

## CONTRIBUTION TO AUSTRALIAN ICHTHYOLOGY.

BY J. DOUGLAS OGILBY.

In the paper here submitted to the Society descriptions of the following new genera and species of Australian fishes are given:— (PLOTOSIDÆ) *Euristhmus*, g.n., and *Ostophycephalus duriceps*, g. and sp.nn.; (GALAXIIDÆ) *Galaxias occidentalis*, sp.n.; (SERRANIDÆ) *Bostockia* (g. redescri.) *hemigramma*, sp.n.; *Epinephelides leai*, g. and sp.nn.; (THERAPONIDÆ) *Therapon humeralis*, sp.n.; and (CEPOLIDÆ) *Cepola australis*, sp.n. The following species, which have been insufficiently diagnosed, are also redescribed:— (MONOCENTRIDÆ) *Monocentris gloria-maris*; (CHEILODIPTERIDÆ) *Apogon rüppellii*; (SERRANIDÆ) *Edelia vittata*; and (SCARIDÆ) *Pseudoscarus gymnognathos*. Notes on *Callanthias platei* are also given; and the suggestion is here thrown out that *Callanthias* (type—*peloritanus*), *Anogramma* (type—*allporti*), and *Gramma* (type—*loreto*) should be set apart as a subfamily (*Callanthiinae*) of the SERRANIDÆ. The families MONOCENTRIDÆ and CEPOLIDÆ are also diagnosed in this paper.

Most of the new species are from West Australia, and were kindly collected and given to me by Mr. Lea, now Government Entomologist of Tasmania, but at that time holding a similar position to the West Australian Government.

Two important species were obtained in Port Jackson, and in this case the honour of adding two new families to the Australian fauna is due to Mr. Brodie, who has kindly submitted to me for identification *Gonorhynchus greyi* and *Cepola australis*.

## PLOTOSIDÆ.

EURISTHMUS, gen.nov.

Body elongate; tail more than twice as long as the head and trunk. Skin smooth. Head tetragonal, much wider than deep,



with small, wart-like papillæ. Mouth moderate; lips thick and papillose, the upper without posterior filament; no mental lobe. Premaxillary teeth conical, in two small patches, the outer series enlarged; mandibular teeth forming an interrupted crescentic band, pluriserial, the outer row enlarged and bluntly conical, the rest granular; vomerine teeth granular and unequal. Anterior nostril on the outer edge of the lip, simple. Barbels moderate. Eyes small, sublateral, without free lid. Gill-membranes separate, broadly attached to the isthmus; gill-openings moderate; seven or eight branchiostegals; gill-rakers in small number; axillary pore present. First dorsal fin originating behind the base of the pectoral; second dorsal longer than the anal; ventrals rounded, with 12 or 13 rays, inserted behind the origin of the soft dorsal; pectoral rounded, with 8 or 9 soft rays; caudal pointed.

*E t y m o l o g y* :—*εὐρύς*, wide; *ἰσθμός*, isthmus.

*T y p e* :—*Plotosus elongatus*, Castelnau.

*D i s t r i b u t i o n* :—Northern and eastern coasts of Australia. To this genus also belongs *Cnidoglanis lepturus*, Günther.

#### OSTOPHYCEPHALUS, gen.nov.

Body moderately elongate; tail more than twice as long as head and trunk. Skin smooth. Head trigonal, much wider than deep, feebly vermiculated, with a few scattered papillæ. Lips rather thin, the upper without posterior filament; mental lobe small. Premaxillary teeth conical, in two small patches, subequal; mandibular teeth forming an interrupted crescentic band, pluriserial, the outer series enlarged and conical, the inner granular; vomerine teeth granular and irregular. Anterior nostril on the outer edge of the lip, simple. Barbels short. Eyes small, lateral, without free lid. Gill-membranes separate, broadly attached to the isthmus; gill-openings moderate; eight branchiostegals; pseudobranchiæ present; gill-rakers in small number; axillary pore well developed. First dorsal fin originating above the base of the pectoral; second dorsal longer than the



anal; ventral rounded, with 11 rays, inserted behind the origin of the second dorsal; pectoral with 8 soft rays; caudal rounded.

**E t y m o l o g y**:—ὀστροφύης bony; κεφαλή, head.

**T y p e**:—*Ostophycephalus duriceps*, Ogilby.

**D i s t r i b u t i o n**:—St. Vincent's Gulf, South Australia. The species described by Günther in the Challenger Reports (i. Shore Fishes, p. 49) as *Cnidoglanis nudiceps* possibly belongs to this genus.

**OSTOPHYCEPHALUS DURICEPS, sp. nov.**

B. viii. 1 D. i 5. 2 D. + C. + A. 227 (111 + 10 + 106).

Depth of body 11 (?), length of head  $4\frac{7}{10}$  in the total length; width of head  $\frac{2}{3}$  of its length, which is  $\frac{3}{5}$  of the distance between the tip of the snout and the vent; upper profile of head gently rounded and but little oblique. Eye with wholly adnate lid, its diameter  $8\frac{3}{5}$  in the length of the head and  $3\frac{3}{4}$  in that of the snout, which is sharply pointed, but weakly declivous at the extremity, and  $1\frac{1}{3}$  times as long as wide; lower lip feebly plicated, the mental lobe small and divided. Interorbital region slightly concave, its width  $\frac{3}{4}$  of that of the mouth and  $3\frac{3}{4}$  in the length of the head. Premaxillary teeth in two small patches, consisting of three teeth each; mandibular teeth in a wide, crescentic, divided band, each half of which is twice as long as broad; a pair of enlarged conical teeth on each side of the symphysis; vomerine patch large, forming an equilateral triangle. Barbels very short and slender, the nasal  $\frac{1}{6}$  of the head and reaching little more than half way to the eye; maxillary barbel even shorter than the nasal; postmental barbel inserted well inside and behind the angle of the mouth, reaching in a direct line midway to the gill-opening, and  $\frac{2}{9}$  of the head; mental barbel  $\frac{1}{3}$  longer than the postmental. Greatest width of the isthmus but little less than the interorbital width. Gill-rakers 2 + 6, the longest  $\frac{3}{5}$  of the diameter of the eye. Skin of head above finely vermiculated, below closely studded with minute pores. Axillary pore large. Distance of first dorsal from tip of snout  $4\frac{1}{2}$  in the total length; dorsal spine moderate, serrated



in front, barbed behind, its length  $\frac{1}{3}$  of that of the head, and much less than the rays, which do not reach to the origin of the second dorsal; second dorsal originating slightly in advance of the base of the ventral: distance of anal fin from tip of mandible  $2\frac{3}{5}$  in the total length: ventral rounded, with 11 rays, its length  $3\frac{1}{4}$  in the head: pectoral with 8 soft rays, the spine serrated on the outer border, its length  $2\frac{1}{2}$  in that of the head and  $\frac{9}{10}$  of the soft rays, which do not reach to the base of the ventral: caudal small and rounded,  $\frac{1}{4}$  of the head. Blue-grey, darkest above, the upper surface of the head nearly black.

*E t y m o l o g y* :—*durus*, hard; *ceps*, head.

Type in the South Australian Museum, Adelaide.

*D i s t r i b u t i o n* :—St. Vincent's Gulf, South Australia. The unique example from which the above description was drawn up appears to have been washed ashore and partially sun-dried; it measures 383 millimeters. I have, however, seen a specimen of *Plotosus* equally constricted in the abdominal region, the evident cause being the presence of a large number of free-swimming copepods (*Lerneolophus* sp.) attached to the inside of the mouth and throat. The condition of the species described above may therefore have been due to disease.

