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NOTES ON FISHES FROM AUSTRALIA AND LORD HOWE
ISLAND.

By

ALLAN R. McCULLOCH, Zoologist, Australian Museum.

(Plates i-iii.)

The Trustees of the Australian Museum have received a large and interesting collection of fishes from Mr. E. H. Rainford, collected by him in the neighbourhood of Bowen, Queensland. This includes many species not previously recognised from Australian waters and some which are regarded as new. Another equally interesting collection has been made by Mr. R. E. Baxter, of Lord Howe Island, and presented by him to the Australian Museum. A few species from each of these collections are dealt with in the following paper.

FISHES FROM AUSTRALIA.

Family CHAETODONTIDAE.

Genus CHAETODON *Linnaeus*.

The following key to the Australian species of this genus is based upon examination of numerous specimens in the Australian Museum collections. Every endeavour to utilise the sub-genera of Bleeker's "Atlas Ichthyologique" and Jordan & Seale's "Fishes of Samoa" has failed, and it seems that each includes little more than its typical species.

- a. Some or all of the scale-rows below the lateral line run obliquely upward and backward.
- b. Scale-rows oblique as above on both upper and lower parts of sides.
- c. Profile convex, not concave, at base of snout, which is obtuse.
- d. An oblique line on each row of scales on the sides; a broad black band before the ocular band covering the snout, and a narrow one behind it. Dorsal, anal, and caudal, each with a black stripe with light-coloured margins. *trifasciatus*.
- cc. Profile concave at base of snout, which is more or less produced.
 - e. Scale-rows of upper anterior part of sides with dark lines running upward and backward and at *right angles* to those running downward and backward on lower posterior portion. (Subg. *Limophora auriga*).
 - f. Dorsal with a produced setiform ray and a black ocellus. *setifer*.
 - ff. Dorsal without a produced ray; a dark band from the dorsal across the peduncle to the anal. *vagabundus*.
 - ee. Scale-rows either without dark lines, or, if they are present, they do not meet at right-angles.
 - g. Ocular band mesially yellow with dark edges.
 - h. Body with seven oblique dark stripes running upward and backward; a dark cross-bar on caudal; ventrals pale. *pelewensis*.

- gg. Ocular band black.
- i. Ventrals blackish, body dark-coloured. *flavivrostris.*
- ii. Ventrals and body light coloured with dark markings.
- j. Ocular band much narrower than eye.
- k. Each scale-row with an oblique dark line running upward and backward; and other markings. *melanotus.*
- jj. Ocular band as broad as, or broader than, eye.
- l. Body with subvertical dark lines descending through each scale-row; scales very large and somewhat angular.
- m. Two broad dark bands descending from dorsal fin onto upper half of sides, and a large black spot on peduncle. *falcula.*
- mm. A broad black band around base of dorsal, crossing the peduncle to posterior base of the anal. *lineolatus.*
- ll. No dark subvertical lines through scale-rows.
- n. A broad black bar extending obliquely upward from shoulder to middle of spinous dorsal, and other markings. *lunula.*
- bb. Scale-rows oblique on upper anterior part of side but more or less horizontal on lower portion.
- o. Each scale with a round black spot forming oblique rows above and horizontal ones below. Anal broadly black-edged, the other fins plain. *citrinellus.*
- oo. Four subvertical dark lines from back onto sides; a dark infra-marginal border on the dorsal and anal fins, and a black ocellus on the former. *assarius.*
- aa. Scale-rows either horizontal or running somewhat downward and backward.
- p. Scales large in 35 or less series.
- q. One or two produced setiform dorsal rays. Snout beak-like. Scales of sides not remarkably large. (Subg. *Rhabdophorus ephippium*).
- r. A large black patch covering greater part of second dorsal and part of back. *ephippium.*
- qq. No produced dorsal rays; snout not beak-like. Scales on middle of sides very large, the rows running downward and backward.
- s. A broad dark band from spinous dorsal to ventral and a much broader one from soft dorsal to anal. *kleinii.*
- pp. Scales small, in 40 or more series.
- t. Ocular band as broad as eye, black.
- u. Two broad black vertical bands crossing body and vertical fins. *tricinctus*—L. Howe Id.
- tt. Ocular band much narrower than eye.
- v. Body and fins with seven narrow equidistant dark cross-bars. Ocular band dark. *octofasciatus.*
- vv. Body either plain or with three broad cross-bands; ocular band yellow with dark edges.
- w. Three broad cross-bands descending from the dorsal fin, which are lilac-coloured in the middle portion, with orange borders. *rainfordi.*
- ww. Body largely brown, without cross-bands descending from the dorsal fin. *aureofasciatus.*

CHAETODON SETIFER *Forsk.*

- Chaetodon setifer* Bloch, Ichth. xii, 1797, pl. ccccxxvi, fig. 1. *Id.*,
Günther, Fische Südsee i, 1873, p. 36, pl. xxvi, fig. 13.
Tetragonopterus, Linophora, auriga Bleeker, Atlas Ichth. ix, p. 47,
1878, pl. cclxxiii, fig. 4 (not *C. auriga* Forskal).
Chaetodon auriga var. *setifer* Day, Fish. India, 1875, p. 106, pl. xxvii,
fig. 3.

A fine specimen, 170 mm. long, is in the Australian Museum from the Clarence River estuary, New South Wales, and two others from Holbourne Island, off Port Denison, Queensland, which were collected by E. H. Rainford.

CHAETODON VAGABUNDUS *Linnaeus*.

(Plate i, figs. 1-2).

- Tetragonopterus, Linophora, vagabundus* (Linn.) Bleeker, Atlas. Ichth. ix, 1878, p. 48, pl. cclxxviii.

Variation.—A series of fifteen young specimens, 24-54 mm. long, exhibits an interesting range of variation in the ornamentation of the dorsal fin. In the youngest specimens, one of which is figured (Pl. i, fig. 2), the soft dorsal fin bears a large black ocellus, and a dusky stripe crosses the rays about the middle of their length; a similar stripe is present on the anal. The ascending lines of the sides are distinct, but the descending ones are not developed. The dorsal spines are much higher than the rays in the young fish and the head is encased in a thick bony armature. With the growth of the fin-rays the dorsal ocellus is gradually moved towards the margin of the fin, where it is eventually lost, and the stripes on the anal and dorsal fins approach the margin to form the black borders which are characteristic of the adult fish. Pl. i, fig. 1 represents a specimen 54 mm. long, in which the ocellus, though distinct, is moving outwards and is confused with the black border.

Localities.—Many specimens are in the Australian Museum from the Solomon Group, New Hebrides, Fiji, Duke of York Island, and Papua. Two young examples which I collected at Murray Island, Torres Strait, and another from Cairns Reef, off Cooktown, Queensland, are the first of the species to be recognised from Australian waters.

CHAETODON MELANOTUS *Bloch & Schneider*.

- Tetragonopterus, Chaetodontops, melanotus* (Bloch & Schneider)
Bleeker, Atlas Ichth. ix, 1878, p. 43, pl. cclxxvi, fig. 1.

