

FURTHER ICHTHYOLOGICAL MISCELLANEA.

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(*Contribution from The Australian Museum.*)

(Plates XI—XIII.)

The contents of this paper are in continuation of the miscellaneous descriptions and notes which I have contributed to these Memoirs in 1930 and 1936. A collection of fishes sent for report by the Director of the Queensland Museum forms the basis of the present paper but I have added sundry notes on allied subjects. Bibliographies of two important commercial fishes (the Pilchard and the Murray Cod) are given, so that students of these species will at least have all the references to their scattered literature gathered together here for quicker information.

I am indebted to Messrs. H. A. Longman and T. C. Marshall, of the Queensland Museum, for the loan of many specimens and notes concerning them; to Miss Joyee Allan for drawing a new species of *Cephalopholis*; and to Mr. G. C. Clutton for photographic illustrations.

Family CLUPEIDAE.

In spite of their economic importance, the fishes of this family have been largely neglected by systematists and their present classification, particularly as regards Australian species, leaves much to be desired. Whilst some of the species have been reviewed from time to time, their generic positions have usually been ignored, the word *Clupea* having too often been used as a sort of pigeon hole into which all sorts of herrings have been squeezed.

The family Clupeidae includes both fossil and recent genera, but only the latter concern us here, and there are some seventy or more of these so far named, though not all of these are valid by any means.

Before an adequate revision of the Australian Clupeidae can be undertaken, it will be necessary to describe and figure certain types in greater detail than has yet been attempted, or at least describe specimens from topotypical material; also, the various generic limits will have to be defined and correct generic names, with genotypes, assigned to the various species. Meanwhile, the following notes may be useful in reviewing some of the scattered information available or in clearing up some minor taxonomic points.

Genus **SARDINOPS** Hubbs, 1929.

Sardinops Hubbs, Proc. Calif. Acad. Sci. (4), xviii, 11, 1929, p. 264. Orthotype, *Meletta caerulea* Girard, Proc. Acad. Nat. Sci. Philad. vii, 1854, p. 138 from San Francisco.

This generic name was proposed for the Californian sardine which Hubbs clearly demonstrated was very different from the European *Sardina*. He included in this genus *S. sagax* (Jenyns) from Chile, *S. melanosticta* (Temminck and Schlegel) from Japan, *S. ocellata* (Pappé) from South Africa, and *S. neopilchardus* (Steindachner) from Australia.

Possibly *Sardinella leiogaster* Cuvier and Valenciennes (Hist. Nat. Poiss. xx, Nov. 1847, p. 270, ed. 2, p. 195. Indian Seas, Ceylon, Java) should also be added, as well as the new species described below.

Hubbs' diagnosis is as follows: "Clupeidae with the upper jaw not notably notched on the mid-line; the gill-rakers of the upper limb folded over those of the lower limb, which become markedly and progressively shortened toward the angle; carina of glosso-hyal not denticulate; no bilobed dermal flap on shoulder-girdle; opercle with strong and markedly oblique ridges; preopercular edge strongly sloping; interopercle widely exposed behind preopercle; scale-rows regularly spaced, the lateral scales all with subequal exposed areas; radii on the scales nearly vertical, and paired on each side of median line; keels on ventral seutes weak; last two rays of dorsal and anal fins somewhat enlarged; a row of dark spots typically developed on upper sides behind head."

SARDINOPS DAKINI, sp. nov.

In the present consignment from the Queensland Museum, there are three sardines. Unfortunately, they are not very good specimens but I can make out the following characters:—

Br. 6. D. 18; A. 18 + 2; P. 19; V. i/9. C. 19.

Eye $3\frac{1}{4}$ to nearly 4 in head and slightly shorter than snout.

Head about one-quarter, depth about one-fifth of standard length.

Sc. circa 40. L. tr. 10-12. About 13 predorsal scales. 17 to 18 preventral and 12 to 14 postventral seutes.

Eye partly concealed by adipose lids which unite with the skin to give most of the sides of the head a gelatinous appearance.

Maxillary reaching vertical of anterior margin of eye. A spade-shaped supplemental bone. Jaws, vomer and palate toothless (only No. I. 5337 has some teeth on palatines). Intermaxillaries meeting at an acute angle. Operculum, preoperculum and interoperculum of about equal depth. Operculum without marked radiating striae, these apparently obsolescent or reduced to a single anterior one. Several venules on opercules, preorbital and scapular region. A wedge-shaped patch of striae on each side of vertex. Nostrils near end of snout. About 37 long, slender, minutely denticulate gill-rakers on lower portion of first branchial arch; they become markedly smaller anteriorly and do not appear to be overlain by the gill-rakers of the upper portion of the arch.

Form robust, fusiform, belly not markedly compressed. There is a median row of keeled scales or scutes along the belly from isthmus to vent. No such keeled scales on back. Scales deciduous, uniform, not covering smaller auxiliary ones. Large alar scales at ventral and pectoral fins. Other scales on bases of dorsal and anal fins and two large leaflike scales on each side of the caudal. Scales with ragged edges but not perforated and the vertical radii are not continued across each scale but interrupted medially. Origin of dorsal before vertical of ventral origin and much nearer to snout than to caudal fin. Anal rays short except the last two which are enlarged. Pectoral equal in length to head without snout.

Colour, in formalin, bluish grey above and yellowish below; the fins whiter. About eleven more or less distinct dark spots along upper part of sides. A dusky brown blotch on snout. A few minute fuscous spots at tip of dorsal and caudal lobes, but no prominent dusky blotches on any of the fins.

Described from three specimens, about 140 to 190 mm. in standard length. Qld. Mus. regd. Nos. I. 5309, 5336, and 5337.

Locality.—Thursday Island, North Queensland; Pres. E. W. Saranealis.

Differs from *S. neopilchardus* as described and figured by McCulloch (Rec. Austr. Mus. xii, 1919, p. 172, pl. xxvi, fig. 1.) in having different scale-counts, fewer gill-rakers, and in several minor details.

Named after Professor W. J. Dakin, Dean of the Faculty of Science, University of Sydney, who discovered the eggs and young of the allied *S. neopilchardus* in New South Wales.

SARDINOPS NEOPILCHARDUS (Steindachner).

Clupea lata Richardson, Trav. N. Zealand (Dieffenbach) ii, 1843, p. 221. *Nomen nudum* ex Solander MS. Tolaga Bay, New Zealand.

Clupea neopilchardus Steindachner, Denkschr. Akad. Wiss. Wien. xli, 1, 1879, p. 12. Hobson's Bay, Victoria.

Sardinia neopilchardus McCulloch, Rec. Austr. Mus. xii, 8, 1919, p. 172, pl. xxvi, fig. 1. Gives full description and account, with bibliography, to which the following references may be added to bring it up to date:—

- 1882. Tenison-Woods, Fish. Fisher N. S. Wales, 1882, p. 86.
- 1885. Cox, Abstr. Proc. Linn. Soc. N. S. Wales, July 29, 1885, p. iv.
- 1893. Gill, Mem. Acad. Sci. Wash. vi, 1893, pp. 103 and 112.
- 1896. Aflalo, Nat. Hist. Austr. 1896, p. 198 and footnote.
- 1897. Ogilby, Proc. Roy. Soc. Tas. 1896, p. 72.
- 1902. Woodward, W. Austr. Year-book 1900-1 (1902) p. 272, listed as *Clupea sagax*.
- 1902. Henry, Trans. N. Z. Inst. xxxiv, 1902, p. 570.
- 1908. Ogilby, Queensland Naturalist, i, 3, 1908, p. 66.
- 1909. Hall, Proc. Roy. Soc. Tasm. 1908, p. ii.
- 1912. Ogilby, Fish. Rept. Qld. 1910-11 (1912), appendix.
- 1916. Roughley, Fish. Austr. (Tech. Educ. Series 21.) 1916, p. 13.
- 1918. Thomson, N. Z. Journ. Sci. Tech. i, 1918, pp. 7, 64, and 136.
- 1921. Thompson, California Fish and Game, vii, 4, 1921, p. 194.
- 1921. McCulloch, Austr. Zool. ii, 2, 1921, p. 17, pl. v.
- 1921. Thomson and Anderton, Hist. Portobello Mar. Fish. Hatchery, 1921, p. 70.
- 1921. Waite, Rec. S. Austr. Mus. ii, 1, 1921, p. 37, fig. 53.
- 1921. Phillipps, N. Z. Journ. Sci. Tech. iv, 3, 1921, pp. 118 and 124.
- 1922. Phillipps and Hodgkinson, N. Z. Journ. Sci. Tech. v, 2, 1922, p. 94.
- 1922. Alexander, Journ. Linn. Soc. (Zool.) xxxiv, 1922, p. 479.
- 1923. Lord, Proc. Roy. Soc. Tasm. 1922 (1923), p. 63.
- 1923. Waite, Fishes S. Austr. 1923, p. 58, fig.
- 1923. Fowler, Proc. Acad. Nat. Sci. Philad. lxxv, 1923, p. 43.
- 1924. Lord and Scott, Vertebr. Anim. Tasm. 1924, p. 32.
- 1924. Phillipps, N. Z. Journ. Sci. Tech. vii, 3, 1924, p. 191, fig.
- 1925. McCulloch and Whitley, Mem. Qld. Mus. viii, 2, 1925, p. 132.
- 1925. McCulloch, Austr. Encycl. i, 1925, p. 613, and vol. ii, 1926, p. 299.
- 1926. Chabanaud, Bull. Soc. Zool. France li, 1926, p. 156.
- 1927. Phillipps, Journ. Pan-Pacif. Res. Inst. ii, 1, 1927, p. 11.
- 1927. Lord, Journ. Pan-Pacif. Res. Inst. ii, 4, 1927, p. 12.
- 1927. Young and Thomson, Trans. N. Zeal. Inst. lvii, 1927, pp. 314-318.
- 1927. Phillipps, N. Z. Mar. Dept. Fish. Bull. i, 1927, p. 12.
- 1928. Fernando de Buen, Bol. Pesca xiii, 140, 1928, p. 101.
- 1929. Phillipps, N. Z. Journ. Sci. Tech. x, 6, 1929, p. 343.
- 1929. Hubbs, Proc. Calif. Acad. Sci. (4) xviii, 11, 1929, p. 265.
- 1929. McCulloch, Austr. Mus. Mem. v, 1929, p. 40.
- 1930. Stead, Austr. Naturalist, viii, 4, 1930, p. 67, fig.
- 1931. Wheeler, Calif. Fish. Bull. xxxvi, p. 123, etc.
- 1933. Dakin, Journ. Coum. Sci. Industr. Res. vi, 1933, p. 211 (breeding).
- 1934. Dakin and Colefax, Rec. Austr. Mus. xix, 1934, p. 136, pl. xvi and text-figs. 1-4 (off Sydney; eggs and early larval stages).
- 1934. Dakin, Abstr. Proc. Linn. Soc. N. S. Wales 472, July, 27 1934, p. 2; Proc. Linn. Soc. N. S. Wales, lix, 1934, p. xxxiv.
- 1935. Dakin, Proc. Roy. Soc. Tasm. 1934 (1935), p. 20, fig.

The Pilchard (*Sardinops neopilchardus*) is the best-known and commonest of the Australian herrings, and the one most likely to be of commercial importance in the future. Huge shoals of these fishes migrate northwards along south-eastern Australian coasts each winter and they are practically identical with the true Sardine of commerce. As early as 1844, a tremendous influx of pilchards was noted from Tasmania, but it is possible that Sprats may have been included with them. Similarly, hundreds of tons of these fishes came to Simon's Cove, Bruni Id., Tasmania in 1867. In New South Wales, their winter migrations were noticed over seventy years ago, and though they were observed annually from about June to September, but few found their way into the markets.

Young ones, barely an inch long, were caught at Botany in November, 1895, but it was not until quite recently that the eggs were positively identified from off Sydney by Professor Dakin and his colleagues. Spawning took place in July, the eggs being abundant for three successive years in that month, though also found in May, July and August, after which the young larvae disappeared. Thus from May to September is the time for catching Pilchards off the coast of New South Wales. They are sensitive to change of temperature, so may be earlier or later at times. Off Richmond Heads, New South Wales, vast shoals of pilchards were noticed in April 1928. Quantities of "*Clupea*," evidently this species, were noted off Botany and Bondi in August 1880, and at Manly in August, 1881. The pilchard is rarely seen inshore further north of the Tweed River district, but is still abundant in the late winter and early spring months off the Richmond Heads. In Queensland, it has been recorded from as far north as Hervey Bay by Ogilby.

In Hobson's Bay, Victoria, a large shoal of pilchards was seen for the first time in August 1864, then the species was very abundant in August 1865, but in the same month next year, countless thousands were seen and could be dipped from the sea in baskets. Hundreds of tons were collected and ship masters reported having passed through shoals for miles. They were plentiful every year since then, but in 1871, they were first seen on 16th November, were more abundant in the December and January following, though in less numbers than in previous years.

Thousands of pilchards were noted off Yamba, Clarence River in May 1911. Probably owing to differences in temperature (the variations of which have yet to be correlated with the occurrence of fishes, whales, etc.), the occurrence of the pilchard in New Zealand waters differs in season from Australian records. As long ago as 1871, pilchards were observed to visit the east coast of Otago in February or March annually, migrating *southwards*. In about April, they appear in Queen Charlotte Sound, where they are prepared as Picton Herring, and they spawn about Christmas time. Odd specimens are found in the Hauraki Gulf in spring, but the pilchard is not known

from the Bay of Islands. May and August are the smoking seasons in Wellington (N. Z.), where an enormous shoal occurred in July 1924. During the winter (May to October) the pilchard is found in deep water inlets, but in summer it prefers outer waters. Fish in roe have been noted from Tory Channel, N. Z., in November and at Seatoun in October, but November-December is the spawning time. A beach near Auckland was strewn with herrings in September 1909 and the "Terra Nova" Expedition collected small specimens, $\frac{1}{2}$ to $\frac{5}{4}$ inch long in September, 1911. These are the occurrences noted by workers in New Zealand.

The Australian Museum has specimens of the pilchard from the Auckland Islands, and from various localities in New South Wales. Several large specimens were trawled in fairly deep water near Montague Island in March 1929. Mr. Stead obtained three mature pilchards from the stomach of a flathead, trawled in about 50 fathoms off N. S. Wales, in February 1916. It is said that there are records of the pilchard in the Royal Commission of Food Supply N.S.W., 1912 Report, but this is not available to me. The pilchard is also very common in Tasmania, vast quantities being found in the George's Bay district in August-November 1924. Professor Flynn observed that they grew to an average size of 4 or 4 $\frac{1}{2}$ inches about Christmas.

Genus **MAUGECLUPEA** Whitley, 1932.

Maugeclupea Whitley, Rec. Austr. Mus. xviii, 6, April 20, 1932, p. 332. Orthotype, *Clupea bassensis* McCulloch 1911, from Bass Strait, Tasmania.

MAUGECLUPEA ANTIPODUM (Hector).

Clupea sprattus var. *antipodum*, Hector, Notes Edib. Fish. in Hutton, Colon. Mus. & Geol. Surv. Dept. (N. Zeal.) Publ. xviii, Feb. 1872, Cat. Fish N. Z., p. 133. Foveaux Strait, New Zealand. Also spelt *antipodarum* in Trans. N. Z. Inst. xi, May 1879, p. 572.

Clupea mülleri Klunzinger, Sitzb. Akad. Wiss. Wien. lxxx, 1, 1879, p. 416. New Zealand.

Clupea holodon Regan, Ann. Mag. Nat. Hist. (8) xviii, July 1, 1916, p. 5. Stewart Island, New Zealand.

Klunzinger's species, like Regan's, is evidently a synonym of *antipodum* Hector.

Family **PLOTOSIDAE**.

Genus **EXILICHTHYS**, Whitley, 1933.

Exilichthys Whitley, Rec. Austr. Mus. xix, 1, Aug. 2, 1933, p. 65. Orthotype, *Cnidoglanis nudiceps* Gunther.

EXILICHTHYS NUDICEPS (Gunther).

Cnidoglanis nudiceps Gunther, Rept. Voy. Challenger, Zool. i, 6, 1880, p. 49. Arafura Sea ("Challenger" Exped.). Type in the British Museum, figured by Weber and Beaufort. Fish. Indo-Austr. Archip. ii, 1913, p. 232, fig. 92. *Id.* Fowler, Mem. Bishop Mus. x, 1928, p. 63.

Ostophycephalus nudiceps, Ogilby, Proc. Linn. Soc. N. S. Wales, xxiv, Aug. 1899, p. 156. *Id.* McCulloch, Austr. Mus. Mem. v, 1929, p. 59.

This species was originally described from the Arafura Sea, and Gunther's type was figured by Weber and Beaufort. It may be admitted into Australian faunal lists since the species evidently occurs commonly in tropical Queensland where Mr. Melbourne Ward and I have collected it :—

2 Specimens trawled at night off Shaw Island, Whitsunday Passage, Queensland, in 10 fathoms over a bluish muddy bottom in three 10 minute hauls, 5 September 1935.

5 Specimens trawled through strong currents, moonlit night, 9-11 p.m. off "Sea Star Reef," Shaw Island, Queensland, about 10 fathoms, mud bottom ; 13 September 1935.

This fish can inflict a sting with its fin-spines.

Austr. Mus. regd. Nos. IA. 6731-3 ; duplicates in the Queensland Museum, Brisbane.

Thinking that this catfish might be the same as a Brisbane species, I asked Mr. C. J. J. Watson of the Queensland Forest Service to get me fresh examples, but all the specimens he kindly supplied were identified as the very distinct Ariid catfish *Neoarius australis* (Gunther). I regard *Arius curtisii* Castelnau, the type of *Neoarius*, as a synonym of *A. australis* Gunther.

Family SYNODONTIDAE.

Subfamily HARPADONTINAE.

Genus **HARPADON** Le Sueur, 1825.

Harpadon Le Sueur, Journ. Acad. Nat. Sci. Philad. v, July, 1825, p. 51. Orthotype, *Salmo microps* Lo Sueur.

Harpadon Cuvier, Règne Anim. ed. 2, ii, April 1829, p. 314, and of later authors.

Triurus Swainson, Nat. Hist. Classif. Fish. Amphib. Rept. ii, July 1839, p. 288. Haplo type, *T. microcephalus* Swainson. Name preoccupied by *Triurus* Lacépède, 1800, a young Sunfish.

Sauridichthys Bleeker, Act. Soc. Sci. Indo-Néerl. v, 1858, p. 2. Orthotype, *Saurus ophiodon* Cuvier (*vide* Jordan, Gen. Fish.).

Visitors to the East are often confused when they see Bombay Duck on the menu and discover that this is really a fish (*Harpadon nehereus*). The origin of the name is obscure, as Yule and Burnell (Hobson-Jobson, 1886, p. 96) point out. The fish when fresh is called Bummelo in parts of India, and, when dried, is known as Bombay Duck, being usually eaten with kedgerree. A very fine account of the Indian fish has been given by Hora (Journ. Bombay Nat. Hist. Soc. xxxvii, 3, 1934, p. 640 and figs.). Since Hora's paper appeared, Setna and Bana (Journ. Roy. Microscop. Soc. (3) Iv, 1935, p. 165) have shown that a protozoan parasite is likely to affect man when eating Bombay Duck, whilst Delsman and Hardenberg (De Indische Zeevisschen en Zeevisscherij, 1934, p. 161, figs. 110-111) have figured the young fish. Imported

Bombay Duck can be procured in "ehop suey" restaurants in Australia, but the living fish also occurs in our tropical waters, though, so far as can be discovered at present, not as regularly as it does in India. Saville-Kent described it as *H. translucens*. So far, statistical investigations have not been made on the Indian and East Indian *H. nehereus*, which may be found to vary within geographical limits, so I keep Saville-Kent's name for the Australian species, especially as this seems to be smaller and to have a different dorsal fin formula.

HARPADON TRANSLUCENS Saville-Kent.

(Plate XI. fig. 1).

Harpadon translucens Saville-Kent, Proc. Roy. Soc. Qld. vi, 5, 1889, pp. 222 and 234, pl. xiii, fig. 2. Ord River, Cambridge Gulf, North Australia. Co-types (Nos. I. 2773-4) in Austr. Mus., Sydney. *Id.* Ramsay, Ann. Rept. Austr. Mus. 1890 (1891), p. 20. *Id.* McCulloch, Austr. Mus. Mem. v, 1929, p. 77.