## GALAXIIDÆ.

### GALAXIAS OCCIDENTALIS, sp.nov.

B. vii. D. 8-9. A. 13-14.

Body moderately stout and compressed, its depth 5 to  $5\frac{1}{3}$  in the total length, its width  $1\frac{1}{2}$  to  $1\frac{2}{3}$  in its depth. Length of head  $4\frac{4}{5}$  to 5 in the total length; width of head equal to its depth and  $1\frac{3}{4}$  to 2 in its length. Interorbital region flat, its width  $2\frac{2}{3}$  to  $2\frac{4}{5}$  in the head. Diameter of eye 4 to  $4\frac{1}{2}$  in the head and  $1\frac{1}{5}$  to  $1\frac{1}{3}$  in the snout. Lower jaw the longer. Maxillary extending to or a little beyond the vertical from the anterior border of the eye, its length  $2\frac{2}{5}$  to  $2\frac{2}{3}$  in the head. Gill-rakers 3+10, short. Dorsal and anal fins rounded; the space between the origin of



the dorsal and the base of caudal  $2\frac{2}{3}$  to  $2\frac{4}{5}$  in its distance from the extremity of the snout, its length 1 to  $1\frac{1}{4}$  in its height,  $1\frac{2}{5}$  to  $1\frac{1}{2}$  in the length of the anal, and  $1\frac{2}{5}$  to  $1\frac{2}{3}$  in the distance between its origin and the anal: anal commencing opposite to or a little behind the origin of the dorsal, its base as long as or a little longer than its distance from the caudal; longest rays when laid back not reaching beyond the short posterior rays: ventral with seven rays, inserted a little nearer to the tip of the mandible than to the base of the caudal, its length  $1\frac{3}{4}$  to  $1\frac{4}{5}$  in the head and  $2\frac{1}{5}$  to  $2\frac{1}{2}$  in the space between its origin and the anal, which is as long as or slightly less than its distance from the base of the pectoral; pectoral with 14 rays, as long as or a little longer than the ventral, and less than half the distance between its base and that fin: caudal emarginate, 6 to  $6\frac{1}{2}$  in the total length; least depth of caudal peduncle 2 to  $2\frac{1}{4}$  in its length behind the dorsal, which is  $1\frac{1}{5}$  to  $1\frac{1}{3}$  in the head. Vertebrae 57 (37 + 20). Dull yellow, everywhere closely powdered with minute dusky dots; body with twelve to fourteen golden, blue-edged transverse bands, which are more crowded on the tail, and do not extend to the dorsal and abdominal profiles: fins immaculate. Young examples are dark brown with bluish transverse bands.

E t y m o l o g y :—*occidentalis*, western; this being the first species recorded from west of the Murray watershed.

Type in my possession.

Length of largest specimen 105 millimeters.

D i s t r i b u t i o n :—Streams south of Perth.

This handsome species belongs to the group of which *Mesites attenuatus*, Jenyns, is the type and which differs from the typical *Galaxias* (type *alepidotus*) in its slender, subterete or slightly compressed body, small head which is as wide or a little wider than deep, small mouth, fewer (six or seven) branchiostegals, small fins, and emarginate caudal. This group might in future be known as *Austrocobitis*, that name being substituted for *Mesites*, Jenyns,\* preoccupied by Schönherr in 1838 for a genus of coleopterous insects.

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\* Voy. Beagle, Fish. iii. p. 118, 1842.



## MONOCENTRIDÆ.

Body ovate, strongly compressed. Head large, with conspicuous muciferous cavities, the snout blunt and gibbous, projecting somewhat beyond the mouth. Mouth wide with oblique cleft, the lower jaw included, broad and truncated in front, with an oval, glandular, luminous disc behind the angle. Premaxillaries protractile, uniting to form a deep symphysial cavity, at the bottom of which is a similar disc, and constituting the entire dentigerous portion of the upper jaw; maxillary narrow, sigmoidal, hidden in front and behind by the shields of the orbital ring, provided with a large supplemental bone. Teeth minute, closely set, tubercular, covering the jaws, palatines, pterygoids, and branchial arches; present or absent on the vomer; tongue toothless or with scattered patches of teeth. Nasal openings large and patent, separated from one another by a narrow naked isthmus, which is curved forward across but is not connected with the deeper curtain which partially divides the nostril from the wide and deep preorbital cavity; both nostril and cavity are separated from the eye by a membranous curtain, which is partially protected along its outer margin by a small pyriform dermal shield; the two preorbital cavities are separated above by a wide bony bridge but are continuous within, so that there is an unobstructed view through the snout; each is provided with a luminous disc near its upper and outer edge. Eye large, situated in the anterior half of the head. Bones of the head rugose but not spiniferous, forming a network, the smooth membranous interspaces profusely punctured by small open pores; suborbital ring narrow, in part aborted; opercle with a strong curved keel traversing its upper moiety, but without prominent spine. Gill-openings wide; gill-membranes separate, free from the isthmus; gills four; the membrane behind the fourth closed; eight branchiostegals; pseudobranchiæ present; gill-rakers short and stout, densely spinulose. Two separate dorsal fins, the first composed of a few strong, rough, more or less isolated spines, which are alternately inclined to left and right; soft dorsal with eleven or



twelve articulated rays; anal short with ten to twelve rays; ventral inserted below the base of the pectoral, with an enormously developed spine and two to four rudimentary rays; the spine provided with a locking apparatus, by means of which it can be immovably fixed at right angles to the axis of the body; when laid back it fits into a smooth groove outside of the abdominal scutes; pectoral moderate, asymmetrical, with thirteen to fifteen rays, the upper the longest; caudal emarginate and rather small; all the soft rays strongly spinulose. Scales large, coarse, and but little imbricated, each with a strong, median carina, bearing near its centre a stout backwards directed spine, from the base of which radiate spinulose striæ; abdomen protected by a series of largely developed scutes; soft dorsal and anal fins depressible within a scaly groove. Air-bladder large. Pyloric appendages in small number.

Inhabitants of the Western Pacific and Indian Oceans, residing possibly at considerable depths but visiting the neighbourhood of the shore at stated seasons.

Referring to the Japanese species, *Monocentris japonicus*, Schlegel writes:\* “Common in Japan, and found in great numbers in winter and spring in the Bay of Nagasaki; its flesh is much relished by the inhabitants of the empire, and they usually eat it raw.”

In comparing our Australian fish with the typical form, several points immediately claim our attention:—

Primarily all the authors whom I am in a position to consult—Cuvier and Valenciennes, Schlegel, and Günther—agree in denying to *M. japonicus* the presence of vomerine teeth; in fact, the authors of the “Histoire Naturelle” go out of their way to remark that the absence of these teeth is “chose singulière.”

The dental diagnosis is thus given by Günther, “villiform teeth in the jaws and on the palatine bones, none on the vomer.”† This brief announcement conveys at best but a hazy idea of the

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\* Fauna Japonica, Pisces, p. 50.

† Catalogue of Fishes, i. p. 9.



dentition of our fish, in which the teeth would more correctly be termed tubercular, and form in fact a smooth pad-like surface, which entirely covers the jaws, both outside and inside, palatines, pterygoids, and branchial arches, and partially the vomer and tongue.

There is no reference in any of the authors above mentioned to the curious bifurcation of the dentary nor to the luminous mandibular disc, the presence of which is, however, the obvious cause of the departure from its ordinary form which has taken place in that bone, since the supplementary external limb has been manifestly provided for the protection of the sensitive light glands, the teeth with which it is armed being of little or no use in such a position. The presence of luminous glandular discs, as such, is not in fact referred to anywhere, though Cuvier and Valenciennes, in their excellent account of the Japanese fish, speak of these discs as colour-markings, not recognising their true character. In addition to these mandibular discs, there are, as mentioned in the diagnosis of the family, three other discs, namely, the maxillary disc, situated at the bottom of the symphyseal cavity, and the two preorbital discs, covering the postero-superior angle of the largely developed cranial canal, which uninterruptedly pierces the rostral framework from side to side in front of the eyes. There is no apparent necessity for this latter pair of luminous discs, unless they are provided for the purpose of disseminating light immediately in advance of the visual organs; but with the three remaining discs the case, as it appears to me, is very different, for I think we may fairly conclude that these luminous glands serve as traps to entice their prey within reach; some such provision would, in fact, be necessary to a species which, having regard to the small size of the fins and the comparative inflexibility of the dermal incasement, must needs be possessed of but feeble swimming powers, and the position of the maxillary and mandibular discs fully supports the legitimacy of this deduction. For, while the glow of the maxillary organ, set as it is in the recess of a cup-shaped cavity, would only be visible to a creature stationed or passing directly



in front of the fish, the luminosity of the mandibular organs would, when the mouth was open, be patent to any animal approaching from the side or behind, and would thus prove a valuable adjunct to the symphysial disc of the upper jaw; while the mere act of closing the mouth would shut off the light whenever its presence was liable to prove a source of danger.

Again, the author of the ichthyological portion of Lydekker's "Royal Natural History" writes of *Monocentris japonicus* as having the scales "articulated together so as to form a solid armature." Whatever may be the case with regard to the Japanese fish I do not know, not having a specimen for examination, but it is certain that no such articulated coat of mail exists in the Australian species; on the contrary, the scales are normally developed, though greatly thickened and embossed, and, far from forming a "solid armature," are only partially imbricated, especially on the tail, so that the naked skin is plainly visible through the interstices, as is observable with many snakes.

If the statement as to the articulation of the scales is correct, and if the luminous organs, which are so conspicuous in the Australian form, are wanting in the Japanese, there can be no doubt that our fish must be relegated to a different genus; but in the absence of special information on these points, I am not prepared to go so far, and shall, therefore, for the present, consider De Vis' *Cleidopus* as a subgenus of *Monocentris*, restricting the latter name to those species in which the vomer is toothless.

