eye. Teeth in the jaws very small, in a single series, closely set and incisor-like, with entire edges. A velum behind the teeth in both jaws, broader in the lower jaw. The nostrils on each side are close together at the upper anterior angle of the orbit. The eye is longer than deep, 5.4 in the length of the head and equal to the interocular space, which is quite flat.

Adhesive apparatus longer than broad, its length equal to the width of the head.

The length of the dorsal is equal to that of the head, and its point of origin to the front edge of the eye is twice its length. The anal commences beneath the fifth dorsal ray and terminates in the same vertical; both fins are higher behind than in front, and are attached to the base of the caudal rays.

Pectorals broad and rounded, nearly half the length of the head and without distinct fold at the base. The ventrals are

attached to the eighteenth pectoral rays. Vent midway between the posterior edge of the sucking disc and the first anal ray. Anal papilla small. Caudal rounded, its length half that of the head, the pedicle very strongly compressed, its depth more than half the length of the caudal.

Colours.—When preserved the general colour is pinkish yellow. The edge of the upper lip is bright scarlet, the colour continued as a streak which passes backward through the eye, towards the upper margin of the opercle. Fins colourless.

We possess two examples which measure 53 mm. and 52·3 mm. respectively in length.

PETROSCIRTES ICELII, *Ogilby.*

Petroscirtes icelii, Ogilby, Proc. Linn. Soc. N. S. Wales, (2), ix., 1894, p. 370.

(Plate xxiv., fig. 3.)

One example only of this species was taken. When first discovered it was basking on a rock, quite out of the water, but hopped into a rock-pool on our nearer approach. Members of the genus *Salarias* indulged in a similar habit. Of these we obtained the following three species:—*S. alboapicalis*, Ogilby; *S. marmoratus*, Bennett; and *S. quadricornis*, Cuvier and Valenciennes, all previously known from the island.

PETRAITES ROSEUS, Günther.

Cristiceps roseus, Günther, Cat. Fish. Brit. Mus., iii., 1861, p. 274.

In the Australian Museum Memoir on Lord Howe Island, Ogilby⁴⁹ tentatively identified "a small *Cristiceps* in bad condition" with *C. roseus*. We obtained three examples of that species. They were taken in rock-pools and when alive were of green colour with darker markings; after preservation in formaline the colour became orange, and it may be noted that most of the species known are described as of yellowish or reddish hues, and several names applied, have such significance notably:—*C. aurantiacus*, *C. roseus*, *C. splendens*, *C. pallidus*. Judging by the Lord Howe Island examples and the number of species of *Cristiceps*, etc., with which I am acquainted in New South Wales waters, I should say that green is the life colour of nearly all. These little fishes habitually live in the green ulvæ of our coasts and bays, and may be readily obtained by means of a sweep net. So characteristic are they of the seaweed that they are known to boys as "weed-fishes."

⁴⁹ Ogilby—Aust. Mus. Mem., ii., 1889, p. 63.

TRIPTYERYGION NIGRIPENNE, *Cuvier and Valenciennes.*

Triptyerygion nigripenne, Cuvier and Valenciennes, Hist. Nat. Poiss., xi., 1836, p. 413, pl. cccxxxix.

I provisionally associate with this species two examples, the larger of which measures 56 mm. in length. The radial formula is:—

D. iv. xv. 11-12; A. i. 21; V. 2; P. 16-17; C. 13;

and is thus noticeably different from the original description. Hutton⁵⁰ remarks that in his opinion *T. forsteri*, *T. fenestratum*, and *T. varium* are only accidental varieties of *T. nigripenne*, in which case our examples may be justly included. In some respects they nearly approach *T. medium*, but differ from that species by having a large orbital tentacle, though this is possibly a doubtful specific character.

In the absence of New Zealand examples for comparison, I am unable to offer any opinion on the validity of the various described species.

TRIPTYERYGION RUFOPILEUM, *sp. nov.*

(Plate xxiv., fig. 4.)

D. iii. xii.-xiii. 10-11; A. 18-20; P. 15-17; V. 2; C. 13; L. lat. 17-18 + 19; L. tr. 3 + 7.

Length of head 3.7, height of body 4.1, length of caudal 4.8 in the total. Diameter of eye 3.2 in the head and slightly more than the length of the snout. Head a little depressed, body subcylindrical, deepest at origin of the second dorsal; eyes close together, directed obliquely upwards; upper jaw a little the longer, teeth small, in bands in the jaws and on the vomer. A bifurcate tentacle on the anterior nostril, and a simple one above the hinder part of the eye.

Head, throat and lower part of body as far as the origin of the anal fin, naked. All the scales minutely ctenoid. The lateral line extends to below the second dorsal, whence two rows lower it *apparently* reaches to the base of the caudal: the lower row is without tubes and the effect of a line is produced by a deep and narrow notch in each scale.

The spines of the first dorsal fin are graduated, the first being longest and 2.4 in the length of the head, the anterior portion of the second dorsal is higher than the preceding fin, the first spine being a little shorter than the second and longest, which is a trifle longer than half the length of the head; the remaining spines decrease gradually to the ninth, thence suddenly. The

⁵⁰ Hutton—Trans. N.Z. Inst., v., 1873, p. 263.

rays of the third dorsal are graduated, the first and longest being a fifth more than the first spine of the anterior fin.

The anal rays successively increase in length to the second last, which equals the first spine of the dorsal fin. The membrane of the first dorsal is slightly and of the anal deeply incised. Pectoral pointed, the tenth ray is the longest and less than its distance from the snout, it extends to the base of the seventh anal ray, the seven or eight lowermost rays are simple and have their tips free and thickened. The ventral rays are united for one-fourth their length, the inner is the longer and less than the height of the body. Caudal rounded, the rays bifurcated only.