This species of Bombay Duck has been recorded from North to north-western Australia, and must now be added to the Queensland list as Mr. A. Bonding has presented a specimen from the Fitzroy River, Rockhampton (Qld. Mus. regd. No. I. 5565), thereby greatly extending the known range of the genus. This was captured on Nov. 22nd in the "town reach," and forwarded by Mr. W. K. Cleeve to the Queensland Museum.

I have identified this specimen as *Harpadon translucens* by comparing it directly with Saville-Kent's types in the Australian Museum. The Queensland specimen agrees with them, though it is a little larger, 80 mm. in standard length. It has depth 12 mm., head 17, ventrals 23, eye 2, interorbital 4.5. Fifteen rays in dorsal and anal fins. Posterior part of body with weak cycloid scales. General characters of the genus.

Colour in formalin pale milky white, minutely dotted with brown on the upper half of the fish. Eye and viscera bluish. Tips of dorsal and caudal fins blackish.

I have also compared specimens of *Harpadon nehereus* from China and Madras with *H. translucens*. The scales and lateral line are better developed in these large (8-10¼ inch.) specimens and the top of the head near the eyes is more rounded. These examples of *nehereus* have only 12 dorsal rays instead of fourteen or fifteen as in *H. translucens*.

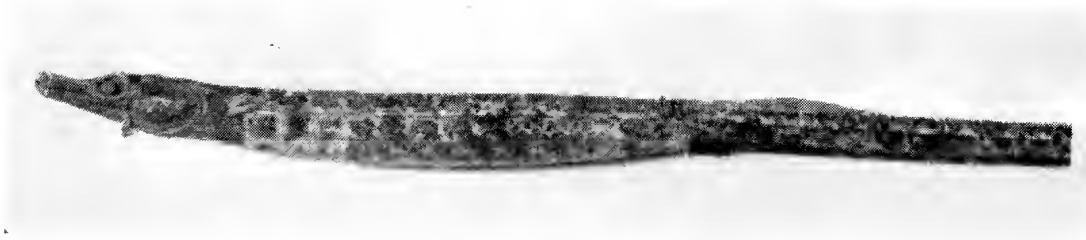


Fig. 1.—*Harpadon translucens* Saville-Kent.

Photo. : W. J. Sanderson.



Fig. 2.—*Oxleyana parviceps* (Ramsay & Ogilby).



Oxleyana parviceps, portion enlarged.

The figures of *H. nehereus* given by Russell, Le Sucur, Swainson, Bleeker, Hora, Weber and Beaufort, and by Delsman and Hardenberg, all show the lower number of dorsal rays usual in that typical species.

Material examined, one specimen to each number :—

Queensland Museum. No. I. 5565. *Harpadon translucens*. Fitzroy R., Rockhampton. (A. Bonding.)

Austr. Museum. I. 2772. *Harpadon translucens* LECTOTYPE. Ord River. (W. Saville-Kent.)

Austr. Museum. I. 2773. *Harpadon translucens* COTYPE. Ord River. (W. Saville-Kent.)

Austr. Museum. B. 7879. *Harpadon nehereus*. Madras, India. (Francis Day.)

Austr. Museum. IA. 7095. *Harpadon nehereus*. China. (Old Collection.)

Family SYNGNATHIDAE.

OXLEYANA, gen. nov.

Orthotype, *Syngnathus parviceps*, Ramsay and Ogilby.

Differs from true *Syngnathus* notably in having the snout shorter than post-orbital portion of head, instead of much longer than it.

The type-species seems restricted to South Queensland and northern New South Wales, and is thus representative of the Oxleyan faunal Sub-area recently distinguished by Iredale (Austr. Zool. viii, 1937, p. 287 and map).

OXLEYANA PARVICEPS (Ramsay and Ogilby).

(Plate XI, fig. 2 and 3).

Syngnathus parviceps Ramsay and Ogilby, Proc. Linn. Soc. N. S. Wales (2), i, 2, Aug. 23, 1886, p. 475. Clarence River, N. S. Wales.

Mr. Melbourne Ward secured a specimen of this pipefish at Southport in October, 1936.

New record for Queensland.

The Australian Museum has several specimens, including the type (No. I. 191), from the Clarence River, N. S. Wales, which is illustrated here.

Family MERLUCCIIDAE.

Genus **MERLUCCIUS** Rafinesque, 1810.**HUTTONICHTHYS**, subgenus nov.

Orthotype, *Gadus australis* Hutton (Colon. Mus. & Geol. Surv. Dept. Public. xviii, Cat. Fish. N.Z., Feb. 1872, pp. 45 and 115, pl. vii, fig. 72. Cook Strait, New Zealand) = *Merluccius (Huttonichthys) australis*.

"155 to 165 scales in a longitudinal series; eye 6 to $7\frac{1}{2}$ in head (in specimens of 340-350 mm); 10 gill-rakers on lower part of anterior arch; pectoral extending to vent or beyond."

In these key-characters, Norman (Discov. Rept. xvi, 1937, p. 45), in a recent revision of the genus *Merluccius*, distinguishes the New Zealand *australis* from all other species of the genus. These distinctions entitle *Gadus australis* to a new sub-generic name. The genotypical New Zealand species, as Norman has demonstrated, also occurs in the Straits of Magellan.

It may be noted here that *Polydatus* Gistel (Nat. Thierr. 1848, p. 105 and Handb. Naturges. 1850 (1847) p. 343) is a synonym of *Merluccius*, its genotype, *Polydatus lucius* Gistel, being a synonym of *Gadus merluccius* Linné, 1758.

Family GADIDAE.

Genus **AUCHENOCEROS**, Gunther, 1889.**AUCHENOCEROS PROVOCATOR**, sp. nov.

Auchenoceros sp. Gunther, Rept. Voy. Challenger, Zool. xxxi, 1889, Pelagic Fish, p. 27, pl. iii, fig. D. Pacific.

A new name is required for the small species of *Auchenoceros* figured in the "Challenger" Report, since, as Gunther recognised, it is quite distinct from the Neozelanie *punctatus* Hutton, the type of the genus. I accordingly name it after H.M.S. "Challenger."

Family SERRANIDAE.

NOVANTHIAS, gen. nov.

Neanthias Norman, Ann. Mag. Nat. Hist. (10), vii, 1931, p. 354. Orthotype, *Neanthias accraensis* Norman. Not *Neonanthias* Castelnau, Proc. Linn. Soc. N. S. Wales, iii, May 1879, p. 366, which was amended to *Neanthias* by Rye, Zool. Rec. xvi, 1879 (publ. 1881), Index p. 7.

The above new name is necessary because *Neanthias* Rye, 1881 preoccupies *Neanthias* Norman, 1931. The genotype of the new genus is *Novanthias accraensis* (Norman).

Family EPINEPHELIDAE.

Subfamily EPINEPHELINAE.

Genus **EPINEPHELUS** Bloch, 1793.**EPINEPHELUS FORSYTHI** Whitley.

Epinephelus forsythi Whitley, Austr. Zool. viii, 4, March 12, 1937, p. 222, pl. xiii, fig. 4. Lord Howe Island (type), Middleton and Elizabeth Reefs.

The species described below is similar to *Epinephelus fuscoguttatus* as figured by Bleeker (Atlas Ichth. vii, 1872, pl. ceevii, fig. 3), but is not true *fuscoguttatus*, as I have noted in my Middleton Reef paper (*loc. cit.*).

D. xi/15 ; A. iii/9, P. i/17, V. i/5 ; C. 15. L. lat *circa* 80 to hypural joint.

Head (255 mm.) 2.4, depth (230) 2.6 in standard length (615). Eye (27) 9, snout (50) 5.1, interorbital (47.5) 5.3, depth of caudal peduncle (67) 3.8, longest (5th) dorsal spine (71) 3.6, pectoral (96) 2.5 in head.

Head and body compressed. Interorbital sunken, except medially. Nostrils large. Bands of strong hooked teeth on jaws ; similar smaller ones on vomer and palatines. A few exterior canines anteriorly in both jaws and an inner series of longer teeth on mandibles posteriorly.

Preoperculum finely serrated above and strongly toothed towards its angle. Inferior border of preoperculum smooth. Three opercular spines, the middle one most posterior, and situated nearer the lower spine than the upper.

Scales oblong, rather large, generally cycloid, though some on the flanks are a trifle ciliated.

Margins of soft fins all rounded.

General colour in formalin pale brownish, conspicuously but irregularly marbled in parts with darker brown on head and body. About five dark brown patches on each side of dorsal base, another on nape, and a small blackish saddle over caudal peduncle. Head, belly, and all fins conspicuously spotted with various shades of brown in ocellus-like markings. Fins with a narrow edging of white. Tips of spinous dorsal membranes black. Tongue with some brown spots, otherwise interior of mouth is white. Eye bluish.

Described from a fine specimen (Q. M. Regd. No. I. 5546) from Lodestone Reef, Townsville, Queensland, presented by Mr. George Coates.

Genus **CAESIOPERCA** Castelnau, 1872.

Caesioperca Castlenau, Proc. Zool. Acclim. Soc. Vict. i, July 15, 1872, p. 49. Orthotype *Serranus rasor* Richardson.

Lacepedia Castlenau, Proc. Zool. Acclim. Soc. Vict. ii, May 10, 1873, p. 42. Haplotype, *L. cataphracta* Castelnau, from Victoria.

The identity of *Lacepedia* has always been in question and the genus has usually been associated with the Cheilodaetylidæ because of the simple nature of the lower pectoral rays. However, the characters of *Lacepedia* given by Castelnau agree with those of *Caesioperca*, of which it must evidently fall as a synonym, and *Lacepedia cataphracta* will be relegated to the synonymy of *Caesioperca rasor* (Richardson).

Subfamily CEPHALOPHOLINÆ.

Genus **CEPHALOPHOLIS** Bloch and Schneider, 1801.

CEPHALOPHOLIS COATESI sp. nov.

(Plate XII).

D. ix/15; A. iii/9; Se. *circa* 85. L. tr. 10/1/40 *circa*.

Depth of body (90 mm.) less than length of head (103). Pectoral, 69 mm.

Eye (17) subequal to interorbital space. Standard length, 265 mm.

Long caniniform teeth in jaws, with one or two somewhat enlarged (but not greatly curved) on either side of each symphysis. Preopercle spineless.

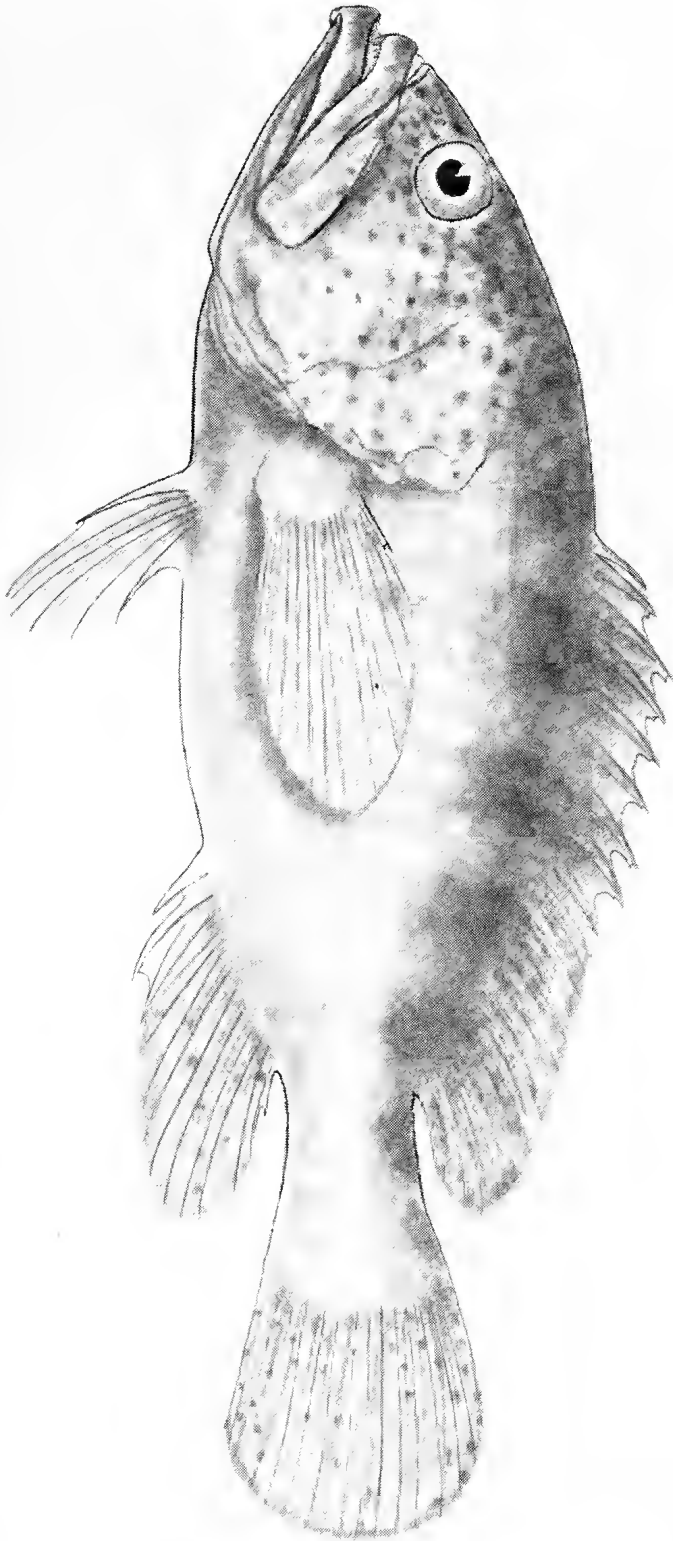
General characters of the allied species of *Cephalopholis*, but with distinctive coloration, unlike any species known to me.

Third anal spine longest. Caudal rounded.

General colour, in formalin, whitish, the head and soft unpaired fins sparsely spotted with brown. Top of head brownish. Four dark brown blotches on each side of dorsal base, and two brown saddle-marks on caudal peduncle. Sides and belly plain, except that viscera show bluish. Eye blue. A narrow dusky edge to ventrals and anal.

Described and figured from the holotype, a specimen 265 mm. in standard length, or just over a foot in total length, from Slasher's Reef, Townsville, Queensland (Qld. Mus. regd. No. I. 5504).

Named after Mr. George Coates, who has discovered a number of interesting species of fishes in north Queensland, and has given many valuable specimens to the Queensland Museum.



Cephalopholis coatesi Whitley.

Del. Joyce Allan.

Face page 124.

CEPHALOPHOLIS PACHYCENTRON (Cuvier and Valenciennes).

Serranus pachycentron Cuvier and Valenciennes, Hist. Nat. Poiss. ii, Oct. 1828, p. 295.
No locality (=East Indies).

Cephalopholis pachycentron Fowler and Bean, Bull. U. S. Nat. Mus. 100, x, 1930, p. 220,
fig. 9 (refs. and synon.).

One specimen, 154 mm. in standard length (Qld. Mus. regd. No. I. 5613) from Four foot Rocks, off Cape Cleveland, north Queensland; presented by Mr. George Coates.

CEPHALOPHOLIS MINIATUS FORMOSANUS Tanaka.

Perca miniata Bonnaterre, Tabl. Encycl. Meth. Ichth. 1788, p. 131. Based on Forskal, non-binom. Red Sea.

Cephalopholis formosanus Tanaka, Fish. Japan ii, June 15, 1911, p. 24, pl. vii, fig. 22. Taihoku, Formosa.

Cephalopholis miniatus Fowler and Bean, Bull. U. S. Nat. Mus. 100, x, 1930, p. 210, fig. 8 (refs. and synon.).

One specimen 255 mm. in standard length, labelled *Cephalopholis miniatus* (Qld. Mus. regd. No. I. 5393) from Rib Reef, Townsville, presented by Mr. George Coates. Mr. T. C. Marshall remarks that this species is not uncommon at Gladstone, where it is brought in from the reefs by fishing boats. This specimen agrees better with the nominal species named *C. formosanus* by Tanaka (*loc. cit.*), from Formosa, than with true *miniatus* Bonnaterre, *ex* Forskal.

Turning up Forskal's non-binomial description, however, we find (Descr. Anim. 1775, pp. xi and 41) several remarks, apart from coloration, in his account of the Red Sea type, which do not agree with the Queensland fish:

“*Vertici* ante oculos litera V. inscripta *Sp. ani* secunda, apice tertiae aequalis; sed validior et longior.” Forskal gives the fin-formula as $D. \frac{9}{24} . A. \frac{3}{13}$, etc., or, as we should write nowadays, D. ix/15; A. iii/10.

The Rib Reef specimen has the unusual number of ten dorsal spines and sixteen rays and A. iii/9, last divided.

Cephalopholis maculatus, Seale and Bean (Proc. U. S. Nat. Mus. xxxiii, Nov. 21, 1907, p. 235, fig. 5.) from the Philippines is more like the Queensland form but that specific name was anticipated by *Perca maculata* Forster, 1844, in Lichtenstein's edition of his Descr. Anim. p. 220, which some authors consider is also *C. miniatus*. However, Forster's name is preoccupied by *Perca maculata* Bloch, 1792.

Under these circumstances, I am using the subspecific name *formosanus* Tanaka for the brown-spotted Queensland species, to distinguish it from the blue-spotted type.

New record for Australia.

Cephalopholis boninius Jordan and Thompson (Mem. Carneg. Mus. vi, 4, September, 1914, p. 248, pl. xxix, fig. 7) from the Bonin Islands is apparently a synonym of *C. formosanus* Tanaka (Fish. Japan. ii, June 1911, p. 24, pl. vii, fig. 22) from Formosa. Another Japanese species was named *Sciaena fusca* by Bosc (Nouv. Diet. Hist. Nat. ed. 2, xvii, 1817, p. 146), but his name is preoccupied by *S. fusca* Mitchell (Trans. Lit. Phil. Soc. N. York, i, 1815, p. 409 = *Pogonias*), but Bosc's fish is evidently a *Cephalopholis boenack* (Bloch, 1790).

Cephalopholis mars (De Vis, 1884) is the Queensland representative of *C. urodelus* (Cuvier and Valenciennes, 1828) from Oceania.

CEPHALOPHOLIS SONNERATI (Cuv. and Val.).

Serranus sonnerati Cuvier and Valenciennes, Hist. Nat. Poiss. ii, Oct. 1828, p. 299. Pondicherry.

Cephalopholis sonnerati Fowler and Bean, Bull. U. S. Nat. Mus. 100, x, 1930, p. 213 (refs. and synon.).

Two specimens in the Queensland Museum from Lodestone Reef, Townsville (Mr. George Coates).

Family MACCULLOCHELLIDAE.

Genus **MACCULLOCHELLA** Whitley, 1929.

MACCULLOCHELLA MACQUARIENSIS (Cuvier and Valenciennes).

At the request of the Chief Secretary's Department, Sydney, I have compiled a chronological list of references in literature to the Murray Cod. This species is of much economic importance, so that it is hoped that the present list will be of value to field investigators by bringing all the known sources of information under one heading.

I very much doubt whether *Homodemus carifrons* De Vis, from the Tully River, is really a Murray Cod, as Boulenger contended, and regard this extension of its range into North Queensland and away from the Murray-Darling river-system as an erroneous record. Mr. T. C. Marshall states, "I am unable to trace De Vis' type In our card catalogue is a comment in De Vis' handwriting as follows:— 'Boul., B.M.C. (2) 1-152 wrongly refers this to *Oligorus macquariensis*.'"

The Murray Cod inhabits all the rivers of the Murray-Darling system from their sources in Queensland and west of the Dividing Range right down to the mouth of the Murray in South Australia. In northern New South Wales, it has trespassed upon the eastern watershed, being found naturally in the Richmond and Clarence systems. It is of course common in the Murrumbidgee and is found in the Federal Capital Territory. In Victoria, it inhabits the northern rivers allied to the Murray. The species

has for many years been introduced into waters which are outside the above natural range of the species. Thus it thrives in Lake George, Lake Bathurst, etc., New South Wales. It has been introduced into the southern Victorian rivers, and into Western Australia, apparently with varying degrees of success.

Opinion that the fish is suffering depletion seems fairly unanimous. Up till the end of the last century there had been considerable over-fishing but the appointment of inspectors and various regulations have operated as some check to waste. One year, in the 'eighties or 'nineties, 330,000 lb. of Murray Cod were sent from the Murray River to the Melbourne Market. In 1900, "it appeared probable that the total value of the fisheries within the South Australian portion of the Murray River may . . . be . . . from £25,000 to £30,000 per annum." When the South Australian authorities held an enquiry in 1903, the result of which was printed in Sydney that year, a decline in the quantity of the fish had been demonstrated, and has apparently continued since. So far as the situation in Victoria is concerned, see Lewis in Barrett's "Save Australia," 1925, 123 *et seq.*

The rate of growth, age, etc. is not scientifically recorded, but the maximum length and weight were given by Waite as six feet and 150 lbs.

As regards spawning, there are a number of conflicting accounts. Ogilby states that "the ova are deposited in the summer months, the statements of trustworthy observers varying between November and January even in the same district." The South Australian enquiries elicited the information that the cod spawn from September to November (and sometimes later) in the lower Murray River.

Mr. H. K. Anderson, formerly Inland Fisheries Officer for New South Wales, accomplished the artificial propagation of Murray Cod. He found their eggs "eyed" in five days, hatched in 13 days, and the fish were ready for liberation 15 days later. He thought this development was retarded by cold. All the Trout Cod captured in October-November and handled by Mr. Anderson were spent fish. He handled many thousands of fish and found the Trout Cod full-roed at 8" and the Murray Cod were never seen full-roed under 15". He found that the number of ova carried by the fish varied considerably :

- 1 fish weighing 9 lbs. carried 83,000 eggs.
- 1 fish weighing 9 lbs. carried 81,000 eggs.
- 1 fish weighing 5 lbs. carried 245,000 eggs.

I am unable to recognise more than one species of Murray Cod, though Mr. D. G. Stead (in a MS. report) says that the form known as the Trout Cod differs from the Murray Cod as follows: "Specimens 8-9 oz. or 17½ ins. in length from south-western New South Wales are in roe, whereas the Murray Cod does not usually mature

under 2½ lbs. The Trout Cod is much smaller than the Murray Cod, and has eye larger and body higher and its bold inexcavate snout overhangs the lower jaw. Sides spotted instead of marbled and a dark stripe along head in life."

I have examined all the Murray Cod in the Australian Museum from Benalla, Victoria; Mary R., Queensland; Richmond River, Wellington, Murrumbidgee and many other New South Wales localities, also the Murray River, and cannot find valid criteria for specific separation.

The depth of body is comparatively slightly greater in most of the Trout Cod but in several there is no appreciable divergence from the Murray Cod in this respect. The snout overhangs the lower jaw in most specimens but in one the jaws are equal, and, as the fish grows, the lower jaw evidently projects more and more. The spotted sides of the Trout Cod do not differ from those of a large Murray Cod and it is evident that the latter is merely the adult form of the young or Trout Cod stage; it is remarkable that we have no young Murray Cod without the Trout Cod characteristics. The dark stripe from snout to eye and gill-cover, the large eyes, and small size are plainly juvenile characters similar to those found in other fishes and I am of the opinion that the Trout Cod, so-called, is merely the young or perhaps a stunted or precocious form of the Murray Cod, and I can find no scale, fin, or other structural characters, not depending on growth or natural variation, to warrant the separation of the two nominal forms as a species or even as a variety. Further, Roughley (Fish. Austr. 1916, p. 63) states, "As the ovaries develop prior to spawning, a marked difference is noticeable in the shape of the fish, the belly becoming rounder and protruded, which considerably increases the depth of the fish. This has, in the past, been the cause of some confusion, and the fish in such condition has been regarded as a separate species." Furthermore, in Cuvier and Valenciennes' original description of the TYPE-specimen of *macquariensis*, a ten-inch male from Bathurst, we read (Histoire Naturelle des Poissons iii, 1829, p. 58) "c'est plutôt sa mâchoire supérieure qui dépasse l'autre" (It is rather the upper jaw which extends beyond the other) and "semé de taches nuageuses noires, médiocres et irrégulières" (strewn with cloudy blackish spots, medioere [in size] and irregular). Thus the *typical* Murray Cod was evidently a "Trout Cod." Therefore the names proposed by earlier authorities for the "Trout Cod": *mitchelli* Castelnau, *gibbiceps* Macleay (based on a teratological or "pug-headed" specimen) and a name given by Stead in MS., are synonyms of the true *macquariensis* C. & V.

If it be later found necessary to distinguish the two nominal forms, the custom of some Palaearctic ichthyologists might be followed and the Trout Cod known as *Maccullochella macquariensis* forma *macquariensis* and the Murray Cod as *Maccullochella macquariensis* forma *peelii*, this name having been given to a specimen with marbled coloration and a projecting lower jaw by Major Mitchell in 1839.

BIBLIOGRAPHY OF THE MURRAY COD.

1824. Wentworth, W. C., Statistical Acc. Brit. Settlements Australia, ed. 3.
1825. Lesson, Ann. Sci. Nat. (Paris) vi, Nov. 1825, pp. 253 and 254, footnote. Named without descr. as *Gryptes brisbanii*, from Macquarie R., N. S. Wales. (Where Lesson had collected the types, of the "Trout Cod" form, at Bathurst).
- (1827. Cunningham, Allan, got Murray Cod in the Mitchell-Namoi R., N.S.W., and the Dumarosq R., S. Queensland.)
- 1828. Lesson, Voyage de la "Coquille" (Duperrey), i, 2, 1828, p. 396.
- 18 9. Cuvier and Valenciennes, Hist. Nat. Poiss., iii, April 1829, p. 58 (Original descr. of *Grystes macquariensis*); Cuvier, Règne Anim. ed. 2, ii, April, 1829, p. 145.
- (Jan. 1829 and 1830. Sturt found Cod in the Murray River).
- 1831. Lesson, Voy. Coquille, Zool. ii, 1831, p. 227. (Bathurst, as *G. brisbanii*).
- (Dec. 1831 and Jan. 1832. Mitchell discovered a supposed new species in the Peel River).
1834. Sturt, Two Expeditions ii, 1834, pp. 35, 42, and 113. (Murrumbidgee).
1834. Bennett, Wanderings in N. S. Wales, 1834, p. 179. (Yass and Murrumbidgee).
1836. Valenciennes, Règne Animal Cuvier (disciples' ed.), Poissons, 1836, p. 39.
1836. Schinz, Abbildungen d. Fische, 1836, p. 49.
1837. Bennett, Cat. Austr. Mus., 1837, p. 61 (Cudgong, N.S.W.).
- (May, 1838, Sturt Collected Murray Cod in the Hume R., N.S.W.).
1838. T. Mitchell, Three Exped. Int. E. Austr., ed. 1, i, 1838, p. 33; ed. 2, Jany. 1839, p. 95, pl. v, fig. 1. (Described and figured as *Acerina (Gristes) peelii* from Peel River, N. S. Wales).
- 1843. Richardson, Rept. 12th Meet. Brit. Assoc. Adv. Sci. 1842 (1843), p. 17.
1844. Guérin-Meneville, Icon. Règne Anim., Poiss., 1844, p. 7, pl. v, fig. 2.
1848. Richardson, Zool. Voy. "Erebus" and "Terror," 1848, p. 118, pl. liii, figs. 8-9.
1848. Mitchell, Journ. Exped. Trop. Austr., 1848, p. 366. (Maranoa R., N.S.W. [now = South Queensland]).
1855. Bleeker, Verhand. Akad. Amstord. ii, 1855, pp. 6 and 19.
1857. Wilson, Trans. Philos. Inst. Victoria, 1857, pp. 23-34 (introduction into Yarra R.).
1859. Angas, Sydney Morning Herald, about May, 1859.—*Macquaria peelii* from Clarence R.
1859. Gunther, Cat. Fish. Brit. Mus., i, 1859, p. 251.
1860. Angas, Ann. Rept. Austr. Mus., 1860, p. 5.
1862. Bennett, Rept. Acclim. Soc. N.S.W., 1861 (1862), pp. 81-82.
1864. Bennett, Third Ann. Rept. Acclim. Soc. N.S.W., 1864, p. 81.
1868. Ramel, Bull. Soc. Acclim. Paris, 1868, pp. 13-16. (Recommends acclimatization of the Murray Cod in Europe)—fide Zool. Record 1868 (1869), p. 144.
1872. Klunzinger, Archiv. f. Naturgeschichte xxxviii, 1, 1872, p. 19. (Murray River, Victoria; 30 centimetres).
1872. Castelnau, Proc. Zool. Acclim. Soc. Victoria, i, 1872, p. 54.
1873. Castelnau, Proc. Zool. Acclim. Soc. Viet., ii, 1873, p. 39 (colour var.) and p. 150 (*Oligorus mitchelli* regarded as a new form from Murray River). [Note: The Murray Cod has been described several times as a "new" species, but modern authorities do not consider that there is more than one, somewhat variable, species, with the following names as synonyms: *Gryptes brisbanii* Lesson, *Grystes macquariensis* C. and V., *Acerina (Gristes) peelii* Mitchell, *Oligorus mitchelli* Castelnau, and *Oligorus gibbiceps* Macleay. The generic name *Maccullochella* was given to the Murray Cod because *Grystes* is a very different American fish and *Oligorus* is a preoccupied name. Since *Gryptes brisbanii*, the earliest name, was not accompanied by a description, i.e., was a "nomen nudum," the correct scientific name of the Murray Cod, Trout Cod, Murray Perch, or whatever other popular name the fish may have, is *Maccullochella macquariensis* (Cuv. & Val.)—G.P.W.]

1875. Giglioli, Viaggio Intorno al Globo . . . "Magenta," 1875, pp. 754 and 772. (Victoria).
1876. Bleeker, Arch. Néerl. Sci. Nat. xi, 1876, Pars. I, p. 262.
1879. Klunzinger, Sitzungsberichte Akad. Wissensch. Wien, lxxx, 1, 1879, p. 347.
- 1880. Gunther, Rept. Voy. Challenger, Zool. i, 6, 1880, p. 32 (Mary Rivor, Queensland).
- 1880. Gunther, Guide to the Study of Fishes 1880, p. 392, fig. 164.
1881. Macleay, Proc. Linn. Soc. N. S. Wales, v, Feb. 1881, p. 352, and Cat. Austr. Fish i, 1881, pp. 52 and 53.
1882. Ramsay, Proc. Linn. Soc. N. S. Wales, vi, 1882, p. 832. (Macquarie R.—colours).
- 1882. Tenison-Woods, Fish and Fisheries of N.S.W., 1882, p. 102, pl. xli.
1883. Ramsay, Proc. Linn. Soc. N. S. Wales vii, 1883, p. 674 (Wagga, &c.); also Cat. Exhibits N.S.W. Court, Great Fisheries Exhibition, 1883, p. 22.
1883. Macleay, Proc. Linn. Soc. N. S. Wales viii, p. 200 (Mary R., Q.) *et ibid* ix, 1884, p. 12; Cat. Austr. Fish. (Suppl.). 1884, p. 12.
- 1884. McCoy, Prodronus of the Zoology of Victoria, decade ix, 1884, p. 19, pls. lxxxv.-lxxxvi. (Murray River system and introduced into Yarra R.—extensive notes on variation).
1885. Johnston, Pap. Proc. Roy. Soc. Tasm. 1884 (1885), p. 252.
- 1885. Macleay, Proc. Linn. Soc. N. S. Wales x, (Abstr. p. 246). page 267. (*Oligorus gibbiceps*, "new" species from near Yass).
1886. Ogilby, Cat. Fish. N. S. Wales, 1886, p. 13.
1888. Macleay, Proc. Linn. Soc. N. S. Wales (2) ii, March, 1888, p. 981 (Richmond R.); also Abstract, Nov. 30, 1887, p. vi.
- 1890. Lucas, Proc. Roy. Soc. Viet. (2) ii, 1890, p. 18.
1893. Saville-Kent, Great Barrier Reef, 1893, pp. 282 and 369. (Queensland & N. S. Wales; grows to 100 lbs.)
- 1893. Ogilby, Edible Fishes of N. S. Wales 1893, p. 17, pl. viii.
1893. Thompson, Hist. Fisher, N. S. Wales, 1893, p. 17 and plate.
- 1895. Ogilby, Natural Science vi, 35, 1895, p. 71 (distribution).
1895. Boulenger, Cat. Fish Brit. Mus. ed. 2, vol. i, 1895, p. 151.
1897. O'Connor, Proc. Roy. Soc., Qld. xii, 1897, p. 109 (Upper Brisbane River).
- 1897. Saville-Kent, Nat. in Austr. 1897, p. 158, pl. xxxi, fig. c. (Distribution, introduction into W. Australia, size, etc.).
1899. Sturt, Life of Charles Sturt, 1899, pp. 69 and 138.
1901. De Vis, Queensland Official Year Book, 1901, p. 111.
- 1902. Zietz, Trans. Roy. Soc. South Austr. xxvi, 1902, p. 265.
1902. Woodward, W. Austr. Year Book 1900-1 (1902), p. 270.
1903. Dannevig and others, "Murray Cod Fisheries." Extracts from Evidence collected by the South Australian Authorities. . . (Dept. Fisheries N.S.W.), 1903, pp. 1-47.
1904. Waite, Mem. Nat. Club of N. S. Wales, i. 1904, p. 27.
- 1904. Boulenger, Cambridge Natural History 1904, p. 659.

1905. Cox, Alphabetical List Fishes (Sydney), 1905, p. 10.
- 1906. Stead, Fish. Austr. 1906, pp. 96 and 262, fig. 38.
1907. Fountain and Ward, Rambles Austr. Naturalist 1907, p. 50 (Darling R.)
1907. Anon., Fisheries of N.S.W. (Govt. Tourist Bureau), p. 67.
- 1908. Stead, Edible Fishes of N. S. Wales, 1908, p. 56, pl. xxiv.
- 1909. Zietz, Trans. Roy. Soc. S. Australia, xxxiii, 1909, p. 268.
1916. Cockerell, Mem. Qld. Mus. v, 1916, p. 54 (scales).
1916. Roughley, Fish. Australia 1916, p. 62, pl. xvi.
- 1917. Anderson, Rept. Fisher. N.S.W. 1916, p. 42 (propagation in hatchery). And in other year's reports.
1921. Joseland, Angling in Australia, 1921, p. 63.
1921. Waite, Rec. S. Austr. Mus. ii, 1, 1921, p. 90, fig. 135.
- 1921. McCulloch, Austr. Zool. ii, 2, 1921, p. 47, pl. xviii; Austr. Zool. Handbook i, 1922, p. 47, pl. xviii, fig. 166a.
1923. Fowler, Proc. Acad. Nat. Sci. Philad. lxxv, 1923, p. 44.
- 1923. MacGillivray, Pan-Pacific Sci. Congress Austr., 1923, Guide Broken Hill, p. 66.
- 1923. Waite, Fish. S. Austr. 1923, p. 113, fig.
1924. Peirce, Knocking About, 1924, p. 78, fig.
1925. McCulloch & Whitley, Mem. Qld. Mus., viii, 2, 1925, p. 148.
1925. Lewis, Fish. In Barrett, Save Australia. 1925, p. 123 *et seq.* (Effect of carp, conservation, etc., Murray River).
1925. I. Lee, Early Explorers in Australia 1925, pp. 552 and 575.
1925. Joseland, Austr. Encyclopædia i, 1925, p. 60.
1926. McCulloch, Austr. Encyclopædia ii, 1926, p. 157 and fig.
- 1927. Burrell, The Platypus, 1927, p. 142.
1928. Kesteven, Rec. Austr. Mus. xvi, 7, 1928, p. 333, figs. 8-10 (skull).
1929. Whitley, Rec. Austr. Mus., xvii, 3, 1929, p. 110 (*McCullochella*, new genus).
1929. McCulloch, Austr. Mus. Mem. v, 1929, p. 152.
1929. Roughley, Mid-Pacific Magazine, xxxviii, 6, 1929, p. 520, fig.
1930. Taggerty, The Fishing Manual, 1929-30, p. 36.
1930. Ramsay-Smith, Myths and Legends of the Australian Aborigine, 1930, p. 229.
1931. Anderson, Austr. Mus. Mag. iv, 6, 1931, p. 187 (Goodradigbee).
- 1932. Iredale & Whitley, Vict. Nat. xlix, 1932, p. 96.
1932. Stead, Australian Geographer, i, 4, 1932, p. 88 and fig.
1933. Stead, Austr. Naturalist ix, 2, 1933, p. 29, fig.
1933. Barrett, Water Life, 1933, pp. 11 and 15.
1936. Fisheries Gazette, N.S.W., to date.
1936. "Angling and Gun Sport," 1936, 30 *et seq.* Cf. also the new Fisheries Legislation.

Family CARANGIDAE.

Genus **TURRUM** Whitley, 1932.**TURRUM EMBURYI**, Whitley.

Turrum emburyi Whitley, Rec. Austr. Mus. xviii, 6, April 20, 1932, p. 337, pl. xxxviii, fig. 4, North West Island, Queensland.

D. viii/31 ; A. ii/27 ; P. ii/20 ; V. i/5.

Head (200 mm.) 3.5, depth (circa 190) about 3.7 in standard length (circa 700). Eye (25) 8, snout (76) 2.6 in head. Profile swollen over eyes. Upper jaw the longer. Maxillary broad, not reaching back as far as eye. Villiform teeth on jaws, vomer and palatines. No exterior enlarged teeth. Cheeks and top of opercles scaly. Pseudo-branchiae present.

Body rather elongate and tapering. Caudal peduncle depressed.

Depth of origin of first dorsal fin about 180 mm., much shorter than length of base of soft dorsal fin, 270 mm.

About 22 small and 28 large scutes on straight portion of lateral line which extends almost half way from caudal fin to shoulder, but not extending as far forward as origins of soft dorsal or anal fins. Curved portion of l. lat slightly longer than straight portion. Breast naked.

Dorsal and anal lobes falciform, but not greatly produced, the last ray of each fin lengthened. Pectoral falciform. Ventrals short. Caudal forked.

General colour in formalin, brownish yellow with faint dusky blotches on fins and caudal peduncle. A very narrow fuscous margin to dorsal and caudal fins. An indistinct humeral blotch.

Described from a specimen (Qld. Mus. regd. No. I. 5333), about 700 mm. in standard length.

Locality.—Gulf of Carpentaria. Collected by Mr. T. Culman.

There is also a small specimen (Q. M. No. I. 5499) from Gladstone, Qld.; presented by Mr. G. R. H. Richmond.

MELBANELLA, gen. nov.

Orthotype, *Micropus mulleri* Steindachner (Denkschr. Akad. Wiss. Wien. xli, 1, 1879, p. 7, from Hobson's Bay, Victoria) = *Melbanella mulleri*.

The species for which I propose the above new name has been placed in several inappropriate genera by authors. Its original situation in *Micropus* is untenable because *Micropus* was employed by Wolf, 1810, for a genus of birds, and by Hübner, 1818, for a genus of Lepidoptera, before Gray first used it for a fish in 1831 (*vide* Sherborn, Index Animalium). Klunzinger (Sitzb. Akad. Wiss. Wien lxxx, 1, 1879, p. 378) noted this invalidity and placed Steindachner's species, of which he saw the

type, in the genus *Micropteryx* Agassiz (Pise. Brasil (Spix), 1831, p. 104). Here again, however, the choice was unfortunate since *Micropteryx* is preoccupied by *Micropteryx* Hübner, 1826, a genus of Lepidoptera. The fish finally appeared in McCulloch's Cheek-List (Austr. Mus. Mem. v, 1929, p. 192) in the genus *Chloroscombrus* Girard (Proc. Acad. Nat. Sei. Philad., 1858, p. 168).

The logotype of this genus was selected by Jordan and Gilbert (Bull. U. S. Nat. Mus. iii, 16 (Smithson. Misc. Coll. xxiv), 1882, p. 440) as *Seriola cosmopolita* Cuvier and Valenciennes (Hist. Nat. Poiss. ix, March 1833, p. 219). The latter species, like others included under *Chloroscombrus* by American authors, has fewer than thirty dorsal and anal rays, and differs from ours in various other respects, so that it is evident that Steindachner's species requires a new generic name.

ABSALOM, gen. nov.

Orthotype, *Caranx radiatus* Macleay, 1881.

A Carangid genus much modified by having the following characters:—Eye shorter than snout. Teeth minute, conical, not juxtaposed, in several rows anteriorly in premaxillaries, in single row on sides and on mandible. Other teeth on vomer and palatines. Gill-rakers not projecting far into mouth.

Many dorsal and anal rays much produced. Body compressed, its depth greater than length of head. Scales extending over breast.

ABSALOM RADIATUS (Macleay).

Caranx radiatus Macleay, Proc. Linn. Soc. N. S. Wales, v, 4, May 20, 1881, p. 537. Rockingham Bay, Queensland.

Caranx compressus Macleay, Proc. Linn. Soc. N. S. Wales, viii, 2, July 17, 1883, p. 204. Lower Burdekin River, Queensland. Preoccupied by *C. compressus* Day, Proc. Zool. Soc. Lond. 1870 (1871) p. 689, from the Andaman Islands.

Caranx radiatus McCulloch, Biol. Res. Endeav. iii, 3, April 21, 1915, p. 132, pl. xxiii (Port Hedland, N. W. Australia).

One specimen, 246 mm. to end of middle caudal rays (Qld. Mus. regd. No. I. 5525) from Heron Island, Queensland; collected by Mr. T. C. Marshall.

Family CHANDIDAE.

KONOPICKIA, gen. nov.

Orthotype, *Ambassis mulleri* Klunzinger (Sitzb. Akad. Wiss. Wien, lxxx, 1, 1879, p. 346, pl. i, fig. 3, from Port Darwin) = *Konopickia mulleri*.

General facies of *Ambassis* auct., but with the following combination of characters: Supraorbital bone without spines. Preoperculum not strongly denticulated. Preorbital with a few denticles. Depth of body between $2\frac{1}{2}$ and 3 in standard length. Se. 25 to 26. Two rows of scales on the cheeks. Lateral line obsolete. Less than ten dorsal and anal rays. Three anal spines. Marine.

This new generic name is required to differentiate the odd species well described by Klunzinger and beautifully figured by his artist Edward Konopieky, after whom I name the genus.

Genus **AUSTROCHANDA** Whitley, 1935.

Austrochanda Whitley, Rec. S. Austr. Mus. v, Sept. 30, 1935, p. 357.

Orthotype, *Pseudoambassis macleayi* Castelnau.

AUSTROCHANDA MACLEAYI (Castelnau).

Pseudoambassis macleayi Castelnau, Proc. Linn. Soc. N. S. Wales, iii, Sept. 1878, p. 43. Norman River, Gulf of Carpentaria.

Ambassis nalua Cockerell, Mem. Qld. Mus. v, 1916, p. 54. Scales from the Cape Bowling Green, Queensland, specimens noted hereunder. Not *Chanda nalua* Hamilton-Buchanan, Acc. Fish. Ganges, 1822, p. 107, pl. vi, fig. 36 from the Ganges.

Austrochanda macleayi Whitley, Rec. S. Austr. Mus. v, 1935, p. 357, figs. 6-7 (references, synonymy, and type-specimens). Queensland.

Five specimens, 54-82 mm. in standard length (Q. Mus. regd. Nos. I. 1971-1978), from Cape Bowling Green, collected by Dr. Hamlyn Harris, agree with the *pallidus* form of this species, figured by me in 1935 (*loc. cit.*, fig. 7). Ogilby had labelled these specimens *Ambassis nalua*, and as such the species was recorded from Queensland by Cockerell. The true *Chanda nalua* Hamilton-Buchanan has, however, much deeper cheeks and depth of body half standard length.

The Cape Bowling Green specimens have the following characters:—Profile of head excavated over eyes. 10-11 predorsal scales. L. lat 22 or 23, complete. Preorbital and suborbital serrations weak. A single supraorbital spine. Lower limbs of preoperculum strongly serrated. No teeth on tongue.

Colour now straw yellowish, front edge of longest dorsal spine dusky. No prominent dark edge to dorsal membrane. A thin brown streak along middle of each side of caudal peduncle.

Marine.

Genus **ACANTHOPERCA** Castelnau, 1878.

ACANTHOPERCA GULLIVERI Castelnau.

Acanthoperca gulliveri Castelnau, Proc. Linn. Soc. N. S. Wales, iii, Sept. 1878, p. 44. Norman River, Queensland. Type in Macleay Museum, University of Sydney.

Ambassis gigas Ramsay and Ogilby, Proc. Linn. Soc. N. S. Wales (2), i, 1886, p. 9. Strickland River, New Guinea. Type in Australian Museum, Sydney. *Id.* Weber and Beaufort, Fish. Indo-Austr. Arch. v, 1929, p. 403, fig. 97.

A fine series of eleven specimens, 3 to 5 inches long, of this species is preserved in the Australian Museum (Nos. I. 13066-13074) from the Flinders River and adjacent pools near Hughenden and Richmond, Queensland; presented by Mr. F. L. Berney in 1914.

Family LATIDAE.

Genus **PSAMMOPERCA** Richardson, 1848.**PSAMMOPERCA WAIGIENSIS** (Cuvier and Valenciennes).

Labrax waigiensis Cuvier and Valenciennes, Hist. Nat. Poiss. ii, Oct. 1828, p. 83, Waigiou, New Guinea.

Psammoperca datnioides Richardson, Zool. Voy. Erebus and Terror, Fish. 1848, p. 116, pl. lvii, figs. 1-2. Australia.

Onidon chinensis Müller and Troschel, Horae Ichth. iii, 1849, p. 21, Manila.

Psammoperca waigiensis Fowler and Bean, Bull. U. S. Nat. Mus. 100, x, 1930, p. 179 (references and synonyms).

A small specimen of this fish (Qld. Mus. No. I. 13/1527) was labelled with a manuscript name by Ogilby, but since it agrees excellently with Cuvier and Valenciennes' description and with Richardson's figure, a new name is unnecessary. It came from the Brisbane River (A.F.A.Q.).

Others labelled *Psammoperca* sp. from Lindeman Island (I. 5345); coll. Melbourne Ward, and from Four-foot Rocks, off Cape Cleveland (I. 5611); presented George Coates. The colours of the latter specimen, which was sent to Brisbane on ice, were noted by Mr. T. C. Marshall, as follows:—

“General body colour light drab, darker on the back and passing into dirty white flecked with grey on the belly, each scale fairly clearly outlined in drab. Fourteen or fifteen pale orange-cinnamon lines on each side running horizontally along the body from operculum to caudal base, and showing strongest below lateral line. Soft dorsal, anal, and caudal fuscous. Spiny dorsal, pectoral and ventrals hair-brown, darker at their extremities. Head slightly darker than body with lips pinkish-white. Eye: iris surrounded by grey shot with golden reflections and separated by a narrow pale gold ring.

“Colours taken from Ridgway, 1912 edition.”

Family ARRIPIDAE.

Genus **ARRIPIS** Jenyns, 1840.**ARRIPIS TRUTTA** (Bloch and Schneider).

Sciaena trutta Bloch and Schneider, Syst. Ichth. 1801, p. 542. Ex. Forster MS. Queen Charlotte Sound, New Zealand.

Arripis truttaceus McCoy, Prodromus Zool. Vict. dec. ii, 1878, p. 19, pls. xvi-xvii. (Victoria).

That the Kahawai (generally miscalled “Salmon”) occurs in South Queensland is demonstrated by notes and photographs of a specimen which Ogilby sent to McCulloch in 1918. A second specimen, probably from Moreton Bay, was described long ago by De Vis on page 103 of his unpublished MSS. notes, preserved in the Queensland Museum. This species is common in Southern Australia and New Zealand and apparently occasionally wanders as far north as Brisbane, though it is evidently rare north of the Clarence River district, New South Wales.

New record for Queensland.

Family LUTJANIDAE.

Genus **GLABRILUTJANUS** Fowler, 1931.*Glabilutjanus* Fowler, Bull. U. S. Nat. Mus. 100, xi, 1931, pp. 88 and 95.Orthotype, *Mesoprion nematophorus* Bleeker.**GLABRILUTJANUS MARSHALLI** Whitley.*Mesoprion aurivittatus* Saville-Kent, Gt. Barrier Reef, 1893, p. 369. *Nomen nudum*. Queensland.*Mesoprion helenae* Saville-Kent, Gt. Barrier Reef, 1893, p. 369. *Nomen nudum*. Queensland.*Lutjanus nematophorus* Ogilby, Mem. Qld. Mus. vii, 1920, p. 20, pl. i. Hervey Bay, Queensland. Probably not *Mesoprion nematophorus* Bleeker, Act. Soc. Sci. Indo-Néerl. viii, 1860, p. 56, from Celebes.*Glabilutjanus marshalli* Whitley, Rec. Austr. Mus. xviii, April 20, 1932, p. 338. Dunwich, Moreton Bay, Queensland. Type in Queensland Museum (No. I. 4723).

A beautiful specimen (Qld. Mus. No. I. 5390), 250 mm. in standard length, from Lorne Reef, Townsville: presented by Mr. George Coates. This fish agrees with the excellent figure given by Ogilby of a Hervey Bay example, and has the vomer and palatines toothless, a large canine on each side of maxillary symphysis, some peg-like teeth in lower jaw, but rest of dentition inconspicuous. A light saddle mark occurs just behind dorsal fin, but could easily be overlooked. Ogilby called it *Lutjanus nematophorus* Bleeker, but his figure differs from that in Bleeker's "Atlas" in coloration and produced rays, but these may vary with age. However, Bleeker's fish has smaller scales, fewer dorsal rays, different form and lepidosis of head and other details, so that I am using what is evidently the valid Australian name for the species, *Glabilutjanus marshalli* Whitley, based on what appears to be the young, which has the spinous dorsal fin convex, the fifth spine longest, no produced rays, and shorter ventral fins, whilst the longitudinal stripes are fewer in number and more definitely marked, as are also the lines on top of the head.

Fowler (*loc. cit.* 1931) has figured Philippine examples with only one much produced ray, and caudal fin without dusky edge.

Genus **LUTJANUS** Bloch, 1790.**LUTJANUS VITTA** (Quoy and Gaimard).*Serranus vitta* Quoy and Gaimard, Voy. Uranie Zool. 1824, p. 315, pl. lviii, fig. 3. Waigiou.*Lutjanus vitta* Fowler, Bull. U. S. Nat. Mus. 100, xi, April-May 1931, p. 138 (references and synonyms).

A specimen about 200 mm. in standard length (Qld. Mus. No. I. 5602) from Salamander Rocks, off Cape Cleveland, Queensland, is a female in roe, presented by Mr. George Coates.

LUTJANUS COATESI Whitley.

Lutjanus coatesi Whitley, Mem. Qld. Mus. x, 1934, p. 176, pl. xxvi, fig. 2 and text fig. 1. Helix Reef, Queensland.

Id. Whitley, Austr. Zool. viii, 1937, pp. 210, 224, 231 and 269.

I was surprised to find this species of Red Bass at Elizabeth Reef, nearly 100 miles north of Lord Howe Island. Possibly the outer Coral Sea fishes impinge on the Great Barrier Reef opposite Townsville, but do not transgress into the better known waters inside the Great Barrier Reef.

Genus **APRION** Cuvier and Valenciennes, 1830.

APRION VIRESCENS PLACIDUS, subsp. nov.

Aprion virescens Cuvier and Valenciennes, Hist. Nat. Poiss. vi, Sept. 1830, p. 544, pl. clxviii. Seychelles.

One specimen, nearly 16 inches overall, has the following characters:—

D. x/11; A. iii/8; L. lat. 50. L. tr. 8/1/16.

Head (110) 3.4 depth (87) 4.3 in standard length (375).

Eye (25) 4.4, interorbital (37) 3 in head. Upper jaw (48) equal to pectoral (48). 5 to 7 rows of cheek scales.

Agrees closely with Cuvier and Valenciennes' description except that coloration in formalin is greyish brown, the depth is less than 4 in standard length, eye more than 4 in head, and the upper jaw comparatively longer.

Locality.—Rib Reef, Townsville. Presented by Mr. George Coates. Queensland Museum regd. No. I. 5307. Others were taken at the same place.

A friend of mine has shown me photographs of specimens which he caught in the Seychelles where the species is called "Job." Thus Jobfish could be used as a vernacular name in Australia.

Mesoprion microchir Bleeker, 1852, differs from the Queensland fish in proportions of eye, jaws, and preorbital in head. Kner's description of *Sparopsis* is not available to me, but in view of the differences noted above, it is evident that the Queensland fish requires a new subspecific name, and Mr. Coates' specimen is designated type of the subspecies, *placidus*.

Family NEMIPTERIDÆ.

Genus **SCOLOPSIS** Cuvier, 1816.

SCOLOPSIS REGINA, sp. nov.

Scolopsis temporalis McCulloch, Proc. Linn. Soc. N. S. Wales xlvi, 4, Nov. 30, 1921, p. 469, pl. xl, fig. 3, and of Australian authors. Not *Scolopsides temporalis* Cuvier and Valenciennes, Hist. Nat. Poiss. v, 1830, p. 341, from Waigiou.

The Australian fish, hitherto known as *Scolopsis temporalis* (Cuv. & Val.) is evidently atypical, as McCulloch himself noted, and may be renamed. It lacks the ring of colour behind the eye, and the marks on the body which are characteristic of true *temporalis*.

A Qld. Mus. specimen (No. I. 5339) has D. x/9; A. iii/7; L. lat. 48 + some smaller scales, and L. tr. 5/1/18.

Depth of body (86) 2.6, head (70) 3.2 in standard length (225).

Eye (21) equal to interorbital (21), less than snout (22.5). Preorbital (14) 1.5 in eye. Upper caudal lobe, 110 mm.; lower, 85.

One large and several small preorbital spines with an antrorse one superiorly. Limb and angle of preoperculum strongly denticulated, the margin excavate over angle-spines. Pectoral shorter than head, without produced rays. Third anal spine longest. Caudal roundly emarginate, the lobes attenuate.

Pale greyish in formalin, very indistinct oblique bars on flanks just below lateral line. Back smoky grey with lighter bars along centre of scale-rows. Two conspicuous dark brown bars join the eyes and a similar oblique bar crosses preorbital. A smoky bar on pectoral base. Caudal margin lighter than rest of fin.

Type-locality.—Rib Reef, Townsville, Queensland.

Presented by Mr. George Coates.

Scolopsis plebaei De Vis, 1884, differs in having height $3\frac{1}{4}$ and head $4\frac{1}{4}$ in standard length, and in other proportions, also in coloration and minor details.

S. speculans De Vis, 1882, has shallower preorbital and first pectoral ray produced, and also differs in coloration.

Family POMADASIDAE.

Genus **PLECTORHINCHUS** Lacépède, 1802.

PLECTORHINCHUS ROUGHLEYI Whitley.

Plectorhinchus roughleyi Whitley, Austr. Zool. vi, 2, Jan. 14, 1930, p. 118. New South Wales.

One large specimen (Qld. Mus. No. I. 5403) from Kelso Reef, Townsville (Mr. G. Coates), compared with the holotype of the species in the Australian Museum.

Family LETHRINIDAE.

Genus **LETHRINELLA** Fowler, 1904.

LETHRINELLA MINIATA (Bloch and Schneider).

Sparus miniatus Bloch and Schneider, Syst. Ichth. 1801, p. 281, *Ex.* Forster MS. Pacific Ocean—Namook Island and New Caledonia.

Lethrinus rostratus McCulloch, Austr. Mus. Mem. v, 1929, p. 227.

Lethrinus miniatus Fowler, Bull. U. S. Nat. Mus. 100, xii, 1933, p. 8, fig. 1 (references and synonyms).

The long snout, broad lips, and conic teeth alone distinguish this genus and species from other Lethrinidae.

One specimen (Qld. Mus. No. I. 5561), 640 mm. in standard length, and weighing 8 lbs., from Lodestone Reef, Townsville, Queensland.

Presented by Mr. George Coates.

Family SPARIDAE.

ALLOTAIUS, gen. nov.

Orthotype, *Dentex spariformis* Ogilby (New Fish. Qld. Coast, Dec. 20, 1910, p. 91; Mem. Qld. Mus. v, 1916, p. 169, pl. xxi) = *Allotaius spariformis*.

Ogilby had some justifiable misgivings when, through lack of specimens or literature, he placed *spariformis* in the genus *Dentex*, from which no later authors have removed it. Yet a new generic name is here very necessary since the tautotype of the genus *Dentex* Cuvier (Mem. Mus. Hist. Nat. Paris, i, 1815, pp. 456 and 487) is *Sparus dentex* Linné (Syst. Nat., ed. 10, 1758, p. 281; ed. 12, 1766, p. 471) figured on plate 268 of Bloch.

Bloch's figure differs from Ogilby's in many respects, the new Australian genus having the following characters:—

Preorbital shallow, not crenulated. Posterior nostril slit-like. Eye large. Preopercular flange scaly. Five rows of scales on cheeks. Form of body deep. More than 45 scales in lateral line. Scales of body fairly uniform in size. Twelve dorsal spines. No fin spines or rays produced.

On comparing actual specimens, the differences become even more marked: the larger eyes, much more elevated upper profile of head, larger scales, differently shaped preorbital, and less scaly interorbital of the Australian *spariformis* at once separating it from the European *Dentex*.

From the Japanese *Taius*, my new genus differs in the shape of the head and fewer anal rays.

Family PLATACIDAE.

Genus **ZABIDIUS** Whitley, 1930.

Zabidius Whitley, Mem. Qld. Mus. x, 1, Aug. 28, 1930, p. 17. Orthotype, *Platax novemaculeatus* McCulloch. *Id.* Weber and Beaufort, Fish. Indo-Austr. Archip. vii, 1936, p. 182, note.

This genus is distinguished from *Chaetodipterus* notably in having no produced dorsal spine and in having the margins of the dorsal and anal fins rounded.

ZABIDIUS NOVEMACULEATUS (McCulloch).

Platax novemaculeatus McCulloch, Biol. Res. Endeavour, iv, 4, Oct. 31, 1916, p. 188, pl. lv, fig. 1. Off Gloucester Head and Bowen, Queensland. *Id.* Partridge and Whitley, Mem. Qld. Mus. ix, 1, 1927, pp. 90 and 95. *Id.* Barnard, Ann. S. African Mus. xxi, 2, 1927, p. 605.

Zabidius novemaculeatus Whitley, Mem. Qld. Mus. x, 1930, p. 17.

A beautiful specimen, about 355 mm. in standard length (Qld. Mus. No. I. 5595) from Salamander Rocks, Cape Cleveland, Queensland; presented by Mr. G. Coates, who remarks:—"Not an uncommon fish in local coastal waters. I have seen them caught at all depths from surface to sixteen fathoms. They apparently

eat any class of fish bait and I have seen one caught on a piece of banana. . . . This is what we call a Sun fish . . . it is always to be seen on a calm day loafing on the surface with its back well out of the water."

This species is known only from Queensland and North Australia.

Family SARDIDAE.

Genus **SARDA** Cuvier, 1829.

SARDA AUSTRALIS (Macleay).

Pelamys australis Macleay, Proc. Linn. Soc. N. S. Wales, v, May 1881, p. 557. Port Jackson, N. S. Wales.

This is the Horse Mackerel, usually called *S. chiliensis* in Australian lists, but local specimens never agree perfectly with descriptions and figures of extralimital ones, so I use the most acceptable Australian specific name.

A specimen (Qld. Mus. regd. No. I. 5498), 477 mm. in length to end of middle caudal rays, from Masthead Island, Capricorn Group, was presented by Mr. K. Gronwald.

New record for Queensland.

Genus **WANDERER** Whitley, 1937.

WANDERER WALLISI Whitley.

Wanderer wallisi Whitley, Austr. Zool. viii, 4, March 12, 1937, p. 229, pl. xiv, fig. 3. Northern New South Wales.

A specimen of the Little Tunny (Qld. Mus. No. I. 5402) has been identified as this species by comparison with the types in the Australian Museum.

Locality.—Kelso Reef, Townsville, Queensland.

Presented by Mr. G. Coates.

Family SOLEIDAE.

Subfamily SYNAPTURINAE.

STRANDICHTHYS, gen. nov.

Orthotype, *Synaptura muelleri* Steindachner.

This well-marked species of sole deserves to be generically separated from true *Synaptura* Cantor 1849, which is typified by *Pleuronectes commersonii* Lacépède (Hist. Nat. Poiss. iv, 1802, pp. 599 and 694; earlier in vernacular form in vol. iii, 1802, pl. xii, fig. 2) from Mauritius.

The Australian *S. muelleri* for which I propose the new name *Strandichthys*, differs from *Synaptura (commersonii)* in being much deeper in body in proportion to its length, in having smaller teeth, long setae on the body, ctenoid scales on both sides,

those of head and neck not enlarged, and only about half the number of lateral line scales which *commersonii* has. Other minor differences will be apparent from the subjoined description made from freshly caught Queensland specimens.

Named in honour of Professor Embrik Strand, of Riga, in appreciation of his great labours in the field of systematic zoology.

STRANDICHTHYS MUELLERI (Steindachner).

Synaptura muelleri Steindachner, Denk. K. Akad. Wiss. Wien, xli, 1870, p. 4, Cleveland Bay, Townsville, Queensland (Baron von Müller). Type in the Natural History Museum, Stuttgart. *Id.* Klunzinger, Sitzb. K. Akad. Wiss. Wien, lxxx, I, 1879, p. 408. *Ex* Steindachner. *Id.* McCulloch, Austr. Mus. Mem. v, 1929, p. 285.

Synaptura arafurensis Gunther, Rept. Voy. Challenger. Zool. i, 6, 1880, p. 49, Arafura Sea ("Challenger" Exped.). Type in the British Museum.

Synaptura muelleri McCulloch and Whitley, Mem. Qld. Mus. viii, 2, 1925, p. 162. *Id.* Weber and Beaufort, Fish. Indo-Austr. Archip. v, 1929, p. 172.

Brachirus arafurensis Fowler, Mem. Bish. Mus. x, 1928, p. 95.

Brachirus muelleri Norman, Biol. Res. Endeavour, v, 5, 1926, p. 295. *Id.* Fowler, Mem. Bish. Mus. xi, 1931, p. 321. *Id.* Chabanaud, Bull. Soc. Zool. France, lvi, 1931, p. 294.

D. 64, A. 50, P. 6, V. 4 and 5. C. 15.

Straight portion of L. lat., left (blind) side, *circa* 78, but anterior scales obscured by cirrhi.

Straight portion of L. lat. right (eyed) side, *circa* 77.

About 25 to 35 rows of scales on body above and below L. lat. on each side.

Head (46 mm.) 4.4, depth of body (93) 2.18 in standard length (203). Eye (7) half the length of the mouth (14). Right pectoral fin (6) longer than left (4). Snout (10) 4.6 in head.

Habit deep, compressed. Upper profile of head steeper than lower; upper jaw easily overtopping the lower. Lips arcuate, smooth where they meet, but fimbriate externally. Teeth small, acute, multiserial, on the blind side. Nostrils tubelike, adorned with a few cirrhi. Eyes small, raised, contiguous, the anterior margin of the upper eye in advance of that of the lower. Maxillary reaching to below anterior portion of lower eye. Some cirrhi around eyes and in the scaleless interorbital depression, also on chin and snout. Other cirrhi along posterior margin of gill-opening on the eyed side and the anterior margin of same on the blind side, the latter having a large opercular flap. Gill membranes united across isthmus.

Head and body of eyed side covered with strongly ctenoid scales, which extend on to bases of the fins; some of these scales, clustered in patches, support long hair-like processes. The blind side of the head is covered by a network of sensory meshes, mostly cirrhated, giving a honeycomb effect.

The nostrils of the blind side are surrounded by a whirligig of cirrhi. The scales of the blind side of the body are ctenoid, but lack the patches of hair-like setae characteristic of the eyed side.

Dorsal originating on the most anterior part of the head, before the level of the mouth opening. Its rays are divided and are longest over middle of back; the last ray is joined to the convex-margined caudal fin. Anal fin originating below the posterior part of the head, otherwise similar to the dorsal. Pectorals reduced, especially on the blind side. There appear to be six rays in each, though they are hidden in adipose tissue and their divided tips misleadingly suggest a larger number. The left pectoral has the upper ray longest. The right ventral fin has five rays and is almost median in situation. The left ventral fin is displaced to one side and has suffered the reduction of one ray. Both ventral fins are separate from one another and from the anal fin. The vent lies between the ventral fins and has a long papilla.

The lateral line runs along the middle of each side, and ascends sharply on the posterior part of the head, then descends, parallel to the dorsal profile, to above the eyes.

Colours, in life, pinkish-brown, with diffuse brown infuscations. Setae black. Pectoral of eyed side blackish. Ventrals brown. Pupils metallic greenish. Blind side whitish, with blue visceral tinge and some pink reflections, also some pink near lips. Sensory ridges of head and the pectoral fin on the blind side, white. No dark crossbars.

These colours have not altered much after months of preservation in alcohol.

Described from a fine specimen, 203 mm. in standard length or nine inches overall. Austr. Mus. regd. No. 1A. 6714.

Locality.—Trawled off "Sea Star Reef," Shaw Island, Cumberland Group, Queensland, on a muddy bottom, with strong currents above, in about 10 fathoms, on the moonlit night of September 13, 1935 by Melbourne Ward and G. P. Whitley. In two hours, on this occasion, we obtained 112 specimens of 26 different species of fishes.

A smaller specimen (1A. 6740) trawled off Shaw Island, Queensland, over a bluish mud bottom in 10 fathoms as the result of three 10 minute hauls on the night of September 5, 1935. At this time 53 specimens of fishes belonging to 18 species were secured, besides invertebrates. Several species of fishes which had been originally described from the Arafura Sea were obtained off Shaw Island.

Norman, in his report on the "Endeavour" fishes, has recorded *S. muelleri* from localities to the northward.

Family AMPHIPRIONIDAE.

Genus **AMPHIPRION** Bloch and Schneider, 1801.**AMPHIPRION VERWEYI** Whitley.

Amphiprion verweyi Whitley, Rec. Austr. Mus. xix, Aug. 2, 1933, p. 85. North-west Islet, Queensland.

Two specimens (Qld. Mus. No. I. 756) from Masthead Island, Capricorn Group, collected by Mr. H. A. Longman, identified by comparison with the types in the Australian Museum. There is another specimen in the Queensland Museum from Darnley Island, collected by J. R. Toshi.

Family CORIDAE.

Genus **CHEILINUS** Lacépède, 1802.**CHEILINUS DIGRAMMUS** (Lacépède).

Labrus digrammus Lacépède, Hist. Nat. Poiss. iii, 1802, pp. 448 and 518. Equatorial Oceans.

Chilinus radiatus Gunther, Journ. Mus. Godef. iv, 15, Fische der Südsee, vii, 1881, p. 247, pl. cxxxv, fig. A. *Ex Sparus radiatus* Bloch and Schneider, 1801, non Linné, 1766.

Cheilinus digrammus McCulloch, Austr. Mus. Mem. v, 1929, p. 317.

One specimen (Qld. Mus. regd. No. I. 5527), agreeing fairly well with Gunther's figure of a Samoan specimen, from Heron Island, Capricorn Group, Queensland; collected by Mr. T. C. Marshall.

Family SALARIIDAE.

Genus **CRENALTICUS** Whitley, 1930.**CRENALTICUS MELEAGRIS** (Cuvier and Valenciennes).

Salarias meleagris Cuvier and Valenciennes, Hist. Nat. Poiss. xi, July 1836, p. 332 "Rapporté par Péron de la terre de Van-Diemen"; probably from North-western Australia or Timor, certainly not from Tasmania. *Id.* McCulloch and McNeill, Rec. Austr. Mus. xii, 1918, p. 16 (refs. and synonym.)

Crenalticus meleagris Whitley, Mem. Qld. Mus. x, 1930, p. 21, and Great Barrier Reef Exped. Sci. Rept. iv, 9, 1932, p. 298.

Mr. Melbourne Ward recently collected several specimens of this Blenny at Ballina, northern New South Wales, the most southerly place from which the species has so far been obtained. Austr. Mus. regd. Nos. IA. 7057-7060.

New record for New South Wales.

An excellent figure of a Queensland specimen was published in Gunther's "Fische der Südsee."

¹ Family BLENNIIDAE.**PHILLIPSICHTHYS**, gen. nov.

Orthotype, *Auchenopterus aysoni* Hector (Trans. N. Z. Inst. xxxiv, July, 1902, p. 240, pl. xv) from the Bay of Islands, New Zealand. Types rediscovered by Phillipps (Rept. Dept. Internal Affairs N.Z., 1919, Museum, p. 6).

The genus *Auchenopterus* was proposed by Gunther (Cat. Fish. Brit. Mus. iii, 1861, p. 275) for *A. monophthalmus* from Central America and a second doubtful species. The name has since been emended to *Auchenipterus* but is preoccupied by *Auchenipterus* Cuvier & Valenciennes (Hist. Nat. Poiss. xv, 1840, p. 207) and *Cremnobates* was proposed by Gunther (Proc. Zool. Soc. Lond. 1861, p. 374) as a substitute. But the New Zealand species called an *Auchenopterus* by Hector is obviously distinct from the Central American fish, with which it was merely associated by mistake, so a new generic name is now supplied and the species may be known in future as *Phillippsichthys aysoni* (Hector).

Named in honour of Mr. William John Phillipps, ichthyologist at the Dominion Museum, Wellington, New Zealand.

Family BATRACHOIDIDAE.

Genus **HALOPHRYNE** Gill, 1863.

Halophryne Gill, Proc. Acad. Nat. Sci. Philad. xv, 1863, p. 170. Orthotype, *Batrachoides diemensis* Le Sueur.

Coryzichthys Ogilby, Ann. Rept. Amat. Fish. Assoc. Qld. 1906-7 (1907), p. 11. Haplotype, *C. diemensis* (Le Sueur). *Id.* Jordan and Richardson, Bull. U. S. Bur. Fish., xxvii, 1908, p. 282.

Coryzichthys Ogilby, Ann. Qld. Mus. ix, Oct. 14, 1908, pp. 45, 46, 50. Haplotype, *Batrachoides diemensis* Le Sueur.

Ogilby's generic name is an absolute synonym of *Halophryne* Gill and the Australian species should be called *Halophryne diemensis*. An allied new genus has recently been described as *Batrachichthys* by J. L. B. Smith (Trans. Roy. Soc. S. Africa, xxii, 1, 1934, p. 98) for *B. albofasciatus* Smith from South Africa. This generic name may be regarded as preoccupied by *Batrictius* Rafinesque (Anal. Nat. 1815, p. 82), in the same family of fishes, which name has been spelt *Batrictius* by Jordan (Gen. Fish. i, 1917, p. 88) and emended to *Batrachichthys* by Agassiz (Nomencl. Zool. 1846, Index Univ.): if so, Smith's genus will require a new name.

Genus **PSEUDOBATRACHUS** Castelnau, 1875.

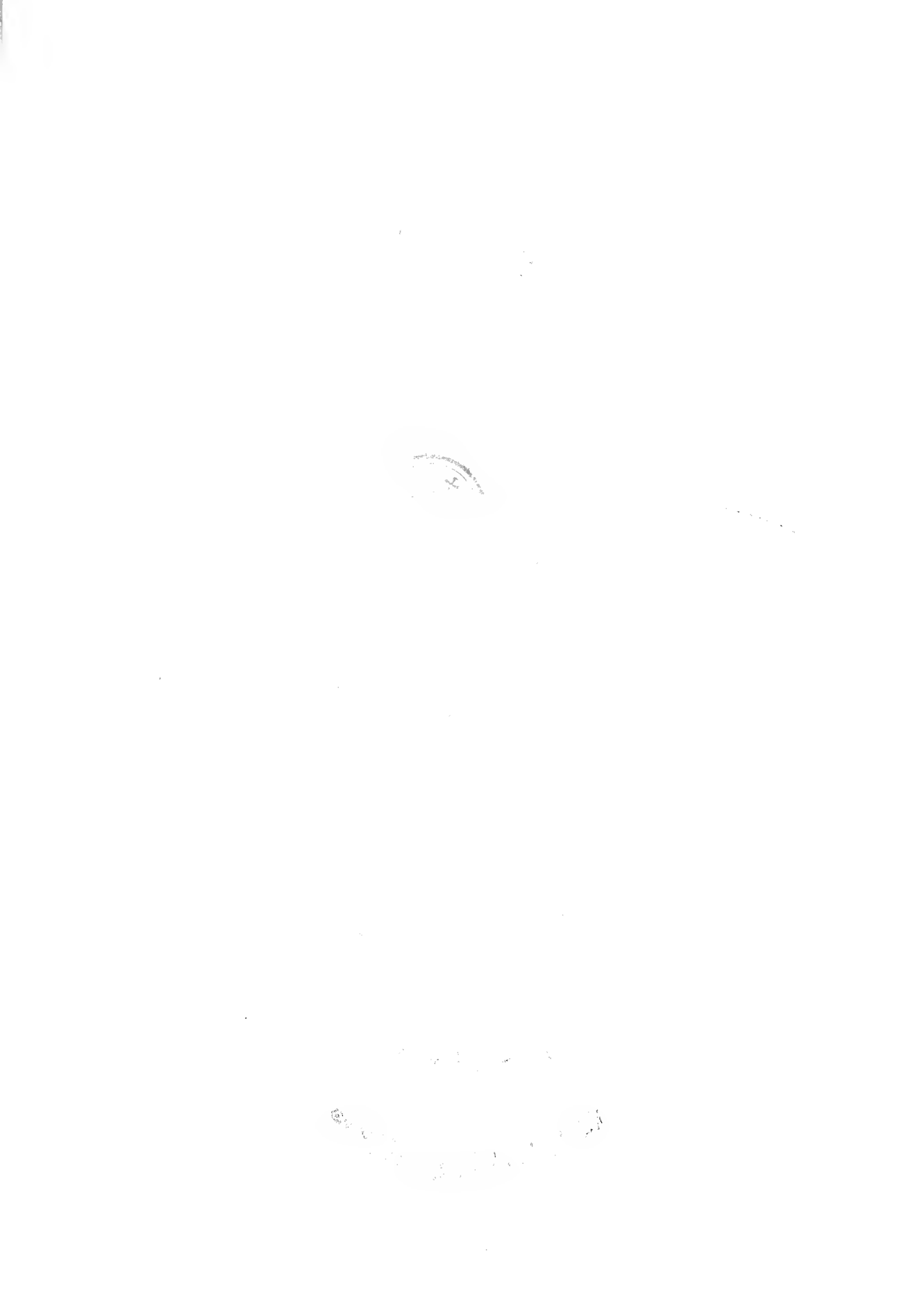
Pseudobatrachus Castelnau, Viet. Offic. Rec. Philad. Exhib. 1875, Res. Fish. Austr. p. 24. Haplotype *P. striatus* Castelnau.

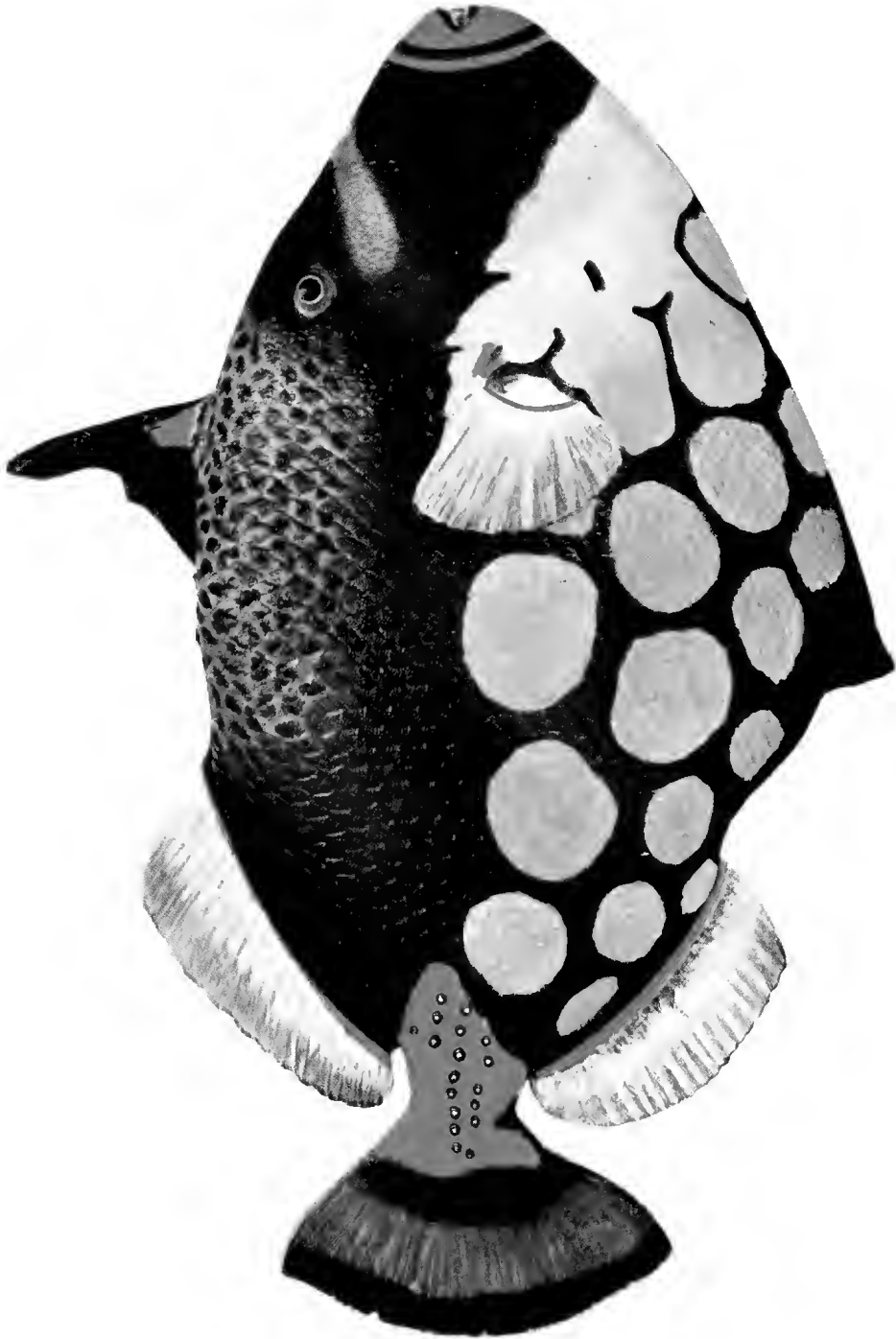
Pelophilictor Ogilby, Ann. Rept. Amat. Fisherm. Assoc. Qld. 1905-6 (July 1906), pp. 9 and 13. Haplotype, *P. caloundrac* Ogilby, *nomen nudum*, made equivalent to *Batrachomoeus (minor)* in *ibid.* (July 1907), p. 13.

Batrachomoeus Ogilby, Ann. Rept. Amat. Fisher. Assoc. Qld. 1906-7 (July 1907), p. 10. Haplotype, *B. coccus* = *Thalassophryne cocca* De Vis, 1884.

Batrachomoeus Ogilby, Ann. Qld. Mus. ix, Oct. 14, 1908, pp. 45, 46, and 54. Logotype, *B. minor* Ogilby, selected by McCulloch.

The *nomen nudum* *Pelophilictor caloundrac* of Ogilby, 1906, from Caloundra, Queensland, and *Lophius nigricans* Forster (Neuesten Reisen Botany Bay, i, 1794, J. White, p. 131, No. 3) from the Sydney district, New South Wales, may be added





Balistooides conspicillum (Bloch & Schneider).
From cast made by T. C. Marshall, Q.M. regd. no. I 5243.

to the synonymy of *Pseudobatrachus dubius* in McCulloch's Check-List (Austr. Mus. Mem. v, 1929, p. 358). Another species, *P. dahli* Rendahl (Medd. Zool. Mus. Kristiania v, 1922, pp. 164 & 195), from Roebuck Bay, north-western Australia, was omitted from the Australian Check-List through inadvertence.

Family BALISTIDAE.

Genus **BALISTOIDES** Fraser-Brunner, 1935.

Balistoides Fraser-Brunner, Ann. Mag. Nat. Hist. (10) xv, June 1, 1935, p. 662.

Orthotype, *Balistes viridescens* Bloch and Schneider, Syst. Ichth. 1801, p. 477, from Mauritius.

The strikingly handsome *Balistes conspicillum* enters the *Balistoides* section of Fraser-Brunner's key, but differs from the genotype in coloration and probably deserves subgeneric separation. Lacépède referred to this species under the vernacular name "Le Baliste Americain" (Hist. Nat. Poiss. i, 1798, p. 375, pl. xvi, fig. 2) but whilst his Mauritius specimen was *B. conspicillum*, his American record was erroneous, and should not be confused with *Balistes americanus* Gmelin (Syst. Nat. Linné, ed. 13, i, 1789, p. 1473), a different species. Some authors call *Balistes conspicillum* by the specific name *niger*, but that is not valid for this particular species.

BALISTOIDES CONSPICILLUM (Bloch and Schneider).

(Plate XIII.)

Balistes niger Bonmaterre, Tabl. Encycl. Meth., Ichth., 1788, p. 19, pl. lxxxv, fig. 352. Mauritius. Not *Balistes nigra* Osbeck, Voy. China and East Indies ii, 1771, p. 92 and preoccupied by *Balistes niger* Bloch, Ichthyologie, 1787, p. 24, pl. clii, fig. 2. Not *Balistes niger* Mungo Park, Trans. Linn. Soc. Lond. iii, 1797, p. 37.

Balistes conspicillum Bloch and Schneider, Syst. Ichth. 1801, p. 474. Habitat mare Indicum et Americanum (not American references), and of most later authors.

Balistes bicolor Shaw, Gen. Zool. (Pisc.) v, 2, 1804, p. 407, pl. clxviii. Indian Seas (Leverian Museum).

Rhinecanthus conspicillum Swainson, Nat. Hist. Class. Fish Amphib. Rept. ii, July, 1839, p. 325.

Balistes (Balistapus) conspicillum Bleeker, Atlas Ichth. v, 1869, p. 116, pl. cexxi, fig. 2 (references and synonyms).

Balistes niger of many modern authors, ex Bonmaterre or Mungo Park, preoccupied and thus invalid.

A fine example (Qld. Mus. regd. No. I. 5243) measuring about 273 mm. overall, from Flat Rock, Moreton Bay, presented by Mr. B. Tucker. There is another specimen in the Queensland Museum from Point Lookout, South Queensland.

New record for Australia. This species has a wide tropical distribution.

The typical Mauritius form has been figured from one of Nicholas Pike's drawings by Gudger (Bull. Amer. Mus. Nat. Hist. lviii, 1929, p. 499, fig. 3) and excellent coloured figures have been given by Bleeker (*loc. cit.*) and Tanaka (Fish. Japan xv, 1914, p. 250, pl. lxx, fig. 247).

My Queensland specimen looks most like the Japanese and it is possible that there are geographical subspecies of this fish with slightly different colour patterns, in which case the south Queensland specimens might well deserve a new subgeneric and a new subspecific name.

The Australian Museum has specimens of *conspicillum* from Rennell, Solomon Islands, and Aneiteum, New Hebrides.

Genus **SUFFLAMEN** Jordan, 1916.

SUFFLAMEN FRAENATUS (Latreille).

Balistes fraenatus Latreille, Nouv. Diet. Hist. Nat. ed. I, xxiv, 1804, Poiss. p. 74. Latinization of the vernacular "*Baliste bride*" Lacépède, Hist. Nat. Poiss. i, 1798, pp. 335 and 381, pl. xv, fig. 3. No locality (Commerson).

Balistes capistratus Shaw, Gen. Zool. v, 1804, p. 417. On "*Baliste bridé*" Lacépède from Indian Seas.

Balistes frenatus Richardson, Voy. Sulphur, Ichth. 1845, p. 129, pl. lx ("China").

Balistes (Balistapus) frenatus Bleeker, Atlas Ichth. v, 1869, p. 114, pl. cexxiii, fig. 2 (references and synonyms).

One specimen (Qld. Mus. No. I. 5538) from Lodestone Reef, Townsville, Queensland, presented by Mr. G. Coates.

General colour, in formalin, various shades of brownish grey. Teeth and lips whitish, mouth surrounded by a whitish ring, most strongly defined inferiorly. An oblique white "bridle"-stripe reaching backwards and slightly downwards behind mouth and ceasing before gill-opening. This stripe is joined to its fellow on the opposite side of the head by a white crossband around chin. Fins dusky, the caudal being dark grey (not yellow).

The present species is often called *capistratus* but *fraenatus* is the earlier name. With reference to Shaw's "General Zoology," Sherborn (Index. Anim. (2), i, 1922, p. cxv) wrote "dates practically unknown," but I find that the fish parts were

acknowledged in the Philosophical Transactions of the Royal Society, so that the dates of publication are approximately as follows :—

- Vols. i, ii, iii, 1800-02 acknowledged Phil. Trans. by February 4, 1802
 Vol. iv, 1803 acknowledged Phil. Trans. by December 22, 1803
 Vol. v, 1804 acknowledged Phil. Trans. by November 8, 1804
 Vol. vi, 1806 acknowledged Phil. Trans. by February 6, 1806
 Vol. vii, 1809 acknowledged Phil. Trans. by March 9, 1809.

I have elsewhere tabulated (Austr. Zool. viii, 1936, p. 189) the dates of publication of the Nouv. Dict. Hist. Nat. so that the priority of *fraenatus* is established :

Balistes fraenatus Latreille, 7 March 1804.

Balistes capistratus Shaw, 8 November, 1804.

The Australian Museum has specimens of *fraenatus* from the Great Barrier Reef, and Moreton Bay, Queensland, also Lord Howe Island, and Aneiteum, New Hebrides. Professor W. J. Dakin collected it at Nauru.

Family TRIURIDAE (Ranzaniidae, *olim.*)

Genus **TRIURUS**, Lacépède, 1800.

Triurus Lacépède, Hist. Nat. Poiss. ii, 1800, p. 200. Haplotype, *T. bougainvilleanus* Lacépède.

Ranzania Nardo, Atti i Riun. Sci. Ital. ed. 2, 1840, p. 165. Orthotypo *R. typus* Nardo (*vide* Sherborn, Index Anim.).

This grouping and the following synonymy result from my identification of *Triurus* as a young Oblong Sunfish. Lacépède's genus must not be confused with *Triurus* Swainson, 1839, which is a synonym of *Harpadon*, the Bombay Duck dealt with earlier in the present paper (p. 119).

TRIURUS LAEVIS (Pennant).

Ostracion laevis Pennant, Brit. Zool. iii, 1776, ed. 4., p. 129, pl. xix, fig. 54. Plymouth, England.

Triurus bougainvilleanus Lacépède. Hist. Nat. Poiss. ii, 1800, p. 200. Between 26° and 27° S. lat. and near 103° or 104° E. [of Paris] longitude [= Indian Ocean?]; in stomach of mackerel, February 1768 (Commerson). *Id.* Bosc. Nouv. Dict. Hist. Nat. ed. 1, xxii, 1804, p. 408 and Latreille, *ibid.* xxiv, 1804, p. 104. *Id.* Fleming, Edinb. Encycl. (Brewster), Ichth. 1830, p. 693. *Id.* Oliver, Life of Philibert Commerson, 1909, p. 119.

Triurus commersonii Shaw, Gen. Zool. (Pisces) iv, 1, 1803, p. 78. New name for *T. bougainvilleanus* Lacépède. *Id.* Swain, Proc. Acad. Nat. Sci. Philad. 1882 (1883), p. 303.

Ranzania laevis Whitley, Rec. Austr. Mus. xix, 1933, p. 108 (further synonyms and references).

The identity of *Triurus* has always been a mystery but from Lacépède's description it seems obvious that it is a young Oblong Sunfish (*Ranzania*), in which

case *Triurus* Lacépède replaces *Ranzania* Nardo and *T. bougainvilleanus* becomes the name for the Indian Ocean form if that be really distinct from *Ostracion laevis* Pennant 1776.

In confirmation, I have just received from Dr. E. W. Gudger of New York, the following note (*in lit.*, April 15, 1937):—

“When your letter of March 15 came yesterday I at once got a copy of Lacépède, 1847 edition, and looked up *Triurus bougainvilleanus*. First of all, it is interesting to see that Commerson got these from the stomach of mackerels. On yesterday I sent you a copy of “The Tail of *Masturus*” [Ann. Mag. Nat. Hist. (10) xix, 1937] and in it you will find that a considerable number of small specimens have come from the stomachs of kingfish and dolphins. When I worked through Lacépède’s text . . . I felt all the time that he was talking about a young *Ranzania*, so that unconsciously I have come to the same conclusion about *Triurus* that you did. It is to be regretted that he did not give sizes, and particularly that he did not state that the tail is obliquely cut downward and forward. Had he done so there would have been no shadow of doubt as to what the fish is. I strongly think it is *Ranzania*.”

Dr. Gudger enclosed a photograph of a Sunfish from Rottnest Island, near Fremantle, Western Australia, dated 30/8/36. This appears to represent *Masturus lanceolatus* (Liénard, 1840), and shows that we now have all three genera of Sunfishes (*Mola*, *Masturus*, and *Triurus*) in Australian waters.

EXPLANATION OF PLATES.

PLATE XI.

Fig. 1. *Harpadon translucens* Savill-Kent. A specimen from the Fitzroy River, Rockhampton, Queensland. Q.M. no. I, 5565. Photo. W. J. Sanderson.

Figs. 2, 3. *Osteocephalus parviceps* (Ramsay and Ogilby). Holotype of *Syngnathus parviceps* from the Clarence River, New South Wales. Austr. Mus. no. I, 191. Photo. G. C. Clutton.

PLATE XII.

Cephalopholis cotesi Whitley. Holotype from Slasher’s Reef, Townsville, Queensland. Q.M. no. I, 5504. Joyce Allan del.

PLATE XIII.

Balistoides conspicillum (Bloch & Schneider). A specimen from Flat Rock, Moreton Bay, Queensland. Q.M. no. I, 5243.

AUSTRALIAN LEAF-HOPPERS (*Jassoidea*, *Homoptera*).

PART 6.*

PENTHIMIIDAE.

BY J. W. EVANS, M.A., F.R.E.S.

(Text-figure 1.)

The Penthimiidae are a family of leaf-hoppers of world-wide distribution, representatives of the genus *Penthimia* Germar occurring in every one of the major zoogeographical regions. In 1923 Baker erected the family *Thaumatoscopidae*, which presumably in addition to *Thaumatoscopus* Kirk. was intended to include the closely related genus *Vulturnus* Kirk. Although the heads of species in the genus *Thaumatoscopus* which are apically foliaceous, differ markedly from those of species in the genus *Penthimia*, which are obtusely rounded between the declivous crown and the ventral surface of the head, there is little doubt that the two genera are closely related. Intermediate forms occur in *Vulturnus* Kirk. and *Neovulturnus* gen. nov. Apart from occipital characters, the venation of the tegmina and the structure of the hind tibiae and male genitalia, are so similar in all four genera, that there seems no good reason why even a sub-family of the Penthimiidae should be erected to hold the genera previously included in the *Thaumatoscopidae*.

Such few representatives of this family as occur in Australia appear to be confined to Queensland and New South Wales, being especially abundant in the former. This distribution suggests that their establishment in this continent is of comparatively recent date.

PENTHIMIA Germar.

Mag. Ent. 4 ; 46, 1821.

The head ventrally is flat longitudinally, slightly convex transversely and the labium is short. The lateral frontal sutures are distinct above, as well as below, the antennal ledges ; the antennal ledges are prominent and the antennal pits shallow. Dorsally the head is declivous, the apical margin is evenly rounded and the anterior third medianly, is occupied by the hind portion of the frons. The ocelli which are situated close to the hind margin of the frons are closer to the eyes on each side than to each other.

* Previous parts in this series appeared in the *Trans. Roy. Soc. S. Aust.* vs. 57, 58 (1933-1934), and in the *Papers of the Roy. Soc. Tas.* for 1935-1936.

The pronotum narrows anteriorly and is wide laterally, and the propleuræ widely separate the eyes from the bases of the tegmina. The tegmina are flattened, not teetiform, have distinct venation and wide appendices that terminate at the apices of the tegmina. There is no development of a supplementary appendix. The hind tibiae are flattened and bear four rows of closely set spines. The male genitalia have wide sub-genital plates and short parameres.

PENTHIMIA AUSTRALIS Walker.

(Fig. 5.)

Scaris australis Walk. List Homopt. Supplement 253. 1858.

Length, 7 mm.; general coloration, brownish-red. *Head* ventrally black but for the external borders of the maxillary plates, the region immediately surrounding the antennae and the frons posteriorly, which are brownish-red. Dorsally pale reddish-brown, the frons somewhat paler in colour than the rest of the crown. *Pronotum* and *Scutellum*, brownish-red. *Tegmen*, hyaline brownish-red. *Thorax*, ventral surface and legs, marked with a pattern of black and red. *Abdomen*, ventral surface, brownish-red, the last ventral segment in the female greater in length than the whole of the proximal abdominal segments.

Distribution, Queensland.

PENTHIMIA VANDUZEII Kirk.

Ectopiocephalus vanduzeei Kirk. H.S.P. Exp. Sta. Bull. 1 (9); 464, 1906.

Penthimia reticulata Dist. Ann. Soc. Ent. Belg. 52; 108, 1908.

Distant's description of this species is adequate, hence re-description is unnecessary. *Penthimia vanduzeei* is smaller than *Penthimia australis*, and is largely black in colour. Figures 1-4 represent the tegmen, head, thorax, and male genitalia.

Distribution, Queensland, New South Wales, Central Australia.

NEOVULTURNUS gen. nov.

Kirkaldy (1907), separated *Vulturnus* Kirk. into two divisions, but did not give them generic rank. The genus defined below represents Kirkaldy's Division 2, characterised as having the "margin of the head blunt, subfoliaceous."

The head is evenly rounded apically, the vertex and posterior third of the frons, which constitutes the crown not being produced, and the labium is short. The hind margin of the frons may be distinct or indistinct. The pronotum is wide laterally and the propleuræ separate the eyes from the bases of the tegmina. The tegmina have in addition to a wide appendix, a supplementary appendix, consisting of the two cells

that lie against the hind apical margin of the tegmen. This supplementary appendix is not pigmented and causes an irregularity in the apical margins of the tegmina. The legs are flattened and the apices of the hind femora rest just behind the eyes. When at rest the hind femora pass between the middle femora and the thorax. The hind tibiae are armed with four rows of closely set spines and the male genitalia have broad sub-genital plates and short parameres. The following species placed by Kirkaldy in Division 2 of his genus *Vulturnus* are transferred to *Neovulturnus*: *vanduzeei* (Type), *vaecors*, *vultuosus*, *vaedulcis* and *vappa*. Four new species are described below.

NEOVULTURNUS BRUNNEUS sp. nov.

(Figs. 8, 9.)

Length, 3.5 mm. : general coloration, brown mottled with white.

Head, ventrally black, dorsally dark brown with numerous small cream-coloured maculations; eyes dark brown; hind margin of frons perceptible. *Pronotum* concolorous with the head. *Scutellum* pale ochreous with dark brown markings. *Tegmen* short, the apical overlap steeply declivous, reticulate; veins and reticulations brown, the rest of the appendix opaque white. Appendix and supplementary appendix pale hyaline brown. A dark brown transverse fascia extends from the distal end of the claval suture to the costal margin of the tegmen. *Thorax* and *abdomen*, ventral surface black. Fore-legs, femora black, tibiae and tarsi cream-coloured. Middle-legs femora black; tibiae and tarsi cream with black markings. Hind legs entirely black but for the spines on the hind tibiae which are whitish.

Type ♀, from Stanthorpe, Queensland, in the collection of the Queensland Museum. Reg. No. 5200.

NEOVULTURNUS PALLIDUS sp. nov.

(Fig. 10.)

Length, 4 mm. ; general coloration black or brown, the scutellum white or yellow.

Head, ventrally black or very dark brown; external borders of maxillary plates white. Crown of head and antennal ledges medianly white. *Pronotum*, light or dark brown mottled with cream or grey. *Scutellum*, either entirely white or very pale yellow, or whitish with dark brown markings. *Tegmen*, whitish, mottled with an irregular and variable pattern of light or dark brown. *Thorax*, ventral surface black, with or without dark brown markings. *Abdomen*, ventral surface, light or dark brown.

Type ♀, from Mt. Glorious, Queensland (coll. H. Hacker), in the collection of the Queensland Museum. Reg. No. 5201.

NEOVULTURNUS MACULOSUS sp. nov.

(Figs. 6, 7.)

Length, 3.5 mm. ; general coloration black.

Head, ventrally, longitudinally concave, black ; crown black, with an anterior median more or less circular pale area, with or without a few or several brown spots. Hind margin of frons indistinct. *Pronotum*, shining black. *Scutellum*, entirely black or entirely pale yellow. *Tegmen*, opaque black with numerous whitish spots lying between the veins. Appendix and supplementary appendix hyaline. *Thorax* and *abdomen*, ventral surface and legs black.

Type ♂, from Brookfield, Queensland (coll. H. Hacker), in the collection of the Queensland Museum. Reg. No. 5202.

NEOVULTURNUS LAPSUS sp. nov.

(Figs. 11, 12, 13.)

Length, 2.8 mm. ; general coloration black.

Head, entirely black, but for the eyes which are dark brown, and the ocelli which are whitish. *Pronotum* and scutellum, black. *Tegmen*, black with numerous small white spots on the proximal half and somewhat larger white spots distally. The two spotted areas are not adjacent to each other but are separated by a black transverse area. Appendix and supplementary appendix opaque brown. *Thorax*, ventral surface and legs, black. *Abdomen*, ventral surface, greyish-black.

Type ♂, from Blunder, Queensland (coll. H. Hacker), in the collection of the Queensland Museum. Reg. No. 5203.

VULTURNUS Kirk.

H.S.P.A. Exp. Sta. Bull. 1 (9) ; 463, 1906.

This genus as defined below comprises species placed by Kirkaldy in Division I of his original genus, characterised as having the "margin of the head between the vertex and frons acute and foliaceous."

The ventral surface of the head is concave posteriorly and convex anteriorly. The lateral frontal sutures, from a point in line with the hind margin of the eyes, diverge towards and above the antennae. The apex of the head is spatulate, and the apical margin which consists of a thickened border overhangs the ventral surface of the head. The crown is produced anteriorly and is transversely convex, and the ocelli which are on the dorsal surface of the head lie well away from the apical margin. The eyes are not in alignment with the margin of the head and the crown and pronotum are declivous.

In the structure of the pronotum, hind tibiae and male genitalia and in the venation and shape of the tegmina, species in this genus resemble those in the previous genus.

Three species described by Kirkaldy belong to this genus; *vulturnus* Kirk. (Type), *voltumna* Kirk. and *virgidemia* Kirk.

Figs. 14 and 15 represent the tegmen and head of *Vulturnus vulturnus*, and figs. 18 and 19 the head of *Vulturnus voltumna*.

VULTURNUS HACKERI sp. nov.

(Figs. 22, 23.)

Length, 3.8 mm.

Head, ventrally black but for the overhanging thickened ledge which is pale yellowish-brown. Dorsal surface very pale yellowish-brown mottled with brown; ocelli large. *Pronotum*, dark brown with yellowish-grey maculations. *Scutellum*, yellow with dark brown markings. *Tegmen*, silvery-white, reticulate between the veins, the reticulations dark brown and black. Appendix and supplementary appendix, pale hyaline brown. *Thorax* and *abdomen*, ventral surface black. *Legs*, fore femora brown, fore tibiae pale brown, the rest of the legs black, but for the spines on the hind tibiae, which are pale yellowish-brown.

Type ♀, from Sunnybank, Queensland (coll. H. Haeker), in the collection of the Queensland Museum. Reg. No. 5204.

VULTURNUS SORDIDUS sp. nov.

(Figs. 24, 25.)

Length, 3.8 mm.

Head, ventrally black; apical thickened margin pale brown, crown of head, *pronotum* and *scutellum* shining-brown with scattered small reddish-brown spots. *Tegmen*, proximal two-thirds concolorous with the head, distal border, appendix and supplementary appendix, dark, hyaline brown. Adjacent to the apical brown border of the tegmen is a transverse hyaline-white fascia across which the veins are outlined in brown. *Thorax* and *abdomen*, ventral surface black. *Legs*, black, the spines on the hind tibiae brown and black.

Type ♂, from Samsonvale, Queensland (coll. H. Haeker), in the collection of the Queensland Museum. Reg. No. 5205.

VULTURNUS PUNCTULATUS sp. nov.

(Figs. 20, 21.)

Length, 3.8 mm.

Head, ventral surface black, apical thickened margin, pale yellowish-brown. Crown of head, *pronotum* and *scutellum*, black with numerous small yellowish-brown or reddish-brown spots. *Tegmen*, greyish-white or yellowish-white, with dark brown or black reticulations between the veins; appendix, supplementary appendix and

apex of tegmen hyaline smoky-grey. From one to three ante-apical cells may be hyaline-white. *Thorax* and *abdomen*, ventral surface, black. *Legs*, black, spines on hind tibiae, brown.

Type ♂, from Nanango District, Queensland (coll. H. Haeker), in the collection of the Queensland Museum, Brisbane. Reg. No. 5206.

VULTURNUS MONTANUS sp. nov.

(Figs. 16, 17.)

Length, 4 mm.

Head, ventrally black, overhanging thickened apical margin very pale yellow. Dorsal surface, pale yellow or ochreous with two round black spots between the ocelli and the apex of the head, and a few faint markings between the ocelli. *Pronotum*, anterior third, yellowish-brown; posterior two-thirds greyish-white, the whole with scattered dark brown markings. *Scutellum* marked with a pattern of yellow and dark brown. *Tegmen*, silvery-white with dark brown reticulations between the veins; appendix and supplementary appendix hyaline-brown. *Thorax* and *abdomen*, ventral surface black with pale brown markings.

Type ♀, from Leura, New South Wales (coll. J. W. E.), in the collection of the Queensland Museum, Brisbane. Reg. No. 5207.

THAUMATOSCOPIUS Kirk.

H.S.P.A. Exp. Sta. Bull. 1 (9); 462, 1906.

This genus of which the type is *Thaumatoscopus galeatus* Kirk. is very closely related to *Vulturnus*, differing principally in that the overhanging apical margin of the head is foliaceous and not thickened. One new species is described below.

THAUMATOSCOPIUS DUNKENSIS sp. nov.

(Figs. 26-29.)

Length, 4.2 mm.

Head, ventral surface black, almost flat; overhanging apical margin, brown. Crown, pale yellowish-brown. *Pronotum* and *scutellum* concolorous with the head. *Tegmen*, pale yellowish-brown, veins dark brown; reticulations between the veins consisting of irregularly-shaped dark brown spots; costal border distally and the apical and ante-apical cells in part, silvery-white; appendix and supplementary appendix, greyish-brown. *Thorax* and *abdomen*, ventral surface, black. Fore and middle *legs*, pale yellowish-brown; hind legs black; spines on the hind tibiae, pale yellowish-brown.

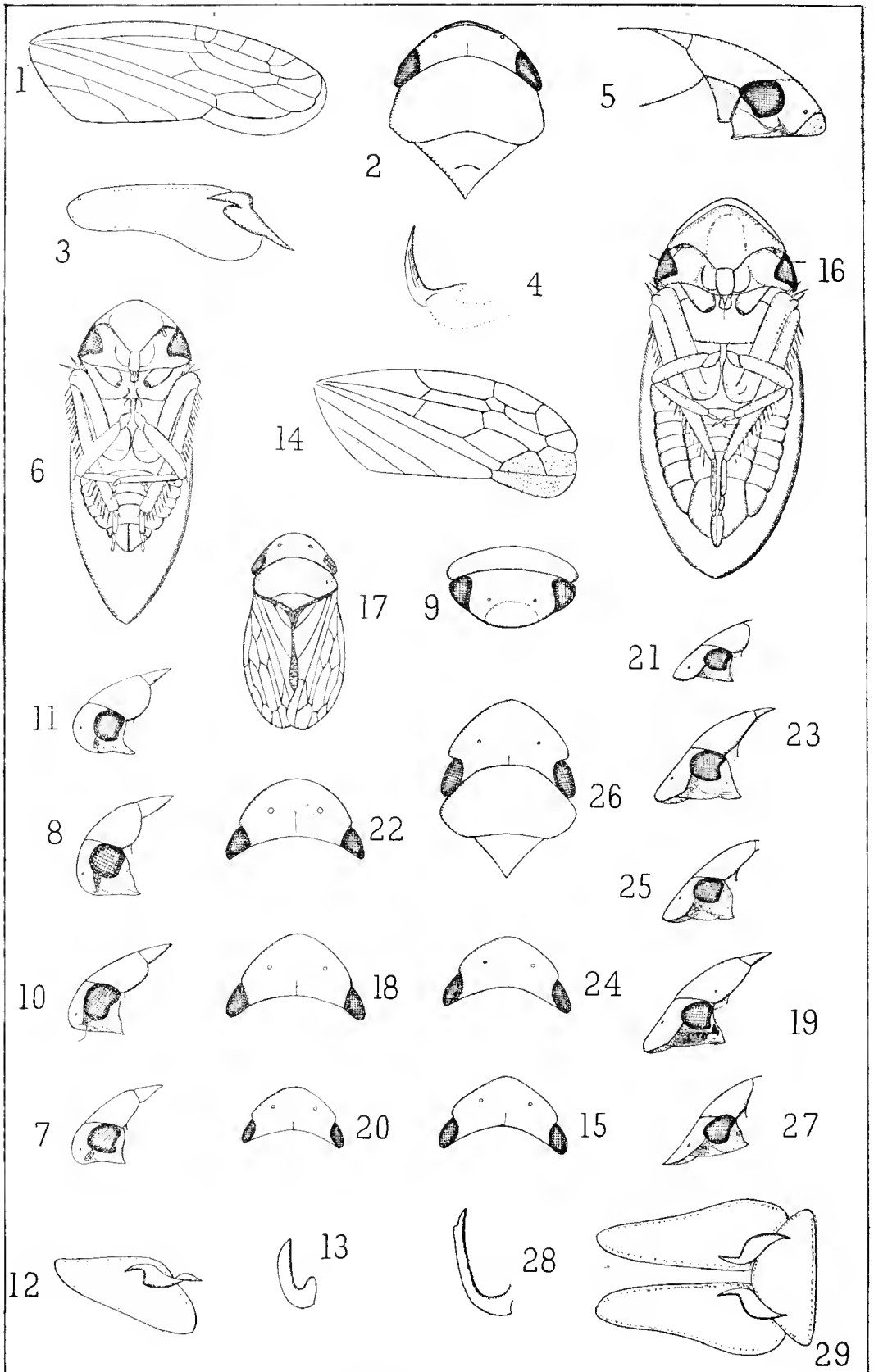
Type ♂, from Dunk Island, Queensland (coll. H. Haeker), in the collection of the Queensland Museum. Reg. No. 5208.

REFERENCE.

Baker, C. F. 1923, Philippine Journ. Sci. 23 (4); 351.

TEXT-FIGURE 1.

- Fig. 1. *Penthimia vanduzeei*, Tegmen.
 Fig. 2. *Penthimia vanduzeei*, Head and thorax, dorsal aspect.
 Fig. 3. *Penthimia vanduzeei*, Sub-genital plate and paramere.
 Fig. 4. *Penthimia vanduzeei*, Aedeagus.
 Fig. 5. *Penthimia australis*, Head and thorax in profile.
 Fig. 6. *Neovulturnus maculosus*, Ventral aspect.
 Fig. 7. *Neovulturnus maculosus*, Head and thorax in profile.
 Fig. 8. *Neovulturnus brunneus*, Head and thorax in profile.
 Fig. 9. *Neovulturnus brunneus*, Head, anterior aspect.
 Fig. 10. *Neovulturnus pallidus*, Head and thorax in profile.
 Fig. 11. *Neovulturnus lapsus*, Head and thorax in profile.
 Fig. 12. *Neovulturnus lapsus*, Sub-genital plate and paramere.
 Fig. 13. *Neovulturnus lapsus*, Aedeagus.
 Fig. 14. *Vulturnus vulturnus*, Tegmen.
 Fig. 15. *Vulturnus vulturnus*, Head, dorsal aspect.
 Fig. 16. *Vulturnus montanus*, Ventral aspect.
 Fig. 17. *Vulturnus montanus*, Dorsal aspect.
 Fig. 18. *Vulturnus voltumna*, Head, dorsal aspect.
 Fig. 19. *Vulturnus voltumna*, Head and thorax in profile.
 Fig. 20. *Vulturnus punctulatus*, Head, dorsal aspect.
 Fig. 21. *Vulturnus punctulatus*, Head and thorax in profile.
 Fig. 22. *Vulturnus hackeri*, Head, dorsal aspect.
 Fig. 23. *Vulturnus hackeri*, Head and thorax in profile.
 Fig. 24. *Vulturnus sordidus*, Head, dorsal aspect.
 Fig. 25. *Vulturnus sordidus*, Head and thorax in profile.
 Fig. 26. *Thaumatoscopus dunkensis*, Head and pronotum, dorsal aspect.
 Fig. 27. *Thaumatoscopus dunkensis*, Head and thorax in profile.
 Fig. 28. *Thaumatoscopus dunkensis*, Aedeagus.
 Fig. 29. *Thaumatoscopus dunkensis*, Sub-genital plate and paramere.



Pentimiidae. Text-figure 1.

AUSTRALIAN LEAF-HOPPERS.

PART 7.

STENOCOTIDAE.

By J. W. EVANS, M.A., F.R.E.S.

(Text-figure 1.)

The Stenocotidae comprise a family of leaf-hoppers that are confined to Australia. Although clearly related to the Ledridae, they differ from this family in several characters, of which the principal one concerns the venation of the tegmina. In the Stenocotidae the anal veins are invariably fused distally, so that a Y vein is formed, such as occurs in the Fulgoroidea. In some species, the second anal vein may terminate separately at the anal border, after junction with the first vein. The ocelli are variable in position and may be dorsal, marginal or ventral. Certain species have the frons separated into two areas, of which the anterior bears the impressions of the dilator muscles of the sucking-pump. As suggested elsewhere (Evans, 1936), these two areas probably represent the post-clypeus and the true frons.

The male genitalia are characterised by the possession of narrow sub-genital plates, short parameres and broad pygophores. The pygophores have long narrow styles that arise from close to their ventral borders. These styles are analogous with those of species in the genus *Eurymela* Le P. and Serv., but not homologous, as with the Eurymelinae the styles are processes of the sub-genital plates. The hind tibiae are also reminiscent of the Eurymelinae, in so far as the possession of a few large prominent spurs with apical spines is concerned. They differ in that the spurs are more flattened and in the possession of three rows of closely set spines.

The sexual dimorphism in the genera *Stenocotis* Stål and *Smicrocotis* Kirk. is striking, the sexes not only differing from each other in size and colour pattern, but also in detailed structure. On this account it is probable that considerable synonymy exists, which at the moment it is impossible to correct.

All the Stenocotidae are essentially arboreal insects, and are probably confined to Eucalyptus trees. Their peculiar flattened nymphs, which occur under bark, are more frequently found than the adults. In coloration various shades of brown predominate, and some species have the tegmina of the males more or less transparent.

The principal purpose of this paper is to enable the recognition of the genera. Until more material is available, of specimens of both sexes taken together, it will be impossible to re-describe the various species.

KEY TO THE GENERA OF THE STENOCOTIDAE.

1. Head ventrally as wide as long	2
Head ventrally longer than wide	4
2. Labium reaching well beyond hind coxae	3
Labium reaching to middle coxae	<i>Anacotis</i> gen. nov.
	Type <i>Anacotis hackeri</i> sp. nov.
3. Ocelli marginal, in shallow oval depressions	<i>Stenocotis</i> Stål
	Type <i>Stenocotis planiscula</i> Stål
Ocelli ventral, in very shallow depressions	<i>Kyphocotis</i> Kirk.
	Type <i>Kyphocotis tessellata</i> Kirk.
4. Ocelli marginal, directed ventrally	<i>Smicrocotis</i> Kirk.
	Type <i>Smicrocotis obscura</i> Kirk.
Ocelli dorsal	<i>Ledracotis</i> gen. nov.
	Type <i>Ledracotis rugosa</i> sp. nov.

STENOCOTIS Stål.

Öfv. Vet-Ak. Förh. 11 ; 254, 1854.

Öfv. Vet-Ak. Förh. 13 ; 67, 1856.

The following species belong to this genus : *planiscula* Stål (Type), *subvittata* Stål (1854) , *corticalis* Walk., *ferruginea* Walk., *depressa* Walk., *australis* Walk., *brevis* Walk., *varia* Walk., *conferta* Walk., *unicolor* Walk. (1851) ; *delineata* Walk. (1858) ; *dimorpha* Kirk., *reticulata* Kirk. (1907).

Stenocotis australis is synonymous with *S. brevis*, *S. subvittata*, *S. varia* and *S. delineata* with *S. depressa*, and *S. dimorpha* with *S. costatis*.

The male genitalia of a number of colour varieties have been examined, but have disclosed no significant differences, and although doubtless there are a number of distinct species within this genus, it is probable that they are fewer than the above list would suggest. Figures are given (Text-figure 1, figs. 1-6) of *Stenocotis depressa*, and a re-description of the genus follows.

♀, Head ventrally, flat anteriorly. The maxillary plates extend beyond the apex of the clypeus and the labium extends beyond the hind coxae. The antennal ledges are distinct and extend across the frontal suture. The hind margin of the frons is not defined and the vertex has a median longitudinal ridge. The ocelli, which are marginal, lie in shallow oval depressions, and the crown is wider in the centre than against the eyes on each side. The eyes are prominent.

The pronotum is transversely striated, produced anteriorly and narrow laterally. The propleurae separate the eyes from the bases of the tegmina. Posteriorly the pronotum is at a higher level than anteriorly. The scutellum is flat and transversely striated. The tegmina are brown, narrow apically and the veins are much branched apically. The hind tibiae have three rows of small spines and a row of six flattened spurs with apical spines, diminishing in size from the apex to the base. The first tarsal segment of the hind tibia is more than twice the length of either of the other tarsal segments.

♂, seven-tenths the length of the ♀.

The crown is only slightly wider medianly than laterally. The tegmina are largely transparent, brown or black basally and medianly, and have many less ante-apical cells than with the ♀. The body is usually black whilst that of the female may be light or dark brown.

SMICROCOTIS Kirk.

H.S.P.A. Exp. Sta. Bull. 1 (9); 370, 1906.

The following five species belong to this genus: *obscura* Kirk. (1906) (Type) *sidnica* Kirk. (1907); *pallescens* Dist., *infuscata* Dist., *projecta* Dist. (1907); *claudenda* Walk. (1858). It is probable that *S. infuscata* is synonymous with the genotype. Two new species are described below, a re-description is given of the genus, and figures of the genotype (figs. 7-9).

♀, The head ventrally is longer than wide and is recurved apically. The maxillary plates extend alongside and beyond the clypeus as narrow borders. The labium extends to the middle of the hind coxae and the antennal ledges which are indistinct reach only as far as the frontal sutures. The hind margin of the frons (or post-clypeus) is distinct and lies well forward of the apex of the head; posterior to this the margin of the vertex (here doubtless the true frons), is raised into a median ridge. The ocelli which are marginal are directed ventrally. The crown of the head is produced anteriorly, the apical margin is straight or irregular and in some species the apex of the head is tilted dorsally. The eyes are not prominent.

The pronotum may be flat or raised, either anteriorly or posteriorly, and is transversely striated posteriorly. The tegmina which are an opaque brown are rounded apically and the veins are raised in relief. The hind tibiae in addition to three rows of small spines have a row of four flattened spurs bearing apical spines, these diminish in size from the apex to the base.

♂, seven-tenths the length of the ♀.

The hind margin of the frons (post-clypeus) is indistinct. The ocelli are ventral, lying above a transverse ridge, the apical margin of the head being ventrally flattened. The tegmina are largely transparent or hyaline, the veins black and white. The crown of the head is never produced medianly, and is either of equal width throughout or widest medianly or laterally.

SMICROCOTIS SOLOMONI sp. nov.

(Figs. 10, 11.)

Length, 7 mm. (from the apex of the head to the tip of the folded tegmina). *Head*, evenly convex, pale yellowish-brown mottled with black and reddish-brown; antennal pits black, ocelli on flattened ventral surface of head; suture between post-clypeus and frons distinct. Crown narrow, wider against the eyes on each side than in the middle, yellowish-white with reddish-brown markings. *Pronotum*, yellowish-white mottled with black and pale orange-brown. *Scutellum*, pale yellowish-brown. *Tegmen*, whitish-hyaline with irregular scattered brownish-black areas; veins brown with raised white spots. *Thorax* and *abdomen*, ventral surface and legs, black with pale brown markings. Hind tibia with six distinct spurs diminishing in size from the apex of the tibia to the base, and in addition two rows of prominent spines and a row of smaller closely-set spines. Sub-genital plates short.

Type ♂, from Crawley, Western Australia (coll. M. E. Solomon), in the collection of the Queensland Museum. Reg. No. 5209.

SMICROCOTIS CHELONIA sp. nov.

(Fig. 12.)

Length, 8 mm. *Head*, ventrally marked with an irregular and evenly distributed pattern of black and yellow; ocelli on the vertical margin of the vertex, not visible from above; crown broad, wider medianly than against the eyes on each side, marked with an irregular pattern of black and yellow. *Pronotum* and *scutellum*, concolorous with the head. *Tegmen*, hyaline yellowish-grey or entirely black, veins dark brown with whitish spots; the whole tegmen covered with a sparse pubescence. *Thorax*, ventral surface, black with yellow markings. *Legs* marked with a pattern of reddish-brown and black. *Abdomen*, black. Hind tibia with eight spurs diminishing in size from the apex of the tibia to the base.

Type ♂, from National Park, Tasmania, 3,500 ft. (coll. F. E. Wilson), in the collection of the Queensland Museum.

KYPHOCOTIS Kirk.

H.S.P.A. Exp. Sta. Bull. 1 (9); 370, 1906.

Four described species belong to this genus: *tessellata* Kirk. (1906, 07) (Type); *fasciata* Dist., *parva* Dist., *nigrescens* Dist. (1907). It is probable that *K. parva* is synonymous with the genotype.

Although as with other genera the sexes differ from each other in size, they resemble each other in colour pattern and can be readily correlated. Kirkaldy in describing this genus cites only one character, which concerns the scutellum: "The posterior three-fifths of the scutellum are elevated in a narrow acute crest." This character is only of specific value, since species occur which are obviously congeneric with the genotype, yet have the scutellum flat. A re-description of the genus follows.

♀, The head ventrally is flat anteriorly and the maxillary plates extend alongside but not beyond the clypeus. The antennal ledges are distinct and terminate at the frontal sutures. The hind margin of the frons which is barely perceptible, lies well forward of the apex of the head and the vertex has a slight median longitudinal ridge. The crown of the head is of even width throughout and the eyes are prominent. The pronotum is raised posteriorly, and the posterior half is transversely striated, the postero-lateral angles are raised into one or two short rounded ridges. The scutellum which is transversely striated is flat, or raised posteriorly into a hump of variable elevation. The tegmina which are rounded apically and have the veins raised in relief, are an opaque brown or grey. The hind tibiae have three rows of small spines and a row of five flattened spurs.

♂, seven-tenths the length of the ♀.

The tegmina are largely transparent and narrow apically.

ANACOTIS gen. nov.

The head is flat anteriorly, and the maxillary plates extend alongside and beyond the apex of the clypeus, and the labium reaches as far as the middle coxae. The antennal ledges are distinct and extend across the frontal sutures, the two ridges meeting medianly on the frons; anterior to their junction the frons is slightly raised, posteriorly it is depressed, with a median longitudinal ridge. The crown of the head is wider medianly than laterally, the apical margin is uneven, and the ocelli lie well away from the apical border on the sides of outwardly facing ridges. The eyes are prominent. The pronotum and scutellum are transversely striated, the latter being raised into a low hump posteriorly. The tegmina narrow apically and the radius is many-branched. The fore and middle femora are flattened and the hind tibiae have three rows of short spines and one row of eleven flattened spurs. The sub-genital plates are short and narrow, not extending as far as the apex of the pygophores. (In *Stenocotis* the sub-genital plates extend well past the pygophores.)

ANACOTIS HACKERI sp. nov.

(Figs. 16, 17.)

Length, 12 mm. *Head*, ventral surface, labium straminaceous; clypeus, maxillary plates, lorae and frons anteriorly black, posteriorly straminaceous; vertex black, crown pale brown. *Pronotum*, pale brown with narrow dark brown markings. *Scutellum*, pale brown, transversely striated. *Tegmen*, transparent but for the costal margin which is pale brown and the costal and anal areas proximally, which are suffused with yellowish-brown. *Thorax* and *abdomen*, ventral surface marked with a pattern of light and dark brown.

Type ♂ from Brisbane, Queensland (coll. H. Hacker), in the collection of the Queensland Museum.

LEDRAOTIS gen. nov.

The head is flattened anteriorly, the maxillary plates extending alongside and beyond the apex of the clypeus and the labium reaches as far as the hind coxae. The antennal ridges are prominent and extend across the frontal sutures. Dorsally the head has a median trough-shaped depression, the crown is produced anteriorly and the ocelli are on the sides of ridges and face outwards and forwards.

The pronotum is evenly convex, very wide laterally, and the propleurae widely separate the eyes from the bases of the antennae. The scutellum is flat and transversely striated. The tegmina narrow apically and the hind tibiae in addition to three rows of small spines have a row of six flattened spurs decreasing in size from the apex to the base.

LEDRAOTIS GUNNENSIS sp. nov.

(Figs. 18, 19.)

Length, 15 mm. *Head*, ventrally deep chocolate-brown; frons punctate, lorae, maxillary plates and vertex, rugose. Dorsally rugose, reddish-brown with a median black longitudinal stripe; ocelli orange. *Pronotum*, transversely striated, reddish-brown mottled with black. *Scutellum*, rugose, marked with a pattern of brown and black. *Tegmen*, pale brown, the veins a somewhat darker brown, and the whole tegmen covered with a sparse pubescence. *Thorax*, ventral surface marked with a pattern of dark brown and black. *Abdomen*, the two proximal segments black, the remainder, dark brown.

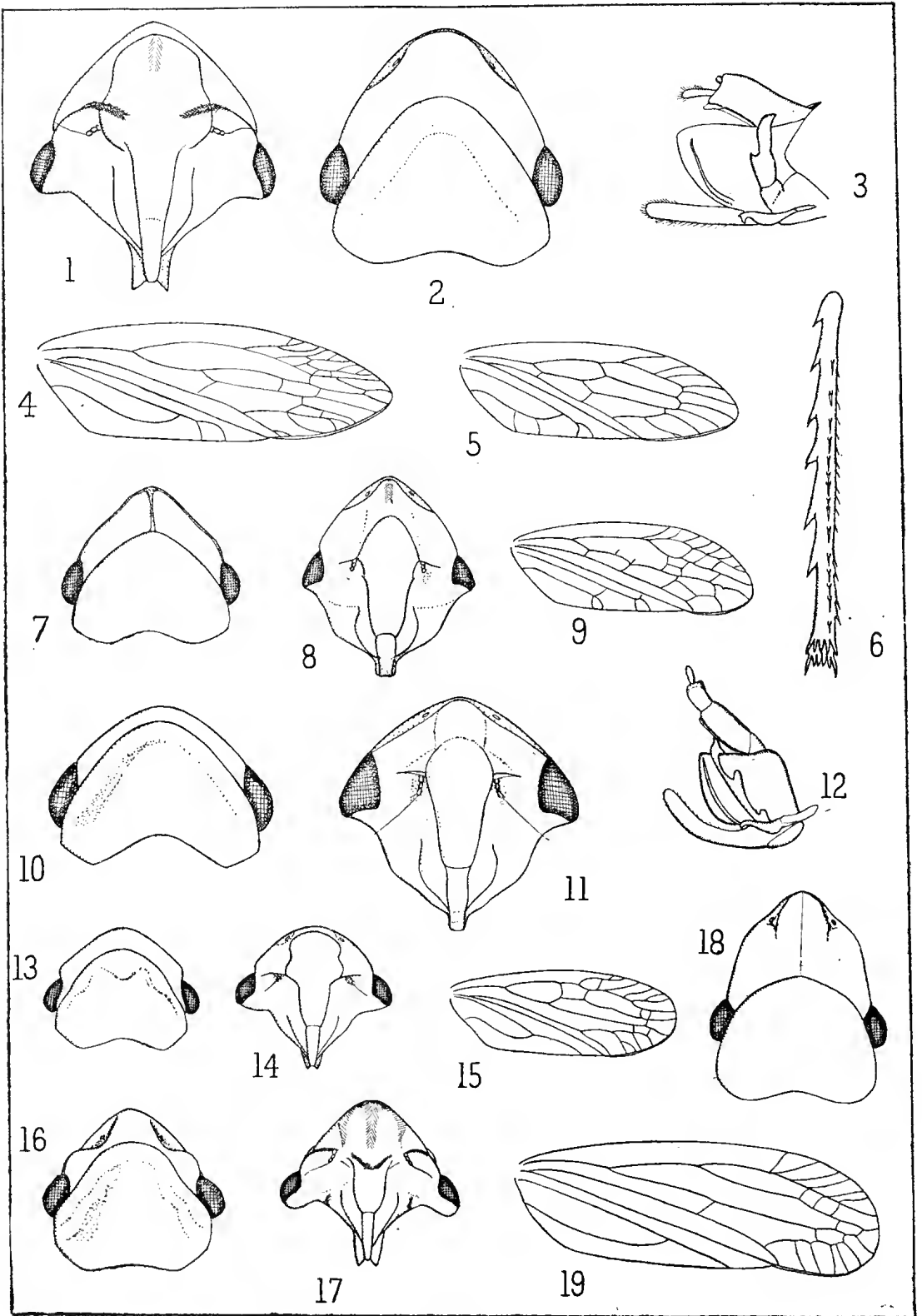
Type ♀, from Gunning, New South Wales, in the collection of the Macleay Museum, University of Sydney.

REFERENCES.

- Distant, W. L. 1907, Ann. Soc. Ent. Belg. 51, 196.
 Evans, J. W. 1936, Papers and Proc. Roy. Soc. Tas.
 Kirkaldy, G. W. 1906, H.S.P.A. Exp. Sta. Bull. 1 (9).
 Kirkaldy, G. W. 1907, H.S.P.A. Exp. Sta. Bull. 3.
 Stål, C. 1854, Öfv. Vet-Ak. Förh. II; 254, 1854.
 Walker, F. 1851, List Homopt. 111.
 Walker, F. 1858, Supplement.

TEXT-FIGURE 1.

- Fig. 1. *Stenocotis depressa*, ♀, Head, ventral aspect.
Fig. 2. *Stenocotis depressa*, ♀, Head and pronotum, dorsal aspect.
Fig. 3. *Stenocotis depressa*, Male Genitalia.
Fig. 4. *Stenocotis depressa*, ♀, Tegmen.
Fig. 5. *Stenocotis depressa*, ♂ Tegmen.
Fig. 6. *Stenocotis depressa*, ♀ Hind tibia.
Fig. 7. *Smicrocotis obscura*, ♀, Head and pronotum, dorsal aspect.
Fig. 8. *Smicrocotis obscura*, ♀, Head, ventral aspect.
Fig. 9. *Smicrocotis obscura*, ♀, Tegmen.
Fig. 10. *Smicrocotis solomoni*, ♂, Head and pronotum, dorsal aspect.
Fig. 11. *Smicrocotis solomoni*, ♂, Head, ventral aspect.
Fig. 12. *Smicrocotis chelonia*, Male Genitalia.
Fig. 13. *Kyphocotis tessellata*, ♀, Head and pronotum, dorsal aspect.
Fig. 14. *Kyphocotis tessellata*, ♀, Head, ventral aspect.
Fig. 15. *Kyphocotis tessellata*, ♀, Tegmen.
Fig. 16. *Anacotis hackeri*, ♂, Head and pronotum, dorsal aspect.
Fig. 17. *Anacotis hackeri*, ♂, Head, ventral aspect.
Fig. 18. *Ledracotis gunnensis*, ♀, Head and pronotum, dorsal aspect.
Fig. 19. *Ledracotis gunnensis*, ♀, Tegmen.



Stenocotidae. Text-figure 1.

HERPETOLOGICAL NOTES.

By H. A. LONGMAN.

BOIDAE.

(Plate XIV.)

CHONDROPYTHON VIRIDIS (Schlegel).

A specimen of this well-known Papuan species was received from the Claudie Goldfield, Cape York Peninsula, in October, 1936, from Mr. S. H. Boyd, through Mr. C. Ogilvie. It was approximately five feet in length (coiled). Dr. Donald F. Thomson, who has done excellent work on our northern snakes, recorded this addition to the Australian fauna the previous year, with notes on its habits.¹

MORELIA SPILOTES VARIEGATA (Gray).

In the course of an important paper on Australian specimens collected for the Harvard Museum of Comparative Zoology, Mr. Arthur Loveridge has resurrected the Linnean species *argus* for our common and very variable Carpet Snake.² As this species is based on Seba's figure showing a snake with large shields on the head, it is not surprising that Boulenger rejected it, especially as the locality was thought to be Africa.³ Apart from the doubt as to whether our snake was ever available for Seba to illustrate, the presence of large head shields makes it difficult to associate the Carpet Snake with this possibly composite and hypothetical species. Mr. Loveridge follows Dr. Olive Stull, who is revising the Boidae,⁴ in reviving the genus *Morelia* and the Linnean species *argus*.

It may here be appropriately recorded that in Queensland the common coastal form, extending to several islands, is *variegata* and not *spilotes*.

ASPIDITES MELANOCEPHALUS (Krefft.)

(Plate XIV, Fig. 1.)

Three living specimens of this interesting snake were received from Mr. H. Muller, Beresford Station, near Clermont, Central Queensland, in May last. The largest snake was seven feet in length, and this is illustrated on Plate XIV, fig. 1. These are the first living specimens to be received here. Although easily handled and somewhat sluggish, the Black-headed Rock Snake presents a formidable appearance when irritated, especially when the fore part of the body is sinuously curved

¹ Thomson D. F. P.Z.S., 1935, p. 724. Plates 1 & 11.

² Loveridge, Bull. Mus. Comp. Zool., Vol. LXXVII, 1934, p. 269.

³ Boulenger, Catal. Snakes Brit. Mus., 1, 1893, p. 82.

⁴ Stull, Olive Griffith. Proc. Boston Soc. Nat. Hist., Vol. 40, 1935, p. 395.

for a strike. The neck region may be distinctly distended (flattened). In some districts these snakes are regarded as dangerous, and have been called "Tigers." The darker bands on the brown body, which are very noticeable in some specimens, probably suggested this misnomer. Because of its striking colouration, this Black-headed Rock Snake has been called "The Tarpot" in some western Queensland districts.

Notwithstanding variation in certain of the head scales, Waite accepted Macleay's *Aspidites ramsayi*⁵ as a distinct species, but Loveridge prefers sub-species.

A very robust specimen of *A. ramsayi* from Yeulba, received from Mr. J. P. Bennett, is 207 centimetres in length. This is the "woma" of Cooper's Creek Aborigines. In comparison with our specimens of *A. melanocephalus* this snake has a more massive head.

In the widely branched structure of the postorbital (postfrontal of Boulenger) at its junction with the parietal and frontal elements the skull of *A. melanocephalus* resembles *Nardoana boa*.

COLUBRIDAE.

BOIGA FUSCA (Gray).

(Plate XIV, Fig. 2.)

Opportunity is taken to give an illustration of a Queensland Museum specimen of the Brown Tree Snake in a characteristically belliose attitude.

This snake is fairly common in south-eastern Queensland, and is sometimes called the "Night Tiger."

DEMANSIA TEXTILIS Dum & Bibr.

The variation in colour in the common Brown Snake is illustrated by specimens sent from Mackay by Mr. F. H. Stevens (J. 5629 & 5678). These are very dark brown and were thought by some to be "a hybrid between the Brown and Black Snakes." These Brown Snakes are strikingly marked in life with bright red spots on the ventral surface, but these quickly fade in spirits. Another specimen sent by Mr. G. Y. Harding, from Nambour (J. 6054) is an olive form, the bright red belly spots being very prominent when first received.

VERMICELLA ANNULATA (Gray).

As the result of Dr. L. D. Brongersma's researches, as recorded in his "Contributions to Indo-Australian Herpetology," Leyden, 1934, p. 223, the genus *Furina* is necessarily replaced by *Vermicella* Gunther, 1858. The species previously known as

⁵ Waite, E. R. Trans. & Proc. Roy. Soc. S. Aus., Vol. XXI, 1917, p. 436. and Rec. South Aus. Mus., Vol. III, 1925, p. 24, with illustrations.

Pseudelaps diadema is apparently the type of Dumeril's *Furina*. *Vermicella annulata* is a common snake in the Brisbane district. The extraordinary habits of this snake in holding folds of its body vertically upwards have been twice illustrated.^{7, 8}

In the synopsis of genera of Gunther's Catalogue of British Museum Colubrine snakes, p. 210, the generic name appears as "Vermicalla"; although this has page precedence it is an obvious misprint for Gray's manuscript name as adopted by Gunther on p. 236 and repeated in later publications.

Dr. Brongersma (*loc. cit*) also points out that the well-known generic name *Pseudelaps* Fitz., must also lapse, being replaced by *Aspidomorphus* Fitz. The type of Fitzinger's *Pseudelaps* was *Elaps furcatus*. Curiously enough Fitzinger had used in 1826 *Pseudoelaps* for *Coluber getulus* L., a North American Snake.

ACANTHOPHIS ANTARCTICUS (Shaw).

In captivity this snake has the habit of lying in sand, which may partly cover it, with the tail curved around to within a few inches of the head. Slight movements may sometimes be seen in the posterior region of the tail and the spine when in this position, and it was noted many years ago that this acted as a lure for small birds which may peck at the moving tail and are then captured by a very swift lateral strike. Birds had been found inside this otherwise very sluggish snake, a fact that puzzled me in earlier years. The actual spine terminating the tail is almost flaccid and has no penetrating power; it could not possibly assist in locomotion.

The Death Adder is a widely distributed snake and is found in a variety of habitats. In February last, on a cold wet night, the writer was called out to despatch a specimen which was slowly moving across a garden path near a residence on Mount Roberts, south-eastern Queensland, at an elevation of nearly 3,000 feet. Fortunately this dangerous reptile is rare. A few years ago it was a notorious menace in some localities in areas closely infested with prickly pear, where it found a favourable environment. With the extraordinary clearance of the pear through the introduction of *Cactoblastis cactorum*, it is far less common to day. Valuable studies of this snake, with fine illustrations, appear in the Medical Journal of Australia for March 9, 1929, by N. Hamilton Fairley, and for August 24, 1929 by C. H. Kellaway and T. Eades.

SCINCIDAE.

RHODONA ALLANAE new species.

Body much elongated; fore limbs absent; hind limbs monodactyl, styliiform; tail as thick as body. Snout projecting; rostral large. Nasals contiguous above with an extensive suture. Fronto-nasals forming a broad band between nasals

⁷ Longman. Mem. Qld. Mus. Vol. VI, 1918, p. 42. Plate XV.

⁸ Thomson Donald. Med. Journ. Aus., July 21, 1934, p. 28.

and frontal. Three supraoculars and five or six supraciliaries. Frontal as long as broad, almost as long as its distance from the end of the snout; pre-frontals small. Fronto-parietals distinct from the interparietal; parietals bordered by enlarged nuchals. Eye small; lower eyelid with a transparent disk. Six upper labials, fourth below eye. Ear-opening very tiny, scarcely discernible. Eighteen scales around the body, dorsals largest; preanals enlarged.

Fore limbs entirely absent, site indicated by a slight depression with a rosette of smaller scales. Hind limbs monodactyl, styliform; length almost equal to diameter of body; relatively longer in young specimens.

Colour (spirits): upper surface Ridgway's drab gray; scales mostly bordered with darker markings. On the back these dark spots form five almost continuous longitudinal lines. The scales on the sides, throat and lower surfaces are prettily marked with dark spots.

Described from three specimens, the largest of which is 144 mm. (tail partly regenerated); head and body 90. This specimen is selected as holotype, Reg. No. J. 6180.

These elongated skinks were sent in from Retro Station, Capella, central Queensland, by Mrs. P. C. Allan, who has presented many interesting specimens to the Queensland Museum, and after whom the new species is named.

Rhodona allanae is undoubtedly allied to *R. wilkinsi* from Torrens Creek, northern Queensland, described by Mr. H. W. Parker in 1926.⁹ It is readily distinguished, however, by the monodactyl hind limb, by the presence of three labials in front of the eye and by the more elongated frontal. *R. picturatus* Fry from Boulder, West Australia, is another allied species.¹⁰ From such species as *Rhodona bipes* and *miopus* it is easily separated by the distinct fronto-parietals, apart from other characters. In the evolution of these species there are interesting illustrations of variation and of convergence. Taking Dollo's "Law of the Irreversibility of Evolution" as substantially correct, one would expect to find greater variation in species with several digits than in monodactyl skinks. *R. allanae* seems one of the most specialised and is obviously adapted to subterranean life.

⁹ Parker, H. W. Ann. Mag. Nat. Hist. (8), Vol. 17, 1926, p. 667.

¹⁰ Fry, D. B. Rec. W. A. Mus., Vol. I, p. 187, 1914.



Fig. 1.—*Aspidites melanocephalus* (Krefft). From life.

Photo. : T. C. Marshall.

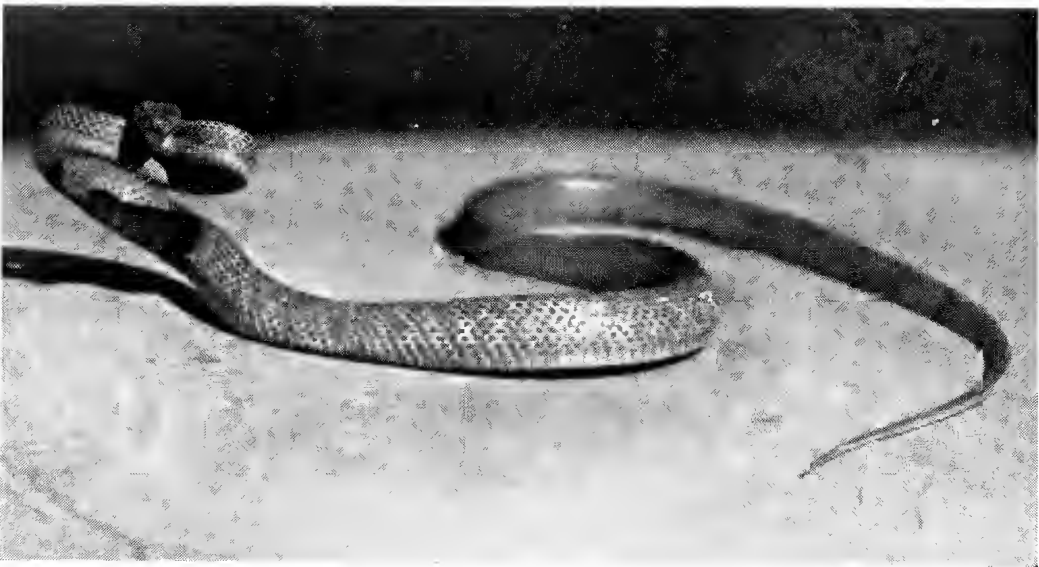


Fig. 2.—*Boiga fusca* (Gray). From life.

Courier-Mail Photograph.

Face page 168.