In the "Study of Fishes," Günther announces that *Monocentris* is found at Mauritius, but as I have failed to find any earlier or fuller record of such occurrence, I am unable to decide whether the Mauritian fish belongs, as would seem more probable, to our type or to that of the North Pacific.

#### MONOCENTRIS.

*Monocentris*, Bloch and Schneider, Syst. Ichth. p. 100, 1801.

*Lepisacanthus*, Lacépède, Hist. Nat. Poiss. iii. p. 321, 1802.

*Cleidopus*, De Vis, Proc. Linn. Soc. N.S. Wales, vii. 1882, p. 367.

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\* Royal Natural History, v. p. 354. The statement is not, so far as I am aware, confirmed by other authors.



Characters included in those of the family.

*Móvos*, single; *κεντρís*, a thorn (*Ælian*).

Type, *Monocentris carinata*, Bloch and Schneider = *Gasterosteus japonicus*, Houttuyn.

Coasts of Japan, Eastern Australia, and Mauritius; approaching the shore during the colder months.

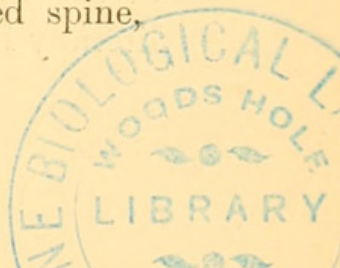
#### MONOCENTRIS GLORIA-MARIS.

*Monocentris japonicus* (not Houttuyn), Macleay, Proc. Linn. Soc. N.S. Wales, v. 1881, p. 510.

*Cleidopus gloria-maris*, De Vis, Proc. Linn. Soc. N.S. Wales, vii. 1882, p. 368.

D. v-vii. 12. A. 11-12. Sc. 2/14-15/4-5.

Depth of body  $1\frac{3}{5}$  to  $1\frac{3}{4}$ , length of head  $2\frac{1}{2}$  to  $2\frac{3}{4}$  in the total length; width of interorbital region 2 to  $2\frac{1}{3}$ , diameter of eye 3 to  $3\frac{1}{5}$  in the length of the head; snout short and rounded, its height as great as or greater than its length, which is  $\frac{3}{5}$  to  $\frac{3}{4}$  of the diameter of the eye; upper profile of head behind the gibbosity slightly concave. Maxillary extending to the vertical from the posterior border of the eye or not quite so far, its length 2 to  $2\frac{1}{4}$  in that of the head, its greatest width  $4\frac{3}{4}$  to  $5\frac{1}{4}$  in its length. 12 gill-rakers on the lower branch of the anterior arch, the longest about  $\frac{2}{5}$  of the diameter of the eye. Dorsal fin originating above or very slightly behind the base of the pectoral; second spine longest,  $1\frac{1}{3}$  to  $1\frac{1}{2}$  in the length of the head and a little longer than the third; first spine intermediate in length between the third and fourth; fifth spine short; these five are always present and united by membrane at the base; one or two small spines present or absent between the two dorsals; outer border of soft dorsal rounded, the middle rays about as long as the first spine: anal originating below the middle of the soft dorsal, the anterior rays the longest, 2 to  $2\frac{2}{5}$  in the length of the head: ventral with three or four rudimentary rays and an enormously developed spine,





which is almost as long as the head and extends to, or nearly to, the end of the fourth abdominal scute; the free portion of the spine is longitudinally fluted: pectoral with 14 or 15 rays,  $1\frac{2}{5}$  to  $1\frac{1}{2}$  in the length of the head: caudal fin about  $\frac{1}{5}$  of the total length; the peduncle rather weak, its depth equal to or less than the diameter of the eye. Abdominal scutes five, the second the longest, as long as the terminal pair and about  $\frac{2}{5}$  of the length of the ventral spine; soft dorsal and anal sheaths composed of three pairs of scales, each of which is armed with a strong denticulated spine and an outer serrated edge; expanded portion of the maxillary closely studded with short, stout, conical spines, that part which impinges upon the orbit being smooth or nearly so; opercle with spinulose striæ radiating from the base of the keel; remaining bones of the head irregularly spinulose and pitted. Whitish with a golden gloss anteriorly, the black skin visible between the scales, especially on the tail; lips and chin black, the naked space between the mandibles with numerous broad, fleshy, white tentacles; luminous discs yellow; bony portion of maxilla and the skin behind and beneath it white; tips of the larger gill-rakers dull blue.

E t y m o l o g y :—*gloria*, glory; *maris*, of the sea.

Type examined, in the Queensland Museum.

Length to 225 millimeters.

Eastern coast of Australia, south to Port Jackson.

The "Knight-fish," so called because of the coat of mail by which it is protected, occurs sporadically on our coast, usually among the detritus washed up on the beach during stormy weather. It may not, however, be so uncommon as would appear from the small number of specimens to be found in our museums, for, being plainly a fish which haunts rocky localities, it would necessarily be out of reach of our net fishermen, while its sluggish habits and dependence on the efficacy of its luminous traps to lure its prey within its reach—a mode of angling which of course necessitates absolute quietude in the angler—takes it equally out of the scope of the line fisher's art, unless he should chance to drop the bait literally into its mouth.



In addition to the type specimen, I have been able to examine four others, three of which are in the Australian Museum and were obtained from Port Jackson (2) and Port Stephens, while the fourth was kindly lent me by Mr. A. Finckh, of the Technological Museum.

## CHEILODIPTERIDÆ.

### APOGON RÜPPELLII.

*Apogon rüppellii*, Günther, Catal. Fish. i. p. 236, 1859; Port Darwin.

D. vii, i 9. A. ii 9-10. Sc. 2/25-26/6.

Depth of body  $2\frac{1}{5}$  to  $2\frac{2}{3}$ , length of head  $2\frac{2}{3}$  to  $2\frac{3}{4}$  in the total length. Dorsal profile strongly, abdominal moderately arched; upper profile of head slightly rounded. Snout  $\frac{5}{7}$  to  $\frac{2}{3}$  of the diameter of the eye, which is  $2\frac{3}{4}$  to 3 in the length of the head. Interorbital region flat, its width  $3\frac{1}{2}$  to  $3\frac{2}{3}$  in the head. Maxillary concave posteriorly, extending to the vertical from the middle of the eye, its length  $\frac{1}{2}$  of that of the head, its width at the distal extremity  $2\frac{1}{5}$  to  $2\frac{3}{5}$  in the diameter of the eye. Outer edge of preopercle serrated, most strongly at the broadly rounded angle; inner ridge with a few serræ at the angle. Cheek with a single series of tube-bearing scales. Gill-rakers 4 + 12, the longest  $\frac{1}{2}$  of the eye. Dorsal fin originating above the base of the pectoral, its distance from the tip of the snout  $\frac{5}{7}$  to  $\frac{1}{2}$  of that from the base of the caudal; third and fourth spines equal or the fourth a little the longer,  $\frac{2}{3}$  to  $\frac{4}{7}$  of the head and  $\frac{5}{6}$  to  $\frac{3}{4}$  of the longest soft rays; spine of second dorsal as long as or a little shorter than that of first; length of second dorsal  $\frac{3}{5}$  of its height and less than that of the anal: second anal spine about as long as the fifth dorsal,  $\frac{3}{5}$  to  $\frac{4}{7}$  of the rays, which are subequal to those of the dorsal: ventrals pointed,  $\frac{4}{5}$  to  $\frac{5}{7}$  of the head, and reaching beyond the origin of the anal: pectoral with 14 rays, reaching to the vertical from the 13th or 14th scale of the lateral line,  $\frac{4}{5}$  to  $\frac{3}{4}$  of the head: caudal rounded,  $3\frac{1}{4}$  in the total length; least depth of caudal peduncle  $\frac{3}{4}$  to  $\frac{3}{5}$  of its length and  $2\frac{1}{5}$  to  $2\frac{3}{5}$  in the depth of



the body. Vertebrae reddish; a series of nine to eleven black spots along the lateral line; a similar spot at the base of the last dorsal and anal rays, and two or three on the upper edge of the peduncle; border of some of the anterior scales above the lateral line black; an oblique bar from the eye to the angle of the preopercle, consisting of numerous small pearly black-edged spots: fins yellowish, the first dorsal apparently with dusky tip.

**E t y m o l o g y** :—Named for Dr. Rüppell, author of several works on the fishes of the Red Sea.

Type in the South Kensington Museum.

Total length 110 millimeters.