Two large examples which I collected at Murray Island, Torres Strait, are the first of the species to be recognised from Australian waters. Others are from Port Moresby, Duke of York Island, Admiralty Islands, and the Solomon Group.

CHAETODON LINEOLATUS *Cuvier & Valenciennes.*

Chaetodon lineolatus (Cuv. & Val.) Günther, Fische Südsee i, 1874, p. 45, pl. xxxiv, fig. A.

Tetragonopterus, Oxychaetodon, lineolatus Bleeker, Atlas Ichth. ix, 1878, p. 51, pl. cccclxxvii, fig. 2.

Colours.—Body silvery grey, darker above, and ruled with black lines down the scale rows. A broad black stripe from the nape through the eye to the throat and joined by its fellow across the forehead by a horizontal stripe above the eyes. Another broad black stripe from the middle of the dorsal, across the caudal peduncle to the base of the anal, which is bordered anteriorly by a bright golden area. Dorsal fin golden, the soft portion with a light, dark-edged stripe across the middle of the rays. Anal golden. Caudal gold with a dark-edged submarginal stripe and a narrow white border.

Two fine specimens were collected by Mr. Rainford near Whitsunday Island, Queensland. This species has not been previously recognised from Australian waters.

CHAETODON LUNULA *Lacépède.*

Chaetodon lunula (Lacépède) Günther, Fische Südsee i, 1874, p. 42, pl. xxxiii.

A fine series of fourteen specimens, 26-192 mm. long, exhibits the three stages illustrated by Günther in "Fische der Südsee," pl. xxxiii, figs. A, C, and D. Of these, eleven are from the New Hebrides, one from Amboyna, and one from Two Isles, off Cape Bedford, North Queensland. The species has been recognised from Australian waters by Cuvier and Valenciennes, who identified a drawing in the Banksian Library of a specimen captured at Prince of Wales Island, Torres Strait.

CHAETODON RAINFORDI *sp. nov.*

(Plate ii, fig. 1.)

D.xi/21; A.iii/18; V.i/5; P.14; C.17. About 45 rows of scales between the origin of the lateral line and the hypural joint.

General form sub-circular, the depth from the tips of the erect dorsal spines to those of the anal greater than the length to the hypural joint. Anterior profile very slightly convex, but concave above the snout, which is a little prominent. Scales rounded, largest on the anterior portions of the sides and becoming much smaller posteriorly; they are arranged in subhorizontal rows between the lateral line and the abdomen, but follow the curvature of the line above it. Lateral line terminating about the base of the eighteenth dorsal ray.

Margin of dorsal fin rounded, the median spines a little longer than the posterior ones; the base of the spinous portion is of the same length as that of the soft part. Anal rounded, the third spine longest. Ventral spine large, reaching the vent, the first ray filamentous and reaching the second anal spine. Caudal truncate.

Colours.—Canary yellow, with darker orange cross-bands. A narrow dark-edged stripe with light lavender borders extends down the median line of the forehead to the upper lip. The ocular band, which is much narrower than the eye, commences on the nape and passes through the eye and across the cheek to the breast; it is deep orange with narrow blackish edges, and has a light lavender border on each side, which is broadest below. A narrow orange band curves forward from the third dorsal spine to the end of the operculum and then backward over the base of the pectoral to behind the ventral; its anterior edge is partly defined by a blackish line, and it is preceded by a broad lavender stripe from above the operculum to the axil of the ventral fin. A broad composite band curves forward from the 6th-9th dorsal spines to the region of the vent; its middle portion is deep lilac, which colour is darkest above, and bordered with rich orange on each side; most of the scales bear dark basal spots, which tend to form dark edges to the orange borders. Another similar band descends from the anterior part of the soft dorsal to that of the anal. A less defined orange band crosses from the posterior part of the soft dorsal to the anal and encloses a large rounded spot on the caudal peduncle. All the fins are uniformly bright yellow, but the caudal has a broad pale lavender border.

Described and figured from a specimen 118 mm. long from Holbourne Island, registered I.A.273.

This species is named after its collector, Mr. E. H. Rainford, to whom the Trustees of the Australian Museum are indebted for many remarkable fishes not previously recognised from Australian waters.

Variation.—A specimen 78 mm. long differs from the larger example described above in having the spot on the caudal peduncle much darker and surrounded by a white ring. The soft dorsal and anal fins have each a narrow lemon-green border, within which is a narrow lavender line, and the caudal fin bears a broad cross-band of the same colour near its base.

C. rainfordi is very similar to *C. aureofasciatus* Macleay, which is also represented in Mr. Rainford's collection from Holbourne Island, but eight specimens of each of various sizes differ consistently in their colour-marking. The anterior bands of both are quite similar in both species, but, whereas the body is dark and uniform in *aureofasciatus*, it is light and conspicuously banded in *rainfordi*.

Locality.—Holbourne Island, off Port Denison, Queensland; holotype and seven paratypes.

CHAETODON AUREOFASCIATUS *Macleay*.

(Plate ii, fig. 2.)

Chaetodon aureofasciatus Macleay, Proc. Linn. Soc. N. S. Wales ii, 1878, p. 351, pl. viii, fig. 3; and v, 1881, p. 388. *Id.* Klunzinger, Sitzb. Akad. Wiss. Wien lxxx, i, 1879, p. 360. *Id.* Kent, Proc. Roy. Soc. Qld. vi, 1889, p. 239.

D.xi/22; A.iii/18; P.15; V.i/5; C.17. About 45 rows of scales between the origin of the lateral line and the hypural joint.

General form sub-circular; the depth from the tips of the erect dorsal spines to those of the anal greater than the length to the hypural joint. Anterior profile very slightly convex, but concave above the snout, which is a little prominent. Scales rounded; largest on the anterior portions of the sides and becoming much smaller posteriorly. They are arranged in sub-horizontal lines between the lateral line and the abdomen, but follow the curvature of the back above it. Lateral line terminating before the end of the soft dorsal fin.

Margin of the dorsal fin rounded; the median spines a little longer than the posterior ones; the base of the spinous portion is of the same length as that of the soft part. Anal rounded; the third spine longest. Ventral spine large, reaching the vent; the tip of the first ray reaches the base of the second anal spine. Caudal truncate.

Colours.—General colour yellowish with the greater portion of the sides brown, owing to a squamose pattern on the bases of the scales. A narrow orange stripe with lilac edges extends down the median line of the forehead to the upper lip. Ocular band orange, much narrower than the eye, with dark violet or blackish edges, exterior to which are ill-defined, pale lavender borders. An orange band commences above the shoulder and extends across the end of the operculum, across the base of the pectoral to behind the ventral fin. Its anterior edge is partly defined by a dark line and it is preceded by a broad lilac stripe. Dorsal, anal, and caudal fins bright yellow, the latter with a broad lavender border. Ventrals pale yellow tinged with green anteriorly. Younger specimens have an ill-defined dark patch on the caudal peduncle and a rounded dark area on the middle of each side below the lateral line.

