Revision of the Fish Genus *Plectranthias* (Serrandidae: Anthiinae) with Descriptions of 13 New Species

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Abstract.—The tropical marine fish genus *Plectranthias* Bleeker, Family Serranidae, Subfamily Anthiinae, is expanded to include the genera *Sayonara, Isobuna, Xenanthias, Pteranthias, Zalanthias, Serranops, Pelontrus*, and *Zacallanthias*. The following 17 described species are recognized in *Plectranthias*: the type species *P. anthioides* (Günther), known only from the holotype from Celebes; *P. foresti* Fourmanoir from the Philippines; *P. gardineri* (Regan) from the Seychelles; *P. garrupellus* Robins and Starck from Florida and the West Indies; *P. intermedius* (Kotthaus) from the vicinity of Socotra, Arabian Sea; *P. japonicus* (Steindachner) from Japan (described as a cirrhitid); *P. kelloggi* (Jordan and Evermann) from Hawaii, Japan and New Caledonia [*azumanus* (Jordan and Richardson) is regarded as a subspecies of *P. kelloggi*, and a population from New Caledonia is named as a new subspecies, *melanesius*]; *P. longimanus* (Weber) from the western Pacific to the western Indian Ocean; *P. maculicauda* (Regan) from New Zealand and New South Wales; *P. megalepis* (Günther) from the Kai Islands, Arafura Sea, Indonesia; *P. megalophthalmus* Fourmanoir and Randall from New Caledonia; *P. morgansi* (Smith) from Kenya; *P. retrofasciatus* Fourmanoir and Randall and *P. rubrifasciatus* Fourmanoir and Randall from New Caledonia; *P. sagamiensis* (Katayama) from Japan and the Ryukyus; *P. winniensis* (Tyler), widespread in the Indo-West Pacific; and *P. yamakawai* Yoshino from the Ryukyus. In addition, the following 13 species are described as new: *P. alleni* from 90 to 192 m off Western Australia; *P. bauchotae* from 140 to 180 m off southern Madagascar; *P. cirrhitoides* from 2.5 to 19 m at Rapa, South Pacific; *P. fourmanoiri* from 15 to 44 m in Oceania; *P. helenae* from 119 to 168 m off Hawaii; *P. inermis* from 14 to 30 m in the Moluccas, New Britain, and the Philippines; *P. kamii* from Guam (275 m), Palau (270 m), Ryukyus, and Japan; *P. maugei* from 250 m off SW Madagascar; *P. nanus* from 5 to 57 m at numerous islands in Oceania and Cocos-Keeling in the Indian Ocean (previously confused with *P. longimanus*); *P. taylori* from 183 m at Canton Island, Phoenix Islands (the largest species, to 237.5 mm SL); *P. vexillarius* from 49 to 63 m in the Gulf of Oman; and *P. wheeleri* and *P. whiteheadi*, both from the Kai Islands, Arafura Sea (syntypes of *P. megalepis*).

Introduction

The anthiine genus *Plectranthias* Bleeker (1873), family Serranidae, was revised by Yoshino (1972). He recognized two species, *P. anthioides* (Günther), the type species, and *P. yamakawai* from the Ryukyu Islands which was described as new. He overlooked the paper by Robins and Starck (1961) in which *Plectranthias garrupellus* was described from Florida and the Bahamas. Also Robins and Starck correctly placed *Pelontrus morgansi* Smith from Kenya in the genus *Plectranthias*.

The holotype of *Plectranthias anthioides* (Günther) from Celebes was examined

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and found to be different from the species to which Katayama (1960) and Yoshino (1972) have applied this name. Furthermore, *Anthias megalepis* Günther from the Kai Islands, Arafura Sea is not a synonym of *P. anthioides* as contended by Boulenger (1895), Weber and de Beaufort (1931) and others. The syntypic series of *A. megalepis* consists of three specimens, each a different species of *Plectranthias*; the name *megalepis* is restricted to the one illustrated by Günther; the other two are described herein as new.

Recent collections of Indo-Pacific fishes by the author and colleagues have yielded other undescribed species of *Plectranthias* which have necessitated an alteration of the generic classification of the Anthiinae. The genera *Sayonara* Jordan and Seale (1906), *Isobuna* Jordan in Jodan and Herre (1907), *Xenanthias* Regan (1908), *Pteranthias* Weber (1913), *Zalanthias* Jordan and Richardson (1910), *Serranops* Regan (1914), and *Zacallanthias* Katayama (1963) are placed in the synonymy of *Plectranthias,* along with *Pelontrus* Smith (1961). Such formerly useful characters as the presence or absence of antrorse spines on the lower margin of the preopercle, a smooth or serrate upper preopercular margin, presence or absence of scales on the maxilla, a complete or incomplete lateral line, and branched or unbranched pectoral rays are so variously shared by the 30 species of *Plectranthias* recognized herein that these genera can no longer be maintained.

The genus *Isobuna* was based on a single specimen, described as *Paracirrhites japonicus* Steindachner in Steindachner and Döderlein (1884) from Japan, which in no longer extant. Randall and Heemstra (1978) concluded that this fish is not a cirrhitid but an anthiine for which a later name, *Sayonara satsumae* Jordan and Seale, was proposed (see discussion of *Plectranthias japonicus* herein). They also reclassified *Serranocirrhitus* Watanabe (1949), originally described as a "cirrhitoid", as a member of the Anthiinae.

The removal of *Isobuna* and *Serranocirrhitus* from the hawkfish family provides a sharper separation of the Cirrhitidae from the Serranidae. Nevertheless, these two families appear closely related. *Plectranthias* shares a number of characters with the Cirrhitidae, such as the notched dorsal fin with X spines, similar ray counts for other fins, 26 vertebrae, the same general body form, and similar dentition. The presence of the thickened lower pectoral rays of *P. cirrhitoides,* and this tendency in some other species of the genus, makes the cirrhitid comparison all the more striking. As is discussed in Remarks under *P. cirrhitoides,* however, the thickened pectoral rays of this species probably do not indicate that it lies in a direct evolutionary line leading to the hawkfishes; more likely it is an example of convergence. But it does seem plausible that the Cirrhitidae arose from anthiine stock similar to *Plectranthias.*

The genus *Ellerkeldia* Whitley (1927) is closely related to *Plectranthias.* It consists of five small species of the southern Australian and New Zealand region (Allen, 1976). As pointed out by Norman (1957), the lateral line is "feebly marked, the tubules mostly confined to the basal part of each scale". The external structure of the lateral line of *Plectranthias kelloggi,* however is similar. The species of *Ellerkeldia* have smaller scales (40 to 50 in the lateral-line series and about 10 oblique rows on the

cheek, discounting the numerous small ones near the margin of the orbit) and the configuration of the head is more sharply linear. Nevertheless, more study is needed to determine if it can be maintained as distinct from *Plectranthias*.

Most of the species of *Plectranthias* have been taken in deeper water than the usual scuba-diving depths. Most are associated with hard substratum, hence are not often caught in trawls. Many are small, thus not apt to be taken by hook and line, or if caught, not likely to be retained as food fishes. It is perhaps not surprising, therefore, that 18 of the 30 species of the genus are known from only one or two collections, and eight of the 18 are represented by a single specimen.

Because material for the study of internal anatomy is lacking for many species of *Plectranthias,* including the type species, and because it is probable that more fishes remain to be discovered in this genus, the present revision must be considered as preliminary. Also, no attempt is made at this time to define subgeneric limits.

Methods

All of the meristic data included in this paper were taken by the author. The last two dorsal and anal rays were counted separately when there was space between their bases. The short upper pectoral ray is contained in the count of the rays of this fin. The number of lateral-line scales of those species with interrupted lateral lines was taken of the anterior series (ending beneath soft portion of dorsal fin); this count was made of only the tube-bearing scales, not those more posterior ones which possess only pores. The important count of the scales above the lateral line to the origin of the dorsal fin was made in a straight oblique line above the first or second lateral-line scale to the base of the first dorsal spine. Often a small scale is present at the base of this spine; this was counted as 1/2. The cheek scales are the diagonal rows of large scales between the eye and the corner of the preopercle; only the rows of large scales were counted (small scales are present at either end on some species). Gill-raker counts were made on the first gill arch and include all rudiments; the raker at the angle is recorded with the lower-limb count. The number of preopercular serrae may be of diagnostic value; those of the upper margin were counted above the midpoint of the rounded corner of the preopercle. It is well to note, however, that the number of serrae tend to increase with age (see Fig. 1).

The presence or absence of scales at certain places on species of *Plectranthias*, such as the maxilla, is often of significance in identification. Scales are easily lost from specimens of this genus at some sites, however, particularly from old specimens or material taken in trawls or dredges. Therefore, one should not place too much emphasis on scale characters when only one or a few specimens are available.

Standard length (SL) was taken from the most anterior point of the upper lip to the base of the caudal fin (end of hypural plate). The depth of the body is the greatest depth. The width of the body was measured just behind the gill opening. Head length was taken from the most anterior point of the upper lip to the end of the opercular flap. The length of the caudal peduncle was measured diagonally from the rear base of

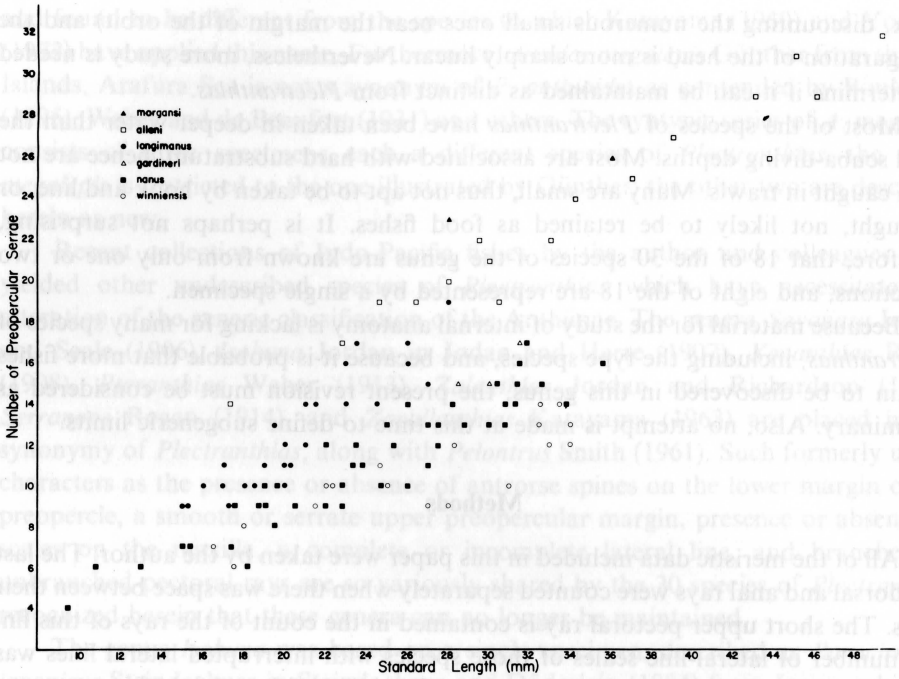

Fig. 1. Relationship of number of preopercular serrae to standard length for six small species of *Plectranthias*. Counts do not include one or two large antrorse spines, if present, on lower margin of preopercle.

the anal fin to the midbase of the caudal fin. Caudal concavity (for those species with emarginate caudal fins) is the horizontal distance between verticals at the distal ends of the longest and shortest caudal rays.

In the descriptions of new species, data in parantheses apply to paratypes. Some generic characters are not repeated in the species descriptions. The species accounts are presented alphabetically after the Key.

Type material of the new species has been variously deposited at the Academy of Natural Sciences of Philadelphia (ANSP); Australian Museum, Sydney (AMS); Bernice P. Bishop Museum, Honolulu (BPBM); British Museum (Natural History), London [BM (NH)]; California Academy of Sciences, San Francisco (SU and CAS); Lembaga Oseanologi Nasional, Jakarta (NCIP); Muséum National d'Histoire Naturelle, Paris (MNHN); J.L.B. Smith Institute of Ichthyology, Rhodes University, Grahamstown (RUSI); U.S. National Museum of Natural History, Washington, D.C. (USNM); and Western Australian Museum, Perth (WAM).

GENUS *Plectranthias* Bleeker

Tables 1, 2, 3

Plectranthias Bleeker, 1873. Ned. Tijdschr. Dierk., vol. 4, p. 238 (type species, *Plectropoma anthioides* Günther, by monotypy).

Sayonara Jordan and Seale, 1906. Proc. U.S. Natl. Mus., vol. 30, p. 145 (type species, *S. satsumae* Jordan and Seale, by original designation and monotypy).

Isobuna Jordan in Jordan and Herre, 1907. Proc. U.S. Natl. Mus., vol. 33, p. 158 (type species, *Paracirrhites japonicus* Steindachner, by original designation and monotypy; new name for *Paracirrhites* Steindachner, preoccupied by *Paracirrhites* Bleeker).

Xenanthias Regan, 1908. Trans. Linn. Soc. London, ser. 2, vol. 12, p. 223 (type species, *X. gardineri* Regan, by monotypy).

Pteranthias Weber, 1913. Siboga-Exped. Fische (Leiden), p. 208 (type species, *P. longimanus* Weber, by monotypy).

Zalanthias Jordan and Richardson, 1910. Proc. U.S. Natl. Mus., vol. 37, no. 1714, p. 470 [type species, *Pseudanthias kelloggi* (Jordan and Evermann), by original designation; (proposed as a subgenus)].

Serranops Regan, 1914. Ann. Mag. Nat. Hist., ser. 8, vol. 13, p. 15 (type species, *Serranops maculicauda* Regan, by monotypy).

Pelontrus Smith, 1961. Ichth. Bull. Rhodes Univ. (Grahamstown), no. 21, p. 364 (type species, *P. morgansi* Smith, by original designation and monotypy).

Zacallanthias Katayama, 1963. Bull. Fac. Educ., Yamaguchi Univ., vol. 13, pt. 2, p. 27 (type species, *Z. sagamiensis* Katayama, by original designation and monotypy).

DESCRIPTION: Dorsal fin rays X, 13 to 18; anal fin rays III, 6 to 8 (usually 7, very rarely 8); pectoral rays 12 to 18; pelvic rays I, 5; branched caudal rays 12 to 15 (a single simple principal ray above and below these, preceded by procurrent rays); near-vertical scale rows from upper end of gill opening (beginning with first lateral-line scale) to caudal base 25 to 41; lateral line incomplete (tube-bearing scales ending beneath soft portion of dorsal fin) or complete, smoothly curved (no sharp downward deflection beneath soft portion of dorsal fin); gill rakers 4 to 9+9 to 17; branchiostegal rays 7; vertebrae 26; depth of body 2.3 to 3.4 in SL; width of body 1.6 to 2.4 in depth; head large, 2.0 to 2.55 in SL; interorbital space narrow, flat to slightly concave; mouth large, the maxilla reaching to or posterior to a vertical at hind edge of pupil (in some species beyond posterior edge of eye); a very small splint-like supramaxilla present; mouth terminal or with lower jaw projecting; villiform teeth in a broad band anteriorly in jaws (but a gap at symphysis without teeth), narrowing to a few rows on side of jaws; usually a short canine or pair of canines in outer row at front of upper jaw separated from tooth of other side by a gap contained about 2 to 4 times in eye diameter; inner medial teeth at front of upper jaw long, slender, lying nearly flat, and depressible; fixed canine teeth anteriorly in lower jaw present or absent; most species with an outer canine at first third to half of lower jaw; small teeth present in a "V"-shape on vomer; small teeth present on palatines in all species except *P. fourmanoiri*; tongue slender, without teeth; anterior nostril in a short membranous tube; posterior nostril usually larger, with or without a low rim, usually within a nostril diameter of edge of orbit; three opercular spines; upper edge of opercle joined

Table 1. Soft fin-ray counts of species of *Plectranthias*.

Species	Dorsal Soft Rays						Anal Soft Rays			Pectoral Rays						
	13	14	15	16	17	18	6	7	8	12	13	14	15	16	17	18
alleni		25					1	24					1	21	3	
anthioides					1			1				1				
bauchotae				1				1				1				
cirrhitoides			3					3			3					
foresti		1	3					4			4					
fourmanoiri				1	1	10		12		2	10					
gardineri		4					1	3				3	1			
garrupellus			2	4				6			6					
helenae			4				1	3				4				
inermis				3	8	1		12			12					
intermedius					2		1	1				1	1			
japonicus		3	8	1				12					2	10		
kamii						3		3			3					
kelloggi		1	25	1				27				4	22	1		
longimanus	19	12	2				12	21		3	30					
maculicauda			13					13				1	11	1		
maugei			3					3			3					
megalepis			1					1			1					
megalophthalmus			1					1					1			
morgansi	1		1					2			1	1				
nanus	3	39	9				2	48	1			27	22	2		
retrofasciatus				1				1			1					
rubrifasciatus			1					1				1				
sagamiensis				5				5			2	3				
taylori						2		2				2				
vexillarius					1			1			1					
wheeleri				2				2			2					
whiteheadi					1			1				1				
winniensis				11	6			17						3	12	2
yamakawai					2			2			2					

Table 2. Lateral-line scale counts of species of *Plectranthias*.