Colours.—The general ground colour is yellow, reddish or brownish, body markings being invariably present in the form of more or less regularly transverse bands, eleven in number: one at the base of the first dorsal fin, another between the bases of the first and second fin, three below the second dorsal, one between the second and third fin, three below the third dorsal, and two on the caudal peduncle. These markings, in examples with light ground colour, are more pronounced dorsally, in dark varieties they are darker and broader below.

With the exception of a scarlet patch on the occiput, which is always present, the head may be with or without markings, such consist of a jet black area which embraces the snout, throat, lower part of the opercles and base of the pectoral fin; the hinder part of the upper and the whole of the lower lip are colourless, an iridescent blue spot on the preopercle. The spinous dorsals are margined with black and have also a broad sub-basal black line. In pale examples the other fins are colourless: in the dark varieties, that is, those with ventral markings, the dorsal fins are colourless, while the anal and caudal are deep black, the latter with or without a white margin. The dark patch at the base of the pectoral extends somewhat on to the rays.

Length 42 mm. Over one hundred examples collected.

These little fishes swarmed in every rock-pool, and it was observed that the colouration is correlated to their surroundings. Examples taken in the coral rock are of reddish hue, those from sandy bottoms yellow, while the specimens obtained in the dark volcanic troughs are the dark variety above referred to. It is especially interesting to note that in these the ventral surface is quite dark in colour, whereas the upper surface is light, markings on the dorsal fin even being absent. So constantly were

these correlated peculiarities noted that the establishment of well marked varieties becomes a certainty.

This fact supports the remarks as to the non-roving habit of rock-pool fishes mentioned in the introductory paragraph.

They spend their lives and breed in the pool in which they find themselves, and when stormy waters rush through, they cling to the rocky walls of their home. Occasional examples may be swept into other pools, the species being thus dispersed and varieties produced and propagated by change of environment.

The species above described has been identified with *T. atrogulare*, Günther,⁴⁸ known from a single specimen taken at Bowen, Queensland. As far as one may judge from the short description, it differs from Günther's species by constantly having an increased number of both dorsal and anal rays and also in the persistent body markings. The dark ornamentation of the head is a feature found in other members of the genus, the type *T. nasus*, Cuvier and Valenciennes, included. This colour peculiarity has not been noted in *T. theostoma*, Jordan and Snyder,⁴⁹ recently described from Japan and to which our species bears considerable resemblance.

ACANTHOCLINUS LITOREUS, Forster.

Blennius litoreus, Forster in Bloch and Schneider, Syst. Ichth., 1801, p. 177.

Acanthoclinus fasciolatus, Ogilby, Aust. Mus. Mem., ii., 1889, p. 63, pl. iii., fig. 3.

A small, though interesting collection of this species was made from rock-pools, the individuals of which exhibit considerable variation.

The following appear to be constant characters, a white stripe from the upper lip along the middle of the head to the origin of the dorsal fin; a round black spot, as large as the eye, on the upper angle of the operculum; the tips of the dorsal and anal spines white. In examples in which the body is wholly dark-brown there is a white or grey streak from the upper lip, to below the eye and opercular spot. In other specimens the body is of lighter hue and the eye and opercular spot are connected by a narrow black line, below this, the whole

⁴⁸ Günther—Journ. Mus. Godeffroy, i., 1873, p. 267.

⁴⁹ Jordan & Snyder—Proc. U.S. Nat. Mus., xxv., 1902, p. 444, fig. 1.

head, with the exception of the tip of the lower jaw, is white, which colour also extends to the base of and includes the pectoral fin, throat and chest. The banded variety (*A. fasciolatus*) is in every way similar to this, with the exception that the body is marked with twelve or more narrow vertical black bars, which do not however quite attain to the dorsal and ventral profiles. With the exceptions above mentioned all the fins are black in every variety.

The largest example measures 55 mm. in length. None exhibit signs of breeding.

DINEMATICHTHYS LONGIFILIS, Ogilby.

Diancistrus longifilis, Ogilby, Proc. Linn. Soc. N. S. Wales, xxiii., 1899, p. 744.

(Plate xxiv., fig. 5.)

The type of this species, the only example known, is in the Queensland Museum and was lent to me, for the purpose of illustration, by the Curator on the application of Mr. Ogilby.

The scales are described as cycloid, striated and deciduous; the few remaining on the body are indicated in the figure. No mention is made, in the original description, of a maxillary spine present on the inferior aspect, in advance of the angle; and the dorsal and anal rays are said to be simple; the rays of all the fins, with the exception of the ventrals, are certainly bifid, the latter are composed each of a single ray which is enclosed in a membrane for its proximal half. The author has erroneously interpreted the condition as:—"Each (ventral) developed as a long filament of two distally coalescent rays." The "strong dentition" is therefore the only feature distinguishing *Diancistrus* from *Dinematichthys*, and one which scarcely entitles it to generic rank.

Note, page 141.

PLOTOSUS ANGUILLARIS, Bloch.

As the foregoing was passing through the press, I received, by the courtesy of Drs. Jordan & Fowler, an advance copy of their "Review of the Siluroid Fishes of Japan."⁵⁰

⁵⁰ Jordan & Fowler—Proc. U.S. Nat. Mus., xxvi., 1903.

I notice that these authors also reject the word *arab* as a specific name for the striped catfish. In adopting *anguillaris* they assign it to Lacépède, 1803; I have credited it to Bloch, 1794, and do not see why the earlier writer should not be quoted.

Under the peculiar system of nomenclature which Bleeker adopted, Lacépède's name was naturally used; but Bleeker's practices are not endorsed by modern writers.

Note, page 167.

APLODACTYLUS ETHERIDGII, *Ogilby*.