Described and figured from a specimen 111 mm. long, from Holbourne Island. Registered I.A.269.

Localities.—*C. aureofasciatus* has hitherto been known only from Port Darwin district and a specimen is in the Australian Museum collection from that locality. A series of nine specimens, 73 mm. to 111 mm. long has been collected by Mr. E. H. Rainford at Holbourne Island and Hook Island near Port Denison, Queensland.

Family LABRIDAE.

PSEUDOLABRUS TETRICUS *Richardson.*

Pseudolabrus tetricus McCulloch, Rec. Austr. Mus. ix, 3, 1913, p. 377, pl. xix (synonymy).

Labrichthys cerulieus (Ogilby) Kent, Proc. Roy. Soc. Tasm. 1887 (1888), p. 47.

Labrichthys ceruleus Kent, Nat. Austr., 1897, p. 174, pl. xxviii, fig. 17.

Cossyphus cerulæus (Ogilby) Johnston, Proc. Roy. Soc. Tasm. 1890 (1891), p. 35.

Synonymy.—The name *Labrichthys cerulieus*, credited to Ogilby by Kent, and changed to *Cossyphus cerulæus* by Johnston, is based upon a species which was described by Ramsay and Ogilby in 1887 as *Labrichthys cyanogenys*. No description appeared with the name *cerulieus*, but the characteristic colour-marking of *L. cyanogenys* is shown by Kent in his illustration of *L. ceruleus* quoted above. As *L. cyanogenys* is synonymous with *Pseudolabrus tetricus*, *L. cerulieus* must be added to the synonymy of that species also.

Family CALLIONYMIDAE.

Genus CALLIONYMUS.

Having examined several types and authentic specimens of species of this genus, together with a fine series of other specimens, I am able to submit the following key to the species recorded from Australia, together with the accompanying notes.

- a. Preopercular spine almost straight and spear-like, with a row of spinules above, and an antrorse barb below. *Subg. Calliurichthys.*
- b. Cranium with exposed rugose bones. *japonicus* and *affinis.*
- bb. Cranial rugosities covered by skin.
- c. 9 dorsal and 8 anal rays; dorsal rays mostly simple.
- d. Snout little longer than the eye; upper lip projecting beyond the preorbitals when the mouth is closed. *grossi.*
- aa. Preopercular spine with curved tip and one or more large hooks above; lower antrorse barb of preopercular spine present or absent. *Subg. Callionymus.*
- e. Lower antrorse barb of preopercular spine present. Dorsal rays mostly simple.
- f. Preopercular spine with only two recurved spines at the tip.
- g. Cranium and supraorbital ridges smooth. *lunatus.*
- gg. Cranium and supraorbital ridges with bony granules. *limiceps.*
- ff. Preopercular spine with 3-5 recurved hooks above.
- h. Margin of first dorsal fin rounded; the first spine not longer than the second. *calcaratus* and *macdonaldi.*
- hh. Margin of first dorsal somewhat excavate, first spine longer than second. *valenciennesii.*
- ee. Preopercular spine without a lower antrorse barb; dorsal rays branched.

- i. Lateral line arched anteriorly, extending along middle of sides posteriorly.
- j. Preopercular spine with two terminal hooks.
k. 7-8 anal rays. *calauropomus.*
kk. 6 anal rays. *papilio.*
- jj. Preopercular spine with three hooks; 8-9 dorsal and 7 anal rays.
l. Eye about one-third length of head. *phasis.*

CALLIONYMUS, CALLURICHYTHYS, JAPONICUS *Houttuyn.*

Callionymus japonicus (Houttuyn), Jordan & Fowler, Proc. U.S. Nat. Mus. xxv, 1903, p. 942, fig. 2 (synonymy).

Callionymus reevesii Richardson, Ichth. Voy. "Sulphur," 1844, p. 60, pl. xxxvi, figs. 1-3 (not fig. 4).

Callionymus longicaudatus Schlegel, Faun. Japon., Poiss., 1845, p. 151, pl. lxxix, fig. 1. *Id.* Günther, Challenger Zool. i, 1880, p. 44. *Id.* Waite, Prelim. Rept. Thetis. Exped., 1898, p. 60.

?*Callionymus affinis* Ogilby, New Fish Qld. Coast, 1910, p. 134 (not *C. affinis* Regan).

This species has been recorded from station 188, between New Guinea and Australia, in the Challenger Report, and from Lord Howe Island by Waite. Four specimens from the latter locality, in the Australian Museum, exhibit considerable variation in the lengths of the dorsal spines and caudal rays, but are very similar to Richardson's figures of *C. reevesii*.

C. affinis Ogilby (not of Regan, 1908) was described from a single specimen from off Cape Moreton, Queensland, which, apparently, has since been lost. The name is preoccupied, but, as the species is probably identical with *C. japonicus*, there is no necessity to propose a substitute.

CALLIONYMUS, CALLURICHYTHYS, GROSSI *Ogilby.*

Callionymus grossi Ogilby, Proc. Roy. Soc. Qld., xxiii., 1910, p. 43.

A specimen, 115 mm. long, identified by Ogilby, is in the Australian Museum from Cape Moreton.

CALLIONYMUS LUNATUS *Schlegel.*

Callionymus lunatus (Schlegel), Jordan & Fowler, Proc. U. S. Nat. Mus. xxv, 1903, p. 949, fig. 5 (synonymy). *Id.* Günther, Challenger Zool. i, 1880, p. 28.

A specimen was obtained in Port Jackson by the Challenger Expedition which Günther identified as *C. lunatus*, but, as no other having the characters of that species has since been obtained in New South Wales waters, it seems probable that the identification was incorrect.

CALLIONYMUS VALENCIENNESI Schlegel.

Callionymus valenciennesi (Schlegel), Jordan & Fowler, Proc. U. S. Nat. Mus. xxv, 1903, p. 950 (synonymy).

Localities.—Apparently incorrectly recorded from Australian waters. Four specimens from Japan are preserved in the Australian Museum.

CALLIONYMUS MACDONALDI Ogilby.

Callionymus macdonaldi Ogilby, Ann. Qld. Mus. 10, 1911, p. 56, pl. vi, fig. 2.

Locality.—Moreton Bay, Queensland (Ogilby).

CALLIONYMUS PHASIS Günther.

Callionymus phasis Günther, Challenger Zool. i, 1880, p. 28, pl. xv, fig. c.

Two specimens, 48 and 66 mm. long, exhibit some variation in the lengths and numbers of their fin-rays and spines. In the larger the dorsal spines are much longer than the rays as in the holotype, but in the other the longest spine is a little shorter than the anterior rays. The latter has nine dorsal rays while the former has only eight; both have seven anal rays.

Locality.—Gippsland Coast, Victoria, 80 fathoms.

CALLIONYMUS LIMICEPS Ogilby.

(Plate iii, fig. i.)