**D i s t r i b u t i o n** :—West coast of Australia. Günther's type came from Port Darwin. There are two specimens in Mr. Lea's collections, one, the larger, from Pelsart Island, and a second (50 millimeters) from the neighbourhood of Perth.

## SERRANIDÆ.

### BOSTOCKIA.

*Bostockia*, Castelnau, Proc. Zool. & Acclim. Soc. Vict. ii. 1873, p. 126 (*porosa*).

Body oblong, compressed. Scales moderate, adherent, cycloid, concentrically striated. Lateral line complete or incomplete, the tube straight, each extending over at least two scales (in *hemigramma*). Head large, partially naked; snout broad and depressed; muciferous system largely developed. Mouth with rather wide, oblique cleft, the chin slightly protruding. Premaxillaries but little protractile; maxillary exposed, naked, with supplemental bone. Jaws, vomer, and palatines with bands of villiform teeth; pterygoids and tongue smooth; lower pharyngeal bones narrow, the teeth acute and conical. Nostrils distant, the anterior on the border of the lip, tubular. Eyes moderate, high, sublateral. Preopercle with a double ridge, the outer serrated; opercle with a single spine, the lobe well developed. Gill-openings wide; gill-membranes separate, free from the isthmus; six branchiostegals; pseudobranchiæ rudimentary; gill-rakers short and clavi-



form or tubercular, few in number. One dorsal fin, with vii-viii 15-17 rays, the soft portion longer than the spinous; anal shorter than the dorsal, with iii 10-11 rays; ventrals small, inserted a little behind the pectorals, close together, with a strong spine and five soft rays; pectorals moderate, rounded, with 12 or 13 rays, the middle the longest; caudal rounded or obtusely pointed. Vertebrae 33 (in *hemigramma*).

**E t y m o l o g y**:—Named for the Rev. — Bostock, who made considerable collections in West Australia from twenty-five to thirty years ago.

**T y p e**:—*Bostockia porosa*, Castelnau.

**D i s t r i b u t i o n**:—Fresh waters of West Australia.

The genus *Bostockia* was proposed by Castelnau in 1873 for the reception of a fish found "in the small watercourses of the interior of Western Australia." Since that time the genus has not been again recorded until now. Castelnau has erred strangely in the position to which he has assigned his new genus. He remarks:—"This genus of *Percidae* appears nearly allied to *Glaucosoma*"; the latter, however, belongs to the *Lutianidae*, while *Bostockia* is a true serranid and should, I think, be placed near *Macquaria*.

The most obvious difference between the present species and *Bostockia porosa* lies in the formation of the lateral line, which in *B. hemigramma* ceases at or before the vertical from the origin of the anal fin, while in the typical form, according to its describer, "the lateral line follows regularly the profile of the back to the base of the caudal." Were it not that in almost every other structural character my fish resembles that of Castelnau, this difference might be taken as constituting a claim to generic validity, but instances of a similar variation of construction are not wanting in other percoidean genera, such as *Enneacanthus*, *Apomotis* and *Ambassis*, though I am unaware of any such in a typical serranid.

The two species may be synoptically arranged as below:—

Lateral line complete; inner ridge of preopercle serrated anteriorly; caudal fin rounded ... .. *porosa*.



Lateral line incomplete; inner ridge of preopercle everywhere entire; caudal fin obtusely pointed ... *hemigramma*.

BOSTOCKIA HEMIGRAMMA, sp.nov.

D. vii-viii 15-17. A. iii 10-11. Sc. 43-47/24. L.1. 8-15.

Depth of body 3 to  $3\frac{2}{5}$ , length of head  $2\frac{3}{4}$  to  $3\frac{1}{5}$  in the total length. Dorsal profile much more strongly arched than the abdominal; upper profile of head concave before the eyes in the adult, nearly linear in the young. Diameter of eye  $4\frac{2}{5}$  to  $4\frac{2}{3}$  in the length of the head and equal to or a little less than that of the snout. Interorbital region gently rounded, its width  $4\frac{2}{3}$  to  $5\frac{1}{2}$  in the head. Maxillary extending to the vertical from the middle or posterior border of the pupil, its length  $2\frac{1}{5}$  to  $2\frac{1}{2}$  in the head, its width at the distal extremity  $\frac{2}{3}$  to  $\frac{1}{2}$  of the diameter of the eye. Outer border of preopercle with 4 to 6 strong, hidden, antrorse spines on the lower limb and angle; inner ridge entire. Gill-rakers 4 + 7, mostly tubercular. Dorsal originating behind the base of the pectoral; spines strong, the first minute and often imperceptible, increasing in length to the fourth, which is  $\frac{2}{5}$  to  $\frac{1}{4}$  of the head and  $\frac{5}{8}$  to  $\frac{5}{8}$  of the longest soft rays, which are in the latter half of the fin: second anal spine longer and stronger than the third,  $\frac{1}{3}$  to  $\frac{1}{5}$  of the head and  $\frac{2}{3}$  to  $\frac{4}{9}$  of the longest soft rays:\* ventral rounded,  $\frac{1}{2}$  to  $\frac{3}{7}$  of the head and  $\frac{5}{7}$  to  $\frac{1}{2}$  of the space between its origin and the vent: pectoral  $\frac{2}{3}$  to  $\frac{5}{8}$  of the head: caudal sub-cuneate,  $3\frac{3}{5}$  to 4 in the total length; least depth of caudal peduncle equal to or a little shorter than its length and  $\frac{1}{2}$  to  $\frac{3}{7}$  of the depth of the body. A large open pore below the chin and another at the origin of the lateral line. 24 series of scales in a transverse line between the first soft dorsal ray and the anal. Lateral line tubes very variable, never extending beyond the vertical from the origin of the anal. Vertebrae 12 + 21. Tawny-yellow, more or less obscured by dark brown: fins yellow, the soft

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\* The dorsal and anal spines are proportionately much longer in young than in large examples.



dorsal and anal with a median dusky band, the caudal spotted with brown.

**E t y m o l o g y**:—*ἥμι*, half; *γραμμή* line.

Total length to 115 millimeters.

Type in the author's possession.

**D i s t r i b u t i o n**—Coastal streams south of Perth, West Australia.

**EPINEPHELIDES, gen.nov.**

Body oblong, compressed. Scales small, adherent, ctenoid, roughened along the outer border, the exposed surface coarsely striated except a small oval basal patch. Lateral line continuous, the tubes bifurcate on the curved portion, simple on the straight, extending to the posterior border of the scale. Head large, scaly, except the snout, maxillary, and mandible. Mouth with wide, oblique cleft; lower jaw prominent. Premaxillaries protractile; maxillary exposed, ridged anteriorly, without supplemental bone. Jaws with a band of villiform teeth, the inner of which are depressible and hinged; a pair of large curved canines in front of each jaw, and a second pair on each side of the lower jaw; villiform teeth on the vomer and palatines; pterygoids and tongue smooth. Nostrils approximate, the anterior small and round, the posterior a subvertical, oval slit. Eyes large, lateral, high. Preopercle serrated behind, the lower limb with large antrorse spines; opercle with three spines; subopercle serrated. Gill-openings wide; gill-membranes separate, free from the isthmus; seven branchiostegals; pseudobranchiæ present; gill-rakers moderate, cultriform, in small numbers. All the fins with scaly bases; dorsal fin with x 20 rays, the soft portion somewhat longer than the spinous; anal short, with ii 8 rays; ventrals inserted below the base of the pectorals, close together, with a strong spine and five soft rays; pectoral large, obtusely pointed, with 15 rays, the middle the longest, none of them dilated; caudal emarginate. Posterior processes of the premaxillaries extending to the frontal; cranium smooth and convex behind the orbits; supraoccipital and parietal bones very short, with strong crests.

**E t y m o l o g y**:—*Epinephelus*, an allied genus; *εἶδος*, resembling.



Type:—*Epinephelides leai*.

Distribution:—West Australia.

This genus differs from *Gilbertia* in the striated scales, prominent lower jaw, three-spined opercle, number of anal spines, non-dilatation of the lower pectoral rays, emarginate caudal, and backward extension of the posterior process of the premaxillaries.

The first soft ray of the anal fin is simple and spine-like, much shorter than the second, being in fact scarcely or not longer than the enormously developed second spine, and though it is conspicuously articulated throughout two-thirds of its length, it is quite possible that this may be an accidental variation peculiar to the individual and not constant, in which case the anal spines would be of the normal number, three. It is on this account that I have not laid much stress on this character, preferring to wait until other examples are available for comparison.

