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STUDIES IN ICHTHYOLOGY.

No. 14.*

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(Plate xvii and Figures 1-5.)

Family CARCHARIIDAE.

Genus *Odontaspis* Agassiz, 1835.

Odontaspis Agassiz, Poissons Fossiles, iii, 1835, p. 55; and 1838, p. 87; 1843, p. 287, pl. G, figs. 1, 1a-d (as *Lamna*) and pl. P, figs. 1-4. Orthotype, *Carcharias ferox* (Risso). *Odontaspis* White, Vertebr. Faunas Engl. Eocene, May, 1931, p. 48.

Odontaspis herbsti, sp. nov.

(Plate xvii, fig. 1, and Figure 1.)

Head subconic with the long snout broadly rounded from both dorsal and lateral aspects, not produced as in *Mitsukurina*. Nostrils large, transverse, with small, rather acute lobe, much nearer mouth than tip of snout. Eyes large, oval, nearer end of snout than first gill-opening, not adnate to side of head, and without nictitating membrane; pupil a vertical ellipse. No visible spiracle. Aquaeductus vestibuli inconspicuous, 10.7 inches from tip of snout. Mouth crescentic, anteriorly level with nostrils and before eye-level and not reaching far behind eyes. Tongue and palate rather rough. Teeth said to be embedded in the gums in the live shark, except when biting, when they are exerted and the lips are drawn back. No central symphyseal tooth, the shagreen entering the mouth at symphyses. Teeth mostly with a pointed central fang and two (rarely three) small acute cusps on each side of it, but there is much variation in size and shape on different parts of the jaws, and those at the corners of the mouth are very small. There are no serrations. The enlarged anterior fangs are flexuous and thick, but the lateral ones are thinner and more erect. The two subequal roots are separated by an arc and the bases of adjacent teeth do not overlap. The teeth of the lower jaw are slenderer than those of the upper. Some of the anterior teeth of the holotype were broken during its struggles; it has four small "eye-teeth" on each side in upper jaw.

The dentition is better shown in the cleaned jaws of the paratype, a larger specimen (Austr. Mus. regd. no. IB. 1859), which agrees well with Dr. Errol White's restricted concept of the genus *Odontaspis* (White, Vertebr. Faunas Engl. Eocene, 1931, page 47), that is, "the crowns of the teeth, especially in the front of the jaws, are very sharply pointed and flanked (on either side) by two lateral denticles equally sharp". There is

* For No. 13, see RECORDS OF THE AUSTRALIAN MUSEUM, Vol. xxii, Part 1, June 30, 1948, pp. 70-94, figs. 1-11.

Thanks are due to the Council of the Royal Zoological Society of New South Wales for all illustrations (except Plate xvii, figure 1) from the author's forthcoming "Fishes of Australia".

no central symphyseal tooth, as in some sharks, there being a gap with a small tooth (called by Dr. White the symphyseal) on each side of it in the middle of the jaw. As in Agassiz's and White's accounts, in my paratype "the first tooth (the Symphyseal) in both upper and lower jaws is much smaller than the second (1st Anterior) which is the largest of all [though in my paratype the 1st and 2nd Anterior are subequal in the upper jaw and smaller than those in the lower jaw]; thence in the lower jaw the

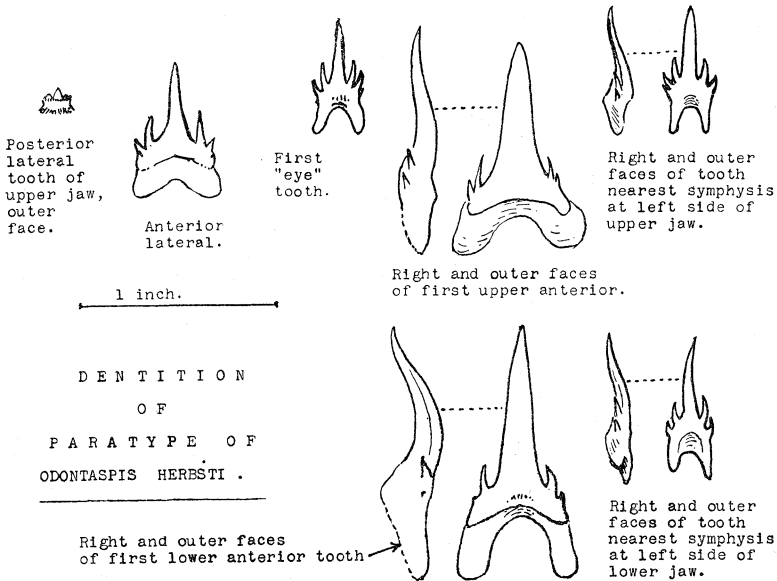


Figure 1.—*Odontaspis herbsti* Whitley. Dentition of paratype from 200 miles south of Sydney, New South Wales.

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teeth decrease gradually in size towards the back of the mouth, but in the upper jaw this gradual diminution is interrupted by the fourth, fifth, sixth and seventh (the 'eye') teeth, which are even smaller than the first" [only slightly so in mine, in which, moreover, the fifth teeth of the right side of the upper jaw have not been developed].

The teeth are in eight rows from front to back. Dental formula $\frac{48}{40}$. The inner

of the two lateral cusps in the Australian species is longer and more acute than in Agassiz's figures and there are fewer posterior teeth decreasing in size backwards. Labial grooves slit-like. Interorbital slightly convex. Cheeks swollen over the large jaws. Anterior part of back and shoulders rather swollen. Ampullae of Lorenzini conspicuous on each side above and below snout. Five lateral gill-slits, the first four subequal, the last shorter, just before pectoral base; they do not cut the ventral surface as in *Lamna*, and the fourth and fifth are closest together.

Body elongate, cylindrical and rounded; the paunch rotund "like a cow's belly". Girth at origin of first dorsal about 27 inches. Depth a little before ventral origins, nine inches. The greatest is at the forequarters. The depth lessens greatly after the ventral fins. Caudal peduncle O-shaped in transverse section, without keels. Lateral line conspicuous, running from above last gill-slit along upper part of side to middle of caudal peduncle and then along upper lobe of tail. Shagreen fine, rather rough to the touch. Dermal denticles small, close-set, imbricate, each with three well-marked complete carinae, the middle one longest, the others diverging, set on a raised base.

Biometrics, following scheme propounded in Proc. Linn. Soc. N.S. Wales, lxxviii, 1943, p. 114:

H. 1	12 in.	B 8	1.4 in.
2	15 $\frac{1}{2}$	9	1.65
3	5	F. 1	7.5
4	4 $\frac{1}{2}$	2	7
5	15 $\frac{1}{2}$	3	1.8
6	35 $\frac{1}{2}$	4	11.4
7	1 $\frac{5}{16}$	5	4 $\frac{1}{2}$
8	0.9	6	4
9	3.8	7	1 $\frac{3}{4}$
10	(no spiracle)	8	5 $\frac{1}{2}$
11	1 in.	9	4 $\frac{1}{2}$
12	2 $\frac{1}{2}$	10	3
13	4 $\frac{1}{2}$	11	1.35
14	4 $\frac{1}{16}$	12	2.5
15	$\frac{1}{2}$	13	—
16	$\frac{3}{8}$	14	8.5
17	3 $\frac{3}{8}$	15	8.5
18	3.2	16	19.5
B. 1	48 $\frac{1}{2}$	17	5.3
2	40	18	5.6
3	21 $\frac{1}{2}$	19	1 $\frac{1}{2}$
4	12	20	10
5	c. 5	21	17 $\frac{1}{2}$
6	2 $\frac{1}{2}$	22	6 $\frac{1}{2}$
7	2		

Other measurements (in inches): Nostril to tip of snout, 4.13; nostril to eye, 1.4; nostril to corner of mouth, nearly 4; distance between outer angles of nostrils, 3.8; ramal length of mouth, 3.8; eye to first gill-opening, 6 $\frac{1}{2}$; eye to last gill-opening, c. 10; distance between pectorals anteriorly 7, and posteriorly 5 $\frac{1}{2}$; distance between ventral origins, 3.7.

Vent large. No interdorsal ridge. No umbilical scar. Preanal length longer than post-anal.

Fins similar to those of *Carcharias*, rather rounded, without spines. First dorsal origin much nearer pectorals than ventrals, its vertical height less than its length. Second dorsal well developed, smaller than first. Anal similar to but entirely behind level of second dorsal. Pectorals short and rounded, upper and lower margins convex and posterior margin almost straight, their inner angles barely reaching level of first dorsal origin, their tips extending back to below anterior half of first dorsal base. Ventral origin nearer origin of second dorsal than base of first dorsal. Claspers small in this specimen, not reaching to ventral tip. Anterior edges of all fins trenchant. Caudal axis little raised. No caudal pits but a pronounced bump at upper caudal origin; dorsal ridge of caudal fairly straight, subcaudal followed by notch, lower caudal lobe rounded.

Flesh whitish. Liver weight, 11 pounds. Stomach contents unidentifiable, apparently digested fish vertebrae and remains, also one pillbug (?). Spiral valve with 25 rings. Vertebral centra radially asterospondylic, with radiating calcifications, without Maltese cross-like secondary calcification.

General colour when fresh almost uniform light grey, on head, body, fins and claspers, slightly paler ventrally and fins with smoky-grey margins, but without dark spots or tips. Lower caudal lobe dusky. Most fins with white posterior axils. Eye bluish-grey with some green below.

Described and figured from the holotype of the species, a young male, 5ft. 6 in. long and weighing 55 pounds. Austr. Mus. regd. no. IB. 2136.

Loc.—Three miles north of Gabo Island, New South Wales; 75 fathoms, steam trawler "Olive Cam" (Capt. W. Smith), night of 14th May, 1948.

Presented by Mr. W. A. Herbst, of Sydney. It was very savage when netted and snapped at everything within reach.

Also paratype jaws from 200 miles south of Sydney, N.S. Wales; about 70 fathoms; trawler "Mary Cam", April, 1947; Mr. W. A. Herbst. Austr. Mus. regd. no. IB. 1859. Vernacular name: Herbst's Shark.

Range.—Southern New South Wales, trawled in 70 to 75 fathoms in April and May.

Differs from the Mediterranean genotype, *Squalus ferox* Risso (Ichth. Nice, 1810, p. 38) in dental formula and colour and in having small pectorals. Risso described the colour as "Corpore obscuré rubro, nigro maculato" or "Un rouge obscur, parsemé de grandes taches noires irrégulières, le colore en dessus et sur les côtés; le ventre est d'un gris rougeâtre". Agassiz's figure shows 27 teeth over 23 on one side of the jaws,

which gives a dental formula of $\frac{54}{46}$, whereas the Australian species has $\frac{48}{40}$. Moreover,

the inner of the two lateral cusps is longer and sharper in my new species than in Agassiz's figures or those of Tortonese (Atti Mus. Civ. Milano, lxxvii, 4, 1938, p. 288, fig. 1). Giltay (Mem. Mus. Roy. Hist. Nat. Belg., v, 3, 1933, p. 8) records a variation of $\frac{46 \text{ to } 54}{36 \text{ to } 48}$ in the dental formula of the Mediterranean *ferox*. Desbrosses' paper (Bull. Soc. Zool. France, lv, 1930, pp. 232-235, 5 figs.) is not available at time of writing.

Family OPHICHTHYIDAE.

Genus *Pisodonophis* Kaup, 1856.

Pisodonophis cancrivorus (Richardson).

(Figure 2.)

Ophisurus cancrivorus Richardson, Zool. Voy. "Erebus" and "Terror", Fish., 1848, p. 97, pl. 1, figs. 6-9. Port Essington, Northern Territory.

Myrophis chrysogaster Macleay, Proc. Linn. Soc. N.S. Wales, vi, 1881, p. 271. Port Darwin, Northern Territory.

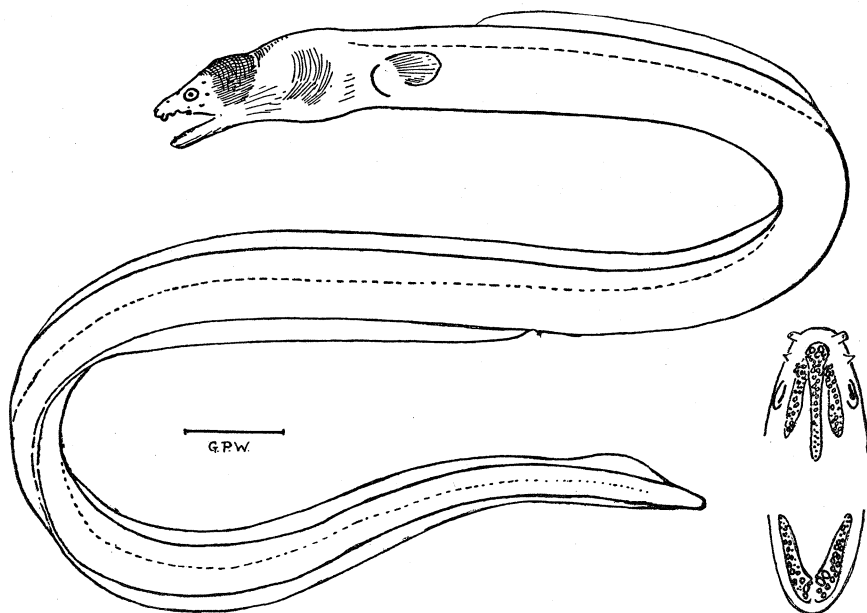


Figure 2.—*Pisodonophis cancrivorus* (Richardson). Holotype of *Myrophis chrysogaster* Macleay from Darwin, Northern Territory.

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Through the courtesy of the Curator of the Macleay Museum, University of Sydney (Mr. J. Henry), I have had the privilege of borrowing Macleay's type of *Myrophis chrysogaster*, now figured for the first time. Under the microscope I find that the tip of the tail is free of fins and the dorsal origin is behind the tips of the pectorals, and thus farther forward than Macleay thought. The specimen is slightly shrunken, so that the dorsal and anal fins are somewhat restored in the figure. There is a dark saddle-shaped chestnut patch over the head, otherwise no spots or bands. Ogilby, on an MS label in the type's bottle, placed Macleay's species in the genus *Pisodonophis*, a more accurate location than *Myrophis*, and Macleay's *chrysogaster* is evidently a synonym of *P. cancrivorus*. The lateral line was not shown in Richardson's figure, but is present in several north Australian specimens; the teeth may be conic or granular and molar-like, possibly through wear, and the dorsal fin may arise over or behind the pectorals.

Family SYNGNATHIDAE.

Yoza compitalis, sp. nov.

D. 21 to 23; A. 3; P. 17; C. 5. Rings 23 + about 54, but almost indistinguishable posteriorly. Subdorsal rings $2\frac{1}{2} + 3$.

Snout (10 mm.) more than half head (18), with low keel but no serrations above. Head 10.7 in total length (192), longer than dorsal base (10.5) and 2.5 in trunk (46). Interorbital (2) less than eye (2.5). No filament over eye. Operculum with radiating striae but without keel.

Superior ridges of trunk and tail discontinuous. Inferior ridges of trunk ending near vent and discontinuous with inferior ridges of tail. Median ridge of body descending over anal to join inferior tail-ridge. A ventral carina. Thus corresponds with no. 5 of Duncker's system. General characters as described for *Yoza bicoarctata brevicauda* Castelnau (in Austr. Zool., xi, 1948, p. 269, fig. 6), but differing in formulae and proportions. Trunk swollen ventrally. Body 7-angled. Vent normal. A small caudal fin present.

Life-colours chocolate-brown nearly all over, lighter below belly, and with few yellow streaks or spots on body anteriorly. Colours change on the head with the pulsating of the gill-chambers. Eye coppery with about 10 or 12 dark brown spots on iris. Fins whitish.

Described from the unique holotype, about 192 mm. or $7\frac{1}{2}$ inches long; Austr. Mus. regd. no. IB. 1665.

Loc.—Pymont, Sydney, N.S. Wales, 9th May, 1945.

Differs from other species of *Yoza* in its formulae, proportions, and colourings.

Histiogamphelus briggsii orae, subsp. nov.

D. 25; P. 12; C. 9. Rings 21 + 35. Subdorsal rings 6 + 2.

Head (11 mm.) 3.8 in preanal length (42). Snout (5) 2.2 in head. Eye (3) 1.7 in snout. Tail (55) longer than head and body (42). Caudal fin (4) nearly 3 in head.

General characters as in McCulloch's description of *H. briggsii* (Austr. Zool., i, 1914, p. 30 and fig.) but differing in having a short keel anteriorly on operculum, eye less than two in snout, as well as in other proportions.

Colour, brownish or tan, without blue spots. A smudged, small, dark brown spot on most rings at the ridges. Lips and nostrils yellow. Dorsal base purplish-brown; pectoral base brown, the fins themselves plain whitish. Caudal dark brown tipped with cream.

Described from the unique holotype of the subspecies, a specimen 97 mm. in total length or about $3\frac{3}{4}$ inches. Austr. Mus. regd. no. IB. 84.

Loc.—Thompson's Bay, Coogee, near Sydney, New South Wales; Mr. A. K. Carter, 1939.

Family MELANOTAENIIDAE.

Quiris, gen. nov.

Orthotype, *Quiris stramineus*, sp. nov.

A genus of freshwater atherines from the Northern Territory of Australia similar to *Telmatherina* Boulenger, 1897, and *Paratherina* Aurich, 1935, from Celebes and *Charisella* Fowler, 1940, from New Guinea, but easily distinguished by the remarkable labial dentition exterior to the jaws, as described below.

Other diagnostic characters are the few short gill-rakers, the somewhat anterior insertion of the anal fin, the robust form, the presence of a silvery lateral band, a single row of cheek-scales, the filamentous dorsal spines and the 33 vertebrae.

Quiris stramineus, sp. nov.

(Figure 3.)

D. vii/i, 9; A. i, 11; P. 14; V, i, 5; C. 15 branched rays. About 28 scales along body. Tr. 6. Pred. 10.

Head (15.5 mm.) 3.4, depth (18) 3 in standard length (54). Eye equals snout (5), less than interorbital (6) and postorbital (5.5). Longest dorsal spines 19 mm.; width at pectoral base, 9; pectoral, 10; predorsal length, 24; depth of caudal peduncle, 7; its length, 8.

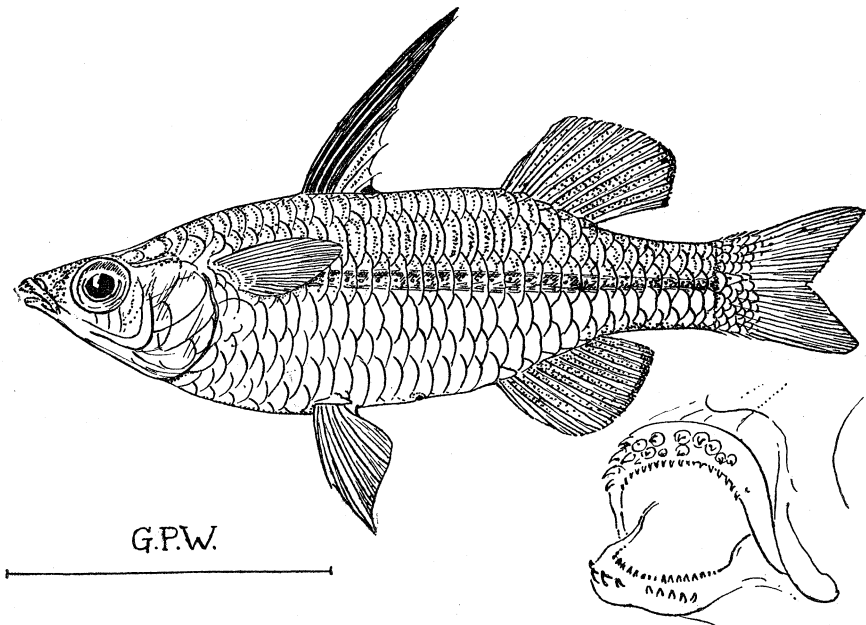


Figure 3.—*Quiris stramineus* Whitley. Holotype from Katherine River, Northern Territory.
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Snout jutting slightly over preorbital. Premaxillary protractile, pedicles about half eye. Maxillary bluntly hook-shaped, slipping under preorbital. Upper lip overhanging lower. Mouth-opening small, oblique, bordered by premaxillaries and mandibles, broadly arched, descending steeply at sides, not markedly notched. Mandibular rami gently rising. Mouth not quite reaching below eye.

Short strong hook-like teeth in upper and lower lips exterior to jaws in 1 to 3 rows. A single series of pointed, slightly movable teeth around front of each jaw. Vomer

with two weak ridges, toothless. Tongue with convex margin, spatulate, toothless. One row of cheek scales. Mucus-pores on head inconspicuous. Nostrils small, oval. Ten or less opercular scales. Gill-membranes free from isthmus. Five over nine short gill-rakers on first branchial arch, much shorter than gill-fringes. Small pseudobranchiae present. Ventral profile of head rounded, not keeled.

Form compressed, robust, broadest behind head. Ventral profile more convex than dorsal. Body covered by cycloid, slightly crenulated scales. A distinct silvery lateral band. Lateral line scales somewhat enlarged and truncate, each with simple pore, and with notches between the four basal radii. Scales do not extend onto fins except a little on bases of paired fins and caudal. Axillary ventral scales above and a lanceolate interventral scale. Four scales between vent and anal origin and $3\frac{1}{2}$ between pectoral base and middle of chest. Vent between ends of adpressed ventrals, in posterior half of distance between snout and caudal and about below hind-border of first dorsal base. Caudal peduncle slightly shorter than anal base.

First dorsal fin with seven long flexible spines, its origin behind level of origin of ventrals, before level of vent, and much nearer snout than root of caudal. Second dorsal with one short spine preceding the branched rays, its origin behind level of that of anal. The latter fin has one feeble spine and eleven branched rays. Second dorsal and anal rounded, not elevated anteriorly as in *Pseudomugil*. Pectoral small, the third ray longest. Caudal forked. Vertebrae (in a paratype) $17 + 16 = 33$, the precaudal and caudal portions equal.

Colour, in alcohol, straw-yellowish, browner above head and on predorsal area. Snout, lips and chin dusky. Upper scales with brown punctate margins. Most of first dorsal membrane blackish, some white near its base posteriorly. Other fins faintly punctulate on their membranes, darkest on second dorsal and along anal margin. Eye bluish. A silvery-blue lateral stripe along middle of lateral line scales. Peritoneum silvery and blackish.

Described and figured from the holotype, largest of five specimens, 60 to 66 mm. (2.6 in.) in total length (Austr. Mus. regd. no. IB. 2149). Also one paratype (IB. 2150) in Austr. Mus. and three paratypes in Mr. Melbourne Ward's Gallery of Natural History and Native Art, Medlow Bath, New South Wales.

Loc.—Katherine River, Northern Territory; Mr. Eric Worrell, 1945; fresh water.

Variation in paratypes: D. vi-vii/i, 9-10; A. i, 10; scales along lateral band, 28-29.

Family SCOLOPSIDAE.

Genus *Scaevius* Whitley, 1947.

Scaevius milii (Bory).

(Figure 4.)

Cantharus milii Bory de St. Vincent, Dict. Class. Hist. Nat., iii, 1823, p. 160, pl. xc, fig. 3. Shark's Bay, W. Australia.

Maenoides cyaneo-taeniatus Richardson, Icon. Pisc., 1843, p. 8, pl. v, fig. 1. Depuch Is., north-western Australia.

Scaevius nicanor Whitley, Austr. Zool., xi, 2, June, 1947, p. 142. Shark's Bay, W.A.

Here figured from the holotype of *Scaevius nicanor*, which appears to be conspecific with the two other species listed above and which were described from paintings which showed colours but only indefinite structural features, so that fresh specimens observed in the field were necessary before the generic position could be determined. *Cantharus dubia* Bory (op. cit., p. 160, pl. xc, fig. 2), imperfectly described from Shark's Bay, may replace *Pentapodus vitta* Quoy & Gaimard, whilst *C. milii* Bory (ibid., pl. xc, fig. 3), which has been associated with *vitta*, appears more like *cyaneotaeniatus* and *nicanor* and is the earliest name for this species.

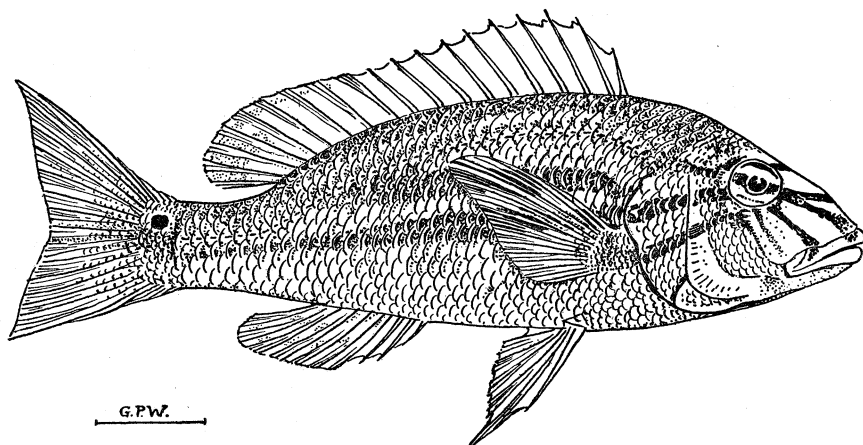


Figure 4.—*Scaevius milii* (Bory). Holotype of *S. nicanor* Whitley from Shark's Bay, Western Australia.

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Family POMADASIDAE.

Genus *Pomadasys* Lacepede, 1802.

Subgenus *Pristipomus* Bosc, 1819.

Pomadasys (*Pristipomus*) *auritus* (Cuv. & Val.).

(Plate xvii, figure 2.)

Pristipoma auritum Cuv. & Val., Hist. Nat. Poiss., v, 1830, p. 263. Siam. *Id.* Cantor, Journ. Asiat. Soc. Bengal, xviii, 1850, p. 1058. *Id.* Gunther, Cat. Fish. Brit. Mus., i, 1859, p. 293. *Id.* Duncker, Mitth. Naturh. Mus. Hamburg, xxi, 1904, p. 149.

Pomadasys auritus Bleeker, Atlas Ichth., viii, 1876, p. 31. *Id.* Chevey, Inventaire faun. ich. Indo-Chine, 19e note, 1932, p. 23 (not seen). *Id.* Weber and Beaufort, Fish. Indo-Austr. Archip., vii, 1936, p. 408.

Pomadasys argenteus (part) Fowler, Bull. U.S. Nat. Mus., 100, xi, 1931, p. 311 (*auritum* regarded as syn. of *argenteus*).

D. xi, 1, 14; A. iii, 7; P. 17; V. i, 5; C. 15. L. lat. 42 to hypural + 6 on tail. Tr. 5/1/12 at dorsal origin to 2½/1/3 on caud. ped. About 32 predorsal scales.

Head (184 mm.) 2·4, depth (c. 144) 3·1 in standard length (450). Eye (24) 7·6, interorbital (41) 4·4, snout (46) 4 in head.

Eye to end of opercular flap, 115 mm.; upper jaw, 43; longest (fourth) dorsal spine, 70; height of second dorsal, 50; second anal spine 76 long by 9·5 wide; pectoral, 122; ventral fin, 86; ventral spine, 60; greatest width (at operculum), 76; depth of caudal peduncle, 42. L.C.F. 510 mm. Total length 21 inches.

No pronounced bulge over eye. Anterior profile fairly straight, becoming convex before dorsal fin. Interorbital broadly and slightly convex, exceeding eye-diameter. Operculum half length of head, being produced backwards as a rounded and bulging lobe with its flap extending above about one-third of pectoral fin. Preoperculum with a similar lobe below but with narrow roughened margin. Seven rows of cheek-scales plus about ten more along preopercular lobe. Two small pores and a central groove below chin. No barbels. Maxilla mostly concealed by preorbital, reaching below the large nostrils. Upper jaw the longer. Bristle-like teeth along jaws; none on palate. (The gills have unfortunately been removed.)

Form tapering, rather sciaenoid, and much slenderer than in *P. hasta* of comparable length. Scales large, with narrow rim of fine apical ctenii and about 13

incomplete basal radii, only a couple of which extend to posterior edge of scale-root. Eight scales above l. lat. anteriorly and three posteriorly.

Dorsals deeply notched, the last spine notably longer than the penultimate. Second anal spine much enlarged, more than twice as long as eye. Fins with scaly sheaths at bases. Pectorals and ventrals pointed. Caudal bilobed.

General colour in formalin silvery, greyish above, with some blue and pink reflections on head. Iris gold and yellow. Upper part of snout and front of jaws brown. Cheeks with brown dots and yellow markings. Inside of mouth whitish. Opercular flap brownish-grey. Caudal brown, darker posteriorly. Other fins yellowish except the dorsals, which are dirty white to greyish with narrow dark grey to blackish margins and with 3 to 7 rows of dark grey spots along their membranes. Similar purplish-grey spots are disposed over the back of the fish, ceasing at level of operculum, and mostly occurring at the tip of each scale; a similar spot at top of pectoral base, the axil of which is otherwise plain yellowish.

Described and figured from a gutted specimen, 21 inches long, and thus evidently of record size. Austr. Mus. regd. no. IB. 2153.

Loc.—Newcastle harbour, New South Wales; found floating half-dead by Mr. Athel D'Ombraïn early in July, 1948.

New record for Australia.

Family TOXOTIDAE.

Genus *Toxotes* Bosc, 1816.

Toxotes Bosc, Nouv. Dict. Hist. Nat., ed. 2, ii, Sept., 1816, p. 442. Haplotype, "*Labrus jaculator* Shaw", i.e. *Sciaena jaculatrix* Bonnaterre, Tabl. Encycl. Meth., Ichth., 1788, p. 121, from Batavia.

Trompe Gistel, Naturg. Thierr. hoh. Schulen, 1848, p. 109. Substitute for *Toxotes*.

The following nominal species of *Toxotes* have been described: *T. antiquus* Agassiz, 1835; *T. beauforti* Sanders, 1935; *T. blythii* Boulenger, 1892 (syn. *T. microlepis* Blyth, 1861, non Gunther, 1860); *T. carpentariensis* Castelnau, 1878; *T. chatareus* (Ham.-Buch., 1822); *T. jaculator* (Bonnaterre, 1788) with syn. *schlosseri* (Gmelin, 1789) and var. *malaccensis* Cantor, 1850; *T. lorentzi* Weber, 1911; *T. microlepis* Gunther, 1860; and *T. oligolepis* Bleeker, 1876.

From these certain Australian Archer Fishes differ, notably in their fin- and scale-counts, proportions and coloration, as defined below.

Toxotes dorsalis, sp. nov.

(Figure 5.)

This new name is provided for the Australian Archer Fish, which has hitherto been called *T. chatareus* by some authors. The latter is an Indian species, originally described as *Coius chatareus* by Hamilton-Buchanan (Acc. Fish. Ganges, 1822, pp. 101 and 370, Pl. xiv, fig. 34) and his figure shows a deeper fish with dorsal fins more peaked and different colour-pattern from the new Queensland form. Later figures by Bleeker, Agassiz, Fowler, H. M. Smith, Weber and Beaufort and others also show true *chatareus* as having the last dorsal spine longer than the first dorsal ray and a blotch on posterior dorsal rays, whereby they differ consistently from Queensland fishes, in which the fifth dorsal spine is shorter than the first ray, whose height is nearly half length of soft dorsal base. The specific characters are as follows:

D. v, 14; A. iii, 17; P. 12; C. 15. L. lat. 35; l. tr. 5/1/11; predorsal sc. c. 25.

Head (54 mm.) nearly 3, depth (67) 2.3 in standard length (160). Eye (12) 4.5, interorbital (20) 2.7, snout (14) 3.8, pectoral (44) 1.2 in head.

General characters as in Weber and Beaufort's account of *T. chatareus* (Fish. Indo-Austr. Archip., vii, 1936, p. 203, fig. 53, A-C). Rostro-dorsal profile slightly convex.

Anal base shorter than that of the two dorsals. Dorsal origin nearer caudal than snout and over tip of pectoral. Gill-rakers 0/1/5. Longest (third) dorsal spine (22.5 mm.) one-third of depth of body below it, and much shorter than head without snout. Fifth dorsal spine shorter than first ray.

Colour, in alcohol, yellowish on sides and below, dusky brown above. Six to seven conspicuous dark greyish-brown blotches along side between eye and upper caudal peduncle. First dorsal, pectorals and ventrals yellowish. Soft dorsal and anal mostly dark grey, their posterior rays pale yellowish and not blotched. Caudal dark grey.

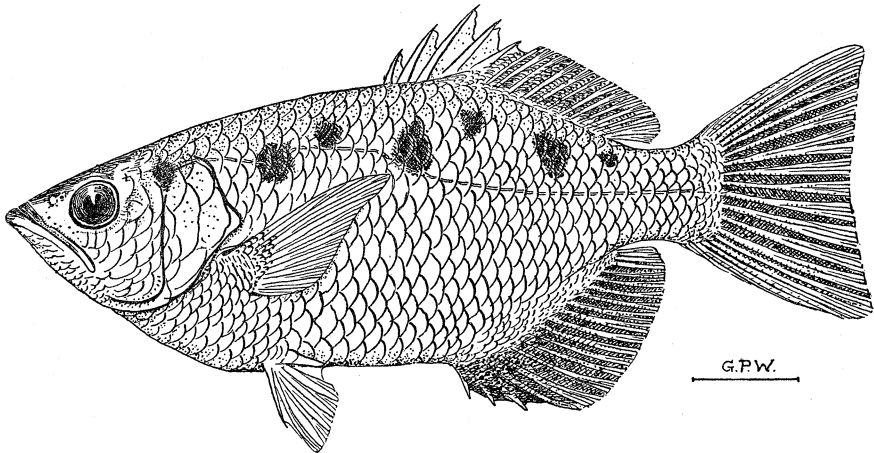


Figure 5.—*Toxotes dorsalis* Whitley. Holotype from Flinders River, Queensland.

G. P. Whitley del.

Described and figured from the holotype, 160 mm. in standard length, L.C.F. 200 mm., or 8 inches overall. Austr. Mus. regd. no. I. 13056.

Loc.—Flinders River, near Hughenden and Richmond, Queensland (Leichhardtian fluvifaunula); Mr. F. L. Berney, 1914.

This species ranges from north-western Queensland across the Northern Territory to north-western Australia, but there are probably subspecies, races or separate stocks in different localities. Typical Flinders River specimens have D. v, 13–14; A. iii, 17 (18); L. lat. 35 or 36 and Tr. 4–5/1/10–12, their scales being more numerous than in Northern Territory specimens.

Many paratypes are in the Australian Museum from the Unsley River near its junction with the Copperfield River, Queensland; and from Mataranka, Roper River, the Katherine River and the environs of Darwin in the Northern Territory. Waite's *Toxotes* sp. from "Mandurah, Western Australia" appears to represent another form and there are allied races or subspecies yet to be described from New Guinea.

Toxotes ulysses, sp. nov.

(Plate xvii, figure 3.)

Toxotes chatareus Steindachner, Denkschr. Akad. Wiss. Wien, xli, 1, 1879, p. 3 (Cleveland Bay, Queensland). *Id.* Klunzinger, Sitzb. Akad. Wiss. Wien, lxxx, 1, 1879, p. 364. Not *Coius chatareus* Ham.-Buch., 1822.

Toxotes sp. Paradise, Quart. Rev. Health Insp. Assoc. Austr., iv, 3, 1926, p. 48 and fig. (Queensland).

? *Toxotes chatereus* (sic) Carr, N. Qld. Nat., xv, 84, 1947, p. 4; Shipway, *ibid.*, xv, 85, 1947, p. 9 and fig. (Barron River, Queensland).

D. v, 12; A. iii, 16; P. 13. L. lat. 29. Tr. 4/1/10 to 4/1/3 on caudal peduncle. Predorsal sc., c. 22.

Head (72 mm.) 2·7, depth (95) 2·0 in standard length (196). Eye (15) 4·8, interorbital (27) 2·6, snout (23) 3·1, pectoral (57) 1·2 in head.

General characters as in preceding species. Rostrum-dorsal profile concave over eye, convex posteriorly. Anal base equal to base of two dorsals. Dorsal origin over extreme tip of pectoral. More than five gill-rakers. Longest (fourth) dorsal spine (c. 37 mm.) about 2½ in body below it and little exceeding postorbital. Fifth dorsal spine slightly longer than first dorsal ray. Caudal subequal to postorbital. Axillary ventral scale covered with smaller scales.

Colour, in alcohol, yellowish on sides and below, dusky-brown above. Five or six conspicuous dark greyish-brown blotches along sides between eye and upper part of caudal fin; of these, three blotches over the body are very large and round, larger than eye. First dorsal, pectorals and ventrals yellowish. Soft dorsal and caudal dirty yellowish. Anal grey, with lighter yellow tinge on spines and last rays. No conspicuous dark blotches on fins.

Described from the holotype, 196 mm. in standard length, L.C.F. 235 mm. or 9·6 inches overall. Austr. Mus. regd. no. IA. 2220.

Loc.—Townsville, Queensland, 8th October, 1924; Surgeon-Lieut. W. E. J. Paradise, R.A.N. Probably lives in brackish water and enters the Jardinean fluvifauna. In his diary Dr. Paradise noted: "*Toxotes* present in twos or fours at Townsville every visit until end of October. Then never seen (cool change). Present at Hinchinbrooke in September." The Australian Museum has smaller paratypes from Cardwell (no. I. 249) and Cairns (IB. 43), with D. v, 12–13; A. iii, 16–18; Sc. c. 26–29; Tr. 4/1/10; base of dorsals less than that of anal in young.

T. ulysseus is distinguished from *dorsalis*, its nearest ally, by its larger scales, different proportions, concavity in profile over eye and larger blotches on body. Dorsal and anal bases subequal in larger specimens.

Protoxotes, gen. nov.

Orthotype, *Toxotes lorentzi* Weber.

The most primitive of the Archer Fishes, the type-species has very small scales, about 46 in l. lat., and seven or eight scales between first dorsal spine and l. lat. The dorsal origin is further forward than in *Toxotes* and the l.lat. is not inflected anteriorly. No dark stripes or blotches on body.

Protoxotes lorentzi (Weber).

Toxotes lorentzi Weber, Notes Leyden Mus., xxxii, 1911, p. 232. Near Merauke, Papua.

Id. Weber and Beaufort, Fish. Indo-Austr. Archip., vii, 1936, p. 198, fig. 52 (refs.).

Two specimens, 5¼ to 5½ inches long, were collected by A. Morton in Yam Creek, Northern Territory, more than thirty years before Weber described the species from New Guinea. Austr. Mus. regd. nos. A. 4812–3.

New record for Australia.

Key to the Australian Archer Fishes.

- A. L. lat. about 46, running straight. Dorsal origin nearer snout than end of tail. D. v, 13-14. Head and body without blotches *Protoxotes* (gen. nov.) *lorentzi*.
- AA. L. lat. less than 40, with anterior inflection. Dorsal origin nearer end of tail than snout or mid-way. Head and body with dark bands or blotches.
 - B. Four dorsal spines *Toxotes jaculator*.
 - BB. Five dorsal spines.
 - C. L. lat. more than 30 *T. dorsalis*, sp. nov.
 - CC. L. lat. 30 or less.
 - D. Five bands across body variety from "Mandurah".
 - DD. Round blotches on body *T. ulysseus*, sp. nov.
 - BBB. Six dorsal spines (fide Castelnau) *T. carpentariensis*.

Family GOBIIDAE.

Rewa, gen. nov.

Orthotype, *Rewa hicklingi*, sp. nov.

A small river goby from Fiji which seems unlike anything known to me in literature or collections. Superficially it seems like *Bryanina* Fowler (Occ. Pap. Bish. Mus., ix, 1932, p. 10) from Tahiti and the Marquesas, and like *Gobius graeffei* Gunther, 1877, from Namusi, Fiji, which is an *Aboma*, but is different.

Snout bluntly rounded. Lips toothless, the upper one thick. Mouth small, reaching below front of eye, its cleft oblique. Tongue not notched. Teeth microscopic. No pit above opercle; papillae not apparent, no barbels or orbital cirrus. Chin rounded but not jutting.

Body rather elongate, compressed, more so posteriorly, where it is deep between dorsal and anal fins. Shoulder-girdle not lobed. Scales ctenoid. Trunk not naked anteriorly. No anal papilla.

First dorsal fin with five or six slender spines, well separated from second. Soft dorsal and anal free from the somewhat pointed caudal. Pectoral base muscular, the fin pointed, without free silk-like rays. Ventrals five-rayed, united as a short, circular, flat (not cup-shaped) sucking-disc, adnate to abdomen anteriorly.

Rewa hicklingi, sp. nov.

D. v or vi/i, 10; A. 10; Sc. c. 33. Tr. 9 between soft dorsal and anal. About 10 predorsal scales.

General characters as defined for genus.

Colour, pale green with dark chromatophores crossing sides posteriorly; two dark marks before base of tail. Two median dark lines from vent converge and join below caudal peduncle. A row of spaced blackish dots each side of second dorsal fin. A dark internal smudge near beginning and end of anal fin. Groups of black dots on snout, cranium and elsewhere. No bands on head or body and no dark bases to paired fins.

Holotype (Austr. Mus. regd. no. IB. 1949) and seven paratypes (IB. 1950-1951), up to 32 mm. in total length.

Loc.—*Rewa* River, Fiji, 2nd and 3rd July, 1947. Collected by Dr. C. F. Hickling, Fisheries Adviser to the Colonial Office, London, after whom I have pleasure in naming the species.

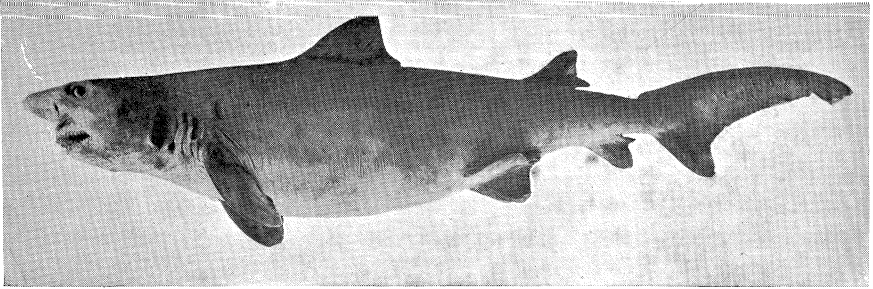
EXPLANATION OF PLATE XVII.

Figure 1.—*Odontaspis herbsti* Whitley. Lateral view of holotype from off Gabo Island, New South Wales.

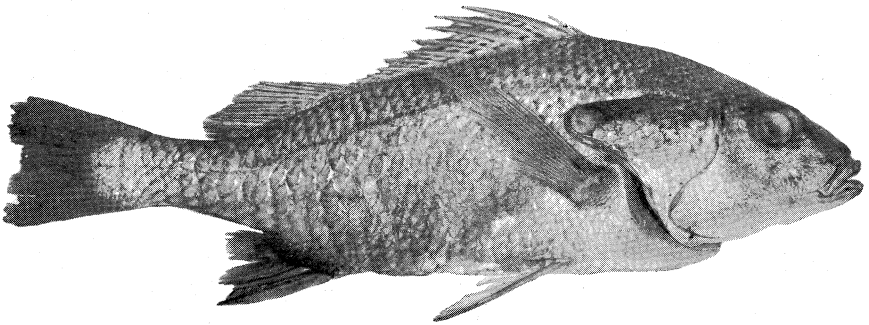
Figure 2.—*Pomadasys auritus* (Cuv. & Val.). A specimen from Newcastle, New South Wales.

Figure 3.—*Toxotes ulysses* Whitley. Holotype from Townsville, Queensland.

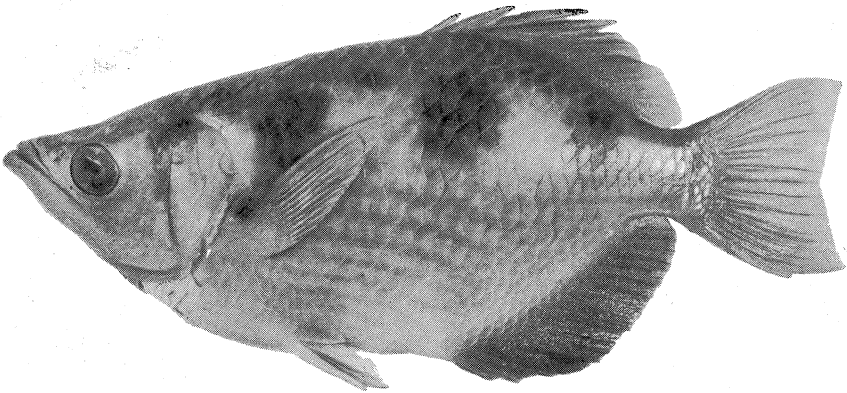
Photos, Howard Hughes.



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