Callionymus limiceps Ogilby, Ann. Qld. Mus. 9, 1908, p. 35.

D.iv/9(10); A.9(10); P.20; V.i/5; C.9. Depth (15.3 mm.) 10.4 in the length of the hypural joint (160); breadth before pectorals (35) 4.5 in the same. The distance between the premaxillary symphysis and tip of preopercular spine (43) 3.7 in the length. Eye (10) 1.5 in the preorbital width (15).

Cranium covered by a large rugose plate. Supraorbital ridges granular; the space between them deeply concave. Preopercular spine curved upward at the tip with a single recurved hook on its upper margin and a strong antrorse spine near its base. Upper lip projecting well beyond the preorbital when the mouth is closed. Maxillary extending backward to below the nostril, which is placed a short distance in front of the eye. A band of villiform teeth in each jaw.

The two anterior spines of the first dorsal fin are filamentous, the first reaching backward beyond the base of the last ray; the third equals the length of the first ray. The dorsal rays decrease in length from the first to the fourth and then increase again backwards, the

last reaching the base of the tail; all are simple except the last, both branches of which are bifurcate. Anal rays increasing in length backward, otherwise similar to those of the dorsal. Upper portion of pectoral fin emarginate, the lower rounded; all but the outer rays are bifurcate. The ninth is longest and reaches the length of the second anal ray. Ventrals reaching backward almost to the level of the first anal ray. The outer caudal ray is single; the others bifurcate.

Colour.—Brown above, closely speckled with brown spots of varying sizes; these form short lines which extend obliquely forward below the eye and they are enlarged along the sides of the body. First dorsal with a large black spot on the third spine which is surrounded by angular grey stripes. The two filamentous spines with numerous grey annuli. Second dorsal with a narrow inframarginal white streak and numerous round spots; some larger dark brown spots on the lower half of the fin. Caudal ornamented with many small white spots between the rays and some darker ocellated spots. Anal with a broad dusky margin. Pectorals and ventrals with irregular rows of grey dots; the latter with a dusky border.

Described and figured from a specimen 216 mm. long from near Cape Capricorn, Queensland.

Variation.—A series of eighteen specimens exhibits some slight variation in the colour-marking, some being much lighter than the others, having the brown spots on the head and body less distinct; those on the body may tend to form rings surrounding imperfect ocelli, or they may be reduced to very small dots. The armature of the preopercular spine and the general form of the cranial armature is similar in all.

Sexual dimorphism.—The females are readily distinguishable from the males by the size of the anal papilla and by the form of the first dorsal fin. In the females the anal papilla is small, whereas it is large in the males reaching backward almost to the origin of the anal fin. The two anterior dorsal spines are greatly elongated in the male, but in the female they are usually much shorter than the anterior dorsal ray; the black spot on the first dorsal fin is much smaller in males than in females, though its size varies considerably in the latter.

Locality.—Eighteen specimens, 147 mm. to 224 mm. long, were trawled by the "Endeavour" at several stations between Hervey Bay and Port Denison, Queensland, at various depths between 13 and 26 fathoms.

CALLIONYMUS CALCARATUS *Macleay.*

(Plate iii, fig. 2.)

Callionymus calcaratus Macleay, Proc. Linn. Soc. N. S. Wales v, 1881, p. 628. *Id.* Ogilby, Proc. Linn. Soc. N.S. Wales x, 1885, p. 121.

Callionymus curvicornis Ogilby, Cat. Fish. N. S. Wales, 1886, p. 37.
Id. Stead, Proc. Linn. Soc. N. S. Wales xxv, 1900, p. 476. *Id.*
 Waite, N. S. Wales Nat. Club Mem. ii, 1904, p. 51 (not *C. curvicornis* Cuv. and Val.).

Callionymus reevesii Ramsay & Ogilby, Proc. Linn. Soc. N. S. Wales
 (2) i, 1886, p. 942. *Id.* Waite, N. S. Wales Nat. Club Mem. ii,
 1904, p. 51 (not *C. reevesii* Richardson).

D.iv/9(10); A.9/10; P.20; V.i/5; C.9. Depth (23 mm.) 7.9 in the length to the hypural joint (183 mm.); breadth before the pectorals (38) 4.8 in the same. The distance between the premaxillary symphysis and the tip of the preopercular spine (47) 3.8 in the length. Eye (10) 1.5 in the preorbital width (15).

Head smooth above without exposed rugose bones. Preopercular spine curved upwards at the tip with three recurved hooks on its upper margin, and a lower antrorse spine near its base. Upper lip projecting slightly beyond the preorbital when the mouth is closed. Maxillary extending backward below the nostril, which is placed a little in advance of the eye. A band of villiform teeth in each jaw.

The first dorsal fin with the margin rounded, its longest spine much shorter than the anterior ray. Most of the dorsal rays are simple, but each branch of the last one is bifurcate. Anal similar to the second dorsal. Upper portion of the pectoral fin emarginate, the lower rounded; all but the outer rays are bifurcate; the ninth is longest and reaches the level of the second anal ray. Ventrals reaching backward to the level of the vent. Caudal rays mostly bifurcate.

Colour.—General colour citrinous yellow above, closely speckled with pale grey ocelli of all sizes. The colours are more pronounced on the head, where they are interspersed by lighter yellowish marbling. Sides below lateral line silvery with a median series of greyish blotches and descending lines of yellow-bronze. Lower parts white. First dorsal citrinous brown anteriorly with bluish spots; the rest of the fin with a large black spot on a white ground. Second dorsal hyaline, with numerous brownish dots and pencillings and milk-white spots between the rays. Caudal similar to second dorsal, the lowermost rays white; a dusky stripe along the lower portion. Margin of anal milk-white, the rays a little darker, with indefinite dusky marks between the rays. Ventrals citrinous, with deeper pencillings and a narrow white margin. Upper half of pectoral with darker spots on the rays, the lower half plain.

Described and figured from a specimen 242 mm. long, from Port Jackson.

The four typical specimens in the Macleay Museum have nine instead of eight anal rays as described. The strong spur described by Macleay as being on "the posterior half of the outer side" of the preopercular spine, and "pointing backwards" is on the basal half

of the spine and is directed forward; the three upper barbs likewise curve forward, not "backward." These errors in Macleay's description have already been noted by Ogilby (1885).

Synonymy.—Ogilby (1886) united *C. calcaratus* with *C. curvicornis* Cuv. & Val., and *C. valenciennesii* Schlegel, but there appears to be reason to maintain it as a valid species. I have compared specimens of *C. calcaratus* with four Japanese examples of *C. valenciennesii* and find the spinous dorsal of the former to be rounded, with the first spine never longer than the second, whereas it is longer than the second in *valenciennesii* and so makes the margin of the fin appear somewhat excavate. The black spot on the first dorsal, when present, occupies the space between the second and fourth spines in *calcaratus*, and is confined to that between the third and fourth in *valenciennesii*. *C. curvicornis* has not been sufficiently well described to permit of a comparison with it, but there is little likelihood that the southern Australian fish is identical with that from Bourbon.