I am not fully satisfied as to the advisability of associating *Plectropoma semicinctum*, Cuvier and Valenciennes,\* and *P. annulatum*, Günther,† with *P. nigrorubrum*, C.V.,‡ as it appears to me that the strongly marked lateral line with its differently constructed tubes, is worthy of more consideration than has so far been given to it. Fortunately there is no need to seek for a new generic designation, since the two former would still remain under the name *Gilbertia*,§ of which *P. semicinctum* is the type, while the latter is the sole representative of *Hypoplectrodes*,|| Gill, defined by Poey in 1871.¶

#### EPINEPHELIDES LEAI, sp.nov.

D. x. 20. A. ii. 8. Sc. 6/76/29. L.l. 64.

Depth of body  $2\frac{7}{8}$ , length of head  $2\frac{2}{3}$  in the total length. Dorsal profile of body more strongly arched than the abdominal;

\* Hist. Nat. Poiss. ix. p. 442, 1833.

† Catal. Fish. i. p. 158, 1859, Port Jackson.

‡ L.c. ii. p. 402, 1828.

§ Jordan and Eigenmann, Bull. U.S. Fish. Comm. viii. 1890, p. 346.

|| Proc. Ac. Nat. Sc. Philad. 1862, p. 236.

¶ Ann. N. York Lyc. Nat. Hist. x. p. 45, 1871.



upper profile of head rounded. Diameter of eye  $4\frac{1}{4}$  in the length of the head and as long as the snout. Interorbital region flat, its width  $7\frac{4}{5}$  in the head; supraciliary ridges rather feeble. Maxillary extending to the vertical from the middle of the eye, its length from the tip of the snout  $\frac{1}{2}$  of the head, its width at the distal extremity  $\frac{3}{5}$  of the diameter of the eye. Anterior canines strong and hooked, those of the upper jaw the longest; lower jaw with a pair on each side; vomerine teeth in an obtusangular band, the outer slightly enlarged; pectoral band biserial. Preopercle finely and evenly serrated on its vertical limb, the lower with two or three strong antrorse spines; middle opercular spine the strongest, nearer to the lower than to the upper; lower spine not further back than the upper; subopercle with three or four small denticulations inferiorly. Gill-rakers  $6 + 7$ , those on the upper branch rudimentary; the longest  $\frac{1}{2}$  of the diameter of the eye. Dorsal fin originating above the outer border of the opercle and terminating well behind the anal; spines moderate, the tenth as long as the third, the fifth the longest,  $2\frac{4}{5}$  in the head and  $\frac{4}{5}$  of the longest soft rays: second anal spine stronger and longer than the longest dorsal spine,  $2\frac{2}{5}$  in the head and  $\frac{2}{3}$  of the second and longest soft ray: ventral spine strong and curved, not quite so long as the second anal, its length  $\frac{2}{3}$  of the outer ray, which is  $1\frac{2}{3}$  of the head and nearly reaches to the vent: pectoral with 15 rays,  $1\frac{1}{5}$  in the head: caudal emarginate, the outer rays  $\frac{1}{4}$ , the middle  $\frac{2}{9}$  of the total length; caudal peduncle deeper than long, its least depth  $2\frac{2}{5}$  in the depth of the body. Scales of opercle nearly as large as those of the body; on the rest of the head much smaller. Lateral line well marked, the anterior tubes bifurcate, the posterior simple and straight. Dark reddish-brown, the sides of the head and the pectoral region lighter: fins purplish-black, the bases of the dorsal, caudal, and anal orange-red.

**Etymology:**—Named for Arthur Mills Lea, Government Entomologist of Western Australia, who has kindly interested himself, in the face of manifold difficulties of transit, &c., in collecting fishes for the use of the work on the "Fishes of Australasia."



Type in my possession.

Distribution:—Pelsart Island, Houtman Abrolhos Group.

At the first glance this fish bears such a superficial resemblance to the *Epinephelus* type that one would naturally put it down as such, but a closer examination at once reveals its proximity to the *Gilbertia-Colpognathus* type.

In many of its characters this fish bears an extraordinarily close resemblance to the *Serranus armatus* of Castelnau\* described originally from the Swan River, West Australia,† even the coloration being practically the same, but it differs in having but one anterior canine to each ramus of the jaws, two on each side of the lower jaw, palatine teeth few in a narrow band, strong antrorse teeth on the lower limb of the preopercle, three spines on the opercle, second anal spine much the strongest, and fifteen-rayed pectoral.

The unique example collected by Mr. Lea measures 122 millimeters.

#### CALLANTHIINÆ.

During the month of November, 1897, I obtained in the Sydney Market a specimen of *Callanthias*, which I at once recognised as being distinct from the Tasmanian *C. allporti*, but being at the time engaged in the study of our silurids, I neglected to describe the species. Subsequently the "Thetis" expedition obtained six examples "off North Head, 36 miles north of Port Jackson, in 32 to 45‡ fathoms" as recorded by Mr. Waite, under the name of *Callanthias allporti* in the Government "Report upon trawling operations off the coast of New South Wales . . . carried on by H.M.C.S. 'Thetis,' 1898." On talking over the matter with

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\* Res. Fish. Austr. p. 7, 1875.

† By a printer's error this species is said to come from the "Suran River" in the second edition of the British Museum Catalogue of Fishes, i. p. 309. On the preceding page of the same magnificent work another error has crept in, the pagination of *Gilbertia annulata* in Günther's Catalogue being given as 415 instead of 158.

‡ 48 doubtless by a printer's error; see page 9, fifteenth haul.



Mr. Waite, it was agreed that in his enlarged report the species should be described as *Callanthias australis*, but before this could be carried into effect I received from Dr. Franz Steindachner a pamphlet containing, among other matter, the description of a *Callanthias* from Juan Fernandez, to which the name *C. platei* was given, and which does not appear to be specifically distinguishable from our fish. In fact, the only appreciable differences lie in the larger head and eye, somewhat shorter maxillary, and some slight variation in the fin and scale formula in our species, which may be synoptically arranged as follows:—

- a. Head a little more than 4 to  $4\frac{2}{5}$  in total length; diameter of eye a little more than 3 to nearly  $3\frac{1}{2}$  in the head; maxillary extending to below the middle of the eye in the adult, not so far in the young. D. xi 11-12. P. 20. Sc.  $2\frac{1}{2}$ -3/42-45/17 ... .. *platei*.
- aa. Head  $3\frac{3}{4}$  to  $3\frac{7}{8}$  in total length; diameter of eye  $2\frac{3}{5}$  to 3 in the head; maxillary not extending beyond anterior border of pupil at any age. D. xi 10-11. P. 21-22. Sc. 2/42-43/15<sup>9</sup> ... .. *platei australis*.

There is but little difference in the size of the examples examined by Dr. Steindachner and myself, so that one would hardly expect to find such a constant variation in the proportionate measurements as has been pointed out above; it is, therefore, proposed to differentiate our form subspecifically as *Callanthias platei australis*. Dr. Steindachner's specimens measured from 157 to 240 millimeters, mine from 178 to 220. In freshly caught examples there are some slight differences in coloration; for instance, referring to *C. platei*, Dr. Plate writes, "the dorsal and anal fins are dark red"; in the Australian fish these fins are grey or greyish-pink, with a narrow but conspicuous violet marginal band; of the caudal fin Dr. Plate remarks, "sometimes the red, sometimes the violet predominates," while in our form the following pattern is very constant: "base and a broad sub-marginal band above and below golden, the middle rays yellowish-grey with violet tips, the rest of the fin violet;" in the Juan



Fernandez fish the iris is blackish, in ours golden, clouded with brown and bordered above with violet; nor is any mention made by Dr. Plate of the conspicuous orange spot behind the base of the pectoral fin. In their habits, also, the two forms appear to show considerable variation, for while the New South Wales fish is only taken at the bottom on rocky ground by persons engaged in fishing for schnapper, (*Pagrosomus auratus*) as in the case of two examples which I have had the privilege of critically examining, or by the trawl net in similar localities, as was the experience of the "Thetis" staff,\* Dr. Plate writes of the eastern Pacific form that it arrives at the island at rare and irregular intervals in vast shoals consisting of many hundreds of individuals, and states that he has seen such swarms of fishes that they seemed to form a solid mass beneath the surface of the water, showing like golden spots in the remoter distance. Enough has, I think, been said to justify the subspecific separation of the two forms. The range of *Callanthias platei* and its subspecies may be given as throughout the South Pacific from the east coast of Australia to Juan Fernandez, and it may therefore be expected to be found eventually in the New Zealand seas.

This fish is the second species of true *Callanthias* as yet described, for, as I shall endeavour to show below, the Tasmanian fish commonly known as *Callanthias allporti* must be removed from that genus. From the eastern Atlantic and Mediterranean *C. peloritanus* our species may be distinguished as follows:—

- a. Depth of body equal to length of head,  $3\frac{1}{3}$  to  $3\frac{2}{3}$  in total length; eye twice the length of snout,  $2\frac{1}{2}$  to  $2\frac{2}{3}$  in the head; maxillary extending to below the middle of the eye, its distal width  $\frac{1}{4}$  of the eye; lateral line 22-25, ending below last dorsal ray      ...      ... *peloritanus*.

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\* "The necessity for raising the net was brought about by the fact of the trawl showing indications of having met with some obstruction. When hauled up it was shown that the cod-end of the net was torn slightly and that the foot-line was broken at the specially weakened part." And again, "They were probably netted among rocks, as obstructions were met with which rendered the raising of the trawl a necessity." (Waite, l.c. pp. 9 and 31).



*aa.* Depth of body much greater than length of head,  $2\frac{9}{10}$  to  $3\frac{1}{5}$  in total length; eye  $1\frac{1}{5}$  to  $1\frac{1}{2}$  times length of snout,  $2\frac{3}{5}$  to  $3\frac{1}{2}$  in the head; maxillary extending to below the middle of the eye or not so far, its distal width  $\frac{4}{9}$  to  $\frac{3}{8}$  of the eye; lateral line 38-40, ending close in front of the caudal ... .. *platei*.

I have mentioned above that I find it necessary to separate the Tasmanian *C. allporti* from the true *Callanthias* as here restricted, placing it in a monotypic genus for which the name *Anogramma* is proposed, and I further submit that these two genera along with *Gramma*, Poey, might conveniently be associated in a subfamily *Callanthiinae*, of equal value to and intermediate between the *Anthiinae* on the one hand and the *Plesiopinae* on the other. The subfamily and the genera may be briefly tabulated thus:—

CALLANTHIINÆ:—Lateral line single, incomplete or interrupted high; a conspicuous scaly process between the ventral fins.

*a.* Vomerine teeth weak or absent; lateral line incomplete; maxillary scaly.

CALLANTHIAS (κάλλος, beautiful; *Anthias*), Lowe, Proc. Zool. Soc. London, 1839, p. 76 (*peloritanus*).

*aa.* Vomerine teeth strong.

*b.* Lateral line incomplete; maxillary scaly.

ANOGRAMMA (ἄνω, high; γραμμή, line), gen. nov. (*allporti*).

*bb.* Lateral line interrupted; maxillary naked.

GRAMMA (γραμμή, line,) Poey, Syn. Pisc. Cuben. p. 296, 1868 (*loreto*).

#### EDELIA.

*Edelia*, Castelnau, Proc. Zool. & Acclim. Soc. Vict. ii. 1873, p. 123, (*vittata*).

Body oblong, compressed. Scales large, adherent, finely ciliated, concentrically striated. Lateral line complete, the tubes few, irregular, simple, extending along the entire exposed surface of the scale. Head moderate, almost entirely scaly.



Mouth with small, oblique cleft; jaws equal. Premaxillaries protractile; maxillary exposed at the distal extremity only, naked. Small teeth in the jaws; vomer, palatines,\* pterygoids, and tongue smooth. Nostrils distant, simple. Eyes moderate, lateral, high. Preopercle entire, with a double ridge; opercle with two spines. Gill-openings wide; gill-membranes united in front, free from the isthmus; six branchiostegals; pseudobranchiæ present; gill-rakers short and few. Two dorsal fins, connected at the base, with vii-viii, i 9 rays, the spinous longer than the soft; anal short, with iii 8 rays; ventrals inserted behind the base of the pectorals, close together, with a strong spine and five soft rays; pectorals rounded, with 12 or 13 rays, the middle the longest; caudal rounded. Vertebrae  $12 + 18 = 30$ . (*Deriv. ign.*)

Fresh-water fishes of small size from West Australia.

I am by no means sure of the correct position of this genus in the natural system.

#### EDELIA VITTATA.

*Edelia vittata*, Castelnau, Proc. Zool. & Acclim. Soc. Vict. ii. 1873, p. 124; Interior of West Australia.

? *Edelia viridis*, Castelnau, l.c. p. 125; Interior of South-western Australia.

D. vii-viii, i 9    A. iii 8.    Sc. 29-30/11-12.    L.l. 12-15.

Depth of body  $2\frac{4}{5}$  to  $3\frac{1}{5}$ , length of head  $3\frac{1}{5}$  to  $3\frac{2}{5}$  in the total length. Dorsal profile more strongly arched than the abdominal; upper profile of head obliquely linear. Snout as long as or a little shorter than the diameter of the eye, which is  $3\frac{1}{2}$  to  $3\frac{4}{5}$  in the length of the head. Interorbital region convex, its width  $3\frac{4}{5}$  to  $4\frac{1}{2}$  in the head. Maxillary not extending to the vertical from the front margin of the eye, its length  $3\frac{2}{3}$  to  $4\frac{1}{4}$  in the head, its width at the distal extremity  $3\frac{1}{4}$  to  $3\frac{3}{4}$  in the diameter of the eye. Three series of scales between the eye and the angle of the pre-

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\* Castelnau found teeth on the palatine bones, but I fail to discover them.



opercle; lower opercular spine the longer. Gill-rakers 4 + 8. Dorsal fin originating above the last fourth of the pectoral, a little nearer to the tip of the snout than to the base of the caudal; spines strong and curved, the first minute and often wanting, the third the longest,  $\frac{2}{3}$  to  $\frac{4}{7}$  of the head and a little longer than the middle soft rays; spine of second dorsal very short, but little longer than the last of the spinous; length of soft dorsal  $\frac{5}{6}$  to  $\frac{2}{3}$  of its height and as long as or somewhat less than that of the anal: second anal spine stronger and longer than the third,  $\frac{3}{4}$  to  $\frac{3}{5}$  of the anterior soft rays: ventral rounded,  $\frac{5}{7}$  to  $\frac{5}{8}$  of the head and  $\frac{5}{6}$  to  $\frac{5}{7}$  of the space between its origin and the vent: pectoral with 12 or 13 rays, reaching to the 7th or 8th body scale,  $\frac{4}{7}$  to  $\frac{1}{2}$  of the head: caudal rounded,  $4\frac{2}{5}$  to  $4\frac{3}{5}$  in the total length; least depth of caudal peduncle  $\frac{3}{5}$  to  $\frac{1}{2}$  of its length and  $\frac{2}{5}$  to  $\frac{1}{3}$  of the depth of the body. Reddish-brown or olive-green above, orange or yellow below; a blackish band or series of blackish spots along the middle of the body, sometimes reduced to a single shoulder spot; sometimes a less conspicuous band above and another below the median band: fins pale brown, the anterior rays of the anal and the outer rays of the ventrals dusky; sometimes these fins are ornamented with small black spots.

E t y m o l o g y :—*vittata*, striped.

Total length to 60 millimeters (70 *fide* Castelnau).

With the exception of the coloration, always an unstable character on which to rely, the following are absolutely the only distinguishing characters between *Edelia vittata* and *E. viridis* as given by Castelnau:—In the latter the “first dorsal is placed rather more forward than in *E. vittata*” and the caudal is pointed, while in *vittata* it is rounded.

## THERAPONIDÆ.

### THERAPON HUMERALIS, sp.nov.

D. xii 11. A. iii 10. Sc. 14/88/36. L. l. 69.

Depth of body 3 to  $3\frac{1}{5}$ , length of head  $3\frac{2}{5}$  to  $3\frac{1}{2}$  in the total length. Dorsal profile more strongly arched than the abdominal;



upper profile of head feebly convex, the snout obtuse. Diameter of eye  $3\frac{3}{4}$  in the length of the head and  $\frac{4}{5}$  of that of the snout. Interorbital region gently rounded, its width  $4\frac{1}{4}$  in the head. Jaws equal. Maxillary scarcely extending to the vertical from the anterior border of the eye, its length  $\frac{1}{3}$  of the head, the width of its distal extremity  $\frac{3}{8}$  of the diameter of the eye. No vomerine or palatine teeth. Preorbital strongly serrated on the postero-inferior angle. Outer limb of preopercle naked, the lower border inconspicuously, the angle and hinder border strongly, denticulated; preopercular scales in eight transverse series, interopercular in two or three; lower opercular spine much the longer, strong, and acute. Gill-rakers  $5 + 13$ , the longest  $\frac{3}{10}$  of the eye. Dorsal fin high, originating slightly behind the base of the pectoral, the spines increasing in length to the fifth, which is  $1\frac{3}{4}$  in the length of the head and subequal to the third and longest soft ray; first spine rather less than half as long as the last, which is shorter than the penultimate and  $\frac{5}{8}$  of the third soft ray: anal much longer than its distance from the caudal, the second spine slightly exceeding the third in length, 2 to  $2\frac{1}{5}$  in the head; outer border of soft dorsal and anal rays convex: ventral rounded, with the outer ray slightly produced,  $\frac{4}{5}$  of the head and nearly reaching to the vent: pectoral with 14 rays,  $\frac{5}{7}$  of the head: caudal subtruncate, with the angles rounded,  $4\frac{1}{2}$  in the total length; least depth of caudal peduncle  $1\frac{1}{4}$  in its length and  $2\frac{4}{5}$  in the depth of the body. Light brown above, grey below; five indistinct broad brown bands across the back but not continued below the lateral line; a large oval blackish shoulder-spot below the lateral line; a narrow blackish band below the eye and a second through the eye to the preopercle: caudal fin profusely, soft dorsal and anal sparingly, spotted with dark brown.

**Etymology:**—*humeralis*, belonging to the shoulder; in reference to the conspicuous dark shoulder-spot.

**Type** in the author's possession.

**Distribution:**—Pelsart Island, Houtman's Abrolhos, West Australia, where a single example, 175 millimeters in length, was obtained by Mr. Lea.



This species is allied to *Therapon ellipticus*, Richardson, from which, however, it differs in the fin and scale formula, the more strongly arched spinous dorsal, the truncated caudal, and the somewhat different pattern of the coloration. Richardson's species is also said to belong to the fresh-water section of the genus, while the present fish is a marine form.

PSEUDOSCARUS GYMNOGNATHOS.

*Scarus gymnognothos*, Bleeker, Nat. Tijdschr. Nederl. Ind. iv. 1853, p. 498, Batavia.

*Pseudoscarus gymnognothos*, Bleeker, Atl. Ichth. i. p. 28, pl. xv. f. 3, 1862.

*Pseudoscarus gymnognothus*, Günther, Catal. Fish. iv. p. 239, 1862.

D. ix 10. A. ii 8. L.l. 20 + 6. L.tr. 2/7.

Depth of body  $2\frac{4}{5}$ , length of head 3 in the total length. Upper profile of head convex, with a well-marked concavity in front of the eyes. Diameter of eye  $4\frac{2}{3}$  in the length of the head and  $\frac{1}{2}$  of that of the snout. Lips covering about half the jaws, the inner not reaching midway to the symphysis. Cheek-scales in two transverse series, the lower consisting of six scales, all but the first of which encroach on the preopercle; interopercle with a single series. Jaws reddish-brown, with the tips white; no posterior pointed teeth. Nostrils minute, the anterior without tentacle. Gill-rakers 13 + 24. Dorsal fin originating above the angle of the bony opercle; fourth and fifth spines longest,  $2\frac{3}{5}$  in the head and as long as the penultimate and longest rays: anal commencing below the second soft dorsal ray, the space between its origin and the base of the caudal but little more than the length of the head; second spine shorter than the first dorsal spine; dorsal and anal fins angulated posteriorly: ventral pointed,  $1\frac{4}{5}$  in the head and  $1\frac{3}{5}$  in the distance between its origin and the anal: pectoral with 15 rays, extending to the eighth scale of the lateral line,  $1\frac{1}{3}$  in the head: caudal rounded,  $\frac{1}{5}$  of the total length; least depth of caudal peduncle  $\frac{5}{6}$  of its length and  $2\frac{6}{7}$  in the depth of the body. Olive-brown, many of the scales darker at the base; the



three lowest series of scales with a median longitudinal golden bar, forming together continuous bands, the upper of which is faintest and does not extend forward beyond the tip of the pectoral; lips and snout violet: dorsal and anal fins violet, with a narrow dark marginal band; ventrals and pectorals gray, more or less tinged with yellow; caudal yellow, broadly tipped with violet.

**E t y m o l o g y**:—*γυμνός*, naked; *γνάθος*, jaw.

**D i s t r i b u t i o n**:—Pelsart Island, Houtman's Abrolhos.

The description is taken from a single specimen captured by Mr. Lea and measuring 194 millimeters. It seems to agree more closely with Bleeker's *P. gymnognathos* than with any other species, but I am by no means assured that it is that species.

The following family not having hitherto been recorded from Australian waters, it is advisable, on behalf of local ichthyologists, to supplement the late Sir William Macleay's Catalogue by a more extended notice than would otherwise be necessary.

## CEPOLIDÆ.

### The Band-Fishes.

Body elongate, compressed, provided with minute, cycloid scales. Lateral line incomplete. Head small, compressed; snout short and blunt. Mouth anterior, with rather wide, oblique cleft; lower jaw slightly projecting. Premaxillaries protractile; maxillary exposed, strongly dilated distally, reaching to below the eyes. Teeth in the jaws moderate, unequal, more numerous in the upper, some of them caninoid; vomer, palatines, pterygoids, and tongue toothless. Nostrils approximate. Eyes large, sub-lateral. Gill-openings wide; gill-membranes separate, almost wholly free from the isthmus; gills four, a slit behind the fourth; six branchiostegals; pseudobranchiæ present. Vent anterior, without prominent papilla. Dorsal and anal fins long, consisting entirely of articulated rays, more or less continuous with the caudal; ventrals small, thoracic, close together, with a feeble spine and five soft rays; pectorals small, submedian. Air-bladder



present. Pyloric appendages in small number. No bony articulation between the infraorbital bone and the angle of the preopercle. Premaxillary processes short; occipital crest feeble. Caudal portion of the vertebral column very long. Vertebrae 69 (15 + 54) in *Cepola macrophthalmus*.

Band-like fishes of moderate size, inhabiting the Mediterranean, north-eastern Atlantic, north-western Pacific, Indian and south-eastern Australian seas.

Two genera are now recognised, and though the first only has as yet been discovered within our limits, the second, having two representatives in the Indian and a third in the Malayan seas, will perhaps eventually be found on our north-western coast. To facilitate the recognition of the two forms, the following brief analysis is given:—

Preopercle entire;	scales non-imbricate;	head wholly	
naked ... ..			CEPOLA.
Preopercle strongly spinate or denticulate;	scales imbricate;		
head partially scaly ... ..			ACANTHOCEPOLA.

With respect to the systematic position of the *Cepolidae*, it is generally conceded at the present day that they fall most fitly between the *Gobioidei* and *Blennioidei*, or to be more exact, between the Dragonets (*Callionymidae*) and the scaly blenniids (*Clinidae*). The former family, however, along with the allied *Platypteridae*, both of which have been associated by most British and continental writers with the true gobies and eleotrans in the somewhat heterogeneous family *Gobiidae* of Cuvier, Günther, and others, differ from that family in so many important characters (such as the enormously protractile premaxillaries, the greatly developed preopercular spine, the widely separated ventral fins, &c.) that it has been proposed, and I think with justice, to differentiate them as an equivalent group under the name *Callionymoides*, a group which perhaps has more affinity to the *Platycephaloidei* than is generally admitted. The *Cepolidae* have, however, been more usually associated with the blennioid than with the gobioid types, but they differ intrinsically from the



former in the possession of thoracic and quinquerradial instead of jugular and paucirradial ventral fins. Gill places the *Gadopsidæ*—a family which is structurally much more intimately related to the blennioid than to the gadoid fishes—next to the *Cepolidæ* and between them and the *Clinidæ*. Reviewing the situation in the light of our present knowledge, I am inclined to place the *Cepolidæ* between the eleotrine gobies and *Gadopsis*.

#### CEPOLA.

*Cepola*, Linnæus, Syst. Nat. ed. 12, i. p. 445, 1766.

Body tænioid. Scales non-imbricate, deeply embedded. Lateral line originating above the opercle, thence obliquely ascending to the base of the dorsal fin, along which it runs for a variable length. Head entirely naked. Teeth in the jaws in a single series, the anterior strong and hooked; lower jaw with or without a short supplementary series anteriorly. Preopercle entire; opercle with a small concealed spine. Gill-rakers long, rather stout, in moderate number. Dorsal fin originating above the opercle, with 57 to 82 rays; anal very long, coextensive with the caudal portion of the vertebral column, with 48 to 79 rays; pectoral rounded, with 12 to 16 rays, the middle the longest; caudal narrow and pointed.

E t y m o l o g y.—*Cepole*, *Cepolla*, or *Cepula*, the names given by the Roman fishermen according to Willughby (Hist. Pisc. p. 116): perhaps from *ceps*, head (Jordan, *in lit.*)

T y p e :—*Cepola macrophthalmus*, Linnæus.

D i s t r i b u t i o n :—Mediterranean and north-eastern Atlantic, occasionally visiting the British Isles, sometimes even in considerable numbers upon their southern shores (*C. macrophthalmus*);\* north-western Pacific (*C. schlegelii*);† and south-eastern Australia (*C. australis*).‡

\* *Cepola macrophthalmus*, Linnæus, Syst. Nat. ed. x., Mediterranean. Syn. *Ophidion macrophthalmum* = *Cepola rubescens* (*vide* Jordan).

† *Cepola schlegelii*, Bleeker, Verh. Batav. Gen. xxvi. 1856, p. 110.

‡ *Cepola australis*, sp. nov. (*v. infra*).



These three species are very closely related, but may apparently be distinguished from one another by the following characters :—

- a.* Head  $\frac{1}{10}$  or less of total length. No anterior supplementary teeth in the lower jaw. A black spot between the premaxillary and maxillary.
- b.* Dorsal more than 70, anal more than 60; dorsal and anal fins broadly united to the caudal ... .. *schlegelii*.
- bb.* Dorsal 67-74, anal 60-70; dorsal and anal fins narrowly united to the caudal .. ... *macrophthalmus*.
- aa.* Head  $\frac{1}{9}$  of the total length.\* An anterior supplementary band of teeth in the lower jaw. No black spot between the premaxillary and the maxillary.
- c.* D. 57. A. 48. Dorsal and anal fins narrowly united to the caudal ... .. *australis*.

In the British Museum Catalogue of Fishes (iii. pp. 486-9) Günther recognises seven species of *Cepola* as possibly valid, namely *C. rubescens* (= *macrophthalmus*), *C. schlegelii*, *C. abbreviata*, Cuv. & Val., *C. krusensternii*, Schl., *C. mesoprion*, Blk., *C. marginata*, C.V., and *C. limbata*, C.V., while an eighth, *C. striata*, is regarded with suspicion. In addition to the species described below, two others, *C. oxylepis*, Bleeker, from the Chinese seas, and *C. indica*, Day, from Madras, have been announced since the publication of that volume in 1861. Of these ten species the *C. striata*, Bl. & Schn.,† from Tranquebar, should probably be dismissed as not belonging to the family, leaving, with *C. australis*, ten supposed species, only three of which, as shown above, belong to the genus *Cepola* as restricted by Bleeker.

In reference to *C. schlegelii*, its describer remarks :—

“This species is so nearly allied to *Cepola rubescens* (= *macrophthalmus*), Linn., from Europe, by its slender body, unarmed pre-

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\* In the measurement of the head the large opercular lobe is not included, the distance between the tip of the snout and the posterior border of the bony opercle only being considered.

† Ichth. p. 242, 1801.





opercle, inter-maxillary membrane-spot, and small scales that I find no specific difference between the two except in the broader and deeper opercle and the somewhat more numerous dorsal and anal rays. I consider it to be the same as the species figured in the Fauna Japonica, with which, however, the description in that work does not agree."\*

Now with regard to the increased number of dorsal and anal rays mentioned above, if we consult the later diagnosis of *C. rubescens* given by Day,† we shall find that the North Atlantic fish often has more than 70 dorsal and normally more than 60 anal rays; as a differential character this is, therefore, valueless, while the size of the opercle is altogether too insignificant to be relied on, especially when we consider how slight were the data on which the distinguished Dutch ichthyologist founded his opinion. The width or narrowness of the junction between the vertical fins is also of too little importance to be seriously considered, and I therefore think it better to look upon *C. macrophthalmus* and *C. schlegelii* as the western and eastern forms of the same species.

Of the seven remaining species, all of which belong to *Acanthocephala*, no less than four are reported as coming from the seas of Japan, and we may perhaps be permitted to suggest that these have been unduly multiplied. The earliest forms made known from those waters were two fishes figured by Krusenstern,‡ and subsequently named (from the drawings) *C. limbata* and *C. marginata* by Cuvier and Valenciennes. These two were distinguished from the other species known to the French savants by the presence of a black spot anteriorly on the dorsal fin.

Writing on the subject, Bleeker says (l.c.):—

"Since then I have discovered that in the Japanese waters at least three species§ exist, the descriptions of which I have communicated here. Not one of these species, however, possesses

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\* Bleeker, l.c.

† Fishes of Great Britain and Ireland, i. p. 213, 1883.

‡ Reise, pl. lx. ff. 1-2.

§ One of these, *C. schlegelii*, being a true *Cepola*, does not concern us here.



the black spot anteriorly on the dorsal fin, which is said to be present in *C. limbata* and *C. marginata*."

With regard to these two species, it can hardly be contended that Cuvier and Valenciennes have made good their claim to specific distinction, while on the other hand Day has described unmistakably an Indian species which possesses the characteristic black dorsal spot. Having, therefore, three reputed species bearing this spot, two of which are only known from old and possibly inaccurate figures, it seems to me that until further light is thrown on the subject it would be extremely unwise to keep all three in the system as valid species.

Appended is a list of the species as I would at present place them:—

1. *Cepola macrophthalmus*, Linnæus, Syst. Nat. ed. x. 1758 ;  
Mediterranean and north-eastern Atlantic.
- 1a. *C. rubescens schlegelii*, Bleeker, Verh. Batav. Gen. xxvi. 1856,  
p. 110; Japan.
2. *C. australis*, Ogilby (*v. infra*); Port Jackson, south-eastern  
Australia.
3. *Acanthocephala krusensternii*, Schlegel, Faun. Japon. Poiss.  
p. 130, 1850; Japan.
4. *A. mesoprion*, Bleeker, l.c. p. 109; Japan.
5. *A. oxylepis*, Bleeker, Verh. Ak. Amst. xviii. 1879, p. 8; China.
6. *A. indica*, Day, Suppl. Fish. Ind. p. 796, 1888; Madras.  
? = *A. limbata*, Cuvier & Valenciennes, Hist. Nat. Poiss. x.  
p. 402; Japan.\*  
? = *A. marginata*, Cuvier & Valenciennes, l.c.; Japan.
7. *A. abbreviata*, Cuvier & Valenciennes, l.c. p. 403; Malay  
Archipelago to China.

CEPOLA AUSTRALIS, sp.nov.

D. 57. A. 48.

Depth of body  $11\frac{3}{5}$ , length of head 9 in the total length; width of body  $\frac{2}{3}$  of its depth. Snout obtuse, rounded, shorter than the

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\* This being the earliest name, must be used should the three forms prove to be identical.



eye, which is  $3\frac{1}{3}$  in the length of the head. Interorbital region flat, its width  $6\frac{1}{3}$  in the head. Maxillary extending to the vertical from the middle of the eye, its length from the tip of the snout  $\frac{4}{9}$  of the head, its width at the distal extremity more than half the diameter of the eye. Anterior teeth in the upper jaw strong, hooked inwards and backwards; lateral teeth numerous, decreasing in size posteriorly; teeth in the lower jaw increasing in size posteriorly, the series terminating in a strongly curved canine; a supplementary series of four pairs of strong teeth on the outer edge of the lip anteriorly. Preopercle rounded. Gill-rakers  $16 + 21$ , the longest  $\frac{5}{8}$  of the diameter of the eye. Vertical fins subcontinuous with the caudal;\* dorsal originating above the opercular lobe, the longest rays in the anterior third of the fin, rather less than half the length of the head: anal originating below the eighth dorsal ray, its distance from the tip of the mandible  $4\frac{7}{8}$  in the total length: ventral rounded, about half the length of the head, not nearly reaching to the vent: pectoral with 16 rays, shorter than the ventral: caudal acutely pointed, with 9 rays, the middle ray somewhat inspissate, about  $\frac{2}{3}$  of the head. Nape scaleless. Lateral line terminating below the twenty-sixth dorsal ray. Body and fins bright red, the middle of the sides with some angular yellow bars; no intermaxillary or dorsal spots.

**Etymology:**—*australis*, southern; the genus not having been hitherto represented south of the tropics.

**Type** in the possession of the Commissioners for Fisheries of New South Wales.

**Distribution:**—Port Jackson. I am indebted to my friend Mr. Brodie, Secretary to the New South Wales Fisheries Commissioners, for the opportunity of describing this unique example of a family not hitherto recorded from Australia. The specimen was taken in a seine net and measures 260 millimeters over all.

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\* The posterior part of the tail having been dried, it is difficult to ascertain accurately to what extent this contiguity exists; apparently, however, it was narrow.





Ogilby, J. Douglas. 1899. "Contributions to Australian ichthyology."  
*Proceedings of the Linnean Society of New South Wales* 24, 154–186.

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