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OBSERVATIONS ON SOME TASMANIAN FISHES: PART XIV

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(With one text figure)

ABSTRACT

Four species are added to the Tasmanian list: *Neoodax frenatus* (Günther), 1862 [Neoodacidae], *Petraïtes phillipi* (Lucas), 1891 [Clinidae], *Cristiceps argyropleura* Kner, 1865 [Clinidae], *Ophiclinops varius* (McCulloch & Waite), 1918 [Ophiclinidae]; some general observations are made on each of these. Other species are discussed as follows. Syngnathidae: *Stigmatopora nigra* Kaup, 1856 (supernumerary opercular keels), *Syngnathus curtirostris* Castelnau, 1872 (dimensions and proportions, meristic features including data on termination and origin of body ridges, regional intensity of ground color). Neoodacidae: comparative observations on all Tasmanian species except *Neoodax attenuatus* (Ogilby), 1897. Clinidae: *Clinus perspicillatus* Cuvier & Valenciennes, 1836 (dorsal and anal radial patterns, tentacles), *Clinus puellarum* Scott, 1955 (general account of a third Tasmanian specimen), *Petraïtes heptaeolus* (Ogilby), 1885 (further records), *Petraïtes johnstoni* (Saville-Kent), 1886 (tentacles), *Petraïtes forsteri* (Castelnau), 1872 (tentacles), *Cristiceps australis* Cuvier & Valenciennes, 1836 (tentacles). Rostral and ocular tentacles of the Tasmanian clinids are figured.

INTRODUCTION

This paper follows the general plan of others in the series. The symbols *Ls, Lt* denote standard length, total length, respectively; *TLs, TLt* signify thousandths of standard, of total, length. Except where otherwise indicated, all linear dimensions are in millimetres, the name of the unit normally being omitted. 'Ordinary' or unadjusted standard deviation, using n (not n-1), has been calculated, regardless of size of sample. Where two, or more, specimens are noted in one context, the sequence of citation of the relevant specification is that of increasing size of individual fish, as measured by *Ls* (rarely, if *Ls* is not conveniently determinable, by *Lt*). Locality records include county names.

Family SYNGNATHIDAE

Genus **STIGMATOPORA** Kaup, 1853

STIGMATOPORA NIGRA Kaup, 1853

Stigmatopora niger Kaup, 1853, *Arch. Naturges.*, **XIX**, 1.233:*nomen nudum*. Type locality: Tasmania.

Stigmatophora nigra Kaup, 1856, Cat. Lophobr. Fish. Brit. Mus.: 53. Type locality: Tasmania (Verreaux).

Supernumerary opercular keels.—Characteristically a well marked and complete opercular keel is present at all stages of growth—a point of distinction from *S. argus* (Richardson), 1840, in which a keel is usually developed feebly in young, but is almost invariably absent in adults. In a specimen, *Lt* 166.0, caught in Scamander River, Cornwall, in green weed near the bank, by Mr K. Lidgerwood on 15th November 1964 an abnormal set-up occurs. A single normal keel traverses the right operculum in an almost straight line (anteriorly briefly concave upward; net direction backwards and slightly upwards), originating quite close to its anterior margin, at level of lower one-third of eye, and ending slightly above the middle of its posterior border. On the left operculum are two additional keels, both lying beneath the normal one. The first arises from the primary keel, at about its anterior one-sixth, and runs back almost in a horizontal line (slightly concave anteriorly, slightly convex posteriorly) to the hind opercular margin. The second originates independently, a trifle nearer to the level of the front of the primary keel than to the point of confluence of the first supernumerary keel, and continues backwards and downwards, in a gently convex curve, for rather less than half the distance between its origin and the free opercular border.

Two distinct keels joining immediately behind the eye are described in the South Australian *Corythoichthys flindersi* Scott, 1957 [later (1962: 117) transferred by its author to *Syngnathus* Linné, 1758; in Whitley's name-list of the fishes recorded from Australia (1964: 38) it is entry 488, *Parasyngnathus* (*Vanacampus*) *flindersi* (T. D. Scott, 1957)]. The illustration (fig. 2: 182) would seem to raise a question as to whether the upper ridge there depicted is an opercular keel in the usual connotation of the term, or whether it possibly represents the upper border of the operculum; but the point cannot be determined without examination of specimens. In *Stigmatopora nigra*, as in some other species, the superior border of the operculum is normally delimited by a low narrow upcurving line or incipient ridge.

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.

Material.—Specimens (*a*)-(*i*); *Ls* 85.7, 91.7, 102.2, 102.7, 102.8, 106.9, 113.8, 120.3, 140.1; *Lt* 87.2, 94.0, 104.4, 105.0, 105.0, 108.9, 116.1, 123.1, 143.1; part of a large collection of various rock-pool fishes taken with rotenone by Mr R. H. Green at Green's Beach, Devon on 4th and 5th August 1965.

Earlier sample.—Data here presented largely supplement and complement data given earlier in these observations (1964) for a sample of 7 specimens, *Ls* 56.2-97.9, $\bar{x}$ 85.67 ± 5.17, from Clarence Point, Devon.

Dimensions, proportions.—Dimensions in mm and proportions as *TLs* of the present sample are set out in Table I. Where significant regression of *TLs* (*Y*) on *Ls* (*X*) obtains, the regression equation, along with its *t*-value, and the estimated values (*Y*) of *Y* for individual fish also are recorded. For those regions the *TLs* value of which as set out in the table comprises only 2 digits a *TLs* of 3 significant figures has been used used in the calculation of the regression equation, so ensuring that full use is made of the available degree of precision of the actual measurements. (It should be noted that whereas in the earlier data (1964, Table I, Table II) proportions are calculated relative to *Lt*, the standard of overall length here adopted is *Ls*.) Inspection of the table shows that the four magnitudes exhibiting significant regresison on *Ls*—snout, eye, interorbital, head—all exhibit a decrease in size relative to overall size of fish. For the remaining entries—which, except in so far as dorsal termination extends shortly beyond the vent, are precaudal—the coefficient of *X* in the (non-significant) regression equations is also negative. Though the neat unbroken run with which *TLs* values for precaudal length decrease to the right in the table (with increasing *Ls*) encountered in an earlier sample of this species (1964, Table I) is not duplicated in the present series, the available evidence is consonant with the situation found in the previous investigation—namely, relative decrease in length to vent, with concomitant relative increase in length of tail, associated with increase in general size of fish. With the earlier sample an attempt was made to investigate the possible existence of a regular growth rate gradient in the various anteroposterior segments of the precaudal length. This was done by calculating for each of the segments the percentage increase in length of specimens (*b*)-(*g*) on specimen (*a*) (smallest), and comparing the results with data similarly arrived at in the case of total length (1964, Table II). Arithmetic means thus obtained, with *Lt* as unity, are as follows (values for present sample, with *Ls* as unity, in parentheses): snout 0.68 (0.98), eye 0.53 (0.73), postorbital head 1.24 (0.87), head 0.88 (0.48), trunk 0.90 (0.98), preanal region 0.89 (0.94), tail 1.06 (1.48). No satisfactory evidence for a simple pattern of growth gradient emerges. For dorsal base, which is partly precaudal, partly caudal, the earlier value was 1.11; for the present material it is 1.10.

Conspectus specifications.—A conspectus of Tasmanian syngnathids (Scott, 1961) provides, as the first 8 entries for each species, the minimum and maximum values, as recorded in the literature, for a count or body proportion. Values of these 8 items for the present material (with conspectus extremes—with some extensions derived from the Clarence Point sample (1964:85)—in parentheses) follow. Total rings 18, all specimens (18-19) + 41-47, $\bar{x}$ 43.7 ± 0.54 (42-47): subdorsal rings 0.1-1.0 + 3.9-5.2 [means 0.40 ± 0.13, 4.63 ± 0.20] (0-1 + 4-5): brood rings caudal 1-14, one specimen only (total 16): dorsal rays 20-24, $\bar{x}$ 21.8 ± 1.2 (20-24): eye in snout 1.8-2.1, $\bar{x}$ 1.99 ± 0.034 (1.8-3.0): snout in head 2.5-2.9, $\bar{x}$ 2.55 ± 0.012 (2.5-2.7): head in trunk 2.3-2.8, 2.49 ± 0.52 (2.4-3.5): trunk in tail 2.2-2.6, $\bar{x}$ 2.45 ± 0.057 (2.2-2.8). Of the present values three thus extend the conspectus entries, two numerically downward (head in trunk 2.3, brood rings 14), one numerically upwards (snout in head 2.9); while more precise values are recorded for the subdorsal annuli.

The statement concerning the earlier sample 'All our values for head in trunk (2.4-2.6) and for trunk in tail (2.5-2.8) , , , stand outside the accepted ranges' (the first numerically in deficit, the second numerically in excess) does not hold good for the present material; though, as noted above, the lower entry for head in trunk is here transgressed.

Pooled values for the two sets of material give frequency distributions of number of caudal annuli, number of dorsal rays as follows. For the 7 counts 41-47 caudal annuli frequencies are 1, 1, 1, 7, 4, 1, 1, respectively. For the 5 counts 20-24 dorsal ray frequencies are 3, 4, 3, 4, 2, respectively. All Tasmanian examples so far examined have 18 trunk annuli.

Size of eye.—Of the sample collected in 1962 it was remarked 'The reason for the distinctly [relatively] smaller eye in our material remains obscure—especially in view of the facts, first, that our specimens are smaller than those previously reported upon (McCulloch & Waite (1918) 2 males 2 females 125-164), and, secondly, that the published ratios take account of a Tasmanian example (from Low Head: *Lt* 142.8)'. Conspectus values for eye in snout, based on available published data at the time, are 1.8-2.1: for the 7 Clarence Point fish [specimens in ascending order of *Ls*: see Table I (1964:87)] the ratios are 2.6, 2.7, 2.5, 2.8, 3.0, 2.8, 2.8. The current sample affords no explanation for the earlier numerically high values; presenting magnitudes (2.0, 2.1, 1.8, 2.1, 2.0, 2.0, 2.0, 2.1, 1.9) having the same extremes as the original conspectus specification.

Meristic data. Meristic data incidentally noticed above are exhibited systematically, along with data for some other characters, in Table II. Three points call for comment.

(*a*) *Right and left body ridges.*—Table II supplements information previously given regarding variation in location, on the two sides of the fish, of the free end of the upper trunk (TU), median trunk (TM), and upper caudal (CU) ridges. Differences between right and left sides expressed as decimal fractions of the anteroposterior extension of one anulus are (of the two figures in parentheses the first applies to the earlier, the second to the present, sample): TU 0.0 (1, 2), 0.1 (4, 1), 0.2 (1, 2), 0.5 (1, 0), 0.7 (1, 0), 0.8 (0, 2), 0.9 (0.1); TM 0.0 (4, 2), 0.1 (2, 0), 0.2 (1, 1), 0.3 (0, 2), 0.5 (0, 1), 0.6 (0, 1), 0.8 (0, 1), 1.1 (0, 1); CU 0.0 (2, 0), 0.2 (1, 1), 0.3 (3, 1), 0.4 (0, 2), 0.6 (0, 3), 0.9 (0, 1), 1.0 (1, 1). Pooling for each type

of ridge observations on both sides, and specifying the point of termination (or of origin; CU) as a decimal fraction of the length of the relevant annulus (measuring from front; 0.0, 1.0 signifying, respectively, anterior, posterior margin), we find TU ends at 0.8 of second caudal ring (0, 1) and at 0.2 (0, 1), 0.3 (0, 1), 0.5 (1, 0), 0.6 (1, 0), 0.7 (1, 6), 0.8 (4, 0), 0.9 (3, 5), 1.0 (4, 1), of third caudal and at 0.1 (0, 2) 0.7 (0, 1) of fourth caudal: TM ends at 0.1 (0, 2), 0.4 (0, 1), 0.7 (0, 1), 0.8 (1, 2), 0.9 (0, 4), 1.0 (8, 6) of last trunk annulus and at 0.1 (4, 1), 0.2 (1, 0), 0.5 (0, 1) of first caudal: CU originates at 0.0 of penultimate trunk annulus (0, 1) and at 0.1 (0, 1), 0.2 (0, 1), 0.4 (5, 0), 0.5 (5, 1), 0.6 (2, 1), 0.7 (2, 1), 0.8 (0, 2), 0.9 (2, 0), 1.00 (0, 2), of last trunk and at 0.1 (2, 3), 0.2 (0, 1), 0.3 (0, 1), 0.4 (1, 2), 0.7 (0, 1), of first caudal. TU is thus seen to extend, in the pooled samples, over 2 annuli (second, third caudal; previously only third), TM over 2 (last trunk, caudal), CU over 3 (penultimate and last trunk, first caudal; previously only latter two).

It is thus apparent the usual practice of citing in a specific diagnosis a unique annulus for the end or beginning (as applicable) of one of these body ridges is of limited validity. The degree of variability now becomes a matter of interest. The relevant data obtained on treating points of origin and termination as continuous variates, measurable in annulus units are given in Table III; where the first three rows specify number of annuli to origin or termination of ridge counted caudad from first trunk annulus (and representing for TU, TM length of ridge; for CU unridged anterior annuli), and the last row, with data available only for current sample, specifies number counted cephalad from last caudal annulus (length of CU). In evaluating the results it should be borne in mind that in both our samples the number of the trunk, but not of the tail, annuli is the same for all individuals: for the species 18-19 trunk rings are recorded. The exceptionally early origin of CU on the left side of (*b*)—see Table II—increases the range of insertion of that ridge from 1.6 to 2.7 annuli. For the pooled sample the distribution is for all ridges leptokurtic, the number of entries lying within the range $\bar{x} \pm \sigma$ being 28, 27, 31 (expected, for normal distribution, 22) for TU, TM, CU, respectively. For the current sample, with an 'expected' number of 12, the number found is 14 for each of the first three distributions, 13 for the last (CU measured from terminal ring).

(*b*) *Supernumerary ridge.*—In specimen (*f*) of the earlier sample, *Ls* 97.0, CU was subcontinuous with an anomalous lateral ridge extending forward along trunk, above TM, for about 11 (left), about $10\frac{1}{2}$ (right) annuli. The supernumerary ridge of the smallest member of the present series specified in Table II has its beginning on left side just overarching, on right overarched by, termination of TM: the right ridge suffers a short interruption posteriorly.

(*c*) *Brood annuli.*—The conspectus entry is 16, without ordinal specification or indication of possible variation in number. On the ventral surface of (*f*) of the present sample two low ridges that presumably delimit an incipient pouch arise just behind vent, at their closest approximation rather less than one-third of width of the annulus apart; diverge rapidly; and from third annulus run back parallel, separated by about half width of ventral surface, to end of 14th ring.

Regional relative intensity of ground color.—The formal discussion of relative intensity in different regions (the three surfaces each of head, trunk, tail) in a single female, *Ls* 139.7, from Low Head, Dorset contained in an earlier contribution (1964: 91) is here complemented by the presentation of observations on the 9 examples of the the current example. Assessments of relative intensity have been made directly by eye (least confidence can be placed in entries for head, in which region the reduction in area of ground color, by abundance of pattern color, makes an accurate estimation of its intensity at times somewhat problematical).

The data are set out in Table IV. Capital letters refer to a color: A black, B very dark brown, C dark brown, D dark reddish brown, E medium brown, F light brown, G dark fawn, H light fawn, I whitish. Lower case letters identify specimens; with numbers in parentheses recording standard length. Numerals not in parentheses are used thus: occurring alone or to left of a decimal point 1, 2, 3 denote the primary (anteroposterior regions), trunk, tail, head, respectively (the sequence following general visual importance, in preference to spatial succession); occurring to right of a decimal point 1, 2, 3 denote the secondary regions (surfaces), lateral, dorsal, ventral, respectively. The entries $>$, $<$, $=$ signify, respectively, deeper than, lighter than, equal in intensity to, ground color of secondary region adopted as standard of comparison. Conventional scores are found by counting $>$ as $+1$, $<$ as -1, $=$ as 0, and summing. Conventional net scores at right provide a conventional estimate of the extent to which a given relative intensity obtains within the sample. Totals of conventional scores, at bottom of table, give for each individual a conventional sum, for the pattern of specification used in the table, of relative intensity values, first, for the three primary or anteroposterior regions, secondly, for the three secondary or superficiary regions.

Considerable individual variation is apparent, only two entries having a conventional net score of 9, the ventral surfaces of the head and the tail being invariably darker than the ventral surface of the trunk. The lateral surface of the tail is at once predominantly darker than the lateral surface of the trunk and lighter than the dorsal caudal surface; again, dorsal caudal is overall darker than trunk or head dorsal: other relations can be determined from the table. In the present inquiry variation in intensity along the anteroposterior axis at an infraregional level (*i.e.*, sectionally within head, trunk, tail) has not been investigated: but the broad picture emerging from such a treatment of the specimen reported upon in 1964, namely, an anteroposterior gradient of ground color intensity with a point of inflection of least intensity at the back of the head would seem to find confirmation at regional level here.

TABLE I

Syngnathus curtirostris Castelnau, 1872. Sample of 9 specimens, *Ls* 85.7–140.1, $\bar{x}$ 107.36 ± 5.05 mm, from Green's Beach, Devon, Tasmania. Dimensions, as measured (mm), and as expressed as thousandths of standard length (*TLs*) of 10 regions: where significant regression of *TLs* (*Y*) on *Ls* (*X*) obtains, the regression equation, with an indication (*t*) of its significance, and the estimated values of *Y* for individual fish also are recorded

Region		Specimen *Ls* : mm									Regression of *TLs* (*Y*) on *Ls* (*X*)	
		(*a*)	(*b*)	(*c*)	(*d*)	(*e*)	(*f*)	(*g*)	(*h*)	(*i*)	Equation	*t*
		85.7	91.7	102.2	102.7	102.8	106.9	113.8	120.3	140.1		
Snout—												
Length	: mm	3.45	3.85	4.05	4.2	4.15	4.05	4.5	4.75	5.05		
TLs	: actual	40	42	40	41	40	38	40	40	36	$Y = -0.09121\,X + 49.37$	4.08**
	: estimated	42	41	40	40	40	40	39	38	37		
Eye—												
Diameter	: mm	1.75	1.8	2.05	2.0	2.05	2.05	2.2	2.3	2.7		
TLs	: actual	20	20	20	19	20	19	19	19	19	$Y = -0.01878\,X + 21.60$	2.78*
	: estimated	20	20	20	20	20	20	20	19	19		
Interorbital—												
Width	: mm	0.95	1.0	1.25	1.2	1.2	1.05	1.15	1.2	1.2		
TLs	: actnal	11	11	12	12	12	10	10	10	9	$Y = -0.04908\,X + 15.94$	2.48*
	: estimated	12	11	11	11	11	11	10	10	9		
Head—												
Length	: mm	9.9	10.05	10.5	11.1	11.05	10.95	11.4	11.8	13.25		
TLs	: actual	116	110	108	108	107	102	100	93	95	$Y = -0.4200\,X + 149.42$	5.82**
	: estimated	113	111	107	106	106	106	102	99	91		
Pectoral—												
Length	: mm	1.9	2.05	2.2	2.2	2.25	2.15	2.2	2.4	3.05	..	..
TLs	: actual	22	22	22	21	22	20	19	20	22		
To dorsal origin—												
Length	: mm	31.0	32.2	36.7	36.9	36.3	36.5	39.95	41.0	48.3	..	..
TLs	: actual	362	351	359	359	353	341	351	341	352		
To dorsal termination—												
Length	: mm	37.0	38.9	43.4	44.6	43.25	44.5	47.95	49.3	58.9	..	..
TLs	: actual	432	424	425	434	421	416	422	410	420		
To vent—												
Length	: mm	32.2	33.3	39.5	37.6	37.95	39.5	41.0	42.1	50.25	..	..
TLs	: actual	376	363	387	366	369	354	360	350	359		
Trunk (calculated)—												
Length	: mm	22.3	23.25	29.0	26.5	26.9	28.55	29.6	30.3	37.00	..	..
TLs	: actual	260	254	279	258	262	252	260	257	267		
Dorsal base (calculated)—												
Length	: mm	6.0	6.7	6.4	7.7	6.95	8.0	8.0	8.3	9.65	..	..
TLs	: actual	70	73	76	73	68	75	70	69	69		

TABLE II

Syngnathus curtirostris Castelnau, 1872. Meristic characters of 9 specimens, *Ls* 85.7 – 140.1, $\bar{x}$ 107.36 ± 5.05 mm, from Green's Beach, Devon, Tasmania

Feature	Specimen								
	(*a*)	(*b*)	(*c*)	(*d*)	(*e*)	(*f*)	(*g*)	(*h*)	(*i*)
Dorsal rays	21	21	20	23	21	21	23	22	24
Trunk annuli	18	18	18	18	18	18	18	18	18
Tail annuli	42	44	43	41	44	45	47	44	44
Annulus (with decimal fraction), on which dorsal originates	17 (0.8)	17 (0.8)	17 (0.9)	18 (0.1)	18 (0.0)	17 (0.9)	17 (0.9)	17 (0.8)	18 (0.2)
Annulus (with decimal fraction) on which dorsal terminates	22 (0.9)	22 (0.9)	22 (1.0)	23 (0.2)	23 (0.1)	22 (1.0)	23 (0.2)	23 (0.2)	23 (0.2)
Annulus (with decimal fraction) on which TU terminates .. right	21 (0.7)	21 (0.7)	21 (0.9)	21 (0.9)	22 (0.1)	22 (0.1)	21 (0.2)	21 (0.7)	21 (0.9)
left	20 (0.8)	21 (0.7)	21 (1.0)	22 (0.7)	21 (0.9)	21 (0.3)	21 (0.9)	21 (0.7)	21 (0.7)
Annulus (with decimal fraction) on which CU originates .. right	19 (0.1)	18 (0.0)	18 (0.8)	19 (0.2)	19 (0.7)	19 (0.4)	18 (1.0)	19 (0.1)	19 (0.3)
left	19 (0.4)	17 (0.0)	18 (0.2)	18 (0.6)	19 (0.1)	18 (0.5)	18 (0.8)	18 (0.7)	18 (1.0)
Annulus (with decimal fraction) on which TM terminates .. right	18 (0.1)	18 (0.9)	19 (0.5)	18 (1.0)	18 (0.4)	18 (0.9)	18 (1.0)	18 (0.8)	18 (0.8)
left	18 (0.9)	18 (0.9)	18 (1.0)	18 (0.7)	18 (1.0)	18 (0.9)	19 (0.1)	18 (1.0)	18 (1.0)
Annuli (with decimal fractions) between which supernumerary mid-lateral ridge extends ..									
right	18 (0.1)–17 (0.1)+ 19 (0.2)–19 (1.0)	..	..	..	..	..	..	..	..
left	18 (0.0)–36 (0.2)	..	..	..	..	..	..	..	..
Annuli (with decimal fractions) between which ridges of rudimentary brood pouch extend	..	..	..	..	..	..	19 (0.0)–32 (1.0)	..	..

TABLE III

Syngnathus curtirostris Castelnau, 1872. Specification of lengths of body ridges, upper trunk (TU), median trunk (TM) and upper caudal (CU), treated as continuous variates, measured in annulus units: for TU, TM annuli counted caudad from first trunk annulus, for CU caudad from first trunk annulus (upper entry) and cephalad from last caudal annulus (lower entry): observations made on both sides of fish. Earlier sample, 7 specimens, from Clarence Point, Devon, Tasmania specified previously (1964 : 85), present sample, 9 specimens, specified in this paper

Morphological feature measured (annuli)	Ridge	Present sample				Pooled sample			
		Range	$\bar{x}$	σ	V	Range	$\bar{x}$	σ	V
Ridge length ..	TU	20.8–22.7	21.77 ± 0.092	0.39 ± 0.065	1.8 ± 0.07	20.8–22.7	21.78 ± 0.070	0.40 ± 0.050	1.9 ± 0.2
Ridge length ..	TM	18.1–19.5	18.83 ± 0.078	0.33 ± 0.055	1.8 ± 0.06	18.1–19.5	18.92 ± 0.048	0.27 ± 0.035	1.4 ± 0.2
Pre-ridge length ..	CU	17.0–19.7	19.00 ± 0.14	0.61 ± 0.10	3.2 ± 0.1	17.0–19.7	18.75 ± 0.22	1.22 ± 0.15	6.5 ± 0.8
Ridge length ..	CU	40.8–47.2	44.01 ± 0.42	1.76 ± 0.29	4.0 ± 0.7	..	..	..	..

TABLE IV

Syngnathus curtirostris Castelnau, 1872. Regional relative intensity of ground color in 9 specimens, *Ls* 85.7–140.1, $\bar{x}$ 107.36 ± 5.05 mm, from Green's Beach, Devon, Tasmania

For explanation see text

Primary region (antero-posterior segment)	Secondary region (surface)	Secondary region as standard of comparison	Specimen (*Ls*, mm)									Conventional net score x = *i* Σ x x = *a*
			(*a*) 85.7	(*b*) 91.7	(*c*) 102.2	(*d*) 102.7	(*e*) 102.8	(*f*) 106.9	(*g*) 113.8	(*h*) 120.3	(*i*) 140.1	
1	1.1	..	B	D	C	A	E	C	C	C	F	..
	1.2	1.1	<	=	>	=	>	=	=	>	>	3
	1.3	..	B	G	H	D	H	H	G	I	I	..
2	2.1	1.1	>	>	=	>	>	>	=	<	>	5
		2.2	<	>	<	>	<	<	<	<	<	−5
		2.3	<	<	>	>	>	>	<	>	<	1
	2.2	1.2	>	>	>	>	>	>	>	>	<	7
		2.1	<	<	>	<	>	>	>	>	>	3
		2.3	>	<	>	>	>	>	>	>	<	5
	2.3	1.3	>	>	>	>	>	>	>	>	>	9
		2.1	>	>	<	<	<	<	>	<	>	−1
		2.2	>	>	<	<	<	<	<	<	>	−3
3	3.1	1.1	=	=	<	=	>	>	>	>	<	2
		3.2	>	>	=	=	>	>	<	>	=	4
		3.3	<	<	<	=	>	>	=	>	=	0
	3.2	1.2	=	<	<	=	=	>	=	<	<	−3
		3.1	<	<	=	=	<	<	>	<	=	−4
		3.3	<	<	<	=	>	>	=	>	=	0
	3.3	1.3	>	>	>	>	>	>	>	>	>	9
		3.1	>	>	>	=	<	<	<	<	=	−1
		3.2	>	>	>	=	<	<	<	<	=	−1
Totals: conventional score		N=3 Σ 1.N N=1	−1	−1	0	−1	0	−1	−1	0	0	−5
	N=3 Σ N.N N=1	N=3 Σ 2.N N=1	2	7	3	3	3	3	2	3	−2	24
		N=3 Σ 3.N N=1	1	0	−1	1	..	3	−2	1	−3	−2
		N=3 Σ N.1 N=1	1	1	−2	3	3	4	−2	4	−4	8
	N=3 Σ N.N N=1	N=3 Σ N.2 N=1	−4	0	0	1	0	4	2	3	−2	4
		N=3 Σ N.3 N=1	6	5	4	−1	−1	−3	−1	−3	1	5

Family NEOODACIDAE

The four species credited to Tasmania in the Check-List—*Olisthops cyanomelas* Richardson, 1850; *Haletta semifasciata* (Cuvier & Valenciennes), 1840; *Neoodax balteatus* (Cuvier & Valenciennes), 1839; and the endemic *N. attenuatus* (Ogilby), 1897—together with *N. radiatus* (Quoy & Gairnard) 1853, first recorded for Tasmania in Part XII of these Observations, have been keyed in that paper (1964:97).

Neoodax frenatus (Günther), 1862 is here added to our list. In the key mentioned it would follow reference number 4, being distinguished from the species in couplet 4 thus: from *N. balteatus* by a greater (31, against 28-30), from *N. attenuatus* by a smaller (31 against 35), number of dorsal radial elements (spines plus rays); and from both these species by a smaller number of anal radial elements (13, against 15, 19, respectively).

Some comparative proportions, as *TLs*, of local examples of all the Tasmanian species, with the exception of *N. attenuatus*, which does not seem to have been satisfactorily recognized since it was described, are exhibited in Table V.

Genus **NEOODAX** Castelnau, 1875

NEOODAX FRENATUS (Günther), 1862

Odax frenatus Günther, 1862, Cat. Fish. Brit. Mus., IV:241. Type localities: Fremantle and Gages Road, Swan River, Western Australia.

Tasmanian record.—An example, *Ls* 152.2, *Lt* 193.5, was obtained in the Tamar River, Dorset/Devon, on 23rd July 1965 by Mr E. W. Gatenby (Queen Victoria Museum Reg. No. 1965.5.6). The species has hitherto been known only from Western Australia and South Australia.

Meristic data.—D. xviii, 14 A. iii, 10. V. i, 4. P. 10 (left), 12 (right). C. 15 (all counted), 12 main rays. L. lat. 41. L. tr. 3/11.

Remarks.—Body ratios in general agree satisfactorily with those given in the original description, based on an example 56 lines in total length. Those noted by Günther (with values for the present specimens in parentheses) are: height of body eight (7.0), head four and a third (4.6), caudal, 6 (4.7) in total length. Pectoral a little shorter than (0.72 of) ventral, two-fifths (0.45) of head.

A fairly full series of proportions of the present example, expressed as *TLs*, are set out in Table V, side by side with corresponding data for three other local neoodacids.

Scales cover the whole of the space between the preopercular ridge and a very narrow naked rim round the orbit to a little in advance of hind border of eye, somewhat irregularly arranged in from 2 rows (above) to 4 or 5 rows (below). Beneath eye lies a smooth lanceolate facet extending horizontally from about one-third of an eye-diameter in advance of orbit to level of hind border of orbit, its borders, the lower of which is the subocular segment of the preorbital ridge, sharply defined and slightly elevated. The area between this facet and lower border of eye is filled by the continuation of the scales already mentioned, which thereby come to extend as far forward as front of pupil, in advance of which they are reduced to a short single series. Small scales occur also on the vertical limb of the preoperculum between its posterior border and the preopercular ridge, reaching at least as far forward as the posterior one-fourth of the genal facet. Operculum covered with scales: those on the upper part are about the same size as, or a little larger than, those on the upper part of the preoperculum; those of the lower part—exhibiting, unlike their preopercular counterparts, little decrease in size—are up to twice as large as those on the preoperculum at the same horizontal level. Several scales on posterior half of subopercular. Preopercular border entire.

Coloration.—General color rather dark green, somewhat darker and more brownish on dorsal surface, somewhat lighter, and, in parts, more yellowish, on lower half of flank, and on ventral surface; some silver anteriorly on throat. On left side a row of pink scales along lateral line. Head: above concolorous with darkest portions of dorsal surface of body; on side green in lower half, lightest on genal facet, a horizontal dark, almost black, bar through eye covering almost whole of snout above mouth and continuing back to end of operculum, several light golden lines on cheek: on ventral surface pale greenish yellow. Dorsal anteriorly concolorous with body, but having at several points basal blackish and bright magenta splashes; posteriorly lighter in general color, becoming, rather suddenly, very light straw, with some dark green basally and with some basal and scattered pale red. Anal chiefly lettuce green in anterior half; yellow or pale orange, with some greenish tinge, in posterior half. Caudal wholly green, save for a dull bronze flush at base and on proximal half of some of the middle rays. Pectoral orange, with dark green basal bar, and with some distal green. Pelvic spine green, first ray brownish, second dark green, inner two dirty white.

NEOODAX RADIATUS (Quoy & Gaimard, 1835

Malacanthus radiatus Quoy & Gaimard, 1835, Voy. *Astrolabe*, Zool., III: 717, pl. XIX, fig. 2. Type locality: King George's Sound, Western Australia.

Neoodax radiatus (Quoy & Gaimard). McCulloch, 1929, *Mem. Aust. Mus.*, V, 1:324 (synonymy).

Comparative proportions.—A specimen, *Ls* 152.0, *Lt* 189.5, caught in the Tamar estuary off Lagoon Bay, Low Head, Dorset, in green seaweed, at 3-4 fathoms by Mr R. Askeland in January 1962, affording the first Tasmanian record of this species, has been noticed in these Observations, and a table of proportions, as thousandths of total length, provided (Scott, 1964:98). For convenient comparison with other members of the family considered in the present contribution, the available relevant proportions have been recalculated as thousandths of standard length and incorporated in Table V.

NEOODAX BALTEATUS (Cuvier & Valenciennes), 1839

Odax balteatus Cuvier & Valenciennes, 1839, Hist. Nat. Poiss., xiv: 303. Type locality: none recorded (Péron [= Tasmania (McCulloch, 1929: 324)].

TABLE V

Haletta semifasciata (Cuvier & Valenciennes), 1840, *Neoodax frenatus* (Günther), 1862, *N. balteatus* (Cuvier & Valenciennes), 1839, *N. radiatus* (Quoy & Gaimard), 1835. Some proportions, as thousandths of standard length, of Tasmanian specimens: for exact localities see text

Dimension	*Haletta semifasciata*		*Neoodax frenatus*	*Neoodax balteatus*			*Neoodax radiatus*
	(*a*) *Ls* 253.0	(*b*) *Ls* 321.0	*Ls* 152.2	(*a*) *Ls* 60.6	(*b*) *Ls* 73.1	(*c*) *Ls* 84.4	*Ls* 152.0
Total length	1174	1165	1271	1216	1211	1256	1240
Length to first dorsal origin	324	332	283	333	319	331	276
,, ,, first dorsal termination (last spine)	635	620	624	640	630	615	..
,, ,, second dorsal origin (first ray)	647	633	638	649	646	629	..
,, ,, second dorsal termination	837	840	817	840	846	821	826
,, ,, anal origin	648	651	650	613	612	629	628
,, ,, anal termination	832	824	811	843	829	852	789
,, ,, pectoral origin	279	276	257	281	274	267	263
,, ,, pelvic origin	356	347	322	365	338	367	304
,, ,, vent	636	636	624	591	590	603	622
Length of longes (*n*th) dorsal spine	83 (9th)	78 (12th, 15th)	106 (6th)	117 (11th)	124 (10th)	106 (11th)	189 (1st)
,, ,, longest (*n*th) dorsal ray	109 (9th)	106 (8th)	102 (11th)	130 (11th)	109 (12th)	136 (12th)	112 (1st)
,, ,, 1st anal spine	37	25	98	49	57	53	53
,, ,, 2nd anal spine	72	55	91	67	85	95	86
,, ,, 3rd anal spine	78	66	72	89	(none)	106	102
,, ,, longest (*n*th) anal ray	94 (12th)	76 (9th)	72 (2nd,3rd)	97 (2nd)	93 (2nd,3rd)	108 (2nd)	..
,, ,, pectoral (whole fin)	154	157	125	163	152	178	..
,, ,, longest (*n*th) pectoral ray	126 (7th,8th)	126 (5th,6th,7th)	112 (4th)	137 (8th)	136 (7th)	150 (7th)	112 (4th)
,, ,, pelvic (whole fin)	125	112	174	134	135	158	..
,, ,, pelvic spine	88	83	137	99	109	120	..
,, ,, 1st pelvic ray	109	100	171	119	115	132	..
,, ,, 2nd pelvic ray	115	103	129	122	122	136	..
,, ,, 3rd pelvic ray	106	97	98	102	118	119	..
,, ,, 4th pelvic ray	69	83	86	87	98	100	..
Head, with opercular flap	279	280	279	302	309	310	283
,, without opercular flap	265	269	265	267	274	284	260
Mouth	59	69	75	58	56	63	..
Eye	44	44	51	81	68	71	47
Snout	118	118	104	87	95	101	106
Interorbital, soft	55	67	49	83	79	55	84
,, bony	48	62	47	66	56	47	..
Depth, maximum	206	196	181	180	192	191	172
,, at opercular border	174	184	157	165	168	187	168
,, at vent	186	181	154	165	178	169	164
,, at caudal peduncle (minimum)	87	87	52	106	109	107	92

Odax algensis Richardson, 1840, *Proc. Zool. Soc. London*: 26. Type locality: Port Arthur [Pembroke], Tasmania.

Odax brunneus Macleay, 1881, *Proc. Linn. Soc. N.S.W.*, vi, 1: 109. Type locality: Port Jackson [New South Wales].

Material.—Three small examples collected by Mr B. C. Mollison: (*a*), *Ls* 60.6, *Lt* 73.7, (*b*) *Ls* 73.1, *Lt* 88.5, both taken at Middleton, Buckingham on 25th June 1961 in 6-10 fathoms; (*c*), *Ls* 84.4, *Lt* 106.1, from Woody Island, Buckingham, on 6th June 1963.

Proportions.—For some proportions, as *TLs,* see Table V.

Meristic data.—D xv, 13; xvi, 12; xvi, 12. A. iii, 12 (last cleft to base); iii, 13 (last cleft to base); iii, 13. P. 14, 14; 13 (left), 14; 13 left), 14. V. i, 4. C. 12 main, 16 total, rays. L. lat. 38, 38, 37. L. tr. 4/12, 4/13, 4/14.

For his *Odax algensis,* which has Port Arthur [Pembroke] Tasmania as type locality, and which since Günther (1862: 240) has been regarded as synonymic with Cuvier & Valenciennes' species, Richardson (1840: 26)) reported only 2 anal spines (while for *O. brunneus* Macleay, regarded by McCulloch (1929: 324) as another synonym, the low total anal count of 14—spines and rays not being distinguished—may perhaps involve a reduction in number of spines). It is interesting therefore to note the position in the present material: in (*a*) and (*c*) the first anal spine is wholly bound up with the second, and it is only with some difficulty its presence is established, in (*b*) only 2 spines occur—however, the anterior shows some suggestion of division distally and may possibly result from the fusion of what would normally have been the first and second spines.

Remarks.—The scales on the preoperculum in advance of the ridge, which is well defined, are in 2-3 rows above and reach a maximum of about 5 below at about the level of hind border of pupil, in advance of which, reduced to 1-2 rows, they extend to below front of pupil, or beyond: they are subequal in size, very much smaller than those on operculum. The width of the naked ocular annulus ranges from one-eighth to one-quarter of a pupil-diameter: in (*a*) the pores occurring in this area

are associated with tubules, which from 8 o'clock (left side) extend forwards, as a continuous ridge, under the eye and well beyond level of its anterior margin. The genal facet, the degree of patency of which increases in the sample with size of fish, is, at its most pronounced, intermediate in development between that in *Haletta fasciata* and that in *Neoodax frenatus*, as represented by our material: its posterior tip reaches almost to below hind border of orbit. Preoperculum behind ridge naked, save for several small scales on left side of (*c*). Large or largish scales occur on the operculum (the upper ones slightly larger or slightly smaller than contiguous body scales, the lower regularly larger than those on pectoral base); they are disposed much as in *H. fasciata*. Suboperculum naked.

Scales on the dorsal surface of the head cease at, or (*c*) slightly in advance of, level of upper angle of preoperculum.

The whole vertical border of the preoperculum is denticulate; glassy projections basally contiguous, acute, 25-30.

Termination of mouth lies midway between tip of snout and eye between anterior orbit and front of pupil. As in *H. fasciata* and *N. frenatus* a subtriangular lobe lies between, and partly covers, the bases of the pelvics.

Specimen (*a*) has a whitish ovoid encysted parasite on the penultimate dorsal ray; (*b*) has one each on the second and the last 3 dorsal rays; (*c*) has two on caudal.

Coloration.—General color of specimens, as preserved in formalin, light, somewhat yellowish brown, darker on back and on side above midlateral line. Dark band, subequal in width to pupil, from upper lip horizontally to eye; behind eye continued (with some increase in width; most notable in (*c*), in which at its maximum extension, occurring near middle of fish, it doubles) straight to middle of caudal base. Indications of about 8 imperfect vertical bars, noticeably developed below the dark longitudinal band only in (*c*), in which irregular dark patches, each involving several scales, are obscurely continuous with, or separate from, rest of bar on upper half of side. Superoposterior surface of upper lip slate, or darker; rest of lip, and whole of lower lip, white. All fins white, except caudal of (*c*), which is yellowish brown basally, darkening somewhat distally.

Genus **HALETTA** Whitley, 1947

HALETTA SEMIFASCIATA (Cuvier & Valenciennes), [1840]

Odax semifasciatus Cuvier & Valenciennes, 1840, Hist. Nat. Poiss. XIV ['1839' = Jan. 1840, *fide* McCulloch, 1929:323]: 299, pl. ccccvii. Type locality: 'Mers des Indes' (Péron) [= Tasmania (McCulloch)].

Odax richardsonii Günther, 1862, Cat. Fish. Brit. Mus., IV:241. Type locality: Port Jackson, New South Wales, and Hobson's Bay, Victoria.

Odax hyrtlii Steindachner, 1866, *Sitzb. Akad. Wiss.* Wien, liii:464, pl. V, fig. 4 (teeth). Type locality: Port Jackson, New South Wales (Hyrtl).

Haletta semifasciata (Cuvier & Valenciennes). T. D. Scott, 1962, The Marine and Fresh Water Fishes of S. Aust.: 281, unnumbered fig. on p. 281.

Material.—Four examples in the Queen Victoria Museum, Launceston have been examined: (*a*) *Ls* 253.0, *Lt* 297.0; (*b*) *Ls* 321.0, *Lt* 374.0; (*c*) and (*d*), which have been gutted, have approximate standard lengths of 322, 326 and approximate total lengths of 373, 378, respectively. Specimen (*a*) Tamar River, Devon/Dorset on 28th July, 1965, E. W. Gatenby (Queen Victoria Museum Reg. No. 1965.5.7); (*b*) Beauty Point, Devon, on 20th August 1965, E. W. Gatenby (Q.V.M. Reg. No. 1965.5.11); (*c*) and (*d*) off mouth of Little Forester River, Dorset, in about 12 ft of water, on 10th September 1961, J. Waterhouse (Q.V.M. Reg. No. 1961.5.3).

Meristic data.—For his *Odax richardsonnii* Günther (1862) gave D. xvii, 13; A. iii, 11-12. T. D. Scott (1962: 281), while retaining the anal formula unchanged, admits variation in the dorsal specification thus, xvi-xvii, 13-14: earlier, however, Macleay (1881: 107), following Günther (1862: 241) had given for Cuvier & Valenciennes' species D 18/12, and had allowed only 2 anal spines (2/11). For the 4 Tasmanian examples we have these counts. D. xviii, 13; xviii, 13 (last cleft to base); xviii, 13; xvii, 14 (last half cleft). A. iii, 12; iii, 11 (last cleft to base); iii, 12; iii, 11. P. 15 in all except in left fin of (*d*), which has 14. V. i, 4 in all (Scott, who correctly notes 4 rays in his general description, has by inadvertence i, 5 in his formal meristic specifications). C. 12 main, 16 total, rays in all. L. lat. 62, 64, 66, 65. L. tr. 8/15, 8/16, 8/16, 8/17.

Proportions.—Some proportions of (*a*) and (*b*) are exhibited in Table V—(*c*) and (*d*) gutted—for comparison with those of three other species.

Remarks.—Scales on the preoperculum in advance of the ridge (which is much less developed than in *Neoodax frenatus*, being in parts obsolescent) form an arc, 5-6 rows wide above and below and 3-4 rows in the middle one-third of band, extending between levels of upper border and middle of lower border of orbit: they are subequal in size, decidedly smaller than those on operculum. Separating this series of scales from the eye is an arc of smooth skin (perforated by portion of a semicircle of small pores concentric with back and lower part of orbit), its width subequal to diameter of pupil, or about one-third shortest distance between orbit and preopercular border: in *N. frenatus* it is relatively about half as wide. Preoperculum behind its ridge naked. The naked lanceolate genal facet noted above in *N. frenatus* is here much less conspicuous, being less acutely angled to the plane of the cheek immediately above it and being bordered superiorly by a less developed ridge: its posterior tip reaches only to midway between middle and hind border of pupil, instead of beyond orbit as in the other species. Large or largish scales occur on the operculum (the upper ones slightly larger or slightly smaller than contiguous body scales, the lower regularly larger than those on pectoral base); they do not extend below, if as far as, the horizontal level of the lower insertion of the pectoral lobe, and are usually absent also from a narrow slip (broadest below, where its width is about that of 2 scales) immediately behind the preoperculum, and,

briefly, from part of the upper half of the opercular margin. Suboperculum naked.

A marked difference in the disposition of scales on the dorsal surface of the head characterizes *H. fasciata* and *N. frenatus*: in the former scales continued from the body cease at about the level of the end of the preoperculum, roughly an eye-diameter behind level of eye; in the latter they extend forwards to, or a trifle beyond, level of front of eye.

In (*a*) the preopercular border is clearly crenulate, and conspicuously, though rather minutely, denticulate: in the other examples the crenulation is more obscure and the amount of the denticulation much reduced.

In this species the termination of the mouth lies midway between tip of snout and a point between front of eye and anterior half of pupil: in our specimen of *N. frenatus* twice horizontal mouth-length reaches just beyond eye.

Six ovoid whitish cysts, 1.5-2 mm long, occur on the caudal rays of (*b*).

Coloration. This exhibits considerable variation; as is illustrated by the following brief specifications of (*a*) and (*b*).

(*a*) General color above dusky with some slate grey on side. Most scales predominantly golden, bordered behind by blue and with some silver in front: in parts, gold reduced to inframarginal arc adjoining blue: in advance of tip of adpressed pectoral, upper flank with most scales wholly silver and marginal blue. On lower half of most of side blue so disposed as to give rise to 3 or 4 longitudinal lines. Ventral surface wholly silvery. Head with scaled areas silvery, with much blue (some scales blue only); dorsum very dark green; snout above level of bottom of eye greenish, translucent, below this more or less silvery. Whitish annulus round eye; iris greenish gold with red lustres, ringed externally with peacock blue; pupil blackish. Spinous dorsal: spines broadly bordered green; membrane in general translucent, somewhat dusky distally, with blue splashes and spots (especially in outer half), and with red and orange splashes along base. Soft dorsal: rays with distal half mostly dull amber, proximal half cross-banded red-blue-red-blue-red; some black at bases of first 7 rays (also, in first 3-4, black along length of rays). Anal: rays mostly whitish or silvery, becoming dusky distally; membrane silvery at base, elsewhere chiefly greyish, with blue and red splashes in basal one-third, or, anteriorly, in basal half, the red in particular tending to form a horizontal line. Pectoral: membrane silvery white; rays straw, very slenderly outlined in red. Pelvic: spine, rays and membrane silvery. Caudal: membrane partly silvery, partly bluish; rays with basal half, or more, reddish on silver, the free silver becoming dark greyish or blackish towards the tips.

(*b*). Trunk and tail: very dark greenish brown on back and upper one-fourth of flank; then becoming largely greenish, the scales edged in their anterior half or one-third with warm red-brown; most of rest of flank ranging from color just described to silvery, marked with 6-8 pinkish or pink and gold (behind level of vent increasingly golden) lines; towards ventral profile free of these lines and with ground colour continuous with that of the ventral surface, which is silvery up to vent, caudad of which it becomes increasingly golden. About 10 irregularly shaped, and in parts (particularly above) obscurely delimited, vertical dark olive brown bars running from dorsal profile from two-thirds to three-fourths of distance towards ventral profile, the first mainly cephalad of dorsal origin, the last on caudal base. Three short light green bars diverging forward from vent. Head: dorsum dark, somewhat greenish brown; snout down to level of lower border of eye concolorous with dorsum, below this with some green and silver; subvertical band of scales on preoperculum bright green, rest of vertical limb of preoperculum shining green and reddish, subhorizontal limb mostly silver; squamous portion of operculum green (darker than scaled preoperculum), rest silvery gold; suboperculum silver; lower lip yellowish flesh, upper dark greenish brown. Spinous dorsal: spines reddish green, barred green-red basally; membrane translucent, with faint pinkish, purplish and greenish flushes, most pronounced adjoining the spines, and with some purple round spine-bases. Soft dorsal: rays olivaceous, becoming more or less amber distally; membrane resembling that of first dorsal, but less extensively colored. Anal: rays pink; membrane immaculate, translucent silvery white. Pectoral: membrane translucent, immaculate; rays somewhat greenish amber. Pelvic: membrane completely translucent; spine and rays white. Caudal membrane flesh-colored, with greenish tinge and some reddish lights; rays greenish brown.

Family Clinidae

The five species then recorded from Tasmania, (together with two—*Tripterygion clarkei* Morton, 1888, *Gillias macleayanus* (Lucas), 1891— now segregated in the family Tripterygiidae) were keyed in Part VII of these Observations (1955: 137): a sixth, *Petraïtes heptaeolus* Ogilby, 1885, has since been listed (1965: 59). Another species of *Petraïtes* Ogilby, 1885, *P. phillipi* (Lucas), 1891, previously reported (McCulloch, 1929: 349) only from Victoria, and a second species of *Cristiceps* Cuvier & Valenciennes, 1836, *C. argyropleura* Kner, 1865, recorded in the Check-List (McCulloch, 1929: 350) only from New South Wales and Lord Howe Island, are here added to the local list, which thus stands at eight.

Some general observations are made on *Clinus perspicillatus* Cuvier & Valenciennes, 1836, *C. puellarum* Scott, 1935, *Petraïtes heptaeolus* Ogilby, 1885. Ocular and rostral tentacles—features of which little use has hitherto been made in specific diagnoses, but which appear to be of considerable taxonomic importance—are figured (fig. 1, *a-h*) for the locally occurring clinids; comprising, in addition to the 3 species named above in this paragraph, *Petraïtes phillipi, P. johnstoni, P. forsteri, Cristiceps australis, C. argyropleura.*

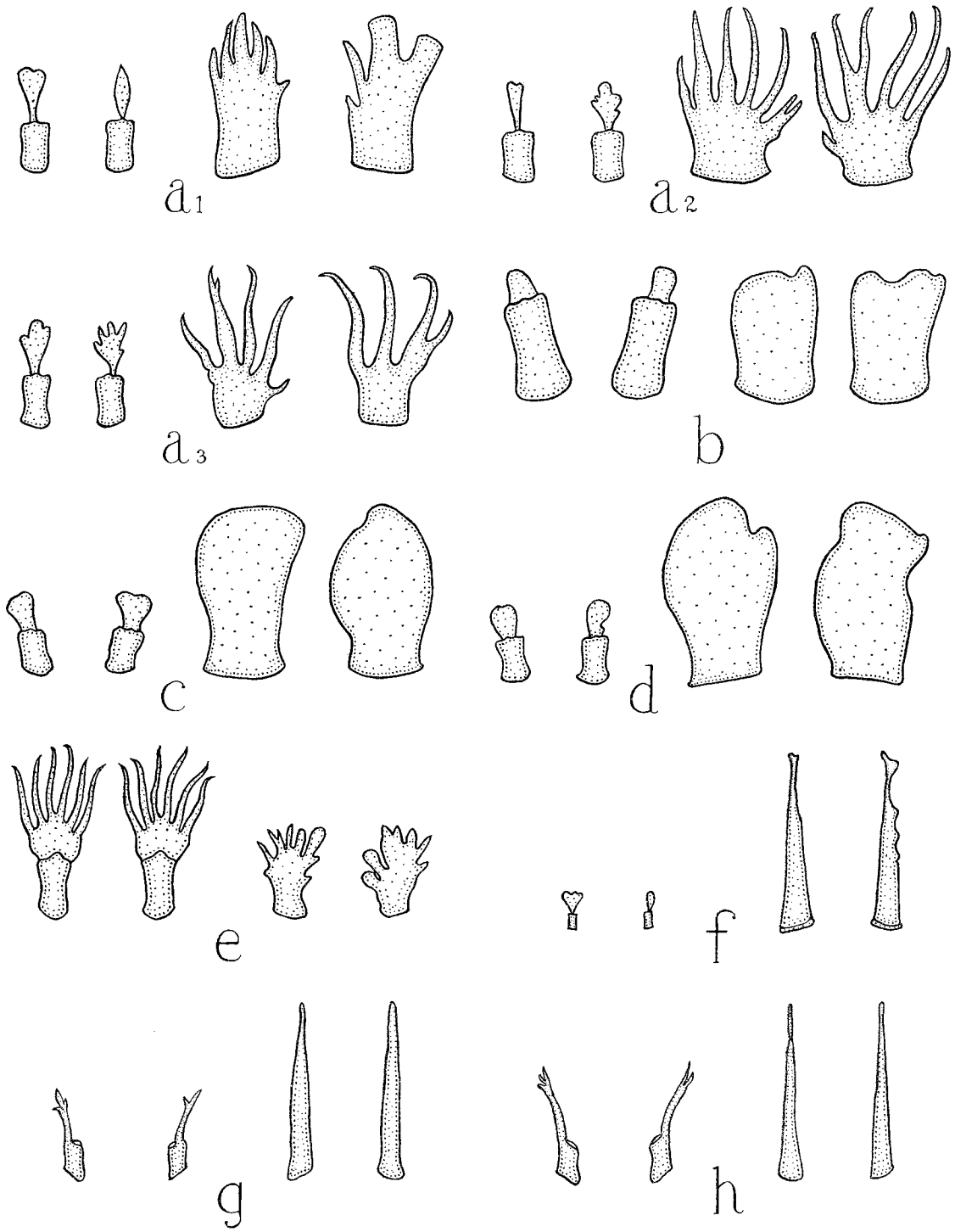

FIG. 1.—ROSTRAL AND OCULAR TENTACLES OF TASMANIAN CLINIDS

For each specimen there are shown, in succession from the left: right rostral, left rostral, right ocular, left ocular tentacle; all viewed from in front. Pigmentation not indicated. Standard length of fish (*Ls*) in millimetres.

a.—Clinus perspicillatus Cuvier & Valenciennes, 1836: a_1 *Ls* 38.0, × 15; a_2 *Ls* 69.0 × 11; a_3 *Ls* 111.2 × 8½. *b.—Clinus puellarum* Scott, 1955: *Ls* 35.7, × 45. *c.—Petraïtes heptaeolus* Ogilby, 1885: *Ls* 44.7, × 25. *d.—Petraïtes phillipi* (Lucas), 1891: *Ls* 78.2, × 15. *e.—Petraïtes johnstoni* (Saville-Kent), 1886: *Ls* 95.0, × 4½ (the rostral tentacles are in preserved specimens constantly directed forwards; they have been lifted and drawn as if carried erect). *f.—Petraïtes forsteri* (Castelnau), 1872: *Ls* 88.8, × 4. *g.—Cristiceps argyropluera* Kner, 1865: *Ls* 70.5, × 9. *h.—Cristiceps australis* Cuvier & Valenciennes, 1836: *Ls* 80.0, × 5.

Genus **CLINUS** Cuvier, 1816

CLINUS PERSPICILLATUS Cuvier & Valenciennes, 1836

(Fig. 1 *a*)

Clinus perspicillatus Cuvier & Valenciennes, 1836, Hist. Nat. Poiss., XI: 372. Type locality: Westernport, Victoria (Quoy & Gaimard).

Clinus despicillatus Richardson, 1839, *Proc. Zool. Soc. Lond.*: 97. Type locality: Port Arthur, Tasmania.

Material.—(*a*) 11 specimens from Taroona, Buckingham, earlier discussed in the Observations (1965: 60): this series has *Ls* range 31.0-137.8 $\bar{x} = 97.88 \pm 8.74$, $\sigma = 29.00 \pm 6.18$, $V = 29.6 \pm 6.2$; *Lt* range 36.1-156.7, $\bar{x} = 112.85 \pm 9.93$, $\sigma = 32.93 \pm 7.02$, $V = 29.2 \pm 6.72$. (*b*) a pooled sample of 29 specimens from Green's Beach, Devon, collected by Mr R. H. Green (*Ls* 24.4-113.5, $\bar{x} = 56.60 \pm 5.58$, $\sigma = 30.06 \pm 3.95$, $V = 53.1 \pm 8.2$; *Lt* 28.8-130.0, $\bar{x} = 65.96 \pm 6.14$, $\sigma = 33.07 \pm 4.34$, $V = 50.1 \pm 6.60$), comprising 3 subsets: (*i*) 6 specimens, 27th September 1964 (*Ls* 70.0-109.0, $\bar{x} = 93.08 \pm 5.46$, $\sigma = 13.38 \pm 3.86$, $V = 14.37 \pm 4.15$; *Lt* 82.2-124.9, $\bar{x} = 107.90 \pm 5.93$, $\sigma = 14.55 \pm 4.20$, $V = 13.49 \pm 3.89$); (*ii*) 17 specimens, 14th December, 1964 (*Ls* 24.4-51.05, $\bar{x} = 34.66 \pm 1.56$, $\sigma = 6.45 \pm 1.11$, $V = 18.61 \pm 3.30$; *Lt* 28.8-59.4, $\bar{x} = 40.77 \pm 1.79$, $\sigma = 7.38 \pm 1.27$, $V = 18.10 \pm 3.20$); (*iii*) 6 specimens, undated (*Ls* 54.4-113.5, $\bar{x} = 82.26 \pm 10.20$, $\sigma = 26.84 \pm 7.75$, $V = 32.62 \pm 10.37$; *Lt* 63.2-130.0, $\bar{x} = 95.38 \pm 9.21$, $\sigma = 22.55 \pm 6.51$, $V = 23.63 \pm 7.19$).

Subset (i) is associated with 1 *Petraïtes heptaeolus;* subset (*ii*) with 44 *Bovichtus variegatus,* 5 *Pictiblennius tasmanianus,* 5 *Alabes rufus,* 1 *Clinus puellarum,* 2 *Petraïtes heptaeolus;* subset (*iii*) with 7 *Pictiblennius tasmanianus,* 3 *Petraïtes phillipi,* 1 *Cristiceps argyropleura,* 1 *Callogobius hasseltii.*

Dorsal and anal counts.—Recorded ranges for dorsal and anal formulae are: D. iii, xxxii-xxxiv, 3-5. A. ii, 23-26. The anal minimum, 2 lower than previously recorded, was reported (1965: 60) for one individual of the Taroona sample. Counts of the pooled Green's Beach material extend, by 1 at each extreme, the range of spines in the second dorsal, which now becomes xxxi-xxxv.

Dorsal and anal patterns.—Pooling of the Taroona and Green's Beach material yields the 12 patterns of total dorsal radial elements (spines plus soft rays) set out in Table VI: no doubt some, if not all, of the obvious combinations unrepresented here (*e.g.,* iii, xxxiv, 3) would be met with in longer series. Inspection of Table VI makes evident the occurrence of a higher mean number of dorsal elements in the Taroona fish. This point is more formally investigated in the frequency distribution exhibited in Table VII; which records also total anal radial elements (spines constantly ii).

In the absence of a larger southern sample it is not clear whether the highly significant differences between the northern and southern populations of dorsal spines and total dorsal elements recorded in the table are to be attributed, wholly or partly, to locality or to some other factors or factors. Increase in the number of rays, *sensu lato,* with increase in size of fish is met with in some blennoid and clinoid species. No certain association of this kind characterizes the present material. Calculation of correlation coefficients for standard length and total dorsal radial elements for the Taroona sample (11 specimens), the pooled Green's Beach material (29) and the largest Green's Beach subset (17) yields two non-significant correlations—one negative (possibly a sampling phenomenon) and one positive—and one positive correlation significant at the 5% level; the respective values being $r = -0.45$, $z = 0.49$, $t = 1.53$; $r = +0.31$, $z = 0.30$, $t = 2.21^*$; $r = +0.22$, $z = 0.22$, $t = 0.65$.

Tentacles.—In his survey of common Australian clinids McCulloch (1908: 43) says of the present species, 'A slender branched tentacle on the snout and another large one over the eye'; T. D. Scott (1962: 253) has 'A small, simple tentacle over the eye, and a slender branched tentacle on the snout'. Neither specification fits the present material, in which the position is as follows. The rostral tentacle invariably consists of a fleshy cylinder, surmounted by a single flap arising from the posterior aspect of its free rim: generally this lamella is simple and more or less ovate or lanceolate; in large individuals, of *Lt* 120 or more, its upper border may develop one or several incisions, resulting in its becoming crenulate—the incisions, however, are always shallow, the terminal or laterotermiinal lobes remaining short, wider than, or as wide as, long; in striking contrast to the digitform lobes of the larger ocular tentacle. The latter regularly presents, in fish of all sizes, a more or less hand-like structure, with, usually 3-5, finger-like diverging lobes, the region corresponding to the palm not being as high as, usually much lower than, the longest (commonly the median) fingers. Characteristic tentacles are shown in fig. 1 *a*.

CLINUS PUELLARUM Scott, 1955

(Fig. 1 *b*)

Clinus marmoratus Klunzinger, 1872, *Arch. Naturg.,* xxxviii, 1: 33. Type locality: Port Phillip, Victoria. Preoccupied by *Clinus marmoratus* Castelnau, 1861, Mem. Poiss. Afr. Austr.: 52 (Table Cape, South Africa).

Clinus puellarum Scott, 1955, *Pap. Proc. Roy. Soc. Tasm.,* 89: 139, pl. 1, fig. 1. Type locality: East Beach, Low Head [Dorset], Tasmania.

Clinus marmoratus Klunzinger. Whitley, 1941, *Aust. Zool.,* 10, 1: 38, fig. 25 (lectotype).

Clinus puellarum Scott. Whitley, 1956, *Aust. Zool.,* xii, 3: 261 (synonymy).

Status.—The original account of *Clinus puellarum* noted 'The description of *C. marmoratus* is not sufficiently detailed or precise to permit of its unequivocal recognition. *C. puellarum* appears to differ from it chiefly in exhibiting the following features: larger head, shallower body; earlier origin of dorsal (?); color pattern, especially absence of dark spots and presence of light patches; lesser size'. Whitley, who examined the two types of Klunzinger's species in Stuttgart, has given a description and figure (1941: 38, fig. 25) of the larger, *Lt* 144, which he has selected as lectotype: subsequently (1956: 261) he has identified *C.*

TABLE VI

Clinus perspicillatus Cuvier and Valenciennes, 1836. Frequency distribution of dorsal spines (both fins), of total dorsal radial elements (spines plus rays), and of total anal radial elements in two Tasmanian samples: 11 specimens, *Ls* 31.0–137.8, $\bar{x}$ 97.88 ± 8.74 mm, from Taroona, Buckingham; 29 specimens, *Ls* 24.4–113.5, $\bar{x}$ 56.60 ± 5.58 mm, from Green's Beach, Devon

Meristic feature	Locality	Frequency distribution					$\bar{x}$	σ	V	Significance of difference of means; t
Dorsal spines (both fins)		**34**	**35**	**36**	**37**	**38**				3.39**
	Taroona	..	2	5	3	1	36.27 ± 0.22	0.86 ± 0.18	2.4 ± 0.51	
	Green's Beach	2	15	11	1	..	35.38 ± 0.10	0.53 ± 0.07	1.5 ± 0.20	
Total dorsal radial elements		**38**	**39**	**40**	**41**	**42**				4.16**
	Taroona	..	..	7	2	2	40.55 ± 0.24	0.78 ± 0.17	1.9 ± 0.41	
	Green's Beach	4	13	10	2	..	39.34 ± 0.15	0.80 ± 0.11	2.3 ± 0.27	
Total anal radial elements		**23**	**24**	**25**	**26**	**27**				0.94
	Taroona	1	..	1	3	6	26.18 ± 0.36	1.19 ± 0.25	4.6 ± 0.97	
	Green's Beach	..	..	4	23	2	25.93 ± 0.03	0.14 ± 0.02	0.5 ± 0.07	

TABLE VII

Clinus perspicillatus Cuvier & Valenciennes, 1836. Dorsal radial element pattern in two Tasmanian samples: 11 specimens, *Ls* 31.0–137.8, $\bar{x}$ 97.88 ± 8.74 mm, from Taroona, Buckingham: 29, *Ls* 24.4–113.5, $\bar{x}$ 56.60 ± 5.58 mm, from Green's Beach, Devon, Tasmania

Pattern	Frequency	
	Taroona	Green's Beach
iii, xxxi, 4		1
iii, xxxi, 5		1
ii, xxxii, 3		2
iii, xxxii, 4		11
iii, xxxii, 5	2	2
iii, xxxiii, 2		1
iii, xxxiii, 3		1
iii, xxxiii, 4	5	8
iii, xxxiii, 5		1
iii, xxxiv, 4	2	1
iii, xxxiv, 5	1	
iii, xxxv, 4	1	

marmoratus with *C. puellarum,* but has pointed out Klunzinger's name is preoccupied [as above], so *C. puellarum* stands. Whitley's valuable description and illustration of *C. marmoratus* leave little doubt *C. puellaram* is conspecific.

Material.—The species, the known range of which now becomes Tasmania and Victoria, is apparently not common, examination of many hundreds of fish from Tasmanian rock-pools in the ten years since its description as *C. puellarum* having yielded only a single example: this is a male, *Ls* 35.7, *Lt* 41.0, taken at Low Head by Mr R. H. Green on 14th December 1964 [for associated species see under *Clinus perspicillatus,* above; series (*b*), subset (*ii*)].

General facies.—The original account of *C. puellarum* is a tolerably full one and does not seem to call for any supplementary detail. However, several general features deserve notice.

The species has a very characteristic form, departing noticeably from the overall configuration of *C. perspicillatus,* and in several ways approaching an ophiclinid facies as typified by, say, *O. gracilis* Waite, 1906—for a close relative of which it could on casual examination readily be mistaken (but from which it is immediately separable by the presence of an ocular tentacle). A striking feature is the almost rectilinear external border of the dorsal fin (discounting the 5-6 posterior rays and, in the present example, several early spines): this is clearly depicted in the figure (1955, pl.V, fig. 1) of the holotype of *C. puellarum,* and is also quite evident in Whitley's figure (1941, fig. 25) of the lectotype of *C. marmoratus.* This condition is in noticeable contrast to the convexity of the border in *C. perspicillatus,* and also in the well-characterized species of *Petraïtes*: the almost straight border of the spinous portion of the second dorsal in *Cristiceps* differs from that found here in that, instead of being about parallel to a line joining upper border of eye and middle of caudal peduncle, it slopes well downward towards the latter point. The Tasmanian specimens (though seemingly not the lectotype) present a closer approach towards parallelism of the dorsal and ventral body contours, particularly in the region immediately behind the vent, than is found in *C. perspicillatus* (or, indeed, in any common Australian clinid). The Green's Beach individual, and, as far as can be estimated in view of the distal upturning of the trunk, also the holotype from Low Head (the two localities are close together, lying on either side of the estuary of the Tamar), have the opisthion posturanic (*cf* Gregory, 1928): in *C. perspicillatus* the opisthion

may be preuranic, uranic, or posturanic; if the last-named, tending to be less markedly so than in *C. puellarum*. (The variability of this feature arises largely from difference in relative depth of trunk associated with overall size of fish, and, more markedly, from variation in the conformation of the sexes).

An interesting index is provided by the ratio of the anal base to the depth at vent. In *C. puellarum* the value exceeds 3 (present specimen 3.3, holotype 3.2); in *C. perspicillatus* it is usually less than, rarely equal to, 3 (for the 17 specimens specified in the general treatment of this species above as series (*b*), subset (*ii*) we find range 2.2-30, $\bar{x} = 2.60 \pm 5.67$; $\sigma = 23.6 \pm 4.05$; $V = 9.08 \pm 1.57$; the variates being approximately normally distributed): in the 3 specimens of *Ophiclinus greeni* Scott, 1936 noted in Part XII (1965: 62) this value is 4.1, 4.5, 4.5. In the two clinids the difference in magnitude of the ratio is in part accounted for by the occurrence in *C. puellarum* of a somewhat longer anal—its base, as *TLs*, being 549 in the Green's Beach specimen, 555 in the holotype, compared with, in the sample of 17 *Clinus perspicillatus* mentioned above, a range of 436-523, and a mean of 486.47 ± 5.41 ($\sigma = 22.52 \pm 3.86$, $V = 4.63 \pm 0.794$): in the same 3 *Ophiclinus greeni* anal base as *TLs* is 530, 551, 549.

Other features in which the Green's Beach fish shows at once a departure from *C. perspicillatus* and a measure of parallelism with *O. gracilis* (and *O. greeni*) are, first, the density of the pigmentation, particularly on the dorsal and anal, and, secondly, the opaque, somewhat velvety nature of the membrane of those fins (in the case of the dorsal, especially in its hinder portion).

Fin counts.—D. iii, xxxvii, 6. A. ii, 29. P. 13 (both fins). C. 13 (of which 10 reach hind border). This gives for the second dorsal one more ray than in the holotype and two more spines and one more ray than in the single paratype. Whitley, who does not recognize any distinction between spines and rays in the vertical fins, gives for the types of *C. marmoratus* examined by him at Stuttgart D. 44; A. 30; P. 13; C. 10. The reference in the account of *C. puellarum* (1955: 139) to a hidden spine in the pelvic appears to be an error.

Lateral line.—For the type material of *C. puellarum* this is described as comprising ' a short conspicuous earlier superolateral segment and a long inconspicuous later mediolateral segment '. The anterior segment, a flat arc above pectoral, consists of 24-25 perforated tubercles, the posterior, of more or less simple pores, is made up of an oblique set of 4 followed by a subhorizontal series of about 38, the last, approaching caudal base, very small. Whitley observes, ' Lateral line showing only anteriorly; it runs straight to the point of the pectorals, when it tends to drop downwards but soon vanishes. It is formed of closely arranged longitudinal keels '. In the Green's Beach fish the elevated anterior segment alone is readily seen; examination with a lens, however, reveals the presence of some irregularly spaced pores presenting an interrupted line along the middle of the flank.

Dimensions and proportions.—Measurements, in mm, of the present specimen for those dimensions recorded in the 1955 account follow (with, in parentheses, values, as *TLs*, for this fish and for the holotype). Head to end of operculum 8.3 (232, 235), to end of opercular flap 8.8 (246, 256). Eye 2.3 (64, 58); interorbital 1.25 (38, 38). Snout with upper lip 1.25 (35, 48), without upper lip 1.0 (28, 35). Length to middle of vent 13.6 (381, 406). Depth [and, in brackets, width] at points specified: front of eye 2.9 (81, 88) [29 (81, 85)], origin of dorsal 6.0 (168, 154), [3.8 (106, 138], immediately behind pectoral base 6.0 (168, 154) [4.0 (112, 106)], vent 5.9 (165, 167) [3.3 (137, 165)]: maximum depth 6.6 (185, 171). Depth of caudal peduncle 2.5 (70, 58). Dorsal: lengths to origin, termination 4.9 (137, 165), 35.0 (980, 1008); base of first dorsal 1.2 (34, 33), interdorsal 1.0 (28, 23), base of second dorsal 27.9 (781, 787); lengths of 1st, 2nd, 3rd spines of first dorsal 1.95, 2.1, 1.95 (55, 59, 55; 44, 48, 42), of 1st, 2nd, 3rd, 17th, 37th spines of second dorsal 2.0, 2.0, 2.1, 2.5, 3.0 (56, 56, 59, 70, 84; 46, 46, 47, 61, 83); radial interspaces of first dorsal 0.4, 0.7 (11, 20; 12, 18) first radial interspace of second dorsal 0.7 (20, 17); oblique heights of 1st, 3rd, 5th, 6th rays 4.0, 4.0, 3.8, 3.0 (112, 112, 106, 84; 112, 113, 77,—). Anal: lengths to origin, termination 14.5 (406, 417), 34.1 (955, 960); lengths of 2nd spine, 5th ray, 25th ray 1.8, 2.6, 3.2 (50, 73, 90; 58, 81, 92). Pectoral: length to origin 8.0 (224, 229); longest (6th, 6th) ray 5.3 (148, 117). Ventral: length to insertion 6.1 (171, 156); lengths of 1st, 2nd, 3rd rays 1.5, 3.9, 4.1 (42, 109, 114; 31, 117, 158). Longest caudal ray 5.3 (148, 142).

Coloration.—General color of lateral surface of trunk and tail somewhat yellowish green, heavily clouded on most of the trunk, distally on the tail, and along the whole dorsal profile with very dark, almost black chromatophores; the six irregular lighter regions previously described (1955: 143) are here not apparent. Ventral surface of trunk lightish yellowish green with scattered dark chromatophores. Head with dorsal surface dark; lateral surface largely greenish and greyish, with two dark ocular spokes as described for the holotype, and with a diffuse dark patch on the operculum not previously reported; ventral surface greenish with some dark brown; upper lip almost black to as far back as the expanded plate of the maxilla, which is grey; lower lip dark almost to its termination. Rostral and ocular tentacles more or less hyaline with some minute dark punctulation. Anterior two-thirds of combined dorsal with five irregular pale greyish translucent areas separated by very dark grey; posterior one-third opaque, blackish: all spines and rays tipped with white. Anal very dark brown, with a few small lighter patches anteriorly; spines and rays conspicuously white-tipped. Caudal largely dark grey, in parts blackish; ray-tips white: the basal white spot figured for the holotype is represented by a pale dot about 0.1 mm in diameter.

The holotype, paratype and present specimen exhibit considerable variation in coloration: this is partly dependent on the degree of expansion of the chromatophores. The white tips of the spines and rays of the vertical fins are highly characteristic. Whitley noted that Klunzinger's speci-

mens, after nearly seventy years in alcohol, are almost uniform brown, but show indications of dark brown margins to dorsal and anal and of light spaces at intervals along the former and on its last ray.

Tentacles.—These have been fully described in the account of the holotype (1955: 140, 141): tentacles of the present specimen are here figured (fig. 1 *b*).

Genus **PETRAITES** Ogilby, 1885

PETRAÏTES HEPTAEOLUS Ogilby, 1885

(Fig. 1 *c*)

Petraïtes heptaelus Ogilby, 1885, *Proc. Linn. Soc. N.S.W.*, x: 225 [as *nom. nud.* on p. 10]. Type locality: Port Jackson [New South Wales].

Cristiceps wilsoni Lucas, 1890, *Proc. Roy. Soc. Vict.* (n.s), iii: 10, pl. iii, fig. 1. Type locality: Port Phillip, Victoria.

Material.—The first record for Tasmania, in these Observations (1965: 59), was based on 2 specimens, *Ls* 44.7, *Lt* 53.9, *Ls* 50.1, *Lt* 60.2, from Green's Beach, Devon. Three further examples—(*a*) ♀, *Ls* 15.0, *Lt* 17.6, (*b*) ♂, *Ls* 45.6, *Lt* 54.1, (*c*) ♀, *Ls* 55.5, *Lt* 65.0—secured at the same locality by Mr R. H. Green exhibit some variations in fin counts and proportions. For data on other species collected at the same time as the present 3 specimens see above, in notes on *Clinus perspicillatus* [(*b*) with series (*b*), subset (*i*), (*a*) and (*c*) with series (*b*), subset (*ii*)].

Fin counts.—D. iii, xxxvii, 1 + 2 [(*a*), (*c*)]; iii, xxxviii, 1 + 2 [(*b*)]. A. ii, 20. P. 12. V. 3. C. 10.

Ranges for spines of the second dorsal now reported from 3 States become: Victoria (Lucas, 1890) xxxiv-xxxviii, New South Wales (McCulloch, 1908) xxxv-xxxvii, Tasmania xxxvi-xxxviii; and ranges for anal rays 17-21, 17-20, 20-21.

Proportions.—For the ratios recorded in Part XIII the values for the 3 present specimens and the 2 examples there discussed are as follows, the fish being in ascending order of *Ls* (in parentheses Ogilby's values for his type $3\frac{3}{10}$ inches in length). Head 3.6, 4.1, 4.6, 4.1., 4.9 (5.2); caudal 6.8, 5.9, 6.4, 6.0, 6.8 (6.6); height 5.9, 4.1, 4.5, 4.1, 4.5 (4.6); length to vent 2.5, 2.8, 2.8, 2.8, 2.6 (—): in total length. Eye 3.4, 4.4, 3.5, 4.5, 3.4 (3.8); pectoral 1.8, 1.3, 1.4, 1.4, 1.5 (1.4); ventral 2.1, 1.6, 1.8, 1.7, 1.7 (1.4): in head. Snout 0.7, 0.6, 0.6, 0.6, 0.6, (half) eye; or 5.0, 7.3, 5.9, 7.5, 6.1 (about 7.2) in head. Interorbital 0.7, 0.6, 0.6, 0.6, 0.5 (0.4) eye. Middle spine of first dorsal 6.2, 1.9, 2.9, 2.1, 2.6 (—); longest (last) spine of second dorsal 3.5, 1.9, 2.0, 1.8, 1.8 (—); longest (antepenultimate) anal ray 4.1, 1.9, 2.3, 1.9, 2.2 (—): in head. The relatively small size of the fins in the smallest individual (*Ls* 15.0) is noteworthy, the entries for the listed spines and rays of the vertical fins being particularly striking. No clear indications of other correlations of magnitude of ratio with overall size of fish emerge.

Young, ova.—Specimen (*c*) is parous, having on each side of the abdominal cavity an ellipsoidal mass of young and ova enclosed in a common membrane. The right ovarian mass is 13 mm long, 7 deep, 4 wide; the left, not dissected out, appears slightly smaller. The right contains 212 eyed embryos, of modal diameter 800-1000μ, 165 ova with a mean diameter of about 500μ, and a large, undetermined number of smaller ova of varying size, ranging down to under 100μ.

Tentacles.—These are figured in this contribution (fig. 1 *c*): they have been described in Part XIII (1965: 60).

PETRAÏTES PHILLIPI (Lucas), 1891

(Fig. 1 *d*)

Cristiceps phillipi Lucas, 1891, *Proc. Roy. Soc. Vict.* (n.s.), iii: 11, pl. iii, fig. 2. Type locality: Port Phillip, Victoria.

Petraïtes phillipi (Lucas). McCulloch, 1908, *Rec. Aust. Mus.*, vii, 1: 43, pl. x, fig. 3.

Record.—Three specimens, (*a*) *Ls* 40.5, *Lt* 49.0, (*b*) *Ls* 47.0, *Lt* 55.5, (*c*) *Ls* 51.6, *Lt* 61.7, occur in a small collection of rock-pool fishes made by Mr R. H. Green at Green's Beach, Devon [collection is specified above, under *Clinus perspicillatus*, as series (*b*), subset (*iii*)]: this constitutes the first record for this State, the species hitherto being reported (McCulloch, 1929: 349) only from Victoria.

Fin counts, branchiostegal rays.—D. iii, xxxi, 2; iii, xxxi, 2; iii, xxxii, 3. A. ii, 24 (all specimens). P. 11 (both fins, all specimens). V. 2. C. 11. Branchiostegal rays—not recorded by Lucas (1891) or McCulloch (1908)—number 6 in all specimens. For dorsal and anal of his figured specimen Lucas recorded 3/30/2, 2/23 and for a second specimen 3/30/3, 2/23, while McCulloch, reporting on 5 examples, gave ranges of D. iii, xxx-xxxii; 2-3, A. ii; 22-25.

Proportions, TLs.—Length to: first dorsal origin 212, 211, 192; second dorsal origin (base of first spine) 289, 305, 279; dorsal termination (membrane) 1012, 1003, 1013; anal origin 494, 505, 503; anal termination (membrane) 983, 958, 973. Length of: pectoral 227, 233, 194; pelvic 221, 232, 205. Head 294, 277, 289; eye 96, 92, 79; interorbital 37, 38, 41. Depth: maximum 222, 213, 252; at vent 175, 192, 215; of caudal peduncle 52, 51, 56. Total length 1210, 1182, 1196.

Remarks.—For his specimen (*a*) Lucas notes the 2nd spine ('ray') of the first dorsal as the longest, while simply observing of his (*b*) 'first and second rays much longer than the third'; McCulloch's figure shows 1st and 2nd spines subequal, about 1.8 times 3rd. The 2nd spine exceeds the 1st in all our fish, the 3rd being about two-thirds of the 2nd, and subequal to 1st of second dorsal, which is one-half, or less, the last spine. In (*a*) and (*b*) the 1st dorsal ray—damaged in (*c*)—is the longest, its tip projecting noticeably beyond that of the last spine. Anal rays increase more or less regularly to the penultimate. Outer pelvic ray $\frac{1}{5}$-$\frac{5}{6}$ of inner; 7th pectoral ray longest. First segment of lateral line more or less horizontal (anterior half slightly convex upwards), with 20-22 tubules; an oblique line of 5-6 pores; third segment along midlateral line, pores, more widely separated and more difficult of detection posteriorly, about 30 or more. Mouth to below anterior border, or

first one-fifth, of eye (shorter than figured by Lucas or McCulloch).

Lucas describes his (*a*) as having 'supra-orbital and snout tentacles very short and small', and (*b*) as having 'supra-orbital tentacles aborted, and snout tentacles short, but distinct': McCulloch notes of both sets simply 'very small and simple'. The rostral tentacle is of the usual type, a cylinder from the hind rim of which arises a somewhat shorter process. The process is so borne that, viewed from the side, it presents an erect proconcave arc. The supraorbital tentacle is a simple rather broadly ovate, or panduriform, lobe; the distal margin entire or slightly crenulate. Figures of both tentacles are here provided (fig. 1 *d*).

Curiously enough, the simple outline figure accompanying the original description succeeds in conveying a much more satisfactory idea of the characteristic facies of the fish than the meticulous illustration provided in McCulloch's survey, which, while recording much more detail, fails to catch the curious triangular nature of the anterior outline and the acute posterior angle that together serve to distinguish at a glance this from the other common species of *Petraïtes*.

Sex.—Specimens (*a*), (*c*) are females carrying young, the eyes apparent through the body wall. The parous condition leads to more lateral than ventral distension, the greatest width of the trunk being more than twice that of the tail. Specimen (*b*) is probably a female also, presenting immediately in advance of origin of anal fin a circular opening, 1.9 in diameter, ringed with a low crenated wall, that presumably represents the distended genital aperture, through which young may have recently been extruded. The yellowish white combined ovarian mass and oviduct of (*c*) is 11 long, 5 wide, 6 deep. It contains 102 eyed ova, fairly tightly embedded, inside a common membrane, in a moderate amount of chiefly gelatinous stroma. Their size mostly ranges from 1.1 (more or less spherical) to 2.8 mm, the modal diameter being around 2. Development is rather more advanced than in the ova of *P. heptaeolus* noted above: in contrast to the position in the example of that species examined there are here no unfertilized ova.

Coloration.—For his (*a*) Lucas records merely 'colours ill-defined in a spirit specimen', but records for (*b*) 'Colour, few dark vertical bands; white band from eye across præoperculum and operculum, continuing along the trunk and tail, below the lateral line to the root of the caudal'. McCulloch has nothing on color in his text, but his illustration shows a pattern in general agreement with that traceable in our material. In our examples, preserved in formalin, the general color is purplish pink; head in general somewhat lighter, with in (*b*) some greyish; belly light purplish, immaculate. The dark pattern on body and tail is now indistinct, but appears to comprise about 6 irregular dark spots along dorsal profile, with one or two dark blotches below each, resulting in the formation of incomplete subvertical bars. A narrow light line runs the full length of the body, at the middle of the side, in (*a*) and (*b*), but is traceable backwards only about half that distance in (*c*): the extension forwards on to the head described by Lucas and indicated (in a slightly different arrangement) in McCulloch's figure is not apparent in the Tasmanian fish. Head with some darkish cloudings (regularly on upper half of operculum) and with some dark vermiculations, best developed on lips, suboperculum, and lower limb of preoperculum; a dark interorbital cross bar. Dark areas on the second dorsal fin, with in (*b*) and (*c*) one in the first dorsal, represent more or less regular extensions upwards from the dark spots fringing dorsal profile of body; rest of fin irregularly ashen and dusky. The anal, collapsed in all specimens, presents 6-7 well-marked blackish spots, which when the fin is erected are seen to constitute short dark bands running downwards and somewhat forwards across rays and membrane, as shown in McCulloch's figure. Pectoral pale grey or whitish; a little dark pigmentation proximally. Pelvic pale yellow, immaculate. Caudal rays crossed by up to 8 narrow dark bands.

Size.—With sexual maturity in the female at a total length of 49, or possibly less, it would seem probable this species does not reach any great size. Specimens described by Lucas measured 67, 53, the present examples are 49.0, 55.5, 61.7, while McCulloch's figure, noted as natural size, is 90. Relative size of sexes does not seem to have been investigated in Australian clinids: some incidental observations suggest a possibility that in *Clinus perspicillatus* males are larger. Of the Eastern Pacific Clinidae reviewed by him Hubbs (1952: 155) has noted 'Secondary sexual dimorphism is present in most, if not all of the species examined'.

PETRAÏTES JOHNSTONI (Saville-Kent), 1886

(Fig. 1 *e*)

Clinus johnstoni Saville-Kent, 1866.—*Rept Fish. Dept Tasm.*, 1866: 13. Type locality: Adventure Bay [Bruni Island, Buckingham], Tasmania.

Clinus johnstoni Saville-Kent. Saville-Kent, 1867, *Pap. Proc. Roy. Soc. Tasm.* (1866): xxxiv and 121. *Id.* Johnston, 1891, *Pap. Proc. Roy. Soc. Tasm.* (1890): 33. *Id.* McCulloch, 1915, *Proc. Linn. Soc. N.S.W.*, xl, 2: 273, pl. xxxvii, fig. 2. *Id.* Scott, 1935, *Pap. Proc. Roy. Soc. Tasm.* (1934):69.

Petraïtes johnstoni (Saville-Kent). Scott, 1955, *Pap. Proc. Roy. Soc. Tasm.*, 89: 138.

Generic status.—Reasons for referring this fish to *Petraïtes* Ogilby, 1885 are considered in an earlier contribution (1955: 139).

Previous descriptions.—Saville-Kent's description of the type, which was 'preserved alive for some time in the tanks of the fishery', merely notes that it belongs to the genus *Clinus*, and 'differs from the single species, *C. despicillatus* [*i.e.*, *C. despicillatus* Richardson, 1839 = *C. perspicillatus* Cuvier & Valenciennes, 1836] hitherto taken in these waters, and which averages the length of 4 or 5 inches only, in its larger dimensions, 15 inches, and in the great development of the nostril tentacles, and in other characters of specific value'. Johnston (1891: 33) recorded fin counts only, and the first full description and figure were supplied by

McCulloch (1915), whose account is based on 2 specimens, 227, 341 in total length, in the Australian Museum, though he remarks, 'I have also examined a still larger specimen in the Tasmanian Museum, which is possibly the type of the species'. Examination of an example, *Lt* 347, led Scott (1935: 69) to record some variations from, and some additions to, McCulloch's account; while what is in effect a concise diagnosis of the species appears in a key to the Tasmanian Clinidae (Scott, 1955: 138) that supersedes an earlier key to the Bleniidae, *sensu lato* including Clinidae (1939: 148).

Tentacles.—The rostral tentacle is the largest and most complex among local clinids. At a height subequal to its diameter the narial tube develops from the whole anterior half of its rim a conspicuous auriform lobe, as long as, or a little longer than, wide. Above the posterior half of the tube rises a large palmate flap that develops from its broad distal margin longer slender processes, tapering distally, modally 5, several or all reaching, when carried down, well on to surface of, the larger ones to or beyond lower border of, lower lip. Viewed from behind this palmate lobe usually exhibits a median groove, suggesting its possible origin from fusion of two moieties: the line of division sometimes traceable right down to base of column. Laid back, tips of longest processes reach to, or beyond, orbit; laid forward, beyond posterior nostril, a short anteroposterior slit, bordered, most noticeably internally, with a low elevation. The ocular tentacle is a flap, moderately to very broad (anterior surface slightly or pronouncedly convex, posterior more or less flat), with a distal series of 5-7 projections, which may be filiform, digitiform, or phylloid, more than one type sometimes occurring on the one structure; one or more processes may be branched. Total bulk of this tentacle is subequal to that of rostral tentacle. Laid forward, reaches to, or slightly beyond, posterior nostril; carried back, goes about halfway towards first dorsal spine. The tentacles are here illustrated (fig. 1 *e*).

PETRAÏTES FORSTERI (Castelnau), 1872

(Fig. 1 *f*)

Cristiceps forsteri Castelnau, 1872, *Proc. Zool. Acclim. Soc. Vict.*, 1: 132. Type locality: Melbourne [Victoria].

Petraïtes incertus McCulloch, 1915, *Proc. Linn. Soc. N.S.W.*, xl, 2: 275, pl. xxxvii, fig. 3. Type locality: Tamar R[iver], Tasmania.

Petraïtes incertus McCulloch. McCulloch, 1929, *Mem. Aust. Mus.*, v, iii: 350. *Id.* Scott, 1935, *Pap. Proc. Roy. Soc. Tasm.* (1934): 70.

Petraïtes forsteri (Castelnau). Scott, 1939, *Pap. Proc. Roy. Soc. Tasm.* (1938): 149.

History, size.—The basic history of the species to 1939 is traversed in the above synonymy: the entry for this form in a key in Part VII (1955: 138) is virtually a concise diagnosis of it—this key supersedes that in Part IV (1939: 148). Its attainment of a total length of about 275 makes it larger than any other local member of the family except *P. johnstoni*, which ranges up to nearly half as long again.

Tentacles.—These are here described and figured (fig. 1 *f*) for comparison with those of other Tasmanian species. Of his *Cristiceps forsteri* Castelnau observes, 'A single bifid filament over the eye'; while of his *Petraïtes incertus* McCulloch says, 'Tentacle of anterior nostril minute; orbital tentacle well developed, with a few small lobes'. The rostral tentacle presents the usual narial tube and flap, the latter subequal in length to the former, its border either entire or incised, the incisions either shallow or deep enough to result in the formation of two or three clearly defined lobes: only a hint of an anterior lip to the tube. The whole structure is small (in marked contrast to that of *P. johnstoni*), failing when adpressed to reach forward to border of preorbital, or backward to posterior nostril. The orbital tentacle, on the other hand, is decidedly longer than in that species, being carriable backwards to, or beyond, base of first dorsal spine, and forwards to, or beyond, base of rostral tentacle. It is long, slender, tapering, terminating in a small lanceolate flap, either tolerably well differentiated from the main tentacular axis, or little more than a compressed prolongation of it: one or several small leaflike lobes may develop laterally.

Genus **CRISTICEPS** Cuvier & Valenciennes, 1836

CRISTICEPS ARGYROPLEURA Kner, 1865.

(Fig. 1 *g*)

Cristiceps argyropleura Kner, 1865, Reise Novara, Fische, ii: 199, pl. vi, fig. 4. Type locality: Sydney [New South Wales].

Record.—This species, hitherto recorded (McCulloch, 1939: 350) only from New South Wales and Lord Howe Island, is here added to the Tasmanian list, a female, *Ls* 70.5, *Lt* 90.4, being included in a collection of fishes obtained in a rock-pool at Green's Beach, Devon by Mr R. H. Green (for associated species see series (*b*), subset (*iii*) under *Clinus perspicillatus*, above).

Fin counts.—D. iii, xxvii, 7. A. 11, 24. P. 12 (both fins). V. 3. C. 9.

Proportions, TLs.—Length to: first dorsal origin 82, second dorsal origin 240, dorsal termination 940, anal origin 342, anal termination 925, pectoral origin 230, ventral origin 184, vent 321. Length of: pectoral 255, longest (7th) pectoral ray 194, ventral 203. Head 255, eye 61, snout 61, interorbital 28. Depth: maximum 235, at vent 199, of caudal peduncle 41. First dorsal spines 230, 210, 99. Second dorsal: 1st, 4th, 13th, 27th spine 70, 98, 102, 114; 1st, 5th (longest), 7th ray 162, 169, 82. Anal: spines 60, 71; 1st, 4th, 13th, 21st (longest), 24th ray 84, 87, 75, 156, 87.

Remarks.—I have not at present access to Kner's original account and figure, and the following discussion takes account only of the treatment of this species by McCulloch (1908) in his review of some Australian clinids.

McCulloch's key separates *C. argyropleura* from *C. australis* Cuvier & Valenciennes, 1836 thus: in former anterior spine over front half, in latter hinder portion, of eye; in former two dorsals connected, in latter first dorsal either distinct from or jointed to base of second. Comparison of his

descriptions yields no other significant difference between the species. The difference in origin of the first dorsal constitutes a genuine, though quantitatively small, distinction. In our specimen the connexion of the first dorsal with the second is minimal, the full continuity of the membrane being traceable only with the aid of a lens.

However, in addition to differences in coloration (*C. argyropleura* being virtually immaculate, *C. australis* fairly extensively, though variably, blotched on body and fins) there are, as McCulloch's illustrations (pl. X, figs. 2, 3) show, noticeable differences both in the absolute size of the dorsal and in the relative development of the dorsal and anal. With the dorsal normally erect, in Kner's species none of the rays extend back to the level of the hypural joint, whereas in the genotype one or more overarch part of the base of the caudal. A more satisfactory criterion, however, is afforded by the relative lengths of anal rays and spines of second dorsal. In *C. argyropleura* most of the rays of the anterior half, or more, of the anal are shorter than, in the *C. australis* equal to or longer than, the dorsal spines surmounting them: specifically, the 4th anal ray is in the former species less than (about 0.8-0.9 of), in the latter species longer than (about 1.1 times) the dorsal spine (about 13th) vertically above it.

McCulloch's figures of the two species show *C. argyropleura* as having smaller mouth; rather smaller eye; longer snout; rather longer and more slender caudal peduncle; relatively longer 3rd spine of first dorsal (exceeding—in our specimen 1.4 times—1st spine of second dorsal: in *C. australis* spines equal, or the first dorsal's shorter); first dorsal base, measured from front of 1st to back of 3rd spine, rather more than once (in our specimen 1.3 times), in *C. australis* about twice, in interdorsal, measured from spine to spine; and with insertion of last dorsal ray behind, in *C. australis* opposite, insertion of last anal ray.

Tentacles.—In the present fish the ocular tentacle, which is long, simple, rounded but a little compressed anteroposteriorly, tapering, is inserted with the anterior border of its base above the middle of the pupil: when laid across the eye towards the angle of the rictus, it reaches beyond the lower margin of the pupil. The rostral tentacle is formed on the same basic plan as that found in *Clinus perspicillatus*, its essential elements being a tube terminating in the narial aperture and a fleshy extension rising above the nostril proper. However, whereas in *Clinus perspicillatus* the fleshy extension takes the form of a leaf-like lobe (distally entire or crenate) directly attached to part of the hind rim of the otherwise simple cylindrical tube, here the general appearance is rather that of a solid tentacle arising directly from the dorsum of the head and having a distally open tube fused to about the proximal one-third of its length. Shortly above the aperture the filament divides into two unequal rounded tapering elements. The whole rostral tentacle is shorter and more slender than the ocular; but when drawn forward it reaches well beyond the free border of the upper lip. Figures of the two tentacles are here offered (fig. 1 *g*).

CRISTICEPS AUSTRALIS Cuvier & Valenciennes, 1836

(Fig. 1 *h*)

Cristiceps australis Cuvier & Valenciennes, 1836, Hist. Nat. Poiss, xi: 402, pl. cccxxxvi. Type locality: Upper Derwent River [Tasmania]. (Quoy & Gaimard).

Cristiceps australis Cuvier & Valenciennes. McCulloch, 1929, *Mem. Aust. Mus.* V, iii: 350 (synonymy).

Remarks.—This is by far the most widely distributed Australian species of *Cristiceps*, being recorded (McCulloch, 1929: 450) from all Australian States except Queensland, and from Lord Howe Island and New Zealand. In Tasmania—where, up to the report in this contribution of a specimen of *C. argyropleura* from Green's Beach, Devon, it has been the only species known—it is not uncommon. *Cristiceps howitti* Castelnau, 1873, *C. macleayi* Castelnau, 1879, and *C. pallidus* Macleay are probable synonyms; *C. splendens* Castelnau, 1872 ['*Christiceps*'] is a possible synonym.

Tentacles.—The rostral tentacle usually shows some indication of the apparent proximal fusion of the cylinder and the process noted above in *C. argyropleura*, but the suggestion is less marked than in our specimen of that species. In general facies the process is long and slender: it may be simple, or divided throughout most of its length into two, or divided distally into several filaments; laid forward, extends at least to upper lip, backward about to posterior nostril. An anterior petalloid lip to the tube (its margin delicately lobate in the right tentacle of an example of *Ls* 183, *Lt* 226) is developed, but is perhaps smaller than in *Petraïtes johnstoni*. The supraocular tentacle is long and tapering; slender and rounded, or somewhat flattened and broadened, but remaining at least several times longer than wide, and terminating acutely; essentially simple, bearing at most a few quite small lobes. Carried down towards rictus, it reaches to, or just beyond, orbit; laid back, it reaches to, or beyond, base of last spine of first dorsal.

Family Ophiclinidae

The notice in Part XIII of these Observations (1965: 62) of the occurrence in Tasmania of *Ophiclinus gabrieli* Waite, 1906, previously recorded (McCulloch, 1929: 352) only from Victoria, brought the local tally to 3 species, all of the genus *Ophiclinus s. str.*—the previously listed forms being *O. gracilis* Waite, 1906, recorded for this State by Olsen (1958, 157) from George Bay, St Helens, Dorset/Cornwall, where he noted it as being a common food fish for small sharks, and the endemic *O. greeni* Scott, 1936.

A fourth species, *Ophiclinops varius* (McCulloch & Waite), 1918, is here added. The new entry is readily separable from the Tasmanian species previously keyed (1965: 61) by the characters noted in the next paragraph as differentiating groups (*a*) and (*b*).

The well-established Australian members of the Ophiclinidae [T. D. Scott (1962: 251) suggests *Neogunnellus microchirus* Herzenstein, 1896 and

N. homocanthus Herzenstein, 1896—both of which were formally included by Waite in his *Fishes of South Australia* (1923)—appear to be synonyms of *Peronedys anguillaris* Steindachner, 1854, family Peronedysidae, and *Ophiclinus antarcticus* Castelnau, 1872, respectively] fall into two clearly defined groups: (*a*) lateral line obsolete, pectoral smaller than eye, dorsal originating well behind head (*Ophiclinus varius* McCulloch & Waite, 1918, *Ophiclinus pardalis* McCulloch & Waite, 1918—the latter has been overlooked in the Check-List (McCulloch, 1929)); the 2 species differing in the vomerine teeth, these being in an angular row in the first, in a broad patch in the second: (*b*) lateral line present anteriorly, pectoral longer than eye, dorsal originating above head; this group subdividing into species with vomerine teeth forming a triangular patch (*Ophiclinus antarcticus* Castelnau, 1872, *Ophiclinus aethiops* McCulloch & Waite, 1918) and species with vomerine teeth pointed forming an angular row or series (*Ophiclinus gracilis* Waite, 1906, *Ophiclinus gabrieli* Waite, 1906, *Ophiclinus greeni* Scott, 1936). Group (*a*) is now for the first time reported from Tasmania, our 3 previously listed species constituting the second section of group (*b*).

Whitley (1941: 39) has identified *Ophiclinus gracilis* Waite, 1906 with *Sticharium dorsale* Günther, 1867, the Ophiclinidae thus becoming the Stichariidae (in the Check-List the latter family appears as the Notograptidae). *Sticharium* Günther, 1867 is certainly very closely allied to, and possibly identical with, *Ophiclinus* Castelnau (amended by Castelnau in 1873 to *Ophioclinus*): the problem is, just what weight is to be given to the several points of distinct divergence between Günther's and Castelnau's diagnoses—for some discussion of the status of Castelnau's *Ophiclinus* and his apparently synonymous *Neogunnellus* of 1875 see McCulloch & Waite (1918: 54), and for a brief comment on the possible identity of *O. gracilis* and *S. dorsale* see Scott (1965: 61). Ophiclinidae is retained by Scott (1962: 246, 249) in his recent catalogue of the fishes of South Australia.

Genus **OPHICLINOPS** Whitley, 1932

OPHICLINOPS VARIUS (McCulloch & Waite), 1918

Ophiclinus varius McCulloch & Waite, 1918, *Rec. S. Aust. Mus.* I, 1: 57, fig. 30. Type locality: Kangaroo Island [South Australia].

Generic status.—*Ophiclinops* was instituted with *Ophiclinus pardalis* as haplotype. However, the characters of that genus that are found also in *Ophiclinus varius*, but in no other form (lateral line obsolete, dorsal commencing well behind head, pectoral smaller than eye) are perhaps more significant than those not shared by the two species (vomerine teeeth in a band in *O. pardalis*, in an angled row in *O. varius*; more dorsal spines—liii; xli-xliv—and more anal rays—39; 26-28—the upper values for both fins being exceeded, it may be remarked, in other species; 'the head comparativly smaller and the body more elongate'). Of *O. varius* McCulloch & Waite observed (1918: 58), 'This species is very similar to *O. pardalis*, differing principally in having fewer dorsal and anal spines'; and the position is here adopted that these two species are perhaps best regarded as congeneric.

Record.—The distribution of this species, hitherto restricted to South Australia, is now extended to Tasmania, a specimen (probably a female), *Ls* 37.8, *Lt* 42.0, having been collected at Green's Beach, Devon by Mr R. H. Green on 27th September 1964.

It appears to be a small form, the 4 types being 42-46 long. Scott (1962: 250)—who, unaccountably, notes 'length 3½ in.'—states 'This species was described originally from preserved specimens, taken at Kangaroo Island, but has not been seen since'.

Fin counts.—D. xliii, 1. A. ii, 28. P. (both fins) 10. V. 1, 2. C. 13 main rays, total 19. The dorsal and anal counts fall within, and the 13 for the caudal agrees with, the specification of the type material; but the pectoral has 2-3 more rays. In their treatment of *O. pardalis*, described in the same paper as the present species, McCulloch & Waite give V. i, 2, remarking (p. 59) 'the spine is completely hidden in the skin': for *O. varius*, however, they record V. 2 without comment. In our example there is in each ventral a short, completely imbedded spine, the presence of which is established only with some difficulty.

Dimensions, proportions.—Some measurements, in mm, followed in parentheses by these dimensions expressed as *TLs* may be noted. Length to: dorsal origin 10.0 (265); dorsal termination, base of last ray 36.95 (978), end of membrane 38.6 (1021); anal origin 18.3 (484); anal termination, base of last ray 37.0 (979), end of membrane 38.6 (1021); ventral origin 4.05 (107); pectoral origin 6.8 (180); vent 17.6 (466). Head, with opercular flap 7.3 (193), without flap 7.0 (185); eye 1.7 (45); snout 1.05 (28); interorbital 1.05 (28). Length of pectoral 1.6 (42), longest (8th) pectoral ray 0.9 (54); ventral 3.95 (104), inner ray 3.75 (99), outer 3.2 (85); last dorsal spine 2.0 (53), dorsal ray 2.05 (54); last anal ray 1.95 (52). Depth: maximum 5.2 (138); at opercular border 4.6 (122), at vent 5.0 (132), at hypural joint 1.8 (48).

For the ratios recorded for the holotype, 45.5 long, the present magnitudes are as follows (McCulloch & Waite's values in parentheses). Head 5.2 (5.1), depth at origin of anal 7.6 (6.8), in *Ls*; eye 4.3 (4.0) in head; snout 1.6 (1.6) in eye; snout equal to ('greater than') interorbital, which is 1.6 (2.6) in eye; pectoral 1.1 (1.3) in eye; inner ventral ray 1.9 (2.0), last dorsal spine 3.7 (4.0), in head. Except in the case of interorbital relative to eye, where the discrepancy is perhaps at least in part accounted for by different conventions for measuring interorbital, the Victorian and Tasmanian entries are seen to be in quite reasonable agreement.

Remarks.—As noted in the original account, the head and abdomen are naked; elsewhere very small non-imbricating or barely imbricating scales occur. In view of Scott's statement that the species has not been seen since its establishment it appears expedient to present here some data supplementing the rather brief original account.

Anal begins under 13th dorsal spine [length to origin 2.08 in *Ls*; compare, in type, from figure,

2.15; and contrast 2.58 in *O. pardalis*, from illustration (McCulloch & Waite, 1918, pl. iv, fig. 2)—the relatively more anterior origin of the fin in the latter species being commented on by McCulloch & Waite]. Anal membrane attached to caudal, well behind caudal base (though not quite as far back as in figure of holotype), shortly in advance of attachment of dorsal membrane. Dorsal begins behind tip of pectoral by about total length of pectoral: its spines increase regularly in length caudad, the increase being most rapid in the anterior one-third of the fin; the single ray slightly exceeds the last spine. Length of first anal spine more than half length of second, the latter about two-thirds first ray: all rays simple, increasing slightly in length backwards. The pectoral, the simple and primitive-looking rodlike rays of which end some considerable distance from the margin of the fin, is bluntly pointed (less rounded than in figure of holotype): it is largely overlain by, and appears to be directly connected with, the translucent opercular lobe. Caudal rounded, nearly as broad as long.

The original account observes 'Form and structure of head and body similar to *O. pardalis*'; and the specifications (excluding those of dentition) given for the latter species (first paragraph, p. 39) are applicable also to the Tasmanian specimen.

The anterior nostril perforates a tube about twice as wide as high, lying about equidistant from orbit and anterior border of upper lip: from the hind part of the rim of the tube rises a small lanceolate flap. The outline figure of the holotype, in lateral view, shows 24 simple openings: of the 2 between the anterior nostril and the eye, that nearer the orbit is the posterior nostril. The cephalic pore system is not readily determined with certainty in our specimen; but as far as can be ascertained it follows the pattern found in *Ophiclinus gracilis*. In that species pores additional to those depicted in the figure of *Ophiclinops varius* comprise: (*a*) a transverse line of 5, of which 3, in a slightly proconcave arc, are mainly dorsal, and 2, a little caudad, are lateral; the 3 anterior pores of this set lie vertically above hindmost pore shown in the illustration: (*b*) a single median pore (rarely absent) behind median pore of (*a*) and closer to it than to base of first dorsal spine: (*c*) 1 just below base of tube of each anterior nostril: (*d*) 3 near, or with 1 or more excavating, border of preorbital, approximately level with top, middle, bottom of eye: (*e*) 1 extra mandibular pore, set very close to symphysis (in *Ophiclinus gracilis* there are of course also the pores of the lateral line, of the score or so of which 2 or 3 occur in advance of posterior border of operculum).

Coloration.—Though morphologically very similar to the type material, our specimen departs markedly from it in coloration. Thus, in the South Australian examples the ground color is light green or yellow; the main markings are 'irregular dark lines and dots on the body, most prominent along the middle of the anterior half of the body, and below the base of the dorsal fin', though they are variable and may be absent; the head is 'darker, specked with black dots': in contrast, in the Tasmanian fish the ground color is a rich dark brown (the pigment is apparently soluble in alcohol, that in which the specimen has been preserved being strongly tinted brown); the main markings are lighter than body color; the head is distinctly lighter than the body. Of the remaining entries for the type, two—'some light and dark bars radiating from the eye', 'vertical fins more or less variegated with light and dark markings'—are applicable to, though scarcely the natural specifications for, our specimen: the blackish annuli reported on the ventrals are, however, a conspicuous feature.

Rich brown ground color virtually uniform over most of trunk and tail, a trifle lighter in middle one-third, and, just in advance of vent, also in lowest one-third, of trunk; anterior portion of lowest one-third much darker: a conspicuous light, somewhat yellowish subcircular patch at base of caudal. A series of 11-14 light lichenoid markings (while the basic pattern unit appears to be subrectangular or subcircular, in some instances there are two portions of a rectangle or a circle separated by a vertical hiatus of ground color; the count in this way being indeterminate), extending, above straight line from pectoral base to last one-fourth of anal base, along whole flank from immediately behind operculum on to caudal base. Each unit consisting of from a dozen to a score of small, irregularly shaped, modally more or less rounded, whitish or pale pink spots or blotches; in most clusters a conspicuous central spot; anterior 3 or 4 marking almost contiguous, rest with interspaces $\frac{1}{4}$-$\frac{1}{3}$ their anteroposterior extent; last 3 markings extending to dorsal and anal bases. In the even dark strip below anterior $\frac{1}{3}$ of dorsal base 3 evenly spaced light ocelli, middle ocellus just caudad of vent, anterior at about middle of trunk.

Head in general greyish or pale greyish brown, lavishly but finely punctulated and vermiculated with darker; a light, anteriorly faintly pinkish, bar (more evenly delimited and more conspicuous on left side) from eye to pectoral; 3 or 4 short dark spokes radiating back from eye; 12-14 small dark spots, anteriorly becoming short bars, along border of operculum; light patch on maxilla; tip of lower jaw dark, approaching black; inferior half of upper jaw light greyish; iris blackish with a few gold spangles; tube of anterior nostril greyish; a dark cross bar occupying posterior three-quarters of interorbital.

Dorsal dark brown, concolorous with, or a little darker than, body: pale pinkish spots and blotches, similar to those on body, 2 small, above first body annulus, 2-3 others, very small, before vent; behind vent, more or less positionally matching, in rather more than last one-third of tail continuous with, those on flank. Anterior $\frac{7}{8}$ of anal border constituted by 6 bays (first very short) of translucent whitish, excavating, anteriorly almost to ventral body profile, the proximal dark greyish brown; latter immaculate, except for its invasion by last 3 light body pattern units. Pectoral: membrance colorless, rays dead white. Ventral whitish, more or less translucent, with, on each ray, 3-5 blackish markings, forming, according to degree of development, imperfect annuli, cross bars, or spots. Caudal mainly greyish, freaked darker, the pigment not extending quite to tips of most rays; middle rays darker.

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