Ramsay & Ogilby (1886) have recorded a specimen from Port Jackson as *C. reevesii* Richardson (part) which is apparently synonymous with *C. valenciennesii*. No specimen so labelled is now preserved however, and I do not find any entered under that name in the Museum registers, so am led to believe that the record was based upon a specimen of *C. calcaratus*.

Localities.—Four specimens, 120-243 mm. long, are in the Australian Museum from Port Jackson, and two others from Houtmans Abrolhos, Western Australia. Macleay's types are from Port Jackson.

CALLIONYMUS CALAUROPOMUS Richardson.

Callionymus calauropomus Richardson, Ichth. "Erebus" and "Terror," 1844, pp. iv and 10, pl. vii, fig. 4-5. *Id.* Günther, Brit. Mus. Cat. Fish. iii, 1861, p. 147, and Challenger Zool. i, 1880, p. 28. *Id.* Klunzinger, Arch. Naturg. xxxviii, i, 1872, p. 31, and Sitzb. Akad. Wiss. Wien lxxx, i, 1879, p. 386. *Id.* Castlenau, Proc. Zool. Soc. Vict. ii, 1873, p. 49, and Res. Fish. Aust. (Vict. Offic. Rec. Philad. Exhib.) 1875, p. 21. *Id.* Macleay, Proc. Linn. Soc. N.S. Wales v, 1881, p. 627. *Id.* Ogilby, Cat. Fish. N.S. Wales, 1886, p. 37. *Id.* McCoy, Prodr. Zool. Vict. dec. xx, 1890, pl. excii. *Id.* Lucas, Proc. Roy. Soc. Vict. (2) ii, 1890, p. 29. *Id.* Woodward, West. Austr. Year-book, 1900-1 (1902), p. 271. *Id.* Waite, N.S. Wales Nat. Club Mem. ii, 1904, p. 51. *Id.* Ogilby, Proc. Roy. Soc. Qld. xxiii, 1910, p. 48. *Id.* McCulloch and Waite, Rec. S. Austr. Mus. i, 1918, p. 48.

Callionymus achatas De Vis, Proc. Linn. Soc. N.S. Wales vii, 1883, p. 620.

Ten specimens from Port Jackson, 90-280 mm. long, show that this species is readily recognisable by its branched dorsal rays and the form of the preopercular spine, which terminates in two barbs; only one specimen has a minute extra barb on each side. D.iv/8; A.7-8.

Distribution.—Richardson gave Western Australia (p. iv.) as the locality for his type, but Günther later quoted it as North-west Australia. However, as the species is common in Victoria, New South Wales, and South Australia, it is probable that Günther was in error. According to Ogilby (1910), *C. achates* De Vis is founded upon a female of *C. calauropomus*, in which case the species ranges northward to Queensland.

The specimen recorded from 115 fathoms near the Philippine Islands by Günther,¹ and that from New Ireland by Peters² were clearly incorrectly identified.

CALLIONYMUS PAPILIO Günther.

Callionymus papilio Günther, Ann. Mag. Nat. Hist. (3) xiv, 1864, p. 197. *Id.* Macleay, Proc. Linn. Soc. N.S. Wales v, 1881, p. 627. *Id.* Ogilby, Cat. Fish. N.S. Wales, 1886, p. 37. *Id.* Lucas, Proc. Roy. Soc. Vict. (2) ii, 1890, p. 29. *Id.* Waite, N.S. Wales Nat. Club Mem. ii, 1904, p. 51. *Id.* Fowler, Proc. Acad. N. Sci. Philad., 1907 (1908), p. 442.

Callionymus ocellifer Castlenau, Proc. Zool. Soc. Vict. ii, 1873, p. 49.

Callionymus lateralis Macleay, Proc. Linn. Soc. N.S. Wales v, 1881, p. 628 (not *C. lateralis* Richardson). *Id.* Johnston, Proc. Roy. Soc. Tasm., 1890 (1891), p. 33.

Callionymus macleayi Ogilby, Cat. Fish. N.S. Wales, 1886, p. 37—substitute name. *Id.* Waite, N.S. Wales Nat. Club Mem. ii, 1904, p. 51.

Synonymy.—The identity of *C. ocellifer* Castlenau and *C. papilio* was recognised by Macleay. The types of the former are preserved in the Paris Museum, and photographs of them, which have been forwarded to the Australian Museum, clearly show the characteristic colour-markings on the fins and body and agree with specimens from Port Jackson which I identify as *C. papilio*. One has eight instead of seven dorsal rays.

The holotype of *C. lateralis* Macleay is preserved in the Macleay Museum, and differs from its description in having seven dorsal and six anal rays instead of eight in each fin. It is similar to others in the Australian Museum, and is clearly the young of *C. papilio*.

Distribution.—New South Wales, from Port Jackson southward to Victoria and Tasmania.

¹ Günther—Challenger Zool. i, 1880, p. 53, and *Ibid.* xxii, 1887, p. 70.

² Peters—Monatsbr. k. Akad. Wiss., Berlin, 1876, p. 841.

FISHES FROM LORD HOWE ISLAND.

Family OPHICHTHYIDAE.*Genus* CALLECHELYS *Kaup.*CALLECHELYS MARMORATUS *Bleeker*

Callechelys marmoratus (Blkr.) Weber, Fish. Indo-Austr. Arch. iii, 1916, p. 288, fig. 132.

A fine specimen 466 mm. long forwarded by Mr. R. E. Baxter, resembles the form figured by Snyder as *C. luteus*.

Locality.—Lord Howe Island.

Family TRACHICHTHYIDAE.HOPISTETHUS ELONGATUS *Günther.*

TRACHICHTHYS ELONGATUS *Günther*, Challenger Rept., Zool. xxii, 1887, p. 22, pl. v, fig. c. *Id.* Waite, Mem. Aust. Mus. iv, 1, 1899, p. 64.

Two specimens were found on the lagoon beach at Lord Howe Island by Mr. R. E. Baxter. Several others are in the Australian Museum from off Norah Head and off Botany Bay, New South Wales, 26-38 fathoms, where the species is occasionally captured by the trawlers.

Family STROMATEIDAE.CUBICEPS *Lowe.*

CUBICEPS *Regan*, Ann. Mag. Nat. Hist. (7) x, 1902, p. 122 (revision).

The genus *Ariomma* *Jordan & Snyder*, has been regarded as synonymous with *Cubiceps* by *Regan*, Brit. Antarc. Exped., Zool. i, 1, 1914, pl. 20, but it apparently differs in having adipose eyelids, while the palate is toothless.

Key to the species of *Cubiceps*:—

- a. 20-23 dorsal and 19-21 anal rays.
- b. Depth of body 4-4½ in length to hypural joint. *gracilis.*
- bb. Depth greater than one-fourth the length to the hypural joint.
- c. Premaxillary concealed by preorbital when mouth is closed; 60 or more scales on lateral line.
- d. Caudal peduncle about twice as long as deep. *capensis.*
- dd. Caudal peduncle almost as deep as long. *baxteri.*
- cc. Premaxillary not entirely concealed by preorbital when mouth is closed; about 52 scales on lateral line. *caeruleus.*
- aa. 14-17 dorsal and 14-15 anal rays.
- e. Pectoral fin longer than the head. *pauciradiatus.*
- ee. Pectoral fin shorter than the head. *brevimanus.*

CUBICEPS CAERULEUS Regan.

(Plate i, fig. 3.)

Cubiceps caeruleus, Regan, Ann. Mag. Nat. Hist. (8) xiii, 1914, p. 15, and Brit. Antarc. Exped., Zool. i, 1, 1914, p. 19.

Cubiceps gracilis, Waite, Rec. Austr. Mus. v, 3, 1904, p. 162. (Not *C. gracilis*, Günther.)

Characters.—D.xi-i/21; A.iii/21; V.i/5; P.21; C.17. About 52 scales on the lateral line to the hypural joint. Depth (25 mm.) 3.1 in the length to the hypural joint (79); head (22.5) 3.5 in the same. Eye (7.2) 3.1, and depth of caudal peduncle (8) 2.8 in the head. Snout (5.3) 1.3 in the eye, and 1.2 in the interorbital width (6.8). Pectoral fin (25.5) 0.13 longer than the head, its length subequal to the depth of the body.

Maxillary not quite reaching the vertical of the anterior margin of the eye when the mouth is closed. Opercles membranaceous, their surfaces with radiating striae. Supraclavicle and clavicle bones exposed and striate. Each jaw with a single row of small cardiform teeth; a small patch of similar teeth on the vomer, and one or two on the anterior portion of each palatine.

Most of the scales are missing; those remaining are thin, with their surfaces concentrically striated. They covered the greater part of the head, the bases of the anal and caudal fins, and evidently that of the second dorsal also. Lateral line following the curve of the back; a groove extends along the middle of each side from the shoulder to the caudal peduncle. Fin-rays imperfect; the pectoral reaches a trifle beyond the vertical of the origin of the anal fin.

Identity.—The specimen here characterised and figured was identified by Waite as *C. gracilis*, but it apparently differs from that species in being considerably broader and in having a shorter maxillary and fewer scales on the lateral line. It is evidently referable to *C. caeruleus*.

Locality.—Lord Howe Island.

CUBICEPS BAXTERI, *sp. nov.*

(Plate i, fig. 4.)

D.xi/23; A.iii/21; P.23; V.i/5; C.?. About 62 scales on the lateral line between its origin and the hypural joint; 5 between the first dorsal spine and the lateral line, and 21 more to the vent.

Depth of body 3.7 in the length to the hypural joint; head 3.2 in the same. Eye almost as wide as its distance from the premaxillary symphysis, a little narrower than the interorbital width, and 3.7 in the head. Snout 3.5, interorbital space 3.2 in the head. Pectoral fin 0.2 longer than the head. Ventral fin 2.5, second dorsal and anal rays 3.8, depth of caudal peduncle 3.2 in the head.

Though now greatly denuded, the head has been largely covered with scales which extended onto the preorbital bone, mandible, and throat; the anterior portion of the snout, and its sides backward to the eyes is naked. The opercular bones are membranaceous and unarmed; preopercular edge entire and free, its angle produced backward as a broad rounded lobe; operculum and suboperculum denuded of scales, their surfaces with fine radiating ridges. Rows of mucigerous canals extend backward from the snout, above the eye, to the supra-scapular region, and all the fleshy parts of the head are closely pitted with small pores beneath the scales. The eye is large, surrounded by a soft skinny margin, without adipose eyelids. Interorbital space convex. Snout tumid, markedly convex, its upper profile forming an even curve with the head and back. Nostrils two simple openings placed close together near the end of the snout. Maxillary rounded posteriorly, not reaching the vertical of the anterior margin of the eye. Jaws subequal in length, each with a single row of small, somewhat curved, cardiform teeth; a small patch of similar teeth is present on the anterior part of the vomer, from which a single row extends backward along the median line of the palate; a short row of teeth on each palatine. The tongue is smooth and broadly rounded. Gill-openings extending well forward, the membranes free from the isthmus. Pseudobranchiæ present; a slit behind the fourth gill-arch. Eighteen gill-rakers on the lower limb of the first arch, the length of those near the posterior angle a little less than one-third the diameter of the eye.

The body is somewhat compressed, but with the dorsal and ventral surfaces rounded. It was evidently entirely covered with thin cycloid scales of moderate size, which extend onto the bases of the dorsal and anal fins. Lateral line curved upwards anteriorly and subparallel with the back. First dorsal originating a little before the vertical of the ventral spine. The third spine is longest, and the membrane from the last terminates just before the first ray. The second dorsal is elevated anteriorly, but is much lower than the first. The anal is similar in form to the second dorsal, but originates farther back. The pectoral is very large, extending backward well beyond the anterior portion of the anal. Ventral rather small, not reaching the vent, the spine weak and slender. Caudal detached from the specimen and incomplete, but evidently deeply forked.

Colour.—General colour dark brown, the vertical fins and the ventrals blackish; pectorals lighter.

Described and figured from an imperfect specimen, 371 mm. long without the tail. Most of its scales are missing, but some remain on the sides of the posterior portion of the body, and its caudal fin has become detached from the hypural bone, which is exposed.

Affinities.—This species is closely allied to *C. capensis* Smith,³ but apparently differs in having the caudal peduncle much shorter,

³ Smith, Zool. S. Africa, Pisces, 1849, p. —, pl. 24.

the pectoral fin longer, and the longest dorsal spine much higher than the third ray. Smith's figure may not represent these characters accurately, however, and I am unable to refer to a later illustration of the species published by Ariola.⁴

Locality.—Lord Howe Island. The specimen was found stranded on a beach after a gale by Mr. R. E. Baxter, to whom the Trustees are indebted for many rarities from the island.

Family LABRIDAE.

INIISTIUS PAVONINUS Cuv. & Val.

Xyrichthys pavoninus Cuv. & Val., H.N. Poiss. xiv, 1839, p. 63.

Iniistius pavoninus Jord. & Evm., Bull. U.S. Fish. Comm. xxiii, i, 1905, p. 329, fig. 139, pl. xlii (synonymy).

Iniistius cacatua Waite, Rec. Austr. Mus. iv, 1, 1901, p. 41, pl. vii.

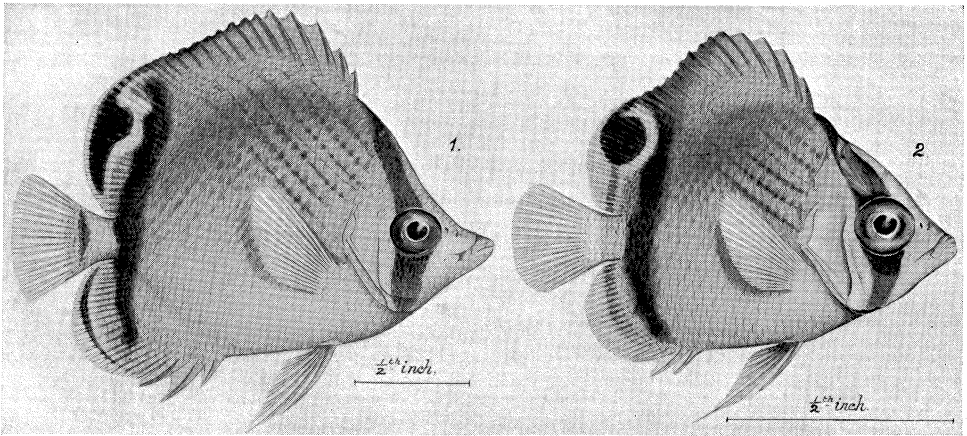
Synonymy.—A comparison of the holotype of *I. cacatua*, with a smaller Hawaiian example, which is evidently *I. pavoninus*, shows them to be very similar in all details except the position of the anterior dorsal spine. This is a little farther back in the larger example, but is not so far back as is illustrated in Waite's rather crude figure, which is inaccurate in other details such as the backward extension of the mouth and the relative length and depth of the head.

Localities.—Lord Howe Island; holotype of *I. cacatua*. Honolulu, Hawaiian Islands.

⁴ Ariola, Revista mens. Pesca vii, 1912, p. 185, pl. —.

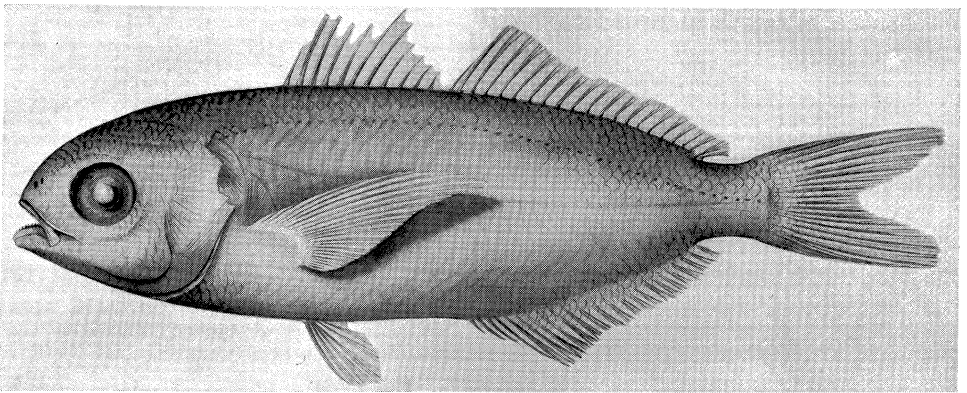
EXPLANATION OF PLATE I.

- Fig. 1. *Chaetodon vagabundus* Linnaeus. A young specimen, 54 mm. from Murray Island, Torres Strait.
- „ 2. *Chaetodon vagabundus* Linnaeus. A very young specimen, 24 mm. long, from the New Hebrides.
- „ 3. *Cubiceps caeruleus* Regan. Lord Howe Island.
- „ 4. *Cubiceps baxteri* sp. nov. Holotype, 371 mm. long without the tail, from Lord Howe Island.

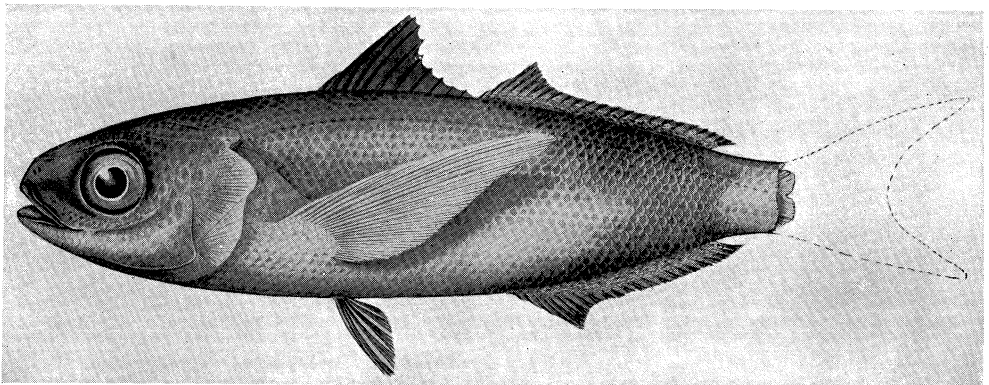


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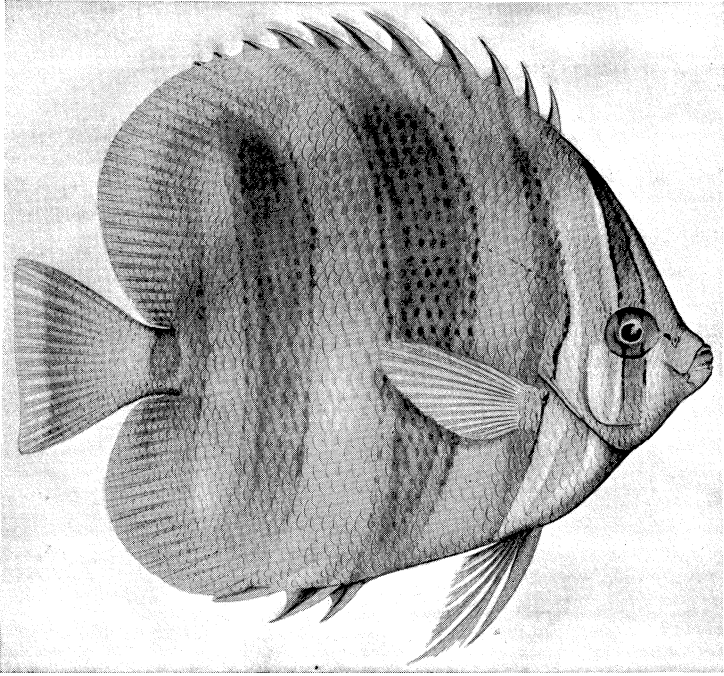
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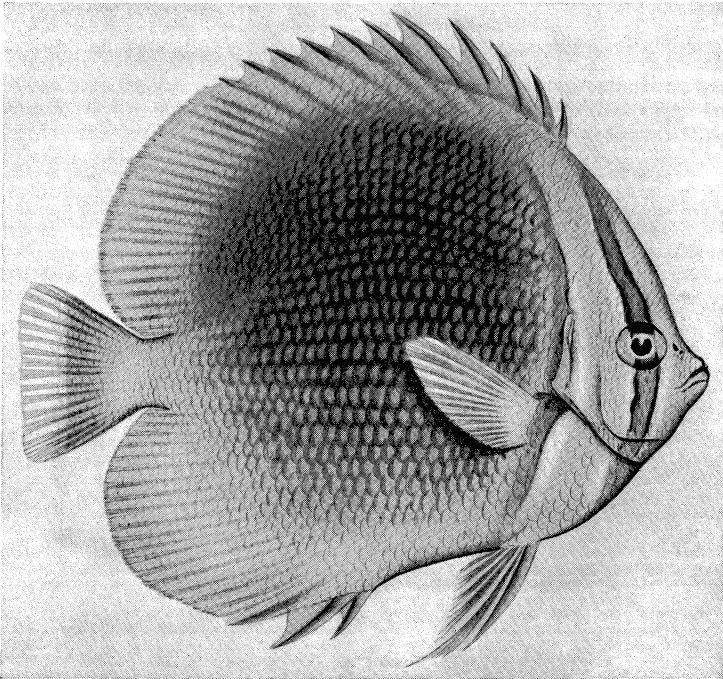
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EXPLANATION OF PLATE II.

- Fig. 1. *Chaetodon rainfordi* sp. nov. Holotype, 118 mm. long, from
Holbourne Island, off Port Denison, Queensland.
- „ 2. *Chaetodon aureofasciatus* Macleay. A specimen, 111 mm.
long, from Holbourne Island, Queensland.



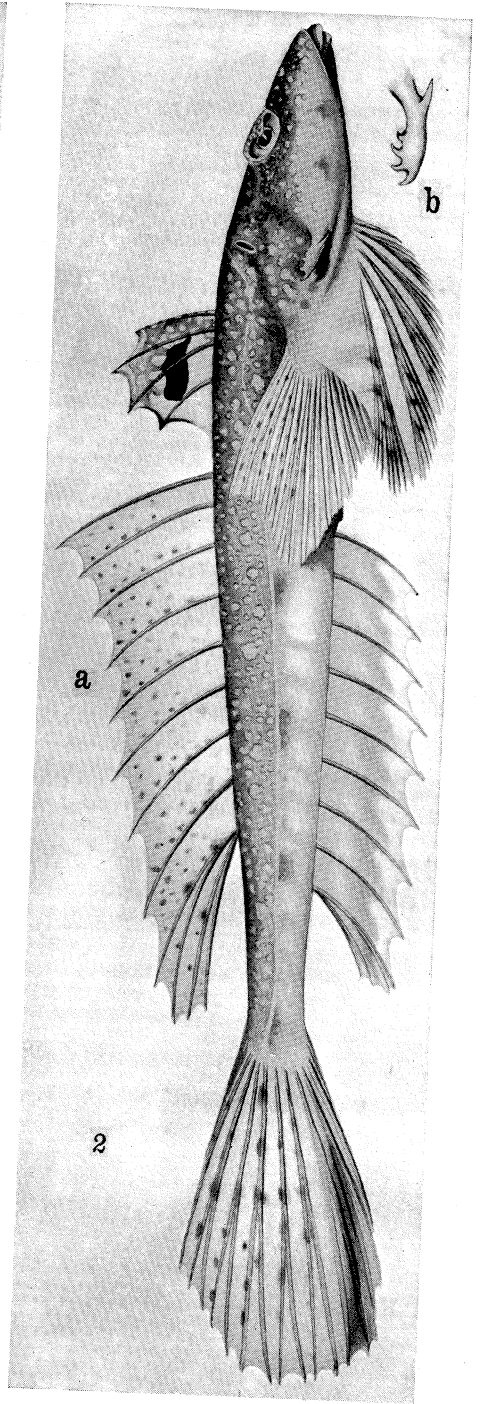
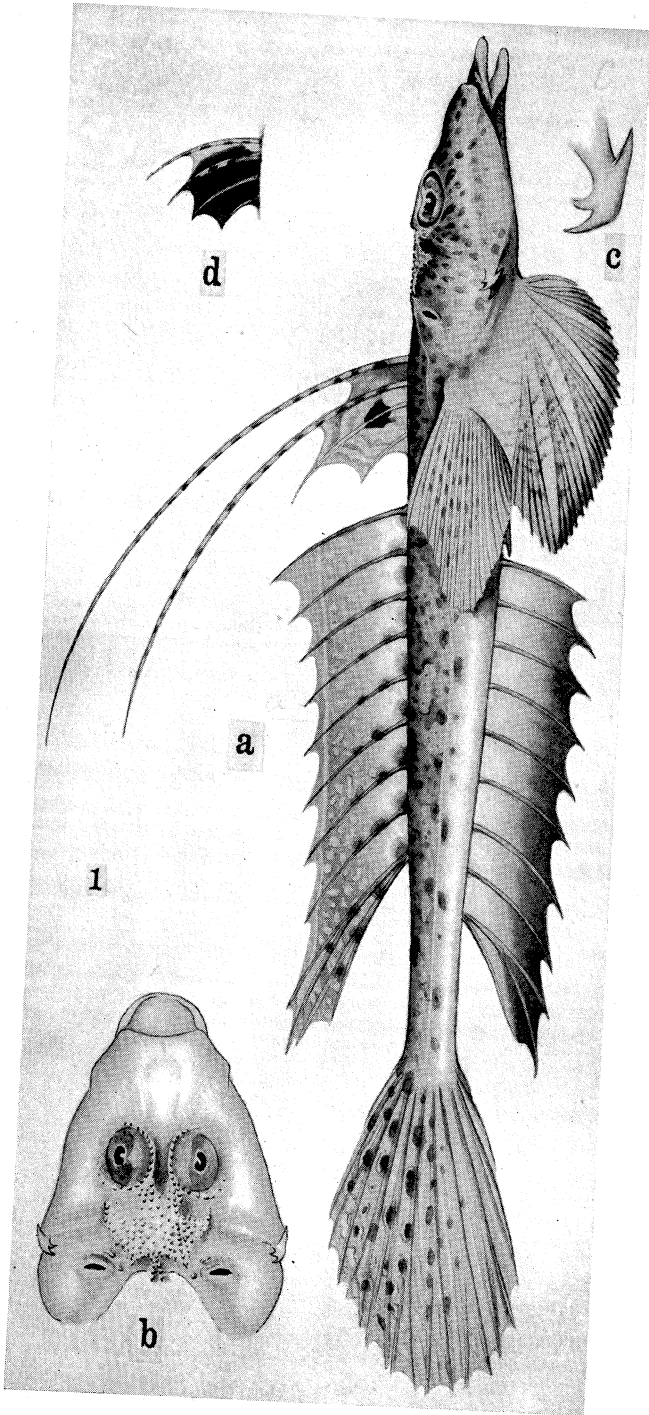
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EXPLANATION OF PLATE III.

- Fig. 1. *Callionymus limiceps* Ogilby. *a.* A male example, 216 mm. long, from near Cape Capricorn, Queensland.
b. Head of same specimen.
c. Preopercular spine of same specimen.
d. Dorsal fin of female.
- „ 2. *Callionymus calcaratus* Macleay. A specimen, 242 mm. long, from Port Jackson.



A. R. McCULLOCH, del.