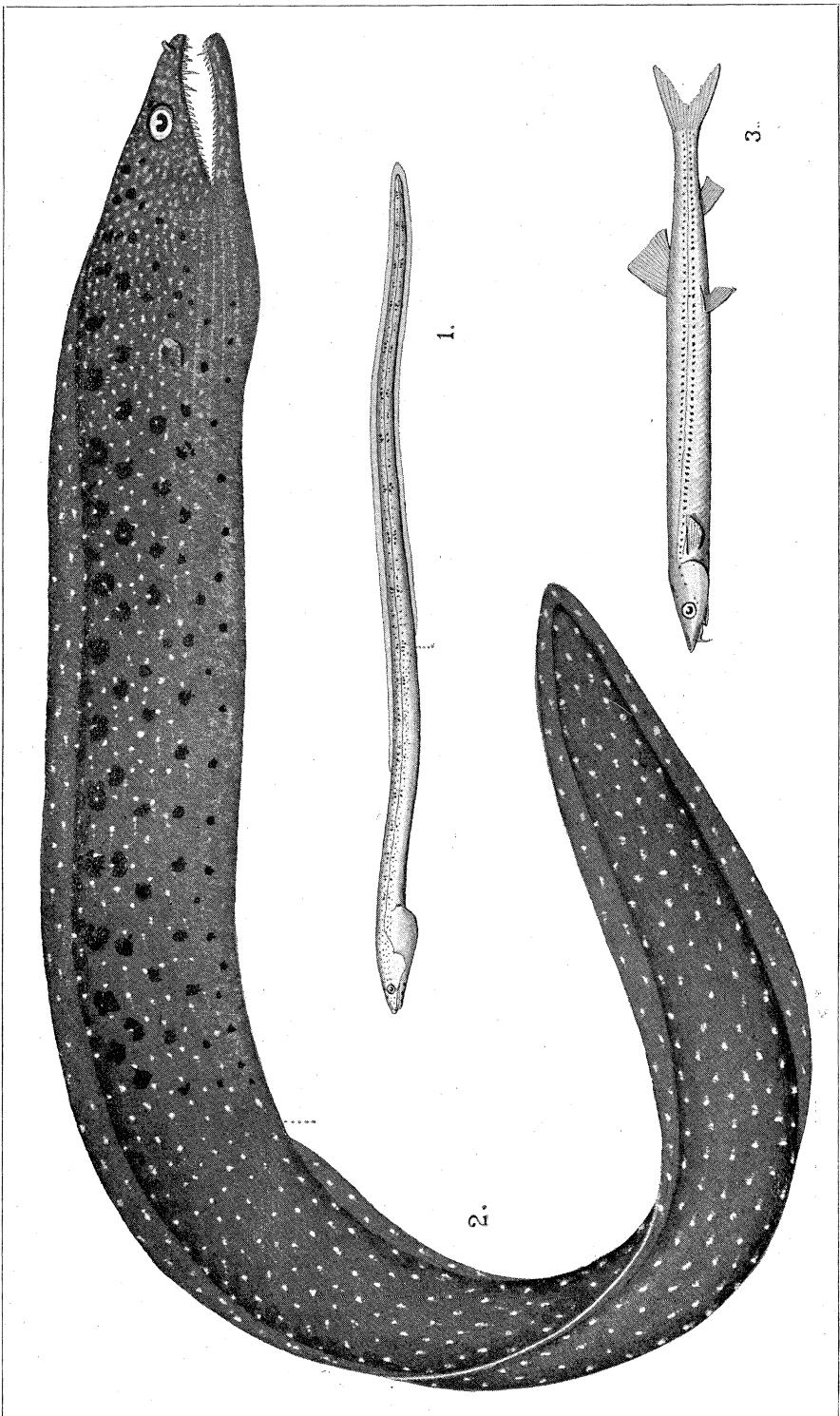
Parhaplodactylus is a genus formed by Thominet⁵¹ for *Aplodactylus lophodon*, Günther, *A. arctidens*, Richardson, and *A. mar-moratus*, Thominet. As I cannot refer to this author's work I am unable to say if *Aplodactylus etheridgii*, should also enter the genus.

⁵¹ Thominet—Bull. Soc. Philom., (7), vii., p. 140.

EXPLANATION OF PLATE XVII.

- Fig. 1. *Muraenichthys nicholsæ*, Waite.
„ 2. *Gymnothorax chalazius*, Waite.
„ 3. *Gonorhynchus gonorynchus*, Linnaeus.

(Fig. 1, enlarged. Fig. 2, reduced. Fig. 3, young, natural size.)

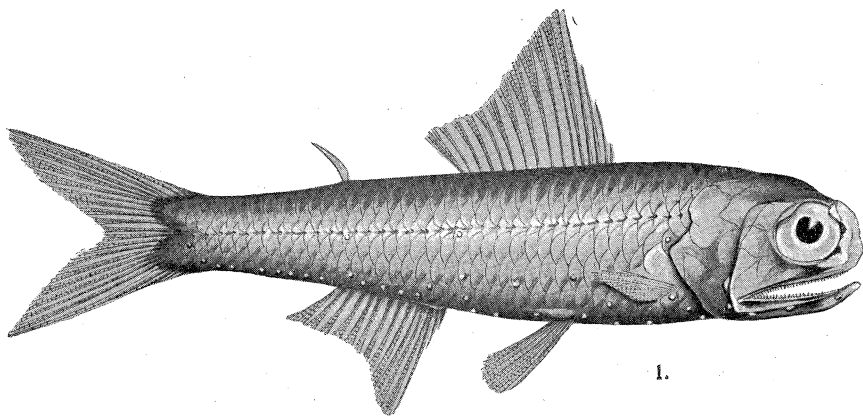


EDGAR R. WAITE, del.,
Aust. Mus.

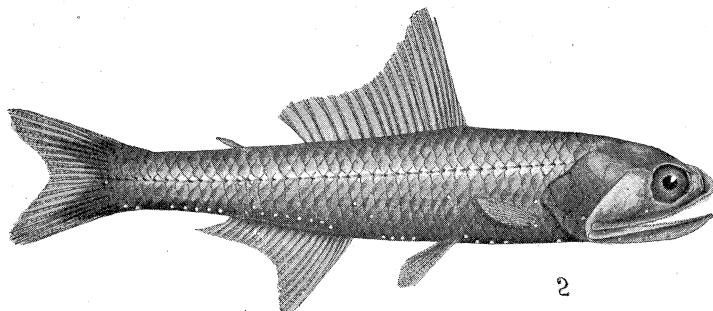
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EXPLANATION OF PLATE XVIII.

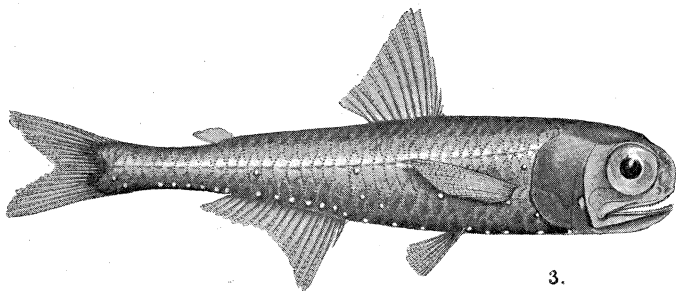
- Fig. 1. *Æthoprora perspicillata*, Ogilby.
,, 2. *Notoscopelus ejectus*, Waite.
,, 3. *Dasyscopelus naufragus*, Waite.
,, 4. *Howella brodiei*, Ogilby.
(All the figures enlarged).



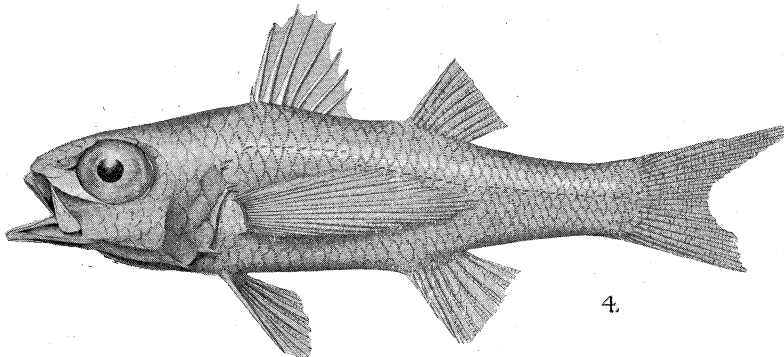
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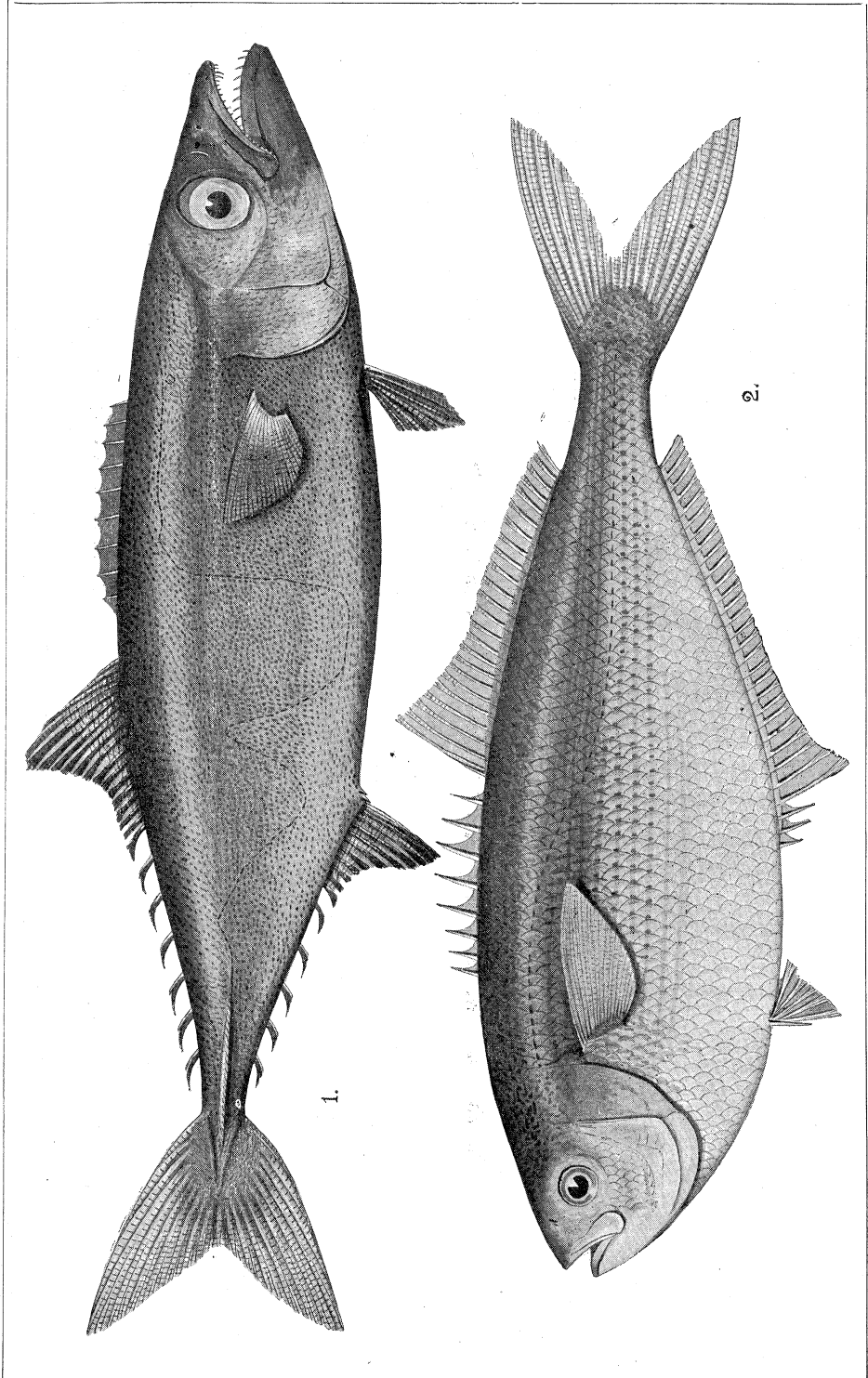
3.



4.

EXPLANATION OF PLATE XIX.

- Fig. 1. *Xenogramma carinatum*, Waite.
,, 2. *Bathystethus cultratus*, Forster.
(Both figures reduced).

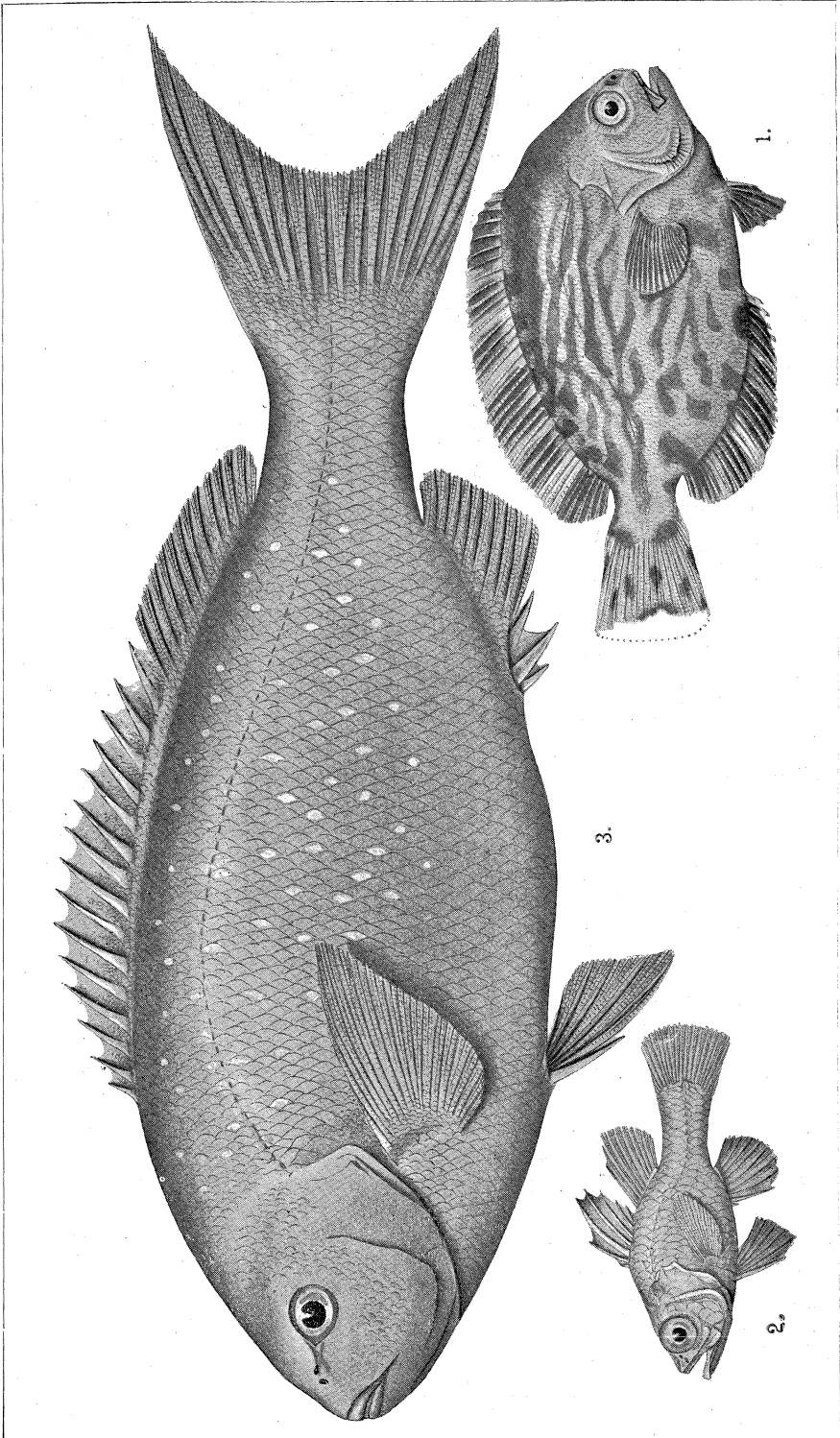


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EXPLANATION OF PLATE XX.

- Fig. 1. *Schedophilus maculatus*, Günther.
„ 2. *Apogon chrysurus*, Ogilby.
„ 3. *Girella cyanea*, Macleay.
(All the figures reduced).

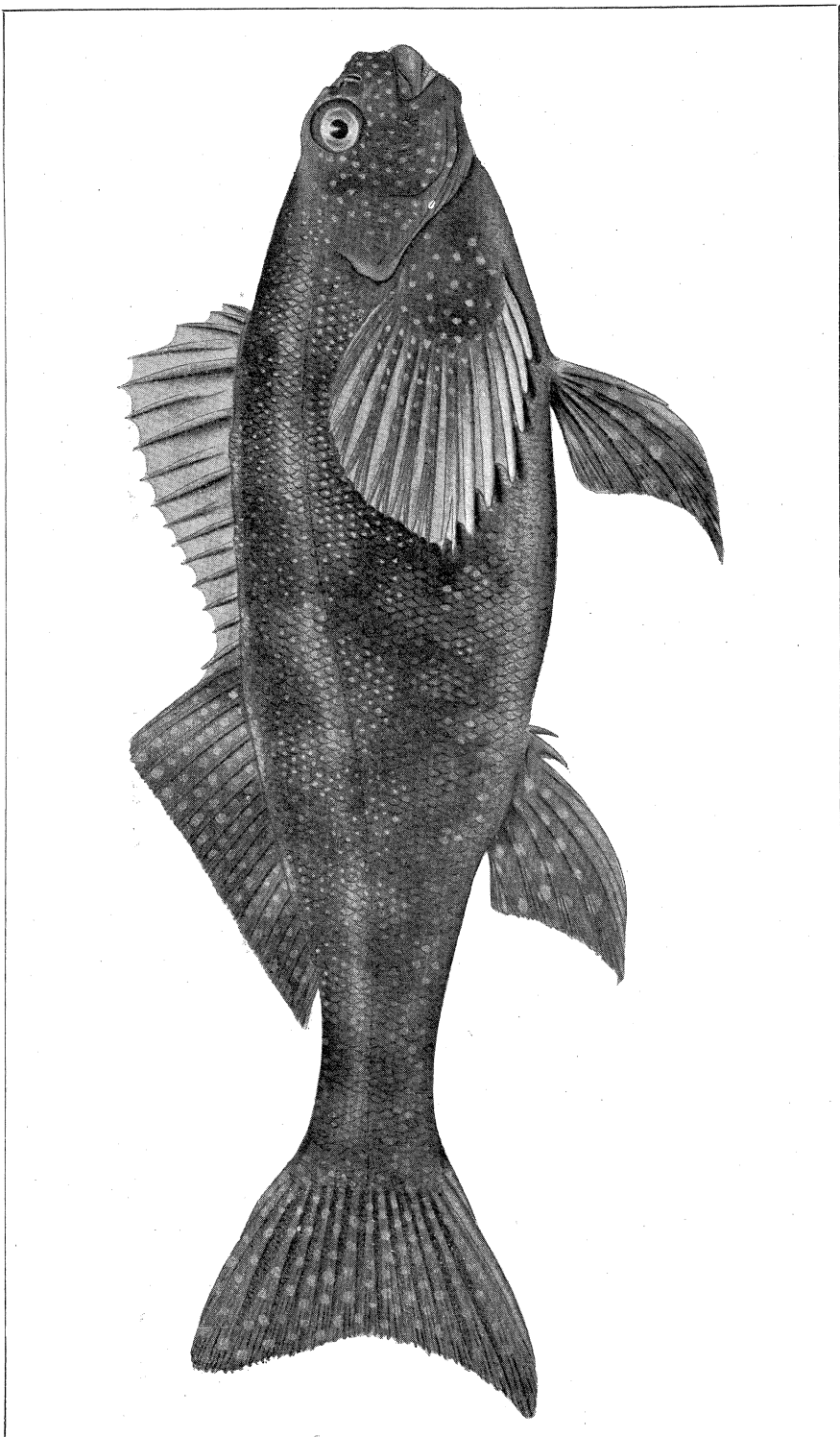


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Electric Photo-Engr. Co., Ltd.,
Sydney.

EXPLANATION OF PLATE XXI.

Aplodactylus etheridgii, Ogilby.
(Reduced).

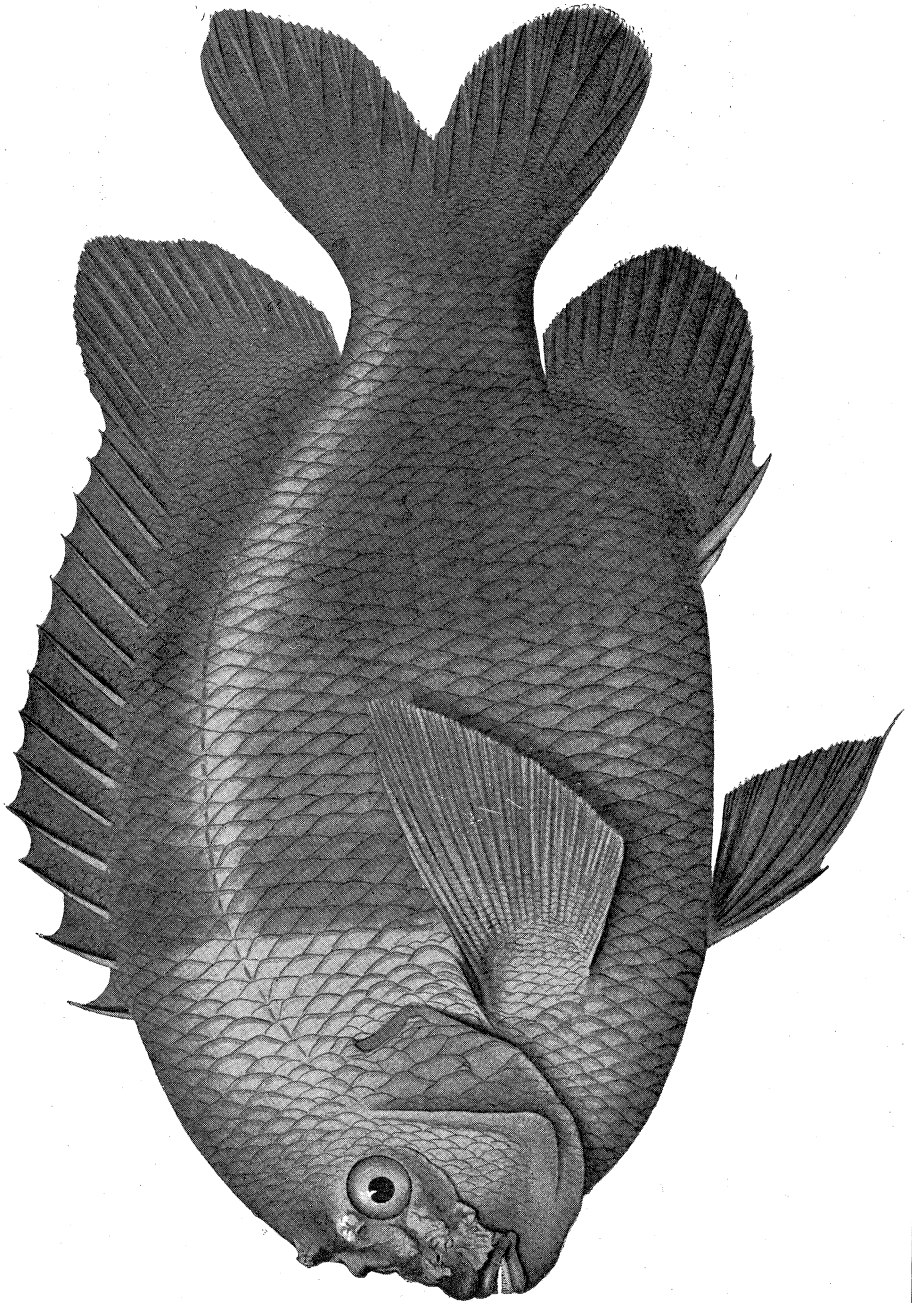


A. R. McCULLOCH, del.
Aust. Mus.

Electric Photo-Engr. Co., Ltd.
Sydney.

EXPLANATION OF PLATE XXII.

Parma polylepis, Günther.
(Reduced).

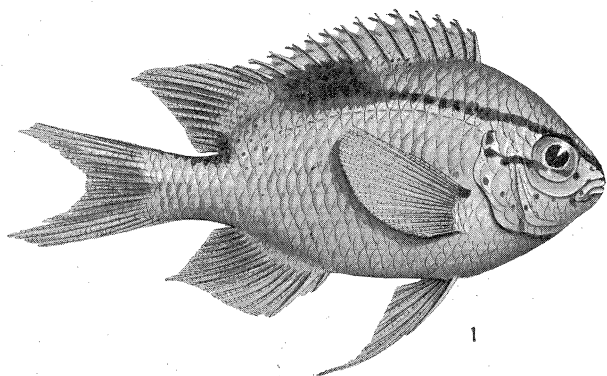


A. R. McCULLOCH, del.,
Aust. Mus.

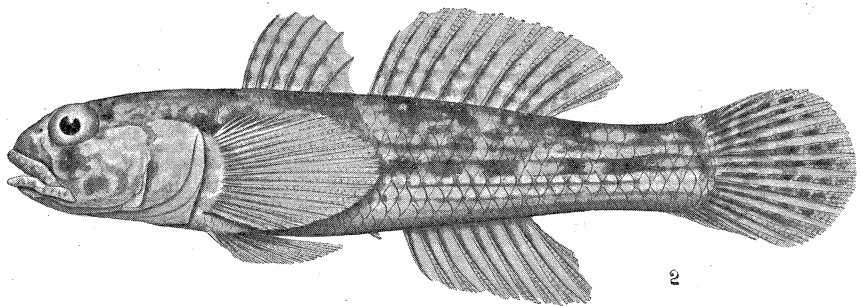
Electric Photo-Engr. Co., Ltd.,
Sydney.

EXPLANATION OF PLATE XXIII.

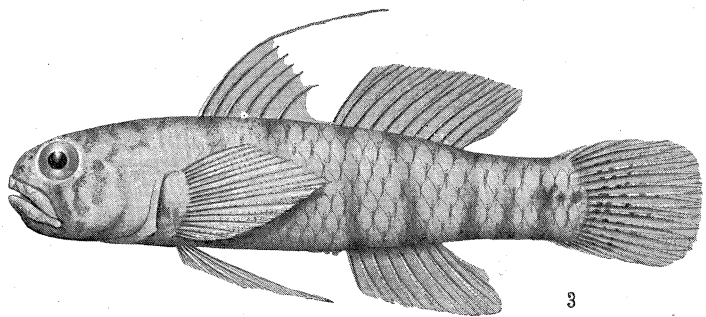
- Fig. 1. *Glyphisodon polyacanthus*, Ogilby.
,, 2. *Gobius aelosoma*, Ogilby.
,, 3. *Allogobius viridis*, Waite.
,, 4. *Limnichthys fasciatus*, Waite.
(Fig. 1, natural size. Figs. 2-4, enlarged).



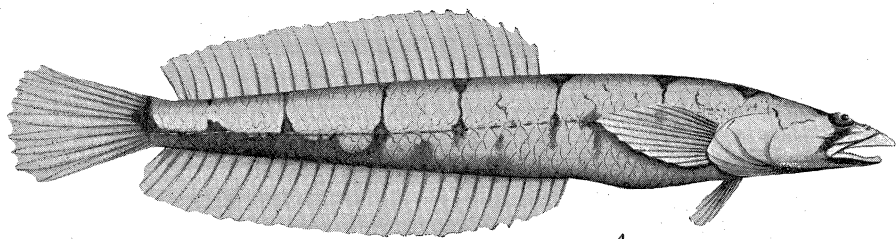
1



2



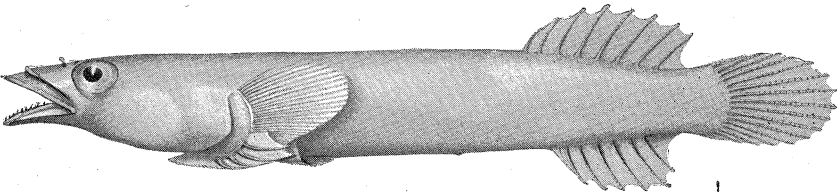
3



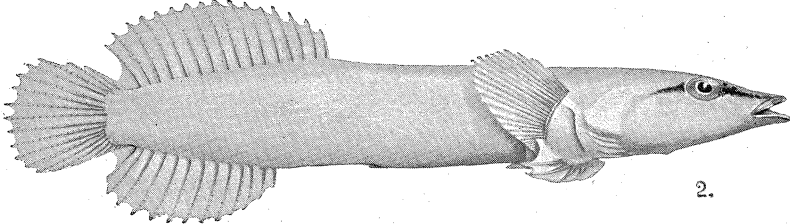
4

EXPLANATION OF PLATE XXIV.

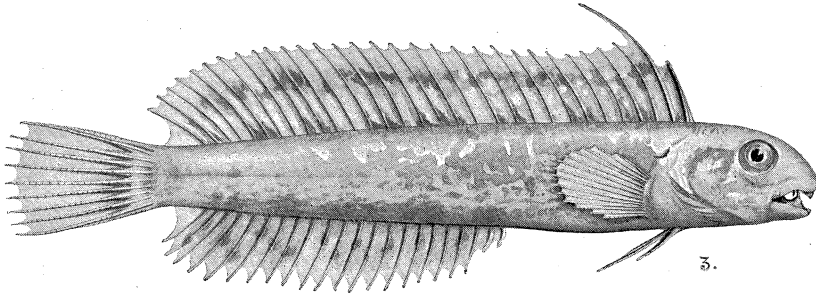
- Fig. 1. *Diplocrepis costatus*, Ogilby.
,, 2. *Lepadichthys frenatus*, Waite.
,, 3. *Petroscirtes icelii*, Ogilby.
,, 4. *Tripterygion rufopileum*, Waite.
,, 5. *Dinematichthys longifilis*, Ogilby.
(Fig. 3 natural size, the others enlarged).



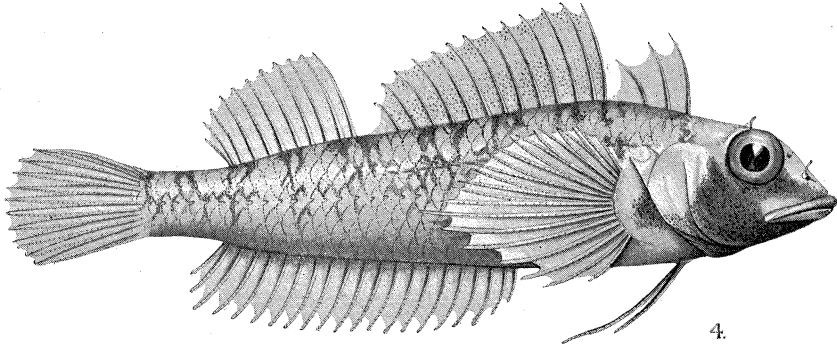
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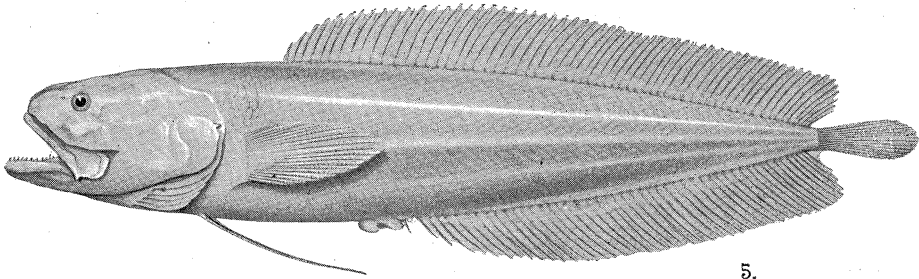
2.



3.



4.



5.

[The following corrections were published in Volume 5 Issue 6 and are to be read with the appropriate paper dated 18 August, 1905.—Sub-Editor, August, 2009]

CORRECTIONS.

- Page 58—for *Prosoplismus recurvirostris*, read *Pentaceropsis recurvirostris*:
(see Ann. Mag. Nat. Hist. (7), xii., 1903, p. 288.)
- „ 170—further investigation, in conjunction with Mr. McCulloch, shows that examples recorded under the name *Glyphisodon antjerius*, and *G. brownriggii* are the young of *Parma poly-lepis*, specimens recorded from the mainland under these names are the young of *Parma squammipinnis*, *Parma micro-lepis*, the tenable name of the species, being the half-grown stage.
- „ 171—for D. xiii. 9; read D. xiii. 19.
- „ 190 No. 9—for figure none, read Kner, Reise Novara, Fische, 1867, pl. xiii, fig. 2.
- „ 195 No. 33—for p. 148, read 481.
- „ 206 No. 81 *Figure*—for 1869, read 1865.
- „ 209 No. 94—delete in favour of No. 92, and see note p. 170 above.
- „ 219 No. 147—read 147 TROPIDICHTHYS CAUDOFASCIATUS, Günther. *Tetradon caudofasciatus*, Günther Cat. Fish. Brit. Mus., viii., 1870, p. 304, of which *T. callisternus* is a synonym.
- „ 234—for *Tropidostethus rhotophilus*, read *Iso rhotophilus*.
- „ 247—at third line from bottom for “elytra ‘24’” read “elytra 2·4.”
- „ 298—line 4 from bottom, for obtuse read obtuse.
- „ 303—line 20 for *m* (0110) read *m*, (0110).
- „ 304—line 10 „ *y* (102) „ *y* (102).
- „ 318—line 9, for “Inserte,” read “Incertæ”

EXPLANATION OF PLATE XIV.

For fig. 10 read fig. 9.

SCAPHITES ERUCIFORMIS, *Eth. fil.*

Fig. 10. Back of limonite cast showing sutures and sculpture.—×2.

EXPLANATION OF PLATE XL.

First and second line from bottom, for *m* 0110 read *m*, (0110).

And add Fig. 5, Plan of Fig. 4.