Species	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41
alleni																						2	10	11	2					
anthioides																						1								
bauchotae																				1										
cirrhitoides																		1	3											
foresti																		4												
fourmanoiri														12																
*gardineri**						1	3																							
garrupellus																	3	3												
helenae																		3	1											
*inermis**	2	1	1	2	2	3	1																							
intermedius																				1		1								
japonicus																				2	1	3	4	2						
kamii																						1	1		1					
kelloggi																					1	4	7	6	6	2	1			
*longimanus**	1	8	17	7																										
maculicauda																					4	6	3							
maugei																		2	1											
megalepis																		1												
megalophthalmus																				1										
morgansi																		2												
*nanus**					2	4	15	13	10	3	4																			
retrofasciatus																		1												
rubrifasciatus																		1												
sagamiensis																1	3	1												
taylori																													1	1
vexillarius																		1												
wheeleri																		2												
whiteheadi																			1											
*winniensis**			1	2	3	3	3	3	2																					
yamakawai																				1	1									

* Denotes species with interrupted lateral lines. Counts made only of tube-bearing (not merely pored) scales of anterior series of these species.

Table 3. Gill-raker counts of species of *Plectranthias*.

Species	Upper Limb					Lower Limb[1]								
	4	5	6	7	8	9	10	11	12	13	14	15	16	17
alleni		11	13	1				16	9					
anthioides			1							1				
bauchotae		1						1						
cirrhitoides		3						1		2				
foresti	1	3						1	2	1				
fourmanoiri	3	3	5	1			1	7	4					
gardineri	2	2				2	1	1						
garrupellus		1	5					3	3					
helenae		3	1					3	1					
inermis		6	6				4	4	4					
intermedius		1	1						2					
japonicus			8	4			2	9	1					
kamii		1	2					1	1	1				
kelloggi			10	15	2						1	18	6	2
longimanus	12	16	5			2	13	15	3					
maculicauda			5	5	3							9		4
maugei		3						2	1					
megalepis		1							1					
megalophthalmus		1							1					
morgansi		1	1					1	1					
nanus	6	30	13	2				18	17	10	6			
retrofasciatus		1						1						
rubrifasciatus		1						1						
sagamiensis		2	3					2	2	1				
taylori		2							1	1				
vexillarius			1							1				
wheeleri		2						2						
whiteheadi		1						1						
winniensis	1	5	11					1	4	8	2	2		
yamakawai		2								2				

[1] Includes raker at angle

to body by a membrane; opercular flap pointed and angling upward; lower margin of preopercle with or without 1 to 3 (usually 2) antrorse spines; upper margin of preopercle usually serrate but may be smooth; scales ctenoid; head completely scaled or variously lacking scales on snout, interorbital space, suborbital, maxilla, and ventrally; diagonal rows of large scales on cheek between edge of orbit and corner of preopercle 4 to 10; dorsal and anal fins usually with small scales basally; third to fifth dorsal spine longest, its length 1.6 to 3.85 in head; dorsal fin notched, the spinous and soft portions almost completely separated on some species, the last dorsal spine 1.5 to 6.6 in length of first dorsal soft ray; second anal spine the longest; caudal fin emarginate to rounded; pectoral fins with middle rays the longest, reaching beyond a vertical at origin of anal fin; pelvic fin origin anterior to pectoral base; pelvic fins not very long, often not reaching anus.

KEY TO THE SPECIES OF *PLECTRANTHIAS*

1. Some pectoral rays branched; lateral line complete 2
1.′ No pectoral rays branched; lateral line complete or incomplete 18
2. Head, including maxilla and chin, completely scaled 3
2.′ Head not completely scaled (most of snout, chin, and usually maxilla scaleless) 5
3. Dorsal soft rays 17; antrorse spines on lower margin of preopercle present, 2; upper margin of preopercle coarsely serrate (about 26 serrae); diagonal rows of scales on cheek between eye and corner of preopercle 10; pale with a dark band or series of small dark blotches along base of dorsal fin which is deflected ventrally as it passes beneath posterior soft portion of fin, ending on midside of caudal peduncle (Arabian Sea) ..... *P. intermedius*
3.′ Dorsal soft rays 14 to 16; antrorse spines on lower margin of preopercle absent; preopercle finely serrate (more than 30 serrae on upper margin of adults); diagonal rows of scales on cheek between eye and corner of preopercle 6 or 7; color not as in 3a 4
4. Caudal fin subtruncate to rounded; no dorsal ray prolonged; no canine teeth in lower jaw; lower-limb gill rakers 10 to 12; no deep red bars on body and no red spot on caudal fin (Japan to the Philippines) ..... *P. japonicus*
4.′ Caudal fin emarginate, the second upper caudal ray usually elongate; second dorsal soft ray prolonged as a filament; a pair of stout canine teeth at each corner at front of lower jaw and another pair on side of jaw about one-third distance from the front; lower-limb gill rakers 14 to 17; deep red bars on body and a small red spot on upper basal part of caudal fin in life (Hawaiian Islands, Japan, and New Caledonia) ..... *P. kelloggi*
5. Body not elongate, the depth 2.2 to 3.15 in SL; eye not very large, the orbit diameter 3.0 to 4.75 in head; canine teeth present in both jaws; upper preopercular margin serrate; color (when known) not mainly yellow 6
5.′ Body relatively elongate, the depth 3.4 in SL; eye very large, the orbit diameter 2.9 in head; no canine teeth in jaws; preopercular margin smooth; color mainly yellow (New Caledonia) ..... *P. megalophthalmus*
6. No antrorse spines on lower margin of preopercle; top of head scaled to front of snout 7
6.′ Two antrorse spines on lower margin of preopercle; top of head not scaled anterior to nostrils 8
7. Dorsal soft rays 14; lower-limb gill rakers 11 or 12; depth of body 2.5 to 2.8 in SL; a narrow blackish stripe from front of upper lip to eye; a faint dusky stripe from eye across upper side of body, and a faint small dusky spot at midbase of caudal fin (stripe and spot more evident on smaller individuals) (Western Australia) ..... *P. alleni,* new species
7.′ Dorsal soft rays 15; lower-limb gill rakers 15 to 17; depth of body 3 to 3.15 in SL; no dark stripes on head; a blackish spot about two-thirds size of eye posteriorly on side of caudal peduncle (New Zealand and New South Wales) ..... *P. maculicauda*

8. Dorsal soft rays 16 to 18 9
8.′ Dorsal soft rays 15 (the Atlantic *P. garrupellus* with 15 or 16) 16
9. Lateral-line scales 29 to 36; diagonal rows of large scales on cheek between eye and corner of preopercle 5 to 7.....10
9.′ Lateral-line scales 40 or 41; diagonal rows of large scales on cheek between eye and corner of preopercle 8 or 9 (Phoenix Islands) .... *P. taylori,* new species
10. Fourth or fifth dorsal spines longest, 2.9 to 3.2 in head 11
10.′ Third dorsal spine the longest, 1.8 to 2.9 in head.....12
11. Depth of body 2.4 to 2.7 in SL; pectoral fins reach beyond first anal soft ray, 2.65 to 2.95 in SL; pectoral rays 13; lateral-line scales 31–32; a pale-edged round red spot as large or larger than eye on midside of body (Ryukyu Islands) ..... *P. yamakawai*
11.′ Depth of body 2.95 in SL; pectoral fins just reaching base of first anal soft ray, 3.1 in SL; pectoral rays 14; lateral-line scales 30; no large red spot on side (color red with two rows of dark blotches on back) (Indonesia) ..... *P. whiteheadi,* new species
12. Lateral-line scales 33 to 36; dorsal soft rays 17 or 18; indistinct blackish blotches on back 13
12.′ Lateral-line scales 29 to 31; dorsal soft rays 16; no blackish blotches on back 14
13. Caudal fin rounded; scales above lateral line to origin of dorsal fin 3 1/2; pelvic fins reaching anus; depth of body 2.86 in SL; pectoral rays 14; a median black band on nape (may be lost in preservative) (Indonesia) ..... *P. anthioides*
13.′ Caudal fin emarginate; scales above lateral line to origin of dorsal fin 5 1/2; pelvic fins not reaching anus; depth of body 2.6 to 2.7 in SL; pectoral rays 13; no median black band on nape (Mariana, Palau, and Ryukyu Islands) *P. kamii,* new species
14. A pair of moderate canine teeth at front of lower jaw; lateral-line scales 31; body relatively deep, the depth about 2.4 in SL; third dorsal spine about 1.7 in head; pectoral rays 14 (Madagascar)... *P. bauchotae,* new species
14.′ No canine teeth at front of lower jaw; lateral-line scales 29; body not very deep, the depth about 2.6 to 2.7 in SL; third dorsal spine 2.2 to 2.5 in head; pectoral rays 13 15
15. Inner row of teeth on side of lower jaw about twice as long as teeth in the outer rows; longest caudal fin ray contained about 1.4 in head; two prominent red bars on body, the first passing downward from edge of dorsal fin where most deeply notched to front of anal fin and the second posteriorly on caudal peduncle (New Caledonia) ..... *P. retrofasciatus*
15.′ Inner row of teeth on side of lower jaw small, about equal in size to those of outer rows; longest caudal fin ray contained about 1.9 times in head; no bars on body (color in life whitish with large irregular orange-red blotches suffused with yellow) (Indonesia) ..... *P. wheeleri,* new species
16. Scales above lateral line to origin of dorsal fin 3 or 3 1/2; caudal fin slightly

emarginate, the caudal concavity about 10 to 12 in head; snout 4.3 to 4.6 in head 17

16.′ Scales above lateral line to origin of dorsal fin 4 1/2 or 5; caudal fin emarginate, the caudal concavity 4 to 6 in head, snout 3.5 to 3.8 in head; whitish in life with irregular orange bars and large spots which interconnect broadly over region of lateral line (Hawaiian Islands) .... *P. helenae,* new species

17. Pectoral rays 13; third dorsal spine longest, 1.6 to 2.2 in head; some scales ventrally on head and branchiostegal rays; top of head scaled almost to nostrils; life color unknown (Atlantic coast of Florida and West Indies) *P. garrupellus*

17.′ Pectoral rays 14; fouth dorsal spine longest, 2.3 in head; no scales ventrally on head; top of head scaled to anterior third of interorbital space; orange-red bars in life (New Caledonia) ..... *P. rubrifasciatus*

18. Lateral-line incomplete, 12 to 22 tube-bearing scales in anterior series. .19

18.′ Lateral-line complete, 25 to 31 tube-bearing scales in series to caudal base 23

19. Fourth dorsal spine the longest; antrorse spines on lower margin of preopercle present, 1 or 2; upper margin of preopercle strongly serrate; pectoral fins not very long, 2.4 to 3.2 in SL 20

19.′ Third dorsal spine the longest; antrorse spines on lower margin of preopercle absent; upper margin of preopercle not serrate or with only a few isolated weak serrae; pectoral fins very long, the longest rays, if intact, reaching posterior to rear base of anal fin, 2.2 to 2.5 in SL (Indonesia, Philippines and New Britain) ..... *P. inermis,* new species

20. Two antrorse spines on lower margin of preopercle; no scales on maxilla; top of head not scaled anteriorly to midinterorbital space; diagonal rows of large scales on cheek 4 or 5; depth of body 2.8 to 3.6 in SL; longest dorsal spine 2.3 to 3 in head; dark markings often present on head and body 21

20.′ One antrorse spine on lower margin of preopercle (may be poorly developed); scales present on maxilla; top of head scaled anteriorly to nostrils; diagonal rows of large scales on cheek 6; depth of body 2.55 to 2.7 in SL; longest dorsal spine 1.9 to 2.15 in head; no dark markings on head, body, or fins (Seychelles) ..... *P. gardineri*

21. Pectoral rays 12 or 13; tube-bearing lateral-line scales 12 to 15; coarse serrae on subopercle 2 to 7 and 1 to 8 on interopercle; pale with large brown blotches interconnecting to form irregular bars; a small dark brown spot at rear base of dorsal fin, one at upper end of caudal peduncle just in front of caudal base, one at rear base of anal fin, and one on lower caudal peduncle between last two spots (less distinct small dark spots along bases of dorsal and anal fins) (western Pacific to western Indian Ocean) ..... *P. longimanus*

21.′ Pectoral rays 14 to 18; tube-bearing lateral-line scales 14 to 22 (usually 16 or more); weak serrae on subopercle 0 to 2 (one of 46 *P. nanus* with 4) and none

(except one *P. nanus* with 1) on interopercle; color not exactly as in 21a (but that of *P. nanus* very similar) 22

22. Dorsal soft rays 13 to 15; pectoral rays 14 to 16 (usually 14 or 15); color as in 21a except a vertical brown line on caudal base separated by a pale zone from two dark spots posteriorly on caudal peducle (Oceania and Cocos-Keeling Islands). ..... *P. nanus,* new species

22.′ Dorsal soft rays 16 or 17; pectoral rays 16 to 18 (usually 17); pale in preservative (in life, mottled orange anteriorly, becoming red and white posteriorly, with a red spot at origin and a white spot at rear base of dorsal fin) (Indo-West Pacific) ..... winniensis

23. Third dorsal spine the longest, with a pennant-like flap near tip, the spine length 1.6 to 2.1 in head; branched caudal rays 15 24

23.′ Fourth or fifth (usually the fourth) dorsal spine the longest, without a conspicuous flap at tip, the spine length 2.1 to 3.4 in head; branched caudal rays 12 to 14 (except *P. cirrhitoides* with 15) 25

24. Caudal fin slightly rounded, without any filamentous rays; dorsal soft rays 13 to 15; diagonal rows of large scales on cheek 5; longest dorsal spine 1.6 to 1.8 in head; depth of body 2.5 to 2.6 in SL; pale in preservative with dark pigment on lateral-line scales 9 to 16 (Kenya) ..... *P. morgansi*

24.′ Caudal fin emarginate, the upper and lower lobes produced; dorsal soft rays 17; diagonal rows of large scales on cheek 7; longest dorsal spine 2.1 in head; depth of body 2.7 in SL; pale in preservative with four irregular rows of large brown blotches on body (Gulf of Oman) *P. vexillarius,* new species

25. Caudal fin emarginate with filamentous rays; some dorsal rays filamentous.. 26

25.′ Caudal fin truncate to rounded (except *P. sagamiensis* with emarginate fin), with no filamentous rays; no dorsal rays filamentous 27

26. Dorsal soft rays 14 or 15; no scales on anterior half of interorbital space (Philippines) ..... *P. foresti*

26.′ Dorsal soft rays 16; scales present to front of interorbital space (Madagascar) ..... *P. maugei,* new species

27. Upper preopercular margin with 18 to 29 serrae; diagonal rows of large scales on cheek 6; caudal fin truncate or emarginate; no dark bars on body (dark blotches generally present); no black spot in anal fin 28

27.′ Upper preopercular margin with 1 to 4 serrae; diagonal rows of large scales on cheek 4 or 5; caudal fin rounded; dark bars on body; a large black spot basally in anal fin 29

28. Lower margin of preopercle with two prominent antrorse spines; a few small serrae present on lower margin of subopercle and interopercle; caudal fin emarginate (Sagami Bay, Japan to Okinawa) . . *P. sagamiensis*

28.′ Lower margin of preopercle without antrorse spines; no serrae on lower margin of subopercle or interopercle; caudal fin truncate (Indonesia) ... . *P. megalepis*

29. Longer lower pectoral rays slightly enlarged; palatine teeth absent; lateral-line scales 25; dorsal soft rays 16 to 18; pectoral rays 13 (rarely 12); top of head scaled to posterior interorbital space; body pale with four brown bars, two bars on postorbital head, and five prominent black spots as follows: origin of dorsal fin, rear base of spinous portion of dorsal fin, rear base of soft portion of dorsal fin, midventrally on abdomen, and rear base of anal fin (Oceania) ..... *P. fourmanoiri,* new species

29.′ Lower six pectoral rays notably enlarged, about twice as thick as shorter upper rays; palatine teeth present; lateral-line scales 29 or 30; dorsal soft rays 15; pectoral rays 14; top of head scaled anteriorly to nostrils; body pale with six broad brown bars, the first on nape, the last on caudal base, the ones between tending to form double bars (upper ends extending into basal part of dorsal fin where they are darker); a large dark spot at base of anal fin, another at base of pectoral, and two small dark spots, one above the other, at caudal base (Rapa) ..... *P. cirrhitoides,* new species

Systematic Account

Plectranthias alleni n. sp.

Fig. 2, Table 4

HOLOTYPE: WAM P. 25625–001, 52.0 mm SL, off SW Western Australia (29°09′S; 113°55′E), 103 m, dredge, crew of R/V SPRIGHTLY, 19 February 1976.

PARATYPES: BM(NH) 1978.2.27:3, 57.6 mm SL, Western Australia, Rottnest Island, 173–176 m, dredged from sponge bottom, BLUEFIN, R. George, 14 August 1962; USNM 218368, 3: 39.2–58.2 mm SL, same data as preceding; AMS I. 20125–001, 49.2 mm SL, Western Australia, Rottnest Island, 165–166 m, dredge, BLUEFIN, R. Geroge, 15 August 1962; BPBM 21093, 2: 26.4–34.9 mm SL, Western Australia, NW of Bunbury (32°57.5′S; 114°48′E), 122–139 m, crew of DIAMANTINA 15 March 1972; CAS 40799, 43.7 mm SL, Western Australia, west of Cape Freycinet (34°S; 114°28′E), 256 m, dredge, DIAMANTINA, 15 March 1972; MNHN 1978–82, 37.0 mm SL, Western Australia (32°43′S; 114°47′E), 179–192 m, DIAMANTINA, 17 March 1972; ANSP 136750, 46.8 mm SL, Western Australia, WNW of Jurien Bay (30°10′S; 114°13′E), DIAMANTINA, 19 March 1972; BPBM 21094, 2: 47.3–63.2 mm SL, same data as preceding; WAM P. 23323, 22.8 mm SL, Western Australia, W of Dongara (29°15′S; 114°01′E), 146 m, DIAMANTINA, 20 March 1972; BPBM 21095, 7: 24.6–48.5 mm SL, Western Australia, NW of Green Head (30°37′S; 114°44′E), 139–146 m, DIAMANTINA, 22 March 1972; WAM P. 23325–30, 10: 30.5–58.8 mm SL, Western Australia, NW of Green Head (29°59′S; 114°25′E), 146 m, DIAMANTINA, 22 March 1972; WAM P. 23322, 17.3 mm SL, Western Australia, W of Rottnest Island (31°59′S; 115°14′E), 182 m, DIAMANTINA, 23 March 1972; WAM P. 23334, 61.7 m SL, Western Australia, W of Rottnest Island (32°0′S; 115°15′E), 146–150 m, DIAMANTINA, 23 March 1972;

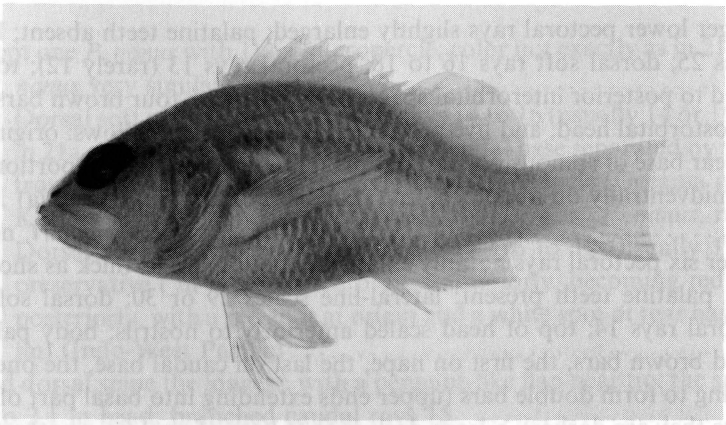

Fig. 2. Holotype of *Plectranthias alleni*, 52 mm SL, WAM P. 25625–001, off SW Western Australia.

Table 4. Proportional measurements of type specimens of *Plectranthias alleni*, expressed as a percentage of the standard length.

	HOLOTYPE	PARATYPES				
	WAM P. 25625–001	BPBM 21095	BPBM 21095	BPBM 21904	BPBM 21096	WAM P. 23334
Standard Length (mm)	52.0	26.4	34.2	47.3	59.3	61.7
Depth of Body	39.5	35.6	36.0	37.3	37.3	39.7
Width of Body	19.6	18.9	19.0	18.6	18.5	21.4
Head Length	41.8	41.7	40.7	42.1	40.2	40.9
Snout Length	11.1	10.8	10.5	11.7	10.9	11.0
Diameter of Orbit	12.3	14.0	12.9	12.4	11.6	11.9
Bony Interorbital Width	6.2	4.9	5.0	6.1	6.6	6.7
Length of Upper Jaw	20.7	19.7	20.1	19.9	19.7	20.3
Least Depth of Caudal Peduncle	13.9	14.0	14.2	13.3	13.5	14.1
Length of Caudal Peduncle	19.4	18.9	18.4	18.5	19.3	19.3
Snout to Origin of Dorsal Fin	43.8	44.3	41.8	41.8	40.9	42.6
Snout to Origin of Anal Fin	66.6	66.9	68.5	69.1	67.3	66.7
Snout to Origin of Pelvic Fins	40.2	37.9	40.3	41.3	38.7	39.4
Length of Dorsal Fin Base	52.2	48.8	48.6	50.0	49.0	52.0
Length of First Dorsal Spine	5.6	5.1	4.9	6.1	5.2	5.8
Length of Longest Dorsal Spine	16.0	16.7	17.5	16.7	16.8	17.2
Length of Longest Dorsal Ray	15.7	18.9	17.8	15.9	15.5	15.4
Length of Anal Fin Base	16.7	17.6	17.5	16.7	17.0	17.2
Length of First Anal Spine	8.6	7.6	8.6	8.4	7.5	8.4
Length of Second Anal Spine	16.3	15.5	16.3	16.5	16.0	16.1
Length of Third Anal Spine	13.0	12.1	14.0	12.9	12.3	13.2
Length of Longest Anal Ray	20.4	23.9	23.1	19.0	18.9	19.5
Length of Caudal Fin	26.4	28.0	broken	25.4	26.3	24.4
Length of Pectoral Fin	33.5	34.5	33.7	34.2	31.6	30.5
Length of Pelvic Spine	25.6	28.4	28.6	27.1	26.5	25.6
Length of Pelvic Fin	15.2	15.1	15.4	15.3	15.3	15.8

WAM P. 23309, 55.0 mm SL, Western Australia, W of Lancelin, DIAMANTINA, 23 March 1972; BPBM 21096, 59.3 mm SL, off SW Western Australia (30°21′S; 114°38′E), 90 m, dredge, R/V SPRIGHTLY, 15 February 1976; RUSI 933, 47.9 mm SL, Western Australia (29°14′S; 114°06′E), 165 m, R/V SPRIGHTLY, 17 February 1976.

DESCRIPTION: Dorsal rays X, 14 (one paratype with IX, 14); anal rays III, 7 (one paratype with III, 6); pectoral rays 16 (15 to 17, usually 16, all but uppermost branched, except for juveniles); branched caudal rays 15; lateral line complete, the tube-bearing scales 36 (33 to 36); lateral line moderately arched over pectoral fin, the highest point below base of eighth dorsal spine (where two rows of large scales lie between the lateral line and dorsal fin base); scales above lateral line to origin of dorsal fin 4 1/2; scales below lateral line to origin of anal fin 12 1/2; circumpeduncular scales 14; dorsal part of head scaled anteriorly to front of snout; suborbital, maxilla and mandible unscaled; branchiostegal rays scaled (these scales easily lost); 7 or 8 diagonal rows of large scales on cheek between eye and corner of preopercle; about 18 prepelvic scales; small scales basally on all fins except spinous portion of dorsal fin (extent of squamation on fins difficult to ascertain due to numerous missing scales, but scales appear to extend half or more the length of the fins).

Gill rakers 6+12 (5 to 7+11 or 12), one upper and 8 or 9 lower rakers elevated, the rest as rudiments; longest gill raker, at corner, slightly longer than longest gill filaments; pseudobranch lamellae 15 (10 to 18, more numerous generally, on larger specimens).

Depth of body 2.53 (2.52 to 2.81) in SL; width of body 2.01 (1.85 to 2.02) in depth; head length 2.39 (2.38 to 2.49) in SL; orbit diameter 3.40 (2.97 to 3.45) in head; bony interorbital width 1.79 (1.64 to 2.20) in snout; least depth of caudal peduncle 3.01 (2.86 to 3.16) in head.

Mouth large, moderately oblique (forming an angle of about 25° to the horizontal), the maxilla extending to or beyond a vertical at hind edge of pupil; maxilla expanded posteriorly, its greatest depth about 1.6 in orbit diameter; teeth in upper jaw in a villiform band of about six rows anteriorly, soon reducing to four rows along side of jaws, two to three medial inner depressible teeth at front of jaws greatly enlarged; a pair of slightly incurved canines on each side at front of upper jaw (the more posterior larger), a little smaller than inner medial canines; lower jaw with a band of villiform teeth in about six irregular rows anteriorly and two or three along side of jaw, the inner row largest; two or three moderate canines on each side of symphysis of lower jaw, and a single or pair of large incurved canines nearly half way back in jaw; villiform teeth in about two irregular rows on vomer and palatines; tongue narrow, without teeth.

Three prominent flat spines on opercle, the middle one largest, the most posterior, slightly upcurved, and equidistant to the other two; opercular membrane produced to a pointed flap at level of middle opercular spine, the tip projecting obliquely upward; no antrorse spines on lower margin of preopercle; preopercle

coarsely serrate, the number of serrae increasing with age (see Fig. 1), from 14 on a 17.3-mm specimen to 40 on a 61.7-mm one, the holotype with 38 serrae, of which 24 or 25 are above middle of rounded corner of preopercle; lower margin of subopercle with 7 (3 to 8) serrae and interopercle with 4 (2 to 7) serrae; a few small serrae on ventral margin of suborbital.

Nostrils in front of upper third of eye, the anterior in a thin membranous tube, the posterior near edge of orbit, with a fleshy rim which is highest posteroventrally; a very large pore (as large as posterior nostril) between nostrils; an arc of four small pores above posterior nostril.

Origin of dorsal fin above third or fourth lateral-line scale; fourth dorsal spine the longest (though fifth and third may be nearly as long), 2.61 (2.32 to 2.52) in head; dorsal fin notched between spinous and soft portions, the last dorsal spine contained about 1.8 times in first dorsal soft ray; all dorsal soft rays branched; longest dorsal soft ray (usually fourth or fifth) 2.57 (2.21 to 2.66) in head, the rays proportionately longer on smaller individuals; second anal spine 2.56 (2.49 to 2.69) in head; second or third anal soft ray longest, 2.05 (1.74 to 2.21) in head; caudal fin slightly emarginate, the longest rays 1.58 (1.49 to 1.67) in head; pectoral fin 2.99 (2.90 to 3.28) in SL, the longest ray reaching a vertical between bases of second anal spine and third soft anal ray; pelvic fins extending from nearly to anus to origin of anal fin, the longest ray 1.63 (1.42 to 1.60) in head.

Color in alcohol pale with a narrow blackish stripe from front of upper lip to eye (just beneath nostrils); stripe continuing faintly behind center of eye, interrupted across upper preopercle, reappearing very faintly on upper opercle and continuing on upper side of body to middle of caudal peduncle; a faint small dusky spot at midbase of caudal fin (partly on last lateral-line scale). Dusky stripe more evident on smaller individuals, very apparent on juveniles. Color in life unknown.

REMARKS: Known only from Western Australia between latitude 29° and 33°S and 90 to 192 m in depth.

Named in honor of Gerald R. Allen of the Western Australian Museum who provided all of the type specimens for the description. Dr. Allen was aware that this species was undescribed when he referred his material to the author.

Plectranthias anthioides

Fig. 3

Plectropoma anthioides Günther,1871. Proc. Zool. Soc. London, p. 655 (type locality, Manado, Celebes).

DIAGNOSIS: Dorsal rays X, 17; anal rays III, 7; pectoral rays 14 (upper 2 and lowermost unbranched, remaining rays branched); branched caudal rays 15; lateral line complete, the tube-bearing scales 33 (35); scales above lateral line to origin of dorsal fin 3½/2; circumpeduncular scales 14; gill rakers 6+13, the longest at angle, about equal in length to longest gill filaments; depth of body 2.86 in SL; width of body

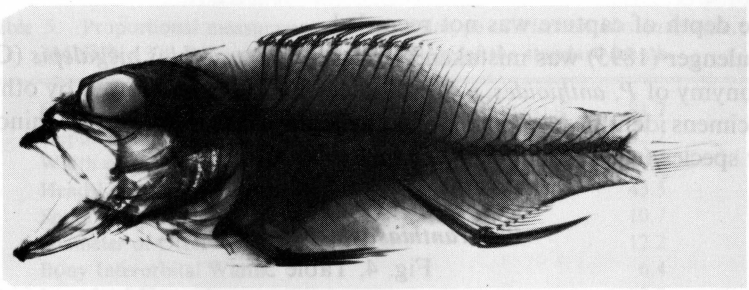

Fig. 3. Radiograph of the holotype of *Plectranthias anthioides*, 83 mm SL. BM (NH) 1871. 7. 20. 49. Celebes.

one-half depth; head length 2.51 in SL; snout 4.0 in head: orbit diameter 3.69 in head; least depth of caudal peduncle 3.46 in head; lower margin of preopercle with 2 antrorse spines; upper margin of preopercle with 26 serrae; subopercle smooth; interopercle with 4 small serrae at posterior end of ventral margin; small teeth present on palatines in 2 irregular rows; teeth on vomer in about 3 irregular rows; a fixed canine tooth on each side at front of upper jaw, the symphyseal gap between them one-third orbit diameter; band of small teeth at anterior part of upper in about 7 or 8 irregular rows, the inner medial ones long and depressible; about 5 rows of small teeth on midside of upper jaw; no canines at front of lower jaw (outer teeth a little stouter but not much longer than those in immediate posterior rows; innermost teeth a little longer and depressible; a pair of close-set fixed incurved canine teeth at edge of lower jaw one-third length of jaw from front; maxilla extending slightly posterior to a vertical at rear edge of pupil; maxilla scaleless; 5 diagonal rows of scales on cheek between eye and corner of preopercle; top of head scaled at least to interorbital space; no scales ventrally on head; third dorsal spine the longest, 2.04 in head length; first dorsal spine 5.35 in head; second dorsal spine 3.5 in head; fourth dorsal spine 2.18 in head; tenth dorsal spine 5.12 in head and 1.5 in lenghth of first dorsal soft ray; all dorsal soft rays branched; first anal spine 3.74 in head; second anal spine 2.04 in head; third anal spine 2.41 in head; first anal soft ray 1.77 in head; pectoral rays not very long, 3.1 in SL, the longest ray reaching a vertical at end of spinous portion of anal fin; pelvic fins reaching anus, their length 1.73 in head; caudal fin rounded.

Color in alcohol light brown; the fins pale. Günther described the life color as red with some irregular and indistinct blackish spots on the back and a blackish band along the median line of the nape.

REMARKS: Known from only a single specimen [BM(NH) 1871.7.20.49: 83 mm SL] which was sent on loan to the author. Unfortunately the upper anterior part of the head has been dissected to expose the cranium, thus the structure of the upper lip, nostrils, and scalation of this part of the head cannot be determined. The specimen has not been illustrated. Because Günther's description is brief, the Diagnosis above has been expanded.

The depth of capture was not recorded.

Boulenger (1895) was mistaken in placing *Plectranthias megalepis* (Günther) in the synonymy of *P. anthioides,* a decision which has been followed by other authors. The specimens identified as *P. anthioides* by Katayama (1960) and Yoshino (1972) are another species (see account of *P. kamii).*

Plectranthias bauchotae n. sp.
Fig. 4, Table 5

HOLOTYPE: MNHN 1978–84, 81.7 mm SL, male?, S of Madagascar, Banc de l'Etoile (25°54′S, 44°36′E), 140 to 180 m, trawl station 73/53, FAO 60, J. Dupont, 1 June 1973.

DESCRIPTION: Dorsal rays X, 16; anal rays III, 7; pectoral rays 14 (uppermost and lowermost unbranched); branched caudal rays 15; lateral line complete, the tube-bearing scales 31; lateral line broadly arched over pectoral region, the highest part beneath bases of fifth to seventh dorsal spines (where two rows of large scales lie between lateral line and dorsal fin base); scales above lateral line to origin of dorsal fin 4; scales below lateral line to origin of anal fin 11; circumpeduncular scales 14; dorsal part of head scaled to posterior nostrils; 6 or 7 diagonal rows of large scales on cheek between eye and corner of preopercle; no scales on snout, suborbital, maxilla, or ventrally on head; scales present basally on median fins, including spinous portion of dorsal fin, probably at least half way out on all of these fins (though most scales now missing); small scales probably present at least basally on paired fins (all scales now missing, but scale pockets indicate their former presence).

Gill rakers 5+11, one upper and eight lower (including one at angle) elevated;

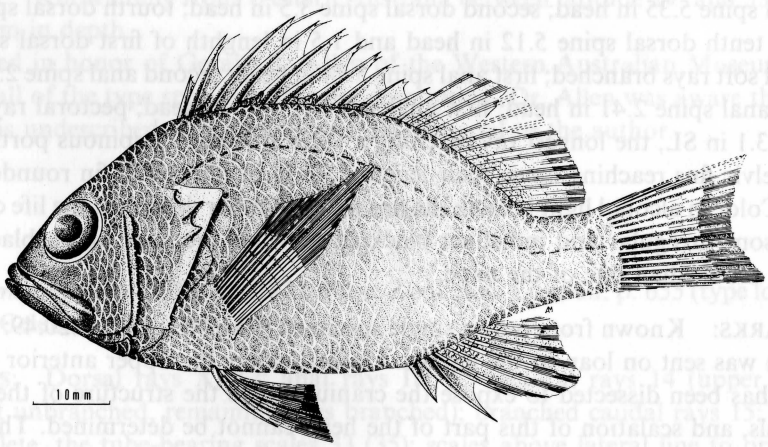

Fig. 4. Holotype of *Plectranthias bauchotae*, 81.7 mm SL, MNHN 1978–84, Madagascar (drawing by L. A. Maugé).

Table 5. Proportional measurements of the holotype of *Plectranthias bauchotae*, (MNHN 1978–84) expressed as a percentage of the standard length.

Standard Length (mm)	81.7
Depth of Body	42.2
Width of Body	20.8
Head Length	43.5
Snout Length	10.7
Diameter of Orbit	12.2
Bony Interorbital Width	6.4
Length of Upper Jaw	22.2
Least Depth of Caudal Peduncle	13.5
Length of Caudal Peduncel	20.6
Snout to Origin of Dorsal Fin	38.8
Snout to Origin of Anal Fin	68.3
Snout to Origin of Pelvic Fins	39.3
Length of Dorsal Fin Base	59.5
Length of First Dorsal Spine	broken
Length of Longest Dorsal Spine	24.9
Length of Longest Dorsal Ray	19.6
Length of Anal Fin Base	13.9
Length of First Anal Spine	10.2
Length of Second Anal Spine	20.4
Length of Third Anal Spine	17.1
Length of Longest Anal Ray	24.4
Length of Caudal Fin	30.5
Length of Pectoral Fin	36.9
Length of Pelvic Spine	16.1
Length of Pelvic Fin	25.1

longest gill raker (at angle) slightly shorter than longest gill filament of first arch, about 4.5 in orbit diameter; pseudobranch lamellae 22.

Upper profile of head nearly straight, forming an angle of about 40° to the horizontal.

Body relatively deep, the depth 2.37 in SL, and somewhat compressed, the width 2.03 in depth; head length 2.30 in SL; snout 4.06 in head; orbit diameter 3.55 in head; bony interorbital width 1.67 in snout; least depth of caudal peduncle 3.23 in head.

Mouth terminal, large, and oblique, forming an angle of about 30° to the horizontal; maxilla nearly reaching a vertical at posterior edge of orbit; maxilla expanded posteriorly, its greatest depth contained 2 times in orbit diameter; a band of small teeth in upper jaw in about 8 irregular rows anteriorly, the inner teeth enlarged, recumbent, and depressible; band of teeth narrowing along sides of jaws but number of rows about the same except posteriorly where there are only 2 or 3 rows; a large stout fixed canine anteriorly at each corner of upper jaw; symphyseal gap between anterior canines contained 3 times in orbit; a few teeth in outer row in about first third of jaw slightly enlarged; a band of small teeth in lower jaw, in about 6 irregular rows anteriorly, soon narrowing to 3 or 4 rows along side of jaw; a moderate incurved

canine on each side of symphysis of lower jaw; a large recurved canine with a smaller one adjacent and just posterior to it slightly posterior to first third of lower jaw; a few slightly enlarged teeth in outer row toward front of lower jaw; an elongate elliptical patch of small teeth on palatines, the teeth in about 5 irregular rows in greatest width; small teeth on vomer in about 2 or 3 irregular rows, forming the usual "V"-shaped patch; tongue slender, the tip rounded, without teeth but with scattered small pointed papillae.

Three flat spines on opercle, the middle one largest and most posterior, angling strongly upward, about equidistant to other spines; upper spine poorly developed and distinctly anterior to lower two; opercular membrane produced to a pointed flap at level of middle spine, projecting obliquely upward in alignment with middle spine; preopercle with 39 serrae on upper margin (41 on other side); lower margin of preopercle with 2 antrorse spines; subopercle with 3 weak serrae; interopercle with 3 weak serrae on one side and none on the other.

Nostrils anterior to middle of eye, small, the anterior in a membranous tube, the posterior with a slight rim, separated by slightly more than a nostril's diameter from front edge of orbit.

Origin of dorsal fin above anterior end of lateral line; third dorsal spine the longest, 1.74 in head length, with a long cirrus near the tip (cirrus about one third length of spine); other dorsal spines with a well developed cirrus but none as long as that of third spine; dorsal fin notched between spinous and soft portions, the last dorsal spine contained about 1.5 times in first dorsal soft ray; all dorsal rays branched, none filamentous; third dorsal ray longest, 2.21 in head; last dorsal ray about 4.2 in head; second anal spine longest, 2.13 in head; third anal ray longest, 1.78 in head; last anal ray 3.5 in head; caudal fin emarginate, the tips of uppermost rays broken but the length estimated as 1.38 in head, the caudal concavity about 7.7 in head; eighth pectoral ray longest, reaching a vertical at base of fourth anal soft ray, its length 2.71 in SL; pelvic fins not reaching anus, 1.73 in head.

Color in alcohol uniform pale brown. Life color unknown.

REMARKS: This species is known from a single 81.7 mm specimen trawled from a bank south of Madagascar in 140 to 180 m. The nature of the bottom was not recorded but L. A. Maugé informed the author that rocky outcrops are known for the region of capture.

In general appearance *P. bauchotae* most resembles *P. morgansi*, also an Indian Ocean species, sharing with it a robust body, elongate third dorsal spine with conspicuous cirrus and very similar meristic data. It differs notably from *P. morgansi*, however, in having antrorse spines on the lower edge of the preopercle and branched instead of simple pectoral rays. It appears to be most closely related to *P. wheeleri* from which it differs in having a deeper body, shorter third dorsal spine, canine teeth at the front of the lower jaw (though not large ones) and in slightly higher lateral-line scale and pectoral-ray counts. The meristic distinction may not hold when a large series of specimens becomes available. These two fishes are known at present from one and two individuals.

This species is named in honor of Dr. Marie-Louise Bauchot in recognition of her contributions in ichthyology and especially for her kindness in suppling the writer with answers to endless questions on specimens in the Muséum National d'Histoire Naturelle in Paris over the years.

Plectranthias cirrhitoides n. sp.
Fig. 5, Table 6

HOLOTYPE: BPBM 15066, 50.8 mm SL, French Polynesia, Rapa, SW side of Karapoo Iti Islet at south end of Rapa, 18 m, cave in reef, rotenone, J. E. Randall and J. D. Bryant, 16 February 1971.

PARATYPES: BPBM 15067, 56.7 mm SL, Rapa, off exposed reef at entrance to Haurei Bay, 2.5 to 3 m, rotenone, D. B. Cannoy and A. Sinoto, 3 February 1971; USNM 212177, 57.2 mm SL, same data as holotype.

DESCRIPTION: Dorsal rays X, 15; anal rays III, 7; pectoral rays 13, unbranched; branched caudal rays 15.

Lateral line complete, the tube-bearing scales 29 (30); lateral line broadly but weakly arched over pectoral region, highest below bases of fifth to ninth spines, where 2 rows of large scales separate lateral line and dorsal fin base; scales above lateral line to origin of dorsal fin 2 or 3; scales below lateral line to origin of anal fin 9; circumpeduncular scales 14; top of head scaled anteriorly almost to nostrils; diagonal rows of scales on cheek between eye and corner of preopercle 5; snout and chin unscaled; a single small cycloid scale at upper posterior corner of maxilla; about 6 prepelvic scales and 2 large median scales ventral on pelvic base associated with small scales; small scales along base of dorsal and anal fins; approximately the basal half of caudal and paired fins with small scales.

Gill rakers 5+13 (5+11 to 13), 6 or 7 on lower limb and one on upper limb elevated, the rest as rudiments; pseudobranch with 11 or 12 lamellae.

Depth of body 3.35 (3.15 to 3.36) in SL; width of body 1.72 (1.77 to 1.78) in depth; head length 2.42 (2.36 to 2.38) in SL; snout 4.28 (4.42) in head; eye 3.75 (3.94 to 4.0) in head; bony interorbital width 3.27 (2.94 to 3.12) in snout; least depth of caudal peduncle 2.14 (2.08 to 2.22) in head.

Mouth large, slightly oblique (forming an angle of about 15°), the lower jaw protruding, the maxilla extending nearly to or just reaching a vertical at hind edge of eye; teeth in upper jaw in a villiform band, about 9 irregular rows in width anteriorly and 3 to 4 posteriorly in jaw, the teeth on each side of symphysis and the inner teeth at front of jaw elongate; a stout canine, only slightly longer than adjacent teeth, in outer row at front of jaw separated from comparable tooth of other side by a gap equal to about half diameter of eye; teeth in lower jaw also in a villiform band, about 6 rows in width anteriorly and 3 posteriorly, the inner teeth about twice as long as the outer; a stout slightly recurved canine or close-set pair of canines in outer row on side of lower jaw; inner rows of teeth in both jaws depressible; 3 to 4 rows of small teeth on vomer;

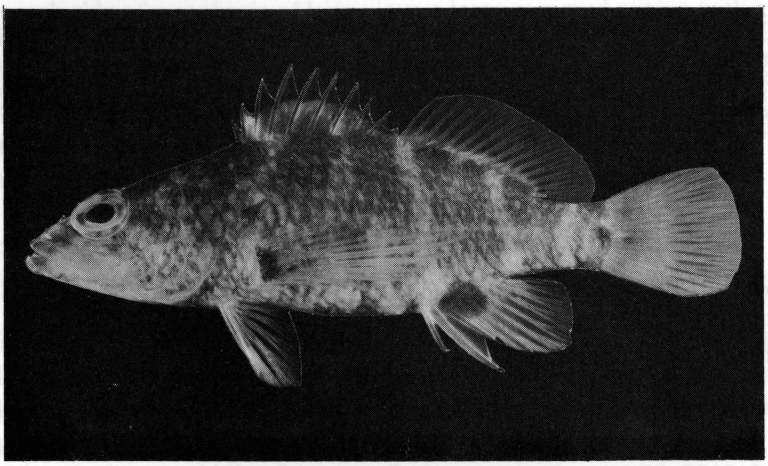

Fig. 5. Holotype of *Plectranthias cirrhitoides*, 50.8 mm SL, BPBM 15066, Rapa.

Table 6. Proportional measurements of type specimens of *Plectranthias cirrhitoides*, expressed as a percentage of the standard length.

	HOLOTYPE	PARATYPES	
	BPBM 15066	BPBM 15067	USNM 212177
Standard Length (mm)	50.8	56.7	57.2
Depth of Body	31.0	31.4	32.2
Width of Body	17.3	17.6	16.8
Head Length	41.4	42.3	42.0
Snout Length	9.1	9.4	9.3
Diameter of Orbit	11.0	10.7	10.5
Bony Interbital Width	2.9	3.0	3.1
Length of Upper Jaw	19.3	19.9	19.1
Least Depth of Caudal Peduncle	11.4	11.2	10.5
Length of Caudal Peduncle	19.3	19.0	20.2
Snout to Origin of Dorsal Fin	40.2	40.1	40.2
Snout to Origin of Anal Fin	65.6	68.9	65.9
Snout to Origin of Pelvic Fins	33.3	33.8	32.5
Length of Dorsal Fin Base	50.4	49.3	48.3
Length of First Dorsal Spine	5.1	5.0	5.3
Length of Longest Dorsal Spine	14.4	13.6	14.2
Length of Longest Dorsal Ray	17.1	17.5	17.1
Length of Anal Base	15.5	15.2	15.6
Length of First Anal Spine	9.3	9.5	9.8
Length of Second Anal Spine	19.6	18.0	18.0
Length of Third Anal Spine	15.3	14.8	14.7
Length of Longest Anal Ray	20.2	21.2	20.6
Length of Caudal Fin	24.2	24.6	24.3
Length of Pectoral Fin	37.0	34.9	33.8
Length of Pelvic Spine	12.4	12.2	12.7
Length of Pelvic Fin	20.7	20.1	20.8

small teeth on palatines in a double row of 4 teeth anteriorly becoming a single row of 8 teeth posteriorly.

Three flat opercular spines, the middle one closer to the lower than the upper spine, the upper spine covered by a scale; middle opercular spine the most posterior; opercular membrane produced to a moderately pointed flap at level of middle opercular spine, the tip projecting slightly upward; lower margin of preopercle with no antrorse spines; upper margin with 1 (3) small serrae; no serrae in lower margin of subopercle or interopercle.

Origin of dorsal fin above second lateral-line scale; fourth dorsal spine the longest 2.84 (2.96 to 3.11) in head; dorsal fin deeply notched between spinous and soft portions, the last dorsal spine contained 3 times in first dorsal soft ray; first dorsal soft ray unbranched; longest dorsal soft ray (fourth to tenth subequal) 2.42 (2.42 to 2.44) in head; second anal spine longest, 2.1 (2.33 to 2.35) in head; fourth anal soft ray longest, 2.04 (2.0 to 2.03) in head; caudal fin rounded, its length 1.71 (1.72) in head; pectoral fins moderately long, the longest (eighth) ray reaching a vertical at base of first to third anal soft rays, their length 2.70 (2.86 to 2.97) in SL; lower pectoral rays about twice as thick as upper rays; pelvic fins short, 2.0 (2.0 to 2.1) in head, not reaching anus.

Color in alcohol pale with 6 broad brown bars (about 3 times broader than pale interspaces) as follows: first from origin of dorsal fin across opercle to thorax; second from middle of spinous portion of dorsal fin (with a diagonal portion within the fin running to midlength of third dorsal spine), passing beneath base of pectoral fin, and dividing on lower side to anterior abdomen; third from posterior spinous dorsal, dividing on midside, and ending on posterior abdomen; fourth from base of second to sixth soft dorsal rays to base of soft portion of anal fin, the upper end faintly divided and extending as two dark areas into basal part of dorsal fin, the ventroanterior part of bar terminating in a large dark brown spot basally in anal fin from third spine to third soft ray; fifth a double bar with anterior half ending in a dark area basally in last 4 dorsal rays and posterior half on anterior caudal peduncle, narrowing and terminating ventrally on peduncle; sixth bar at posterior end of peduncle, containing a small black spot at midcaudal base; brown bands on head less distinct, but three radiate posteriorly from eye, and one from front of eye across snout and upper lip to lower lip; a dark brown spot middorsally on snout; fins pale except for upper ends of bars that extend into dorsal fin, the aforementioned large dark spot in anal fin, a hemispherical dark brown spot at pectoral base and a small dark brown spot midventrally between pelvic fins; in addition there is a faint vertical dusky band on caudal fin near base.

The color from Ektachrome transparencies taken by the author of the holotype and the smaller of the two paratypes soon after they were collected is almost the same as the color in preservative. The brown bars have a slight yellowish cast on the slides, and the head is slightly pinkish, particularly over the operculum, as is the abdomen; the pectoral rays are salmon pink, especially the distal part of the thickened lower rays; the soft rays of the remaining fins are light reddish; the extreme base of the soft

portion of the dorsal fin of the paratype is light red, and the basal half of the caudal fins of both specimens is light reddish; the inner rim of the iris is red.

REMARKS: The author and associates made a large collection of over 200 species of fishes at Rapa in the expectation that this isolated island in the South Pacific (27°36′S, 114°18′W) might harbor some endemic fishes. *P. cirrhitoides*, however, was one of only a few fishes that are thus far restricted to Rapa. This species may eventually be found at other islands in Oceania, however.

This fish is named *P. cirrhitoides* because of its resemblance in general form, color, and especially the thickened lower pectoral rays to certain of the Cirrhitidae.

One of the paratypes was collected in 2.5 to 3 m on a patch reef only partially protected from swell by other reefs more offshore. This is the shallowest record of any *Plectranthias* