OBSERVATIONS ON SOME TASMANIAN FISHES: PART X

By

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(With three text figures)

ABSTRACT

Two species, *Lissocampus caudalis* Waite and Hale, 1921, and *siphonognathus argyrophanes* Richardson, 1858, are added to the Tasmanian faunal list: the brood pouch of, and dermal tentacles in, the first-named species are now first described and figured. Miscellaneous observations are made upon the following: *Parascyllium multimaculatum* Scott, 1935 (description of second recorded individual, a virtual topotype; comparison with holotype; figure of oral region): *Callorhynchus milii* Bory de St. Vincent, 1823 (egg cases: distribution of a large sample along a beach, specification of size and coloration in a sample of this population): *Muraenichthys tasmaniensis* McCulloch, 1911 (proportions, coloration, incidental correction to earlier key): *Macrorhamphus scolopax* (Linné), 1758 (occurrence in Tasmania confirmed; account of specimen): *Notopogon endeavouri* Mohr, 1937 (general account of a local example, with figure): *Syngnathus curtirostris* Castelnau, 1872 (position on local list): *Aldrichetta forsteri* (Valenciennes), 1836 (sample with two size classes; contrasted with unimodal sample of *Arripis trutta* (Bloch and Schneider), 1801 in same haul). General surveys are made of the position of Tasmania of the families Macrorhamphosidae and Syngnathidae; keys to the local representatives are provided for these and for Orectolobidae, Mugilidae, Siphonognathidae.

In view of the importance attachable to the Handbook of Australian Fishes (Munro 1956+), now in course of serial publication through the monthly *Fisheries Newsletter,* our material has been systematically checked against the Handbook specifications, and attention has been called to any divergences met with.

INTRODUCTION

This paper follows the general plan of earlier contributions under the same title. Among established conventions are these: standard length, total length are denoted by *Ls, Lt,* respectively; unless otherwise stated, linear dimensions are regularly given in millimetres, the name of the unit being customarily omitted; locality specifications include county name. Conventions for the presentation of synonymy follow in general the recommendations of Schenk & McMasters (1956). Symbols here introduced in connexion with proportional dimensions are *TLs,* thousandths of standard length; *TLt* thousandths of total length: similarly for hundredths, *HLs, HLt* are available.

Basic data is at all points compared with that presented in the Handbook of Australian Fishes. Comprehensive surveys of the Australian fish fauna as a whole are few: Macleay's Descriptive Catalogue of the Fishes of Australia (1881) with Supplement (1886), based largely on Günther's British Museum Catalogues, and giving generic and specific diagnoses, with geographical distribution; McCulloch's (1929) A Check-List of the Fishes Recorded from Australia; The Fishes of Australia (Whitley, 1940), of which only the first volume (covering elasmobranchs, holocephalans, dipnoans, cyclostomes, cephalochordates; with illustrations) has so far appeared; the Handbook of Australian Fishes (Munro 1956 +), now in course of serial publication through the monthly *Fisheries Newsletter,* issued by the Department of Primary Industries, Canberra, which gives specific diagnoses, accompanied by figures. In view of the importance of Mr. I. S. Munro's new work, first, as the most up-to-date survey of our present knowledge in this field, secondly, as a probable standard of reference over a considerable period, it has been thought expedient to check our material, item by item, against the Handbook specifications, and to call attention to any divergences encountered—perhaps the most significant contribution occurring in the Syngnathidae, where an examination of a fair amount of material has led, in a number of instances, to some extension in range of meristic and other metrical criteria.

Family ORECTOLOBIDAE

Five species recorded from Tasmania: (1) *Orectolobus* Bonaparte, 1843, (*a*) *O. maculatus* (Bonnaterre), 1788, recorded from all Australian States; (2) *Parascyllium* Gill 1862, (*b*) *P. variolatum* (Duméril), 1853, Victoria, South Australia, southern Western Australia, Tasmania, (*c*) *P. collare* Ramsay and Ogilby, 1888, New South Wales, Victoria, Tasmania, (*d*) *P. ferrugineum* McCulloch, 1911, Victoria, South Australia, Tasmania—the Tasmanian record by Olsen (1958) postdates McCulloch (1929), Whitley (1940), and Munro (1956), (e) *P. multimaculatum* Scott, 1935, Tasmania.

KEY TO ORECTOLOBIDAE RECORDED FROM TASMANIA

1 Origin of anal behind origin of second dorsal (anal usually wholly behind second dorsal; continuous or subcontinuous with caudal). Spiracle in wide oblique slit .... *Orectolobus*
Body broad, flattened. Anterior teeth long, sharply pointed. About seven weed-like appendages on either side of head. Brown: large spots, with conspicuous white annulus, on body; light spots on all, or most, fins .... *O. maculatatus*

Origin of anal in advance of origin of second dorsal (anal just in advance of, or partly, under second dorsal; separated from caudal by interval exceeding anal base). Spiracle not in wide oblique slit; minute .... *Parascyllium*: 2

2 Origin of first dorsal behind middle of total length. Posterior margin of first dorsal excavate .... *P. multimaculatum*

Origin of first dorsal not behind middle of total length. Posterior margin of first dorsal rounded or truncate 3

Body with numerous white spots. All, or most, fins with several blackish blotches. A well-defined dark nuchal band with numerous (scores of) white spots .... *P. variolatum*

3 Body without numerous white spots, but with fairly evenly spaced large brown spots. All, or most, fins with one or several brown spots. An indistinct darkish nuchal band, without numerous white spots, but with a small number of (about three) dark spots on each side .... *P. ferrugineum*

Genus **PARASCYLLIUM** Gill, 1862

PARASCYLLIUM MULTIMACULATUM Scott, 1935

(Text figure 1.)

Parascyllium multimaculatum Scott, 1935, *Pap. Proc. Roy. Soc. Tasm.*, 1934: 63, pl. v, fig. 1. Type locality: Tamar Heads [Devon/Dorset], Tasmania.

Parascyllium multimaculatum Scott. Whitley, 1940, Fishes of Aust., I: 77, fig. 64. Munro, 1956, Handbk Aust. Fish.: 4, fig. 22 [instalment No. 1 in *Fisheries Newsletter*, XV, 7, July 1956: 16, fig. 22].

Virtual topotype.—The species appears to have remained unrecognized for a quarter of a century: considerable interest is thus attached to the capture of a second individual, netted, near rocks, at Green's Beach, Devon, by Mr. H. L. von See on 10th April, 1957 (Q.V. Mus. Reg. No. 1957.5.16). This specimen is a virtual topotype—Green's Beach is the sea-beach beginning immediately at, and extending several miles westward from, the western bank of the Tamar (type locality: Tamar Heads): in some sharks, it has been found, the distribution is quite limited, and this may obtain here. It is of the same sex as the holotype (male), which it approaches very closely, both in dimensions (see Table 1) and in color pattern. In spirit, gutted.

Dimensions.—Some comparative dimensions of the two sharks are set out (in the first line in mm, elsewhere in thousandths of total length) in Table I; and some additional dimensions (in mm) of the present example are recorded in Table II.

Mouth.—The only published figure of the species (Scott, 1935: pl. v, fig. 1) shows the holotype in lateral aspect. The mouth was, unfortunately, not illustrated, and, the specimen being mounted, the omission could not subsequently be satisfactorily remedied: the ventral surface of the head of the Green's Beach individual is shown in text-fig. 1.

TABLE I

Parascyllium multimaculatum Scott, 1935. Dimensions of holotype male, Tamar Heads, Devon/Dorset, Tasmania, and male from Green's Beach, Devon, Tasmania. Actual dimensions in millimetres in first line: all other dimensions expressed as thousandths of total length.

Dimension	Holotype		Green's Beach Specimen	
Total length (mm)	710		713.5	....
Head: length to first gillslit; to fifth gillslit	101	157	....	158
Eye: interorbital	18	42	18	44
Snout: preoral length	48	13	44	14
Spiracle: distance from eye; interspiracular distance	14	68	12	65
Nostril: internarial distance	25		27	
Length (chord) of gillslit: first; second	8	10	10	12
Length (chord) of gillslit: third; fourth	11	11	13	13
Length (chord) of gillslit: fifth	37		29	
Pectoral: length to origin; length of fin	142	86	141	88
Pectoral: length of base; total spread	46	273	48	275
First dorsal: length to origin; base	507	56	504	56
First dorsal: vertical height	68		68	
Interdorsal	142		140	
Second dorsal: length to origin; base	706	56	708	56
Second dorsal: vertical height	59		60	
Pelvic: length to origin; length of inner border	372	94	367	95
Clasper: medial length of main cartilage	82		79	
Anal: length to origin; base	638	65	641	65
Anal: vertical height	30		34	
Caudal: length to origin; inferior lobe; superior lobe	804	820	804	813
Caudal: maximum depth	45		47	
Depth: at origin of first dorsal; at origin of second dorsal	....	37	50	39
Depth: maximum	91		....	
Width: at origin of first dorsal	49		50	

TABLE II

Parascyllium multimaculatum Scott, 1935. Additional dimensions (mm) of virtual topotype male, supplementing data in Table I.

Dimension	mm	
Mouth, width: cleft; between outer labial borders	34	35
Mouth, length of level of rictus	15	
Pectoral, direct length from tip to: superior insertion; inferior insertion	61	72
Pectoral, maximum width (normal to longitudinal axis)	51	
First dorsal, length (direct) of border: anterior; posterior	61	36
First dorsal, length (direct) of border: inferior	22	
Second dorsal, length (direct) of border: anterior; posterior	60	31
Second dorsal, length (direct) of border: inferior	18	
Anal, length (direct) of border: anterior; external	47	35
Anal, length (direct) of border: internal	8	
Caudal: depth at notch; maximum depth caudad of notch	15	24.5
Caudal, distance behind inferior origin to maximum depth	46	
Vent: length to enterior border; anteroposterior length	28.5	7
Nostril, length to: anterior border; posterior border of nasal cavity	7	12
Nostril, length to tip of nasal cirrus	14	

Family CALLORHYNCHIDAE.

Meuschen's genus was spelt *Callorynchus*: this is generally amended to conform to the standard spelling of *rhynchos*, a beak; with the family name adjusted correspondingly.

Genus **CALLORHYNCHUS** Meuschen, 1781

CALLORHYNCHUS MILLII Bory de St. Vincent, 1823

Callorynchus milii Bory de St. Vincent, 1823, Dict. Class. d'Hist. Nat., iii: 62, pl.v. Type locality: 'Cotes occidentales de la Nouvelle Hollande'.

Egg cases; abundance.—While not exactly rare, the characteristic egg cases are certainly not common objects on most Tasmanian beaches. In May, 1959 the writer found empty egg cases were abundant, over a stretch of some seven-tenths of a mile, at Beauty Point, Devon, on the River Tamar, approximately eight miles from the sea. Empty cases collected on 16th May on 300 yards of beach numbered 410. The next day the search was extended upstream for 300 yards (at which point swampy land was encountered, making collecting impracticable) and downstream for 600 yards—counts being recorded at 25-yard intervals: also, on two subsequent days the original 300 yards was worked over. In all the search yielded 994 specimens. The results are summarized in Table III: it will be observed that the highest concentration, 1.09 eggs per linear yard of beach-line, falls sharply upstream; the decrease seaward being much more gradual, with the plot of abundance against distance here virtually linear.

All the specimens were picked up on a rather (at times decidedly) narrow sandy strip, riverward from which the beach extended as a flat, in part rock-strewn, but chiefly consisting largely or wholly of mud, for a distance (greatest near the middle of the stretch examined) of up to several hundred yards. I was informed egg cases are to be found in this region in abundance at almost any time: on a subsequent visit to Beauty Point I again observed large numbers here. Some residents use them as garden manure. It would seen probable that this species—the females of which have been reported to carry a pair of eggs protruding from the oviducts for some time before laying them (Whitley, 1940: 237)—breeds freely in close proximity to the site at which the material was secured.

Egg cases; size.—Five measurements carried out on 50 examples taken at random are specified in Table IV. Total length is the largest measurement, between parallels, including the fine terminal filaments: hard length omits the filaments (finger pressed lightly against end to determine measurable terminal point): formal length is taken, between parallels, from level of inner ends of paired slits (usually some 2 cm long), found between the distal portion of the longer pipe and the adjoining float, to the further end of the oval portion of the capsule, as defined by a change in color where the primary inflation ends rather abruptly.

Three points of interest brought out by the table may be noted. (*a*) For all measurements the coefficient of variation is, to nearest integer, 7—this conforms to expectation based on magnitudes encountered in related fields (see Simpson and Roe, 1939; Haldane, 1952; Scott, 1953). (*b*) The mean value, for the three modes of measuring the length of the percentage of entries, occurring within the range $\bar{x} \pm \sigma$ is 66, a good approximation to the 68.3 of the normal distribution. (*c*) The values of range σ do not differ greatly from those expected on a normal distribution (for n = 50: mean 4.50; P = 0.05, 5.64; P = 0.01, 6.23).

An examination of the correlation coefficients for the various measurements in relevant pairs shows: a closer correlation of width of egg capsule with hard length ($r = 0.26$) and with formal length,

i.e., hard length of capsule plus most of longer process (0.24), than with total length (0.18); a much greater correlation of total length with hard length (0.94) than with formal length (0.62); a noticeably more marked correlation of total width with width of egg capsule (0.52) and with hard length (0.51) than with either total length (0.40) or formal lengh (0.31).

Egg cases; color.—The color varies considerably in different specimens and as often as not differs in parts of the one example: the range is mainly from black through blackish brown, brown, slaty green, olivaceous, dark green, to lightish green, greenish amber, and amber. The egg capsule with its associated processes is commonly darker than all, and is almost always darker than some part of, the float. Often a dark band flanks the capsule and at least the proximal portion of the processes, usually being separated from the margins of the longer pipe and from the one-third of the capsule at the base of the shorter pipe by a narrow lighter-colored or less-pigmented strip. The hair-like covering that extends over the whole of one surface (save for about two-thirds of the capsule at its end adjacent to the longer process; this region being almost always nearly or completely naked) may be lighter in color than its substrate.

Family ECHELIDAE

In a key to the Echelidae recorded from Tasmania (*Muraenichthys breviceps* Günther, 1876, M. *australis* Macleay, 1881, *M. tasmaniensis* McCulloch, 1911) given in an earlier contribution in this series (1953: 146) two entries are unfortunately transposed. The specification 'Interval between dorsal and anal origins about 1 in head' given for *M. australis* belongs to *M. tasmaniensis* and the correlate given for *M. tasmaniensis* belongs to *M. australis*. (That an error has occurred is, indeed, directly deducible from the text by a consideration of the two entries immediately following the reference letters B, BB).

Genus **MURAENICHTHYS** Bleeker, 1865

MURAENICHTHYS TASMANIENSIS McCulloch, 1911

Muraenichthys tasmaniensis McCulloch, 1911, Zool. Res. Endeavour, 1: 19, fig. 5. Type locality: Oyster Bay [Pembroke], Tasmania.

Musaenichthys tasmaniensis McCulloch. Munro, 1957, Handbk Aust. Fish.: 46, fig. 323 [instalment No. 11 in *Fisheries Newsletter*, XVI, 5, May, 1957: 16, fig. 46].

TABLE III

Callorhynchus millii Bory de St. Vincent, 1823. Numbers of egg cases collected on beach, Beauty Point, Devon, Tasmania, on stated dates in specified regions.

Regions: In succession seaward	Length of region: yards	Number of egg cases collected: May, 1959 No entry denotes no collection made				Number of eggs per linear yard collected on 17th
		16th	17th	18th	20th	
A	150	....	24	....	....	0.16
B	150	....	41	....	....	0.27
C	300	410	79	57	29	0.26
D	150	....	163	....	....	1.09
E	150	....	112	....	....	0.75
F	150	....	64	....	....	0.43
G	150	....	15	....	....	0.10
Totals and mean	1200	(410)	498	(57)	(29)	0.42

TABLE IV

Callorhynchus milii Bory de St. Vincent, 1823. Dimensions (mm) of 50 egg cases collected on beach at Beauty Point, Devon, Tasmania, May, 1959. For specification of dimensions see text.

Dimension	Range	Mean	Standard deviation	Coefficient of variation	Percentage of entries within the range $\bar{x} \pm \sigma$	Range/σ
Total length	202-285	239.9 ± 2.5	17.5 ± 1.8	7.5 ± 0.8	64	4.74
Hard length	181-247	215.4 ± 2.1	14.9 ± 1.5	7.1 ± 0.7	56	4.37
Formal length	104-147	129.0 ± 1.3	9.2 ± 0.9	6.9 ± 0.7	78	4.69
Maximum width including float	75-116	98.4 ± 1.0	7.1 ± 0.7	7.2 ± 0.7	78	5.81
Width of egg capsule	31-45	38.2 ± 0.4	2.6 ± 0.3	6.7 ± 0.7	76	5.47

Specimen from Deviot.—This fish is not frequently met with, and I know of no data on Tasmanian material other than the holotype, total length 170: the species is, however, now recorded also from Western Australia. A specimen, total length 198, from the Tamar River at Deviot, Devon, found dead and partly dried out on a rock by Miss S. Ashton, was received at the Queen Victoria Museum Launceston on 8th August, 1958.

Some proportions (TLt).—Length to: vent 414, origin of anal 422, origin of dorsal 480. Length of: eye 4.0, snout 15, head 81, mouth cleft 27. Interorbital 8.6. Depth (in parentheses width), as preserved, at: back of eye 11 (10), middle of branchial sac 23 (13), gill opening 21 (15), vent 20 (20). The fins were sunken into the mesial grooves and their height was not measurable.

Schmidt's index.—In the key mentioned above the entry for this species of Schmidt's index, $S = \frac{a - d}{t} \times 100$, where a = length to vent, d length to dorsal origin, t = total length, is based, as there noted, on the holotype only. That value is —7.6; in the present specimen S = —6.6: both entries contrast well with the value for the type of *M. australis* (—2); in the other Tasmanian species, *M. breviceps*, S = +16-23.

Coloration.—In spite of its rather dried state the specimen yields some useful notes on coloration. There is a sharp line of demarcation on trunk and tail between the upper half, which is yellow, thickly studded with small brown chromatophores, and the lower half, which is clear pale yellow: ventral surface darker mesially than elsewhere. Head darker than body: whole of its dorsal surface dark, somewhat reddish brown deepest (and least red) on snout: lateral surface to level of back of eye dark brown (about concolorous with dorsum of snout), behind eye generally somewhat lighter, a state of affairs partly accounted for by the fact that the rather densely set small brown chromatophores that extend behind eye for about an eye-diameter fade out on most of rest of side of head (the chromatophores on lower jaw extend further caudad than those on cheek): ventral surface lighter than lateral. Branchial basket chiefly somewhat reddish brown.

Family MACRORHAMPHOSIDAE.

Though the group is a small one, with only about half a dozen Australian representatives, earlier uncertainties regarding distribution and continuing developments in taxonomy have combined to keep the overall position of the family on Tasmanian lists in a continual state of flux: and it may well be that the last systematic word has not yet been said. The following survey accepts as basis for discussion the taxonomic position arrived at by Mohr (1937) in her *Dana* revision. This differs from what may perhaps be regarded as the currently accepted Australian view notably in three respects: first, the local *Macrorhamphosus elevatus* Waite is subsumed by Mohr in the cosmopolitan *M. scolopax* (Linné); secondly, she identifies as *M. velitaris* (Pallas) a fish having (as in the original description) 25 anal rays, whereas Weber & De Beaufort (1922), Munro (1958), and others identify it with the fish, with 18 anal rays, described by Gilbert as *M. hawaiensis*, reproducing Gilbert's figure (1905); thirdly, two species of *Centiscops* are recognized, instead of one. It is, indeed, by no means certain that Mohr's revision represents a final tidying-up—however, with the foregoing three points in mind, her taxonomic framework can be, if it is thought desirable, readily transformed in terms of local conventions.

Species entering the discussion are: (*a*) *Macrorhamphosus* Lacépède, 1803 (the original spelling, *Macroramphosus*, is retained by McCulloch (1929) and by Whitley and Allan (1958), but is by most authors amended as here: Mohr (1937:30) credits *Macrorhamphosus* to Regan, 1914 *a*); (1) *M. scolopax* (Linné), 1758; (2) *M. velitaris* Pallas (1770); (3) *M. gracilis* (Lowe), 1839; (4) *M. elevatus* Waite, 1899 (originally published as a variety, *M. scolopax* Linnaeus, var. *elevatus* Waite); (5) *M. gallinago* Ogilby, 1908; (6) *M. lancifer* Ogilby, 1910; (7) *M. robustus* Ogilby, 1910; (8) *M. mollieri* Whitley, 1930: (b) *Centriscops* Gill, 1862; (9) *C. humerosus* (Richardson), 1864; (10) *C. obliquus* Waite, 1911 (originally published as a variety, *C. humerosus* Richardson, var. *obliquus* Waite: Mohr recognizes, in addition to the typical subspecies, a second, *C. o. maculatus* Pozzi and Bordalé, 1936): (*c*) *Notopogon* Regan, 1914; (11) *N. lilliei* Regan, 1914; (12) *N. endeavouri* Mohr, 1937.

The changing composition over some fourscore years of the Tasmanian list is outlined below—the name by which a species was catalogued by the author concerned being followed by its equivalent in Mohr's revision (species names specified by the serial numbers of the preceding paragraph).

(A).—Allport MS: (1) (as *Centriscus scolopax*) = M (1). Morton Allport's list is the first known catalogue of Tasmanian fishes: unpublished MS in this Society's library.

(B).—Johnston, 1883: (1) (as *Centriscus scolopax*) = M (1). Though actually listing (1)—*fide Allport*—Johnston observes, 'It is questionable whether the Tasmanian species may not be *C. humerosus* Rich. I have not yet examined any local specimens.'

(C).—Johnton, 1891: (1) (as *Centriscus scolopax*) = M (1). Between (B) and (C) he had handled an example, 100 long, from Port Sorell [Devon], had received reliable reports of other specimens caught near the Leven River [Devon], and had written (1885: 254) 'All my doubts about its existence in Tasmania are now set at rest.'

(D).—McCulloch, 1911: (4) = M (1): the determination of the M equivalent of (9) calls for discussion, Mohr observing, 'McCulloch lumps together several species and one cannot satisfactorily determine which of his 18 animals belong to the several species and localities: both the figured examples certainly do not belong, the others probably do not belong, to *Centriscops humerosus* Rich . . . ' Of the figured specimens, one (fig. 9: 25), the smallest in the whole collection, 70 long, was secured, as is found by collating (D) and (E), 'Off Storm Bay, Tasmania'; the other, the largest

in the series, 265 long (length given later, in (E), as 270), which is the subject of pl. v, came from 'Sixty miles south of Cape Everard, Victoria, 60-70 fathoms'. These two individuals were re-described in (E) ,being there referred to (11). By including the entry for (D) without qualification in her synonymy of (12), Mohr may be assumed to have accepted both these specimens as belonging to her species: however, an earlier entry in her synonymy, citing (D), shows some confusion, since parts of two separate illustration-references are given, 'pl. v, fig. 9', while (contrary to her usual practice) only one length is noted. We may certaily write (9) (part.) = M (12); and may suggest (9) = M (12) + M (11) ? + M (9) ?? The material dealt with in (D) is of course only that in the *Endeavour* collections, and does not constitute an Australian or Tasmanian family list.

(E).—McCulloch, 1914: (9) = M (10), (11) = M (12). No Tasmanian record for (9): (11) is the same material identified in (D) as (9).

(F).—Lord, 1923: (4) = M (1), (9) = M (10) (probably), (11) = M (12). See comments on (G).

(G).—Lord & Scott, 1924: (4) = M (1), (9) = M (10), (11) = M (12). No actual Tasmanian records of any of the three species are given—simply references: (4) to Waite (1899:59), (9) to McCulloch (1914:90), (11) to McCulloch (1914:91). It seems possible that Lord (1923), who in this paper does not cite references (or records), wrongly picked up (9) as Tasmanian from (D)—what was there given as (9) really being a *Notopogon*: re-identified in (E) as (11), now identifiable as (12)—and missed the re-identification in (E), and that in the compilation of Lord & Scott (in which the Fishes were handled by Lord) references were just formally added to the pure name-catalogue (F). It is, of course, not impossible that (9) may occur here, but I am much inclined to believe the entry in Lord & Scott is a formal one unsupported by any definite record.

(H).—McCulloch, 1929: (2) = M (2), (3) = M (3) (though this species is not regarded by Mohr as Australian), (4) (with (5), (6), (7) as synonyms) = M (1) (with same species as synonyms), (9) (with (10), listed as a variety, as a synonym) = M (9) + M (10), (11) = (12). The Check List records as Tasmanian (4) = M (1), (11) = M (12).

(I).—Mohr (1937) gives (1) (with (4), (5), (6), (7), (8) as synonyms), (9), (10), (11), (12). Of these she would apparently regard as Tasmanian (1) (British Museum specimen, 110 long, from Tasmania from Morton 'Allpoch' = Allport, noted), (3), (12).

(J).—Munro, 1958: (3) = M (3), (4) = M (1), (9) = M (9) + M (10), M 11—as regards record, this entry = M (11) + M (12); but the figures (two) both numbered 657, on p. 94—reproductions from D, fig. 9, p. 25, and pl. v—refer to (12). The Handbook gives as Tasmanian (11); curiously omitting (4) = M (1).

(K).—Whitley and Allan, 1958: (4) (with (5), (6), (7) as synonyms) = M (1) (with same species as synonyms), (11) = M (11), (12) = M (12).

The standing on the Tasmanian faunal list of the 12 species listed above may be summarized thus:

The five species (1), (4), (5), (6), (7) appear clearly to represent a single form, regarded by Mohr as (1), by most Australian authors as (4). Though Tasmania is omitted from the Handbook's localities, the species undoubtedly occurs here—Tasmanian specimens noted, see above, by Johnston (1885), (D), and by Mohr (1937) (I), the last-noted individual probably being that mentioned by Regan (1914 *b*: 19): two local examples are discussed below.

Species (2) is not reported from Tasmania by Australian authors generally. Mohr (1937: 34) lists a specimen from 'zwischen Tasmanian und Australien', but the latitude and longitude cited (37° 05′ S., 159° 05′ E.) locate a point just off the New South Wales coast, near Eden: in her distribution chart (fig. 31: 61) she shows it as occurring along the Island's north coast, and eastward of its east coast (flanking here the coastal distribution of (1)).

Species (3) and (8): no Tasmanian records (unless, indeed, (8) is, as Mohr holds, a synonym of (1)).

The species entered in the local lists (F) and (G) as (9) is probably (10); but reasons for doubting that an actual Tasmanian record is involved have been given above. Neither (8) nor (9) is regarded as Tasmanian by Australian authors—most of whom recognize only (9)— or by Mohr.

(K) gives for (11) New Zealand, Tasmania, South and south-western Australia. Since (E), (F), (G), (H), (J) do not distinguish between (11) and (12), it is not possible to say whether their entries refer solely to 12 (which is the one species to which the basic reference, (E), undoubtedly relates) or to both (12) and (11).

The Tasmanian occurrence of (12) is guaranteed neither by (E) and its derivative references nor by (I). However, Whitley and Allan (1958:71) state, 'Off Tasman Head a trawler in March, 1914 caught 17,920 specimens of this species . . . their number was calculated by bucketsful and these buglers comprised the whole catch . . .'. A specimen from our east coast is dealt with below.

KEY TO MACRORHAMPHOSIDAE THAT OCCUR, OR HAVE BEEN THOUGHT TO OCCUR, IN TASMANIA

1	Lateral line absent. No patch of bristles on head or nape	2
	Lateral line present. A patch of bristles on head or nape (at any rate in adult)	5
2	First and second dorsals continuous, or subcontinuous. Head and body with small non-contiguous spicular scales, each with transverse ridge or spine	3
	First and second dorsals separate; the interdorsal ≥ base of second dorsal. Head and body with more or less contiguous scales, in each of which is embedded a keeled rhombic bony plate	4

Second dorsal spine straight. Supraorbital rim feebly denticulate. Less humped; height of dorsal profile above front of pectoral base $\doteq$ 2/3 snout. Unicolorous .... *C. humerosus*

3 Second dorsal spine slightly proconvex. Supraorbital rim strongly denticulate. More humped; height of dorsal profile above front of pectoral base $\doteq$ snout. With 5-6 oblique bars (*C. o. obliquus*) or with 20-60 dark spots (*C. o. maculatus*) .... *C. obliquus*

As these species are understood by Mohr (1937), *Macrorhamphosus scolopax* (of which, in the view of most Australian authors, *M. elevatus* is the Australian correlate) and *M. velitaris* are separable thus:

Anal rays $\leq$ 19. Diameter of eye $>$ postorbital portion of head .... *M. scolopax*

Anal rays $=$ 25. Diameter of eye $<$ postorbital portion of head .... *M. velitaris*

4 As these species are understood by Munro (1958), *Macrorhamphosus elevatus* (which Mohr synonymizes with *M. scolopax*) and *M. velitaris* are separable thus:

Origin of second dorsal spine nearer to caudal base than to head. Body deeper. Third dorsal spine usually $>$ 3 in second dorsal spine. Brick-red above, violet bronze below .... *M. elevatus*

Origin of second dorsal spine nearer to head than to caudal base. Body shallower. Third dorsal spine usually $<$ 3 in second dorsal spine. Mostly silvery, darkish on top of head and on back .... *M. velitaris*

Membrane of spinous dorsal weak, naked. Second dorsal spine inserted behind middle of total length without head; its length usually $<$ 6 in total length. Bristle-patch extending to, or caudad of, level of opercular margin. Head $>$ height of body. Of height of body at ventral origin, $\doteq$ ½ above body-axis .... *N. lilliei*

5 Membrane of spinous dorsal firm, scaly. Second dorsal spine inserted in advance of middle of total length without head; its length usually $>$ 6 in total length. Bristle-patch not extending to level of opercular margin. Head $\leq$ height of body. Of height of body at ventral origin, $\doteq$ 3/5 above body-axis .... *N. endeavouri*

Genus **MACRORHAMPHOSUS** Lacépède, 1803

MACRORHAMPHOSUS SCOLOPAX Linné, 1758

Centriscus scolopax Linné, 1758, Syst. Nat., ed. 1: 329. Type locality: North Atlantic and Mediteranean.

Centriscus scolopax Linné. Allport MS. Johnston, 1883, *Pap. Proc. Roy. Soc. Tasm.*, 1882: 123; 1885, ibid., 1884: 254; 1891, ibid., 1890: 34.

Macrorhamphosus scolopax Linnaeus var. *elevatus* Waite, 1899, *Mem. Aust. Mus.* iv: 59, pl. vii, fig. 1.

Macrorhamphosus gallinago Ogilby, 1908, *Proc. Roy. Soc. Qld* xxi: 92.

Macrorhamphosus lancifer Ogilby, 1910, New Fish. Qld Coast: 90.

Macrorhamphosus robustus Ogilby, 1910, New Fish. Qld Coast: 91.

Macrorhamphosus elevatus Waite. McCulloch, 1911, Zool. Res. Endeavour, I, 1: 23, text-fig. 8. Regan, 1914, *Ann. Mag. Nat. Hist.* (8), viii, 73: 17. Lord, 1923, *Pap. Proc. Roy. Soc. Tasm.*, 1922: 65. Lord and Scott, 1924, Synop. Vert. Anim. Tasm.: 38, 8. Munro, 1958, Handbk Aust. Fish.: 95, fig. 653 [instalment No. 23 in *Fisheries Newsletter*, xvii, 5, May, 1958: 19, fig. 653].

Macroramphosus elevatus Waite. McCulloch, 1929, *Mem. Aust. Mus.*, v, i: 83. Whitley and Allan, 1958, The Sea-Horse and its Relatives: 70, colored pl., fig. 5; text-fig. 21, No. 1.

Macrorhamphosus scolopax Linné. Mohr, 1937, Dana-Report No. 13: 36.

Tasmanian status.—The right of this species to appear in the Tasmanian list (from which it is omitted in the Handbook) has been discussed above.

Two recent occurences.—Two examples have recently passed through my hands: (*a*) *Ls* 99.8, *Lt* 118.6, caught 21st May, 1954, in 6-7 fathoms (Munro (1958:93) gives range as 23-84 fathoms) on gritty bottom in D'Entrecasteaux Channel, by Mr. M. Lynch and forwarded by Mr. E. Andrews, Senior Inspector of Fisheries; (*b*) *Ls* 75.8, *Lt* 88.2, from Bridport, Dorset, submitted for identification to the Queen Victoria Museum, Launceston, by Scottsdale High School, through Mr. J. R. Skemp.

As the following data (all values in this paragraph in *TLs;* smaller individual first) show, these two examples agree tolerably well in many of their proportions. Length to origin of: pectoral 479, 509; first dorsal 792, 715; second dorsal 918, 881; ventral 752, 731; anal 784, 799. Length of: eye 103, 95; snout 309, 327; head 501, 496. Length to vent (middle) 731, 769. In this, as in other species of the genus, however, striking variations in outline may be exhibited by individuals of different, and even by those of comparable, size; and in the present specimens (whose total lengths are in the ratio 1:1.34) some noticeable differences in relative depth are found: depth at back of head is in (*b*) greater than depth at vent (302, 290), in (*a*) less (282, 231): depth at front of eye is in (*b*) rather greater than at second dorsal origin dorsal origin (157, 153), in (*a*) less (141, 191). Associated with these variations in depth are differences of slope in various sections of the contour (especially behind the dorsal and/or anal fins) which may result in striking differences in the anteroposterior extension of the unpaired fin bases (though these bases, measured directly from first to last ray, are of closely comparable magnitude). Thus the base, between parallels, of first dorsal in the two individuals is 49, 85, of second dorsal 21, 43; the anal however exhibiting no significant difference (135, 131).

In *TLs*, length of second dorsal spine is 203 (*b*), 350 (*a*). Length of this spine in (*b*) is 2.7 in head [this is well outside range given by Munro (1958) 'from 1.8 in head to longer than head', though no injury is apparent], in (*a*) 1.3: in Johnston's Port Sorell specimen 1.2.

Genus **NOTOPOGON** Regan, 1914

NOTOPOGON ENDEAVOURI Mohr, 1937

(Text-fig. 2)

Notopogon endeavouri Mohr, 1937. Dana-Report No. 13: Revision der Centriscidae (Acanthopterygii Centrisciformes): 49, text-fig. 23.

[?] *Centriscops humerosus* Richardson. Waite, 1911, *Rec. Cant. Mus.*, 1, 3: 169 [*non* Richardson].

Centriscops humerosus Richardson. McCulloch, 1911 [*partim*], Zool. Res. Endeavour, I, i: 24 [*partim*] pl. v and fig. 9 [*non* Richardson].

Notopogon lilliei Regan, 1914 [*partim*], *Ann. Mag. Nat. Hist.* (8), xii: 18, 20.

Notopogon lilliei Regan. Regan, 1914, Brit. Antarct. *Terra Nova* Exped. 1910, Zool. I, 1: 15, pl. xvii, fig. 4. McCulloch, 1914, Biol. Res. Endeavour, II, 3: 91. Lord, 1923 [*partim?*], *Pap. Proc. Roy. Soc. Tasm.*, 1922: 64. Lord and Scott, 1924 [*partim?*], *Vert. Anim. Tasm.*: outline fig. on p. 38. Munro, 1958 [*partim*], Handbk Aust. Fish.: 95: text *partim*, but both the figs numbered 657 [instalment No. 23 in *Fisheries Newsletter*, xvii, 5, May, 1958: 19: text *partim*, but both the figs numbered 657].

Notopogon endeavouri Mohr. Whitley and Allan, 1958, The Sea-Horse and its Relatives: 21, fig. 73.

Tasmanian example.—A specimen, *Ls* 202.5, estimated *Lt* 232.5, preserved in deep freeze at the Fisheries Cannery, Bicheno, Glamorgan, and made available for description by Mr. F. J. White, Manager, has thawed out in good order and still most beautifully colored. This fish was caught near Bicheno in the course of ordinary commercial fishing.

Fin counts, dimensions.—Mr. White's specimen has D. vii, 14 (last cleft to base). A. 17 (last three set close together). V. 1, 5. P. 18. A series of dimensions, expressed in *TLs*, is set out in Table V.

Comparison with figures of type and of McCulloch's specimens.—No indication of the relative size of the figure of the cotype (Mohr, 1937, text-fig. 23) is provided: it is perhaps natural size or near to it, in which case it is reasonably comparable in size with our specimen, which is approximately one-third as long again. In general form the two fish are extremely similar, there being no significant difference (and in most cases surprisingly close correspondence) in proportional size (relative to length to caudal base) of eye, snout, head, length of dorsal spine, depth at various parts of body, and in relative length to origins and terminations of fins. The most obvious variations found in our example are: second dorsal base decidedly more convex, relatively shorter, measured obliquely (10.5%, *cf.* 14%); direct length of anal base somewhat less (15%, 19%); caudal peduncle somewhat upturned (probably partly, and perhaps wholly, a postmortem deformation), much more tapering, its least depth being barely 0.6 of, instead of subequal to, its length.

From McCulloch's smaller individual, *Lt* 70 (1911, text-fig. 9) the present example differs markedly in outline. It agrees, however, tolerably well with his larger individual, *Lt* 265 or 270 (1911, pl. v), the most notable divergences exhibited by the Bicheno fish being the following: snout longer, about in ratio 6:5; snout markedly upturned (as in type), its dorsal tip being about 1.0, instead of rather less than 0.2 of, vertical eye-diameter above anteroposterior axis of fish, as represented by a line through middle of eye and middle of caudal peduncle; eye larger, about 7:6; a caudad displacement of first dorsal, accompanied by decrease in slope of profile between nuchal bristles and dorsal origin, and bringing origin of second dorsal spine slightly behind level of the anterior one-fifth of horizontal extent of anal base, instead of about vertically above anal origin; as a further consequence of this shift, termination of second dorsal base comes to lie absolutely (5 mm) about twice as far behind anal termination, thereby also increasing the excess in length of the ventral over the dorsal profile of the caudal peduncle (a divergence enhanced, in this specimen, perhaps fortuitously, by the upturned posture of the peduncle).

General description.—In rehandling part of his 1911 material, and in referring it to *Notopogon lilliei*, McCulloch gave a full general description of the two individuals he had figured earlier: and this would appear to be still the most detailed account given of Australian specimens. Examination of Mr. White's fish provides some additional data. Except perhaps in the case of length of caudal in head (fin imperfect; longest ray 3.1 in head) values for all ratios recorded by McCulloch fall within his (distinctly wide) range. Posterior nostril the larger, about twice as far from orbit as from enterior nostril. First dorsal spine not, second considerably, remainder greatly, compressed. Most pectoral rays are split longitudinally, for most or all of their length, into external and internal moities: a similar condition obtains in four of the five surviving caudal rays, their bases being in the upper part of the fin quite widely separated (presumably as result of postmortem injury), the disjunction being in the sagittal plane. Reference may be made to similar radial fission recorded in these Observations (1953: 161, 165) in *Brachionichthys hirsutus* (Lacépède), 1809.

Rays of second dorsal (and to a lesser extent rays of anal) are much flattened dorsoventrally, their right and left edges being each fringed, for at least its basal half, with a hard glossy denticulated or crenulated flange. Near middle of tuft, cephalic or nuchal bristles subcylindrical, proconcave, fairly sharply pointed, long (up to 3.5 mm); stouter, more obtuse posteriorly; more slender anteriorly: the patch merging at either end into the blunt spinules and irregular elevations of the highly rugose dorsum. Immediately in advance of bristle-patch, dorsal profile is locally and briefly (for an eye-diameter or less) distinctly convex; the tuft itself being set, however, in a shallow concavity. Two ridges noted by McCulloch as lying near the (trenchant) midventral edge of the trunk, and extending backwards to end of ventrals, form here the side-walls of a trough, into which the furled fins are wholly and neatly received. The maximum

TABLE V

Notopogon endeavouri Mohr, 1937. Dimensions—expressed as thousandths of standard length (202.5 mm)—of a specimen from near Bicheno, Glamorgan, Tasmania. Measurements not otherwise specified are made between parallels.

Dimension	*TLs*		
Eye: horizontal diameter, vertical diameter. Interorbital	78	77	48
Snout length: parallels, direct. Depth at middle of length	296	311	32
Head length: parallels, direct. Postorbital length: direct	454	459	79
Bristle patch: length to origin; length, parallels, direct	415	39	54
Pectoral: length to origin; length of longest ray; direct length of base	464	151	74
First dorsal fin: length to origin; base, parallels, direct	800	74	133
First dorsal spine: direct length. Direct length of third dorsal spine: total, exposed beyond sheath	12	94	20
Second dorsal spine: length to origin; direct length, maximum width without membrane	809	143	20
Second dorsal fin: length to origin; base, parallels, direct	874	40	105
Ventral fin: length to origin; length of spine; length of longest ray	664	13	40
Anal fin: length to origin; base, parallels, direct	780	109	151
Length of longest caudal ray preserved	148		
Posterior nostril direct to: base of first dorsal spine; termination of second dorsal fin; origin of ventral fin	588	748	459
At level of specified point: depth below axis joining middle of eye and middle of caudal peduncle base; height above this axis; total height:			
Anterior border of eye	59	49	109
Posterior border of eye	143	96	239
Opercular border	178	168	346
Termination of pectoral base	207	222	430
Origin of ventral	220	254	474
Middle of vent	183	262	444
Origin of anal	175	264	440
Base of second dorsal spine	170	257	427
Termination of anal	54	133	188

thickness of the fish, which slightly exceeds diameter of eye, is found immediately behind upper one-third of posterior border of orbit. McCulloch notes that dorsal spines after the second are 'largely hidden in the skin only the tips projecting'. The fin membrane, the character of which Mohr cites as a diagnostic feature of her species, is, indeed, very stout, being rather of the nature of a sheath: it is completely covered with scales, and is in its basal half virtually opaque. The wide slip of membrane flanking the posterior border of long second dorsal spine is wholly covered with heavy irregular scales, thickly beset with small ridges, spinules, and rugosities. The true appearance of these heavy membranes associated with all dorsal spines save the minute first one cannot be gathered from McCulloch's plate. Anterior border of large dorsal spine, shown smooth by McCulloch, and serrate by Mohr, is in our specimen minutely and obscurely denticulate.

Coloration.—Though within its three-sentence compass informative, McCulloch's treatment of the coloration (which Mohr quotes) is of necessity over-condensed. Indeed, I know of no published account that conveys anything like an adequate idea of its brilliance and diversity: even on thawing out from deep freeze, Mr. White's specimen presented such a striking array of colors as to make it one of the most beautiful fish I have seen.

The most extensive areas of color were eight: (*a*) large opercular patch of lime green, partly outlined posteriorly in white; (*b*) breast, bounded by operculum, pectoral base, slightly proconvex white arc from pectoral base to pelvic, and ventral border, chiefly purplish brown, heavily and irregularly splashed with light-green, marked with ten white spots, and narrowly bordered ventrally by an internal arc of pale purple, and an external arc of dull orange bearing four brighter orange spots; (*c*) subrectangular area, wholly pale green, bordered anteriorly by (*b*), ventrally by margin of body between pelvic and first one-third of anal base, posteriorly and superiorly by (*d*) and (*f*), respectively; (*d*) large obliquely-set oval area of pale purplish with some silver, extending from above most of anal base almost to level of origin of second dorsal, ringed (anteriorly by continuous line, posteriorly by proconcave line of large spots) with pale purplish and whitish; (e) lying behind (d), paler purple, with three large whitish patches on caudal peduncle; (f) above pectoral, purplish, with four or five large scale-like markings, each with radiating light lines and silvery periphery; (g) lying in advance of (f) more or less yellowish with some areas orange, with two large oblique subparallel white markings behind and above eye; (h) bordered below by (f), (d), (e), mostly greenish, with subhorizontal whitish vermicula-

tions, the whole upper edge, constituting the dorsal profile from nuchal bristles to first dorsal spine, with a sharply delimited border, of even width throughout, of clear pale green.

Snout pale greenish yellow, somewhat dusky dorsally, elongate subterminal whitish subelliptical marking. White lobe from anterosuperior border of eye; white streak below eye, extending anteriorly to level of anterior nostril. Pectoral rays silver. Pelvic pinkish basally, then lighter, tip shining white. Post-pelvic spines glassy, Anal rays whitish, slightly dusky distally; a pink patch across the middle of the first few rays. Dorsal spines (which are strongly compressed) whitish; parallel white lines run inwards from them, and there are conspicuous white patches at bases of two of them. Dorsal rays silver; a narrow grey inframarginal streak along fin base. Caudal rays whitish, partly dusky, with some orange.

Family SYNGNATHIDAE

KEY TO AND CONSPECTUS OF SYNGNATHIDAE RECORDED FROM TASMANIA

The subjoined schema is something more than a mere formal key: it incorporates a considerable amount of hitherto unpublished data, and presents, within the limits of its pattern of specification, a synoptic view of available knowledge on the local representatives of the family. It supersedes an earlier key to Tasmanian and ad-Tasmanian species (Scott, 1939).

Seventeen species are here recognized as Tasmanian: (1) *Lissocompus caudalis* Waite and Hale, 1921; (2) *Urocampus carinirostris* Castelnau 1872; (3) *Leptoichthys fistularius* Kaup, 1853; (4) *Leptonotus semistriatus* Kaup, 1856; (5) *Histiogamphelus briggsii* McCulloch, 1914; (6) *Syngnathus tuckeri* Scott, 1942; (7) *Syngnathus mollisoni* Scott, 1955, (8) *Syngnathus curtirostris* Castelnau, 1872; (9) *Syngnathus phillipi* (Lucas), 1891; (10) *Solegnathus robustus* McCulloch, 1911; (11) *Solegnthus spinosissimus* (Günther), 1870; (12) *Solegnathus fasciatus* (Günther), 1880; (13) *Stigmatophora nigra* Kaup, 1853; (14) *Stigmatophora argus* (Richardson), 1840; (15) *Phyllopteryx taeniolatus taeniolatus* (Lacépède), 1804 [*Phyllopteryx foliatus* (Shaw), 1804 in Check-List (McCulloch, 1929: 95)]; (16) *Hippocampus abdominalis* Lesson, 1827; (17) *Hippocampus breviceps* Peters, 1870. Of these 17 species, no fewer than 10—(1), (2), (3), (6), (7), (8), (9), (10), (12), (15)—represent additions to the Tasmanian fauna as it appears in the Check-List: while two species—(1), (8)—are not credited to this State in the Handbook (Munro, 1958).

For each species there is provided, in the order and grouping here given, the eleven items noted in this paragraph. Total rings: subdorsal rings: brood rings. Dorsal rays. Eye in snout: snout in head: head in trunk: trunk in tail. Approximate maximum total length (mm). Character of rostral crest. Presence or absence of opercular keel. [Any additional data is enclosed in square brackets.]

Various systems of symbols for the longitudinal ridges have been devised: perhaps the simplest is that employed in the Handbook (Munro, 1958: 82) and adopted here. Of two capital letters, the first locates ridge on body or tail (T = trunk, C = caudal): the second letter is U, M, or L, denoting, respectively, upper, median, lower. A mixed one-, three-, and four-letter notation used by Herald (1953: 233) provides three additional points of specification. Duncker's (1915) formal schema, covering the empiric array of combinations of ridges, has been reproduced by, and is more readily available in Weber & De Beaufort (1922) and Whitley & Allan (1958).

The information supplied is classified by a two-letter code (in parentheses); the first letter being concerned with novelty (in a broad sense), the second with the area of reference over which the novelty extends. In the set of first letters, "a" is used in connexion with non-metrical data and signifies new; "b" marks an extension of the accepted metrical range (whether by excess or deficit being evident from the context); "c" calls attention to a refinement in accuracy; "d" denotes a correction. In the second set, "t" signifies all literature examined; "h", literature other than these studies; "m", the Handbook (Munro, 1958). Thus, for example, (at) means information (non-metrical) now first published; (bh), extends range beyond that noted outside these studies; (am), not noted in Handbook. Thus constituted as a two-letter symbol, the notation applies only to the immediately preceding entry: converted to a three letter symbol by the doubling of the second letter, its application extends backwards, over more than a single item, to the immediately preceding colon or period (whichever is encountered first).

1 { Body without longitudinal ridges, the angles scarcely defined. Dorsal fin short; on 3 body rings; base ≤ its height; rays < 13. Tail ≥ 4.0 in trunk. 12 + 56 (bt)-60 : 1 + 2 [0.2-0.3 + 2.0 (ctt)] : 0.5 + 12.9 (at). 11-12 (bt). 2.0-2.5 (bt) : 2.7 (bt)-3.1 : 2.2 (bt)-2.6 (bt) : 4.1 (bt)-4.8. 110. Obtuse, elevated, terminating on interobital space [text-fig. 3a (ct)]. Absent. [Paired submental barbels (text-fig. 3b), dermal appendages on head and trunk and tail (text-fig. 3c), may be present (att).] [Folds of brood pouch in the form of tumid lips: fairly rigid, though, as far as can be determined, without special stiffening plates; closely approximated in midventral line; the interval between their outer borders about half total width of tail in vicinity.] .... *Lissocampus caudalis*

Body with longitudinal ridges, the angles well defined. Dorsal fin long, or moderately long; on ≥ 4 rings; base > its height; rays (except in some specimens of *Urocampus carinirostris*) > 13. Tail < 4 in trunk 2

TM double (*i.e.*, 4 longitudinal ridges on each flank). Fulfilling both these conditions: TU and CU continuous, TM and CL continuous. Dorsal fin: origin behind vent by > length of base.
8-9 [Lord & Scott, in error, 18] + 49 [Lord & Scott, 42: error?]-57: caudal 6th or 7th-caudal 10th or 11th [Munro employs formally ambiguous notation: (6-7) + (10-11)]: subcaudal 12-14. 1.3 (am): 3.0-3.3 (bm): 1.5-2.5 (bm): 3.3-3.7. 110. Strong, elevated, confluent with supraorbital ridges. Present. [Simple and/or branched dermal appendages on head and trunk and tail may be present] .... *Urocampus carinirostris*

2

TM single (*i.e.*, 3 longitudinal ridges on each flank). Not fulfilling both these conditions: TU and CU continuous, TM and CL continuous. Dorsal fin: origin not behind vent by > length of base (origin at, or very shortly behind, or usually, in advance of, vent) 3

TU and CU not continuous. Tail: not whiplike; rings < 55; caudal fin present or absent; prehensile or non-prehensile. Trunk: depth slightly or markedly > width 4

3

TU and CU continuous. Tail: whiplike; rings > 55; caudal fin absent; non-prehensile 16

TM ending free posteriorly. Tail: caudal fin present, non-prehensile 5

4

TM not ending free posteriorly (continuous with CU or CL). Tail: caudal fin absent; prehensile 11

Brood pouch on trunk. Trunk > tail in length. Rings: trunk > caudal in number in most specimens, if caudal > trunk never by > 4; last caudal > penultimate in length. Caudal fin > (about 2) distance from enterior border of eye to posterior border of operculum.
23 (bh)-28 + 20-27: 3-4 + 5-6: 19-23 + 0 (cmm). 34-38. 6.0 (bm)-7.5 (bh): 1.1 (bm)-1.4: 2.0-2.5: 0.8-0.9. 560. Rudimentary. Absent. [Brood pouch lacks protecting flaps.] .... *Leptoichthys fistularius*

5

Brood pouch on tail. Trunk < tail in length. Rings: trunk < caudal in number by > 4 (by at least 10); last caudal ≤ penultimate in length. Caudal fin < (usually about half) distance from anterior border of eye to posterior border of operculum 6

Trunk: depth ≧ 2 its width; length < 2 head. Dorsal rays ≧ 37. Marked sexual dimorphism; female with dorsal profile conspicuously elevated and with acute ventral ridge.
19-21 + 46 (bh)-50: 3-4.2 (ch) [*i.e.*, 5 (bh)] + 5.1 (ch) [*i.e.*, 6 (bh)]-7: caudal 1st- caudal 15th (cm). 4.3 (bh)-7.2 (bm): 1.6-1.8 (bh): 1.3-1.9 (bh): 1.9-3.0. 250. Obsolete, confluent with supraorbital ridges. Absent. [Brood folds lacking plates.] [Eggs about 55-60, in one row posteriorly, in 2-3 rows anteriorly, above each flap (ah).] [Depth of trunk 2.4-3.4 width in males, 2.4 (bh)-5.0 in females.]. Total length > 200 .... *Leptonotus semistriatus*

6

Trunk: depth < 2 its width; length < 2 head. Dorsal rays < 37. No marked sexual dimorphism; female without conspicuously elevated dorsal profile and without acute ventral ridge. Total length < 200 7

Rostral crest greatly elevated; its least height < 2 in snout; middle of superior border (well) above level of top of eye. Caudal annuli > 39. 22 + 39; 5 + 2: presumably subcaudal .23. 2.5: 2.1: 4.6: 1.7. 235. Thin, greatly elevated, reaching to behind eye. Absent. .... *Histiogamphelus briggsii briggsi*

7

Rostral crest not greatly elevated; its least height > 2 in snout; middle of superior border not above level of top of eye. Caudal annuli < 39 8

Number of subdorsal rings: trunk > (>4) caudal. Dorsal: length to origin of fin < 3 (about 2½) base of fin; rays ≧ 33.
22 (bh)-23 + 40 (bh)-43 (at): 9 (bt)-10 + 1.9 (ch)-3 (bt): caudal 1st-caudal 12th (cm). 33 (bt)-35. 3.1 (dm)-3.3 (am): 2.1 (cm): 1.9 (bh)-2.2 (bh) [Handbook, 3 (dm)]: 2.1 (bh)-2.3. 132 (bh). Prominent; free margin sinuous (lowest near middle; terminating at level of anterior nostril. Absent. [Dorsal base somewhat elevated—emendation (1960) of original description (1942) (dm).] [Brood pouch folds with 1-3 series of subcircular or polygonal depressions internally: no protective plates: eggs imbedded in jelly-like matrix, in 2 lateral, and in 1-2 mesial, rows; mostly in single layer, but in at least 2 layers mesially.] .... *Syngnathus tuckeri*

8

Number of subdorsal rings: trunk < (≦½) caudal. Dorsal: length to origin of fin > 3 (about 3½-4½) base of fin; rays < 33 9

Subdorsal annuli > 9. Dorsal: length to origin of fin < 3.75 (about 3.6 base of fin; rays ≧ 27.
10 + 44: 2.8 + 7 [Handbook, 8 (dm)]: presumably subcaudal. 28 (am). 5.6: 1.7 [Handbook, 1.6 (dm)]: 2.7: 2.2. 163. No conspicuous crest. Absent .... *Syngnathus mollisoni*

9

Subdorsal annuli < 9. Dorsal: length to origin of fin > 3.75 (about 4.0-4.8) base of fin; rays < 27 10

Operculum not keeled. Head > 2.5 (about 3.0-3.5) in trunk. Eye < 2.5 (about 2.1) in snout. Snout: > 2.25 (≧ 2.5) in head; depth at its middle < 3.5 in its length.
18-19 + 42 (bm)-44: 0-1 + 4-5: 0 +16 (cmm). 20 (bm)-24. 1.8-2.1 (bh) (amm): 2.5-2.7: 2.9 (bh)-3.5: 2.2-2.4. 164. Low. Absent .... *Syngnathus curtirostris*

10

Operculum keeled. Head < 2.5 about 2.0) in trunk. Eye > 2.5 (about 3.0-3.5) in snout. Snout: < 2.25 (≦ 2.0) in head; depth at its middle > 3.5 in its length.
18-20 + 40 (bm)-48 (bm): 1-2 + 5-6: 0-1 + 15-18 (cmm). 22-28 (bm). 3.4 (am): 1.9: 2.0: 2.4. 130. Low crest extending on to interorbital space. Present .... *Syngnathus phillipi*

TM continuous with CU. Distal tail rings (about 20) each with a pair of fleshy pads on ventral surface. Rings: subdorsal > 9, all caudal; trunk > 22 (≧ 25); total > 70 (≧ 74). Head > 1.75 (about 2) in trunk 12

11

TM continuous with CL. Distal tail rings without fleshy pads. Rings: subdorsal < 9, not all caudal; trunk < 22 (≦ 18); total < 70 (≦ 60). Head < 1.75 (about 1.5) in trunk 14

Depth of snout < 5.5 (about 5.0) in its length. Depth of tail immediately behind dorsal fin < 3.5 (about 3.0) in base of fin. TM attains dorsal profile near, or behind, middle of tail.

26-27 + 48-53: caudal 1st or 2nd—caudal 10th or 11th (ctt) [original description (McCulloch, 1911) 'ten body rings']: subcaudal. 29.34. 3.9-4.1: 1.7-1.9. 2.4-2.7 (bmm): 0.9 (cm)-1.0 (dm). 364. No definite crest (am). Absent. [Each trunk scute with a flattened central spine, from which radiate lines of smaller, but well developed, spines.] [Eggs large, isolated, in open cells on tail generic character, applicable also to two species of bracket No. 13.]

12 .... *Solegnathus robustus*

Depth of snout > 5.5 (about 7.0) in its length. Depth of tail immediately behind dorsal fin > 3.5 (about 4.0) in base of fin. TM normally (dh) attains, or virtually attains, dorsal profile immediately behind termination of dorsal fin [in an earlier key (1939) statement is given without qualification: I have since examined a specimen of *Solegnathus fasciatus* in which the condition does not obtain.] 13

Scutes convex, intensely spiny: at middle of either lateral border of each trunk scute a four-rayed or five-rayed cluser of spines, diverging from an enlarged central spine or small group of spines. Occipital scute a rosette, with one central, and six-eight peripheral, lobes. Two preanal rings orange.

27-29 + 51-55: caudal 1st-caudal 11th (bt) (ctt): subcaudal. 35-38. 4.0-5.4 (bt): 1.7: 2.0: 1.2 (am). 320. No definite crest (am). Absent. [Each trunk scute with a system of spinigerous ridges in the form of a lozenge, or ellipse; and a vertical ridge from apex to apex, terminating in a large two-crowned or three-crowned spine that forms part of longitudinal body ridge.] .... *Solegnathus spinosissimus*

Scutes flattish, mainly rugose: at middle of either lateral border of each trunk scute a spinigerous fusiform fascia, with an enlarged central spine, or an elliptical boss with elevated centre, from which radiate numerous rows of blunt spinules. Occipital scute with three subequal lobes. Preanal rings blackish.

13 25-28 + 51 (bt)-56 (bt): caudal 1st or 2nd (bt)-caudal 10th or 12th (bt) (ctt): subcaudal. 36(bt)-41. 4.0-5.0: 1.6 (bt)-1.7: 2.0: 1.1 (am). 420. No definite crest (am). Absent. [Each trunk scute with a system of about three to about six subvertical, rather sparsely, often obscurely, spinigerous ridges that through most of their length are subparallel, becoming approximated above and below, where they terminate in a large two-crowned or three-crowned spine that forms part of longitudinal body ridge.] .... *Solegnathus fasciatus*

Head: axis at an oblique angle to that of trunk; < 2.0 (about 1.5) snout. Rings: trunk > 15 (about 17-18); caudal number > 2.5 (about 4) trunk number; subdorsal, caudal number > 2 trunk number; brood > 12 (usually 17-19), none on trunk. Large unbranched foliaceous appendages (mostly paired on head, trunk, tail. Eggs unprotected.

17-19 (bt) + 32-37: 1-2 + 5-7: caudal 1st-caudal 17th, 18th or 19th (cm). 27-36. 6. 1(bt)-10.0 (bt): 1.4-1.6 (bt): 1.5 (bt)-1.8(bt): 1.1 (bt)-1.3 (bt). 460. Snout compressed and, specially at middle of length, somewhat elevated, but no separate crest developed: a pair of superolateral spines in proximal one-third (cm). Absent. [Depth of body 1.8 width in young females, 2.9 (bt)-4.2 (bt) in adult females, less in adult males.] [Enlarged spines comprise: one on head, one on neck, pair on back behind middle of trunk, pair near middle of breast, 4-5 (bm) sets on dorsal surface of tail, all, or some (dm), paired (usually at least first two sets paired)—all these normally bear appendages: also, lacking appendages, one pair flanking dorsal fin near its origin, one pair on ventral profile just in advance of vent (amm).] .... *Phyllopteryx taeniolatus taeniolatus*

14 Head. axis about at right angles to that of trunk; > 2.0 (about 2.5-3.0) snout. Rings: trunk < 15 (≤13); caudal number < 2.5 (about 2) trunk number; subdorsal, caudal number < 2 (≤ 1) trunk number; brood < 12 (usually 5-8), commonly one or more on trunk. Smallish, simple or branched, slender, tapering appendages (characteristically unpaired) may occur on head and trunk, not on tail. Eggs enclosed in a permanent sacklike brood pouch .. 15

Subdorsal rings ≧ 6; of which ≧ 3 are subcaudal. Dorsal: rays > 24; base > 1.5 (about 2) postorbital head. Head < 2.75 snout. Total length > 150.

11-13 + 42 (bt)-49: 2.3 (ct)-5.0 + 2.0 (bt)-5.0: 0-1 + 5.7 (cmm). 26-31. 1.9 (bt)-3.4 (bt): 2.0 (bt)-2.5: 1.1 (bt)-1.8 (bt): 2.2 (bt)-3.3 (bt). 260. Short high crest on proximal portion of snout. Absent.

15 .... *Hippocampus abdominalis*

Subdorsal rings < 6; of which < 3 (usually 1) are subcaudal. Dorsal rays: < 24; base < 1.5 postorbital head. Head > 2.75 snout. Total length < 150 (seldom > 75).

11 + 38-42: 3-4 + 1: 1-2 + 3-4 (cmm). 19-22. 2.1: 3.0: 1.5: 1.8-1.9 (bm). 75. Proximally, snout is sharply elevated, rising to, or beyond, eye-level. Absent.

....*Hippocampus breviceps*

TM: does not extend beyond 1st caudal ring; in female produced to form a sharp edge. Opercular keel well developed in young and adult. Subdorsal annuli: trunk number > caudal number. Total length < 180 (normally ≦ 110).

16-19 (bt) + 58-72: 10-13 (bt) + 6-7: 0 + 14 (cmm). 35-43. 5.0-6.8 (bm): 1.5 (bt)-1.7: 1.6: 1.6-2.3 (bt). 108. Low, terminating in advance of eye. Present in all stages. [In males, trunk slightly wider than deep; in females, more than twice—*e.g.*, 2.2(ct).] [TM ends free on last trunk ring (bt) or 1st caudal ring.] [Eggs large, isolated, in cutaneous cells, enclosed in a completely closed brood pouch formed by paired cutaneous folds—generic character, applicable also to next species.]

16 .... *Stigmatophora nigra*

TM: extends beyond 1st caudal ring; in female not

produced to form a sharp edge. Opercular keel feebly developed in young, usually absent in adult. Subdorsal annuli: trunk number $\leq$ caudal number. Total length $>$ 180. 17-22 + 68-90: 7-10 + 8-12: 0-1 + 16-20 (cmm). 43.58 (bh). 6.0 (bt)-9.3 (bt) 1.4 (bt)-1.6 (bt): 1.3-1.7 (bt): 1.7-2.8. 281 (bt). Low, terminating in advance of eye. Feeble in young; generally absent in adult, but (dh) see Scott (1960:90)—other examples with keel since examined. [TM ends on 6th-24th (bt) caudal ring: Australian authors customarily state 6th; Weber & de Beaufort (1922: 98) give 10th-14th; in 6 Tasmanian individuals the ridge terminates on 6th, 7th, 15th, 17th, 21st, 24th caudal ring.] .... *Stigmatopora argus*

Genus **LISSOCAMPUS** Waite and Hale, 1921

LISSOCAMPUS CAUDALIS Waite and Hale, 1921

(Text-fig. 3)

Lissocampus caudalis Waite and Hale, 1921, *Rec. S. Aust. Mus.*, 1, 4: 306, fig. 46. Type locality: Kangaroo Island, South Australia.

Lissocampus caudalis Waite. McCulloch, 1929, *Mem. Aust. Mus.*, v, i: 91. Munro, 1958, Handbk Aust. Fish.: 88, fig. 611 [instalment No. 21 in *Fisheries Newsletter*, xvii, 3, March, 1958: 20, fig. 611].

Tasmanian record.—This species has been reported only from South Australia and Victoria. Three specimens, (*a*), (*b*), (*c*), total length 100.5, 91, 68, standard length 98.5, 88.9, 66.6, respectively, collected on Fisher Island, Bass Strait by Mr. C. B. Mollison add it to the Tasmanian list. The largest individual is a male. Mr. Mollison observes, *in litt.*, 22nd September, 1959, 'the pipefish are to be found commonly in fine kelp attached to granite slabs on the eastern side of South Point (Fisher Is.). I obtained them by cutting kelp near the holdfasts and shaking it out on the rocks, when two or three specimens were noticed among molluscs and crustaceans. In life they are very similar to the stems of the kelp; mottled grey-violet on brown; markings seem very irregular and vary for each individual, but you may find a pattern'. Mr. Mollison has since informed me that searches made at this site on two subsequent visits by C.S.I.R.O. parties have failed to secure further examples. No direct statement is made by Waite & Hale of the depth at which the type material was collected, but a probable inference is that was obtained, like the present material, at a shallow depth. Herald (1953: 231) has pointed out that pipefishes taken in the Marshall and Marianas Islands in Operation Crossroads in 1946 seemed to be clearly divisible into intertidal and deepwater forms, with a demarcation line between the two habitats at a depth of about 10-15 ft. Little systematic attention has been given to this matter in the study of Australian syngnathids (of the two species described by the writer the unique holotype of one, *Syngnathus mollisoni*, was collected at a probable depth of 25 fathoms, while the several known specimens of the other, *Syngnathus tuckeri*, are of shallow water origin: most local species probably occur normally at no great depth).

Supplements to original description.—Available data on the characters of this form, as summarized by Munro (1958), appears to be confined to that afforded by the original description of the holotype female, 97 in length, collected at Kangaroo Island in 1901 (Waite & Hale note they had before them a second female, 102 long, from the same locality). The present material provides some interesting supplementary information—points of special significance are the presence in some individuals of two curious barbels and other dermal appendages, and the nature of the brood pouch.

Meristic and other metrical data.—Values for the three Fisher Island examples are in descending order of total length (corresponding values for holotype, where available, in parentheses). D. 12, 11, 11, (11). P. 6, 5, 5, (5?). C. 5, 5, 5, (10) (I do not find more than 5 caudal rays: Waite & Hale's entry 10 may possibly represent a count of halves of divided rays). Rings 12 + 58, 12 + 57, 12 + 56 (12 + 60). Subdorsal rings 0.2 + 2.0, 0.3 + 2.0, 0.3 + 2.0 (1-2: 'the dorsal commences on the posterior edge of the last body ring'). Brood rings 0.5 + 12.9 (*i.e.*, pouch begins on last body ring), —, —, (—). Eye in snout 2.1, 2.2, 2.5 (2.0); in head 6.3, 6.8, 6.8, (6.2). Snout in head 3.0, 3.1, 2.7, (3.1). Head in trunk 2.6, 2.6, 2.2, (2.5); in total length 16.0, 14.4, 13.3, (15.5). Trunk in tail 4.6, 4.1, 4.5, (4.8). Tail in total length, 1.3, 1.4, 1.4, (1.3). As *TLt* (Tasmanian specimens only): trunk 165, 180, 163; length to dorsal origin 222, 241, 232; dorsal base 28, 29, 29; length of pectoral 19, 20, 21; length of caudal 19, 23, 21, length of brood pouch 259, —, —. In largest local individual depth (in parentheses width) (*TLt*) at: middle of eye 19 (18), end of operculum 28 (20), vent 29 (19), end of pouch 20 (19); maximum (near middle of trunk) 30, 19. (It should be noted that in proportions given as *TLt* the last digit—though it is convenient formally to record it— is commonly suspect—dimensions having been measured only to nearest tenth of a millimetre).

Dermal appendages.—These are present in our three examples (text-fig. 3c). No mention of them is made in the original account of *L. caudalis*; nor have they been reported for the only other member of the genus, *L. affinis* Whitley, 1944, from Western Australia. Omission of notice of them in the description of the type material may be due (*a*) to oversight (they are scarcely observable without a lens); (*b*) to their loss by injury (*e.g.* postmortem abrasion); or (*c*) to their failure to develop in those specimens. With regard to (*c*), it is to be observed that the presence of such appendages in some individuals and their absence in others has been reported as a normal state of affairs in some pipefishes— *e.g.*, *Urocampus carinirostris* Castelnau, 1872, and (Herald, 1953: 260) *Micrognathus brevirostris* (Rüppell), 1840 [contrast, however, Munro (1958: 87), who notes, simply, 'cutaneous appendages on head nape and body ridges'.] Disposition and degree of development show individual variation—most conspicuous in specimen (*a*), least

in (*b*): there may be differences between two sides of the fish. In one or more cases the following may be observed. On head: 1 median preorbital, at end of rostral ridge, minute, simple; an incomplete ring of up to at least 8 (2 or 3 above and below most noticeable) on periphery of eye; on frontal region 3 small, unbranched (*a*), or 1 moderate-sized, branched (*c*). On trunk: along midlateral line 1 of fair size on each ring, mostly simple, if branched seldom with more than 2 branches; along line of junction of the flattish flank and the rounded belly (which latter lacks appendages) runs a line of pores, every third or fourth of which may bear a smallish simple appendage; on dorsal surface (in all individuals) 5 pairs, largish, branched (sometimes complexly)—proceeding caudal, the anteroposterior intervals between pairs decrease, the first three slightly, the last markedly. On tail: up to half a dozen pairs, small, simple, on dorsum of about every third or fourth ring.

Barbels.—Arising from ventral surface of snout, at a distance of rather more than their own length from free tip of lower jaw, is a pair of processes. In specimen (*a*) (text-fig. 3*b*1) they are subcylindrical (right slightly dilated distally) and unbranched; directed downwards and backwards at such an angle as to continue the general oblique profile of lower half of anterior wall of rostrum bounding the subvertical mouth-cleft; slightly divergent, their tips about one-fifth as far again apart as their bases, the interval between which is subequal to length of process, itself equal to diameter of eye (1 mm): general color pale horn, with some basal clouding, and with a minute but distinct subterminal ring, of red-brown. As developed in this individual, they present a novel appearance, the overall appearance of the anterior portion of the head coming to be quite unreminiscent of that in any pipefish with which I am acquainted. In (*c*) (text-fig. 3*b*3) they are non-rigid multifid, as preserved, not erected, the whole structure collapsed flat against rostrum: general color pale brown, ashen at insertion. In this form the structures clearly present themselves simply as large cutaneous appendages not essentially different from, though larger than, those developed elsewhere— thus they are here, as in the largest fish considered alone they certainly are not, readily assimilable to the cephalic dermal fringes of *e.g.*, certain species of *Ichthyocampus* and perhaps also to the subrostral tags sometimes found—see figure by McCoy (1882, pl.65); contrast figure by Waite and Hale (1921): for remarks, with figure, see Scott (1934)— in *Phyllopteryx taeniolatus taeniolatus* Lacépède (dealt with in the three sources just cited under the name of *P. foliatus* (Shaw), 1804). In (*b*) all that is observable (text-fig 3*b*2) is a pair of very small blackish conical papillae: this reduced condition may conceivably be due to injury but there is no direct evidence that such is the case.

Brood pouch.—The brood pouch, not previously known, proves to be extensive, involving 0.5 + 12.9 rings; the most anterior thus being that carrying the vent (in *L. affinis* Whitley, 1943, from Western Australia, the brood pouch is noticed as being 'below the first ten tail rings'). In our specimen a narrow midventral slit runs the full length of the organ, and for the greater part of its length it is bounded by a pair of tumid lips, each about one fourth as wide as the whole ventral surface, and slightly wider than its own height. Posteriorly, these elevations lapse to virtual extinction near the end of the 12th tail ring, the slit for the rest of its length (about one ring) expanding very slightly, and being now bordered by small thin fleshy blackish fringes: anteriorly, the ridges, though declining steadily in height cephalad over about two rings, do not appear to suffer so great or so abrupt a lapse as they do posteriorly, but again the terminal portion of the slit, in this case throughout its appearance on hinder half of anal ring, is bordered with thin fleshy fringes. Several small folds developed at the extreme anterior end of the slit appear to be continuous with a more complex system of plicae flanking the vent, and the association of the external structure of the brood pouch with the external structure of the anal region is notably close. Though the whole structure is tolerably rigid, no plates have been observed in the folds.

Genus **SYNGNATHUS** Linné, 1758

SYNGNATHUS CURTIROSTRIS Castelnau, 1872

Syngnathus curtirostris Castelnau, 1872, Proc. Zool. *Acclim. Soc. Vict.*, 1: 243. Type locality: St. Vincent's Gulf, South Australia.

Syngnathus curtirostris Castelnau. McCulloch, 1929, *Mem. Aust. Mus.*, v, i: 86. Scott, 1953, *Pap. Proc. Roy. Soc. Tasm.*, 1952: 150. Munro, 1958, Handbk Aust. Fish.: 82, fig. 569, p. 83 [instalment No. 20 in *Fisheries Newsletter*, xvii, 2, February, 1958: 18, fig. 569, p. 19].

Pugnaso curtirostris (Castelnau). Whitley, 1948, *Rec. Rust. Mus.*, xxii, 1: 75.

Tasmanian status.—It seems expedient to call attention to the non-inclusion of Tasmania among the States (South Australia, Victoria) given for this species in the Handbook. Earlier the Check-list gave South Australia only: though included in Johnston's second list (1891), it was not accepted as Tasmanian by Lord (1923) or by Lord & Scott (1924). A specimen collected by Miss Ann Mather at Low Head, Dorset, on 21st February 1952, and recorded in these Observations (1953: 150), satisfactorily establishes this pipefish as a member of our fauna.

Family MUGILIDAE

Three Tasmanian species: (*a*) *Mugil cephalus* Linné, 1758; (*b*) *Myxus elongatus* Günther, 1861; (*c*) *Aldrichetta forsteri* (Valenciennes), 1836: (*a*), (*b*) occur in all States, (*c*) in all States except Queensland. All of commercial importance—especially (*a*); though in Tasmania the abundance of the less-esteemed (*c*) gives it considerable significance.

KEY TO MUGULIDAE RECORDED FROM TASMANIA

Prominent adipose eyelid covering eye except for slit above pupil. Anal: originating below origin of second dorsal; its base ≒ base of that fin. Pectoral with axillary scale. Teeth: restricted to jaws; in each jaw a single row, setiform .... *Mugil cephalus*

No such adipose eyelid. Anal: originating in advance of origin of second dorsal; its base > base of that fin. Pectoral without axillary scale. Teeth: not restricted to jaws (occurring at least on vomer and palatines); in each jaw not in a single row, not setiform 2

2 Lateral line 43-46; predorsal 28. Scales: ctenoid; on cheek in 5 rows. Teeth: none on pterygoids, tongue, pharynx: in jaw in single row, close-set small incisors. Fins with white margins .... *Myxus elongatus*

Lateral line 54-58; predorsal 30-31. Scales: cycloid; on cheek in 2-3 rows. Teeth: on pterygoids, tongue, pharynx; in jaw in band, strong. Fins with brown margins .... *Aldrichetta forsteri*

Genus **ALDRICHETTA** Whitley, 1945

ALDRICHETTA FORSTERI (Valenciennes), 1836

Mugil forsteri Valenciennes, 1836, Hist. Nat. Poiss. xi: 141—*ex Mugil albula* Forster MS. Type locality: New Zealand.

Agonostomus forsteri (Cuvier and Valenciennes). McCulloch, 1929, *Mem. Aust. Mus.*, v, 1: 118.

Aldrichetta forsteri Valenciennes. Munro, 1958, Handbk Aust. Fish.: 106, fig. 721 [instalment No. 26 in *Fisheries Newsletter*, xvii, 8, August, 1958: 18, fig. 721].

Sample with two size classes.—Towards the end of the year the young swarm round the coasts and enter brackish and fresh water in great numbers. The composition of a small sample secured during the course of night seine-netting carried out by holiday makers on the beach at Ulverstone, Devon, on 5th January, 1958 is of interest—two clearly defined size classes being present. Class A comprises six individuals, *Ls* 130.0, 128. 0, 120.5, 118.0, 114.5, 104.5 (mean 119.3 ± 3.5): class B, 8, *Ls* 67.3, 67.0, 63.5, 63.3, 62.5, 62.0, 59.0 (mean 63.8 ± 0.9). Class B is the more compact (V = 4.1 ± 1.0; *cf.* 7.1 ± 2.1). The groups are clearly independent—a test for the significance of the difference of the means gives $t = 6.43$.

Proportions.—Values given for each ratio are the range (in parenthes, mean) for class A; followed by the corresponding data for class B: (*a*) length to vent in *Lt* 1.9 — 2.1 (2.0), 1.9 — 2.0 (1.9); (*b*) depth in *Lt* 5.1 — 5.6 (5.4), 5.3 — 6.2 (5.7); (*c*) head in *Lt* 4.5 — 5.0 (4.7), 4.5 — 5.1 (4.7); (*d*) eye, not inclusive of adipose lid, in head 4.2 — 4.8 (4.4), 3.3 — 4.3 (3.9); (*e*) eye, inclusive of adipose lid, in head 2.9 — 3.7 (3.3), 2.6 — 3.2 (2.8); (*f*) interorbital in head 2.8 — 3.5 (3.2), 2.9 — 3.6 (3.3); (*g*) snout in head 3.5 — 4.0 (3.7), 3.3 — 4.2 (3.8). Among items (*b*), (*c*), (*f*), (*g*) as given in the Handbook (for adults?) limits are transgressed by the present data in two cases, namely, the (numerical) maximum for (*c*) and for (*f*). While with such small samples any such deductions must be drawn with extreme caution, it seems not improbable that real difference may exist between the two size classes in respect of ratios (*b*), (*d*), (*e*).

Contrast with sample of Arripis trutta.—The bimodal distribution of this sample of yellow-eye mullet contrasts trenchantly with the unimodal distribution of a sample of 50 individuals of young Australian salmon, *Arripis trutta* Bloch and Schneider, 1801, secured at the same time. Specifications of *Ls* of this sample are: range 61.5 — 96.5, $\bar{x}$ 77.4 ± 1.1, σ 7.6 ± 0.8, V 13.8 ± 1.4, range /σ 4.61, percentage of entries within $\bar{x} \pm \sigma$ 74. The subspecies represented—see Fairbridge (1950) Malcolm (1959)—was not determined.

Other species secured.—Other species caught in these operations, three successive hauls on the one night, included the dusky sea garfish, *Hemirhamphus melanochir* Valenciennes, 1846 (three specimens examined, two females, *Ls* 364, 373, 1 male, 250) and one or more undetermined species of flounder.

Family SIPHONOGNATHIDAE

Two Australian species, both referred to *Siphonognathus* Richardson, 1858, appear in the Check List: (*a*) *S. argyrophanes* Richardson, 1858, Western Australia (type locality, King George's Sound) South Australia, Victoria; (*b*) *S.beddomei* (Johnston), 1885 (type locality, Derwent River) Tasmania.

Of (*b*) Lord & Scott observe, 'We have been unable to trace Johnston's type, which was apparently not preserved, nor have we been able to secure further specimens'. A sketch found among Johnston's notes has been published by Whitley (1929, pl. IV, fig. 6). Whitley records that it was after an examination of Johnston's sketch that McCulloch recognized the fact that Johnston's fish was a *Siphonognathus*.

Species (*a*) is here for the first time recorded from Tasmanian waters.

KEY TO SIPHONOGNATHIDAE RECORDED FROM TASMANIA

A. Rays: first dorsal < 22 (≒20); second dorsal < 16 (≒ 12). L. lat. < 50 (≒ 40). Snout < 2 (≒ 1½) postorbital head. Barbel absent. Total length < 15 (≒ 10) maximum depth. Known length 120 mm .... *S. beddomei*

AA. Rays: first dorsal > 22 (≒ 24); second dorsal > 16 (≒ 21-22). L. lat. > 50 (≒ 105). Snout > 2 (≒ 2½) postorbital head. Barbel present. Total length > 15 (≒18-20) maximum depth. Length to 400 mm or more .... *S. argyrophanes*

Genus **SIPHONOGNATHUS** Richardson

SIPHONOGNATHUS ARGYROPHANES Richardson, 1858.

Siphonognathus argyrophanes Richardson, 1858, *Proc. Zool. Soc.*, 1857: 238, pl. vi. Type locality: King George's Sound, Western Australia.

Siphonognathus argyrophanes Richardson. McCulloch, 1929, *Mem. Aust. Mus.* v, ii; 325.

First Tasmanian record.—The first record for Tasmanian waters is provided by a specimen, standard length 324, total length 379.5, secured in a garfish net, in less than two fathoms of water, with a bottom of green seaweed, by Mr. Frank Henwood at Lady Barron, Flinders Island, in early August, 1957.

Remarks.—In Richardson's figure, which is reproduced by Waite (1921: 136, fig. 211), dorsal origin is shown as slightly in advance of pectoral origin: in our example dorsal origin is 4.5 mm caudad of pectoral origin. In the figure the anal appears to terminate beneath the 2nd or 3rd dorsal ray, counting cephalad; in our fish it ends below the 5th. Fin formulae usually given are, D. xxiv, 22; A. 14: the present counts are, D. xxiv, 21 (cleft to base); A 13—with P. 12 and C. 10 main rays.

Principal proportions.—These are here given in *TLs.* Head (hard, soft) 320, 333, snout 211, eye 28, interorbital 22, mouth cleft 63, tip of upper jaw to hind border of maxilla 90, barbel 28, caudal from hypural 171, caudal from ray-base 155, pectoral 62, longest pectoral ray 57, depth at front of eye 37, maximum depth (occurring at vent) 49. Length to: pectoral origin 327, dorsal origin 341, vent (middle) 727, anal origin 745.

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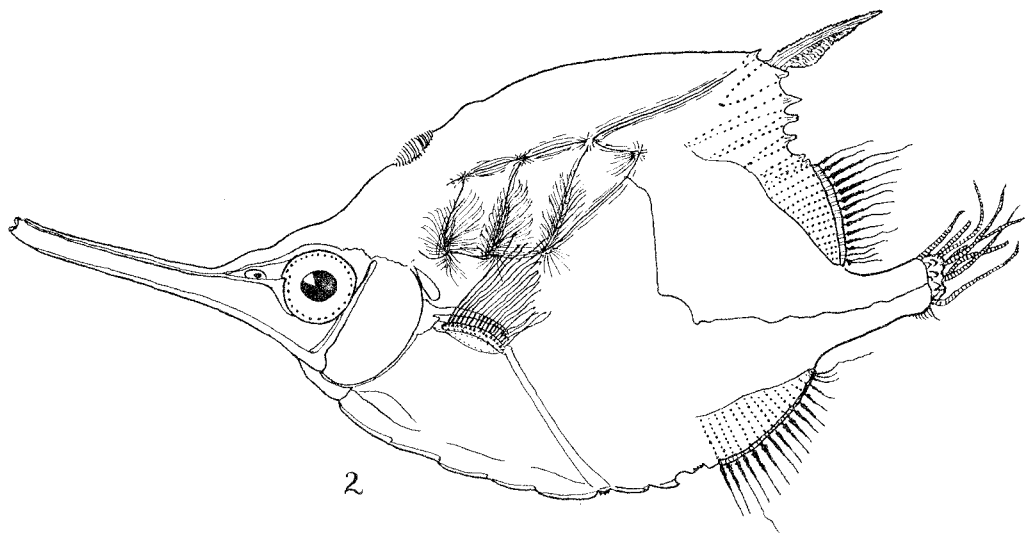

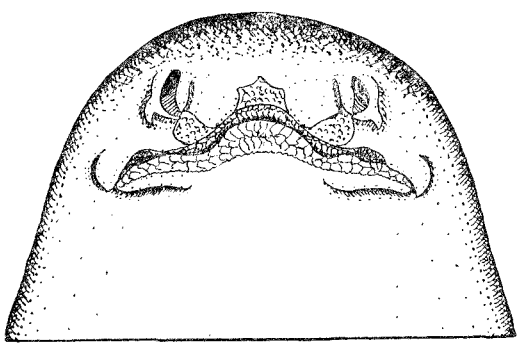

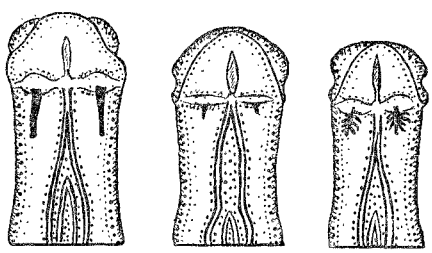

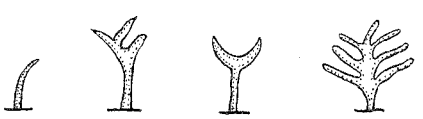

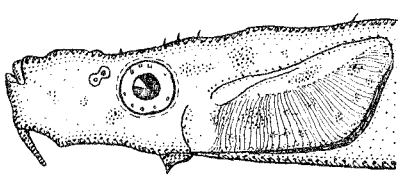

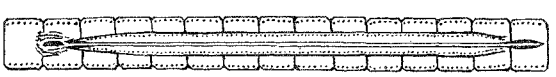

LEGENDS TO FIGURES

FIG. 1.—*Parascyllium multimaculum* Scott, 1935. Ventral aspect of anterior half of head of a virtual topotype, 713.5 mm. in total length, from Green's Beach, Devon, Tasmania; × 1⅓.

FIG. 2.—*Notopogon endeavouri Mohr*, 1935. Outline sketch (scales, colour pattern not indicated) of a specimen, 202.5 mm. in standard length, from near Bicheno, Glamorgan, Tasmania (fins damaged; some caudal rays split sagitally): × 3/5.

FIG. 3.—*Lissocampus caudalis* Waite & Hale, 1921: all specimens from Fisher Island, Bass Strait. *a*.—Lateral aspect of head of a specimen 100.5 in total length: × 8. *b*.—Ventral aspect of head (*b*1, *b*2, *b*3, of specimens 100.5, 91, 68 mm., respectively, in standard length) to illustrate barbels (shown black): all × 14 1/3. *c*.—Dermal fringes, simple and compound, all approximately × 25. *d*.—Brood pouch of largest individual: × 1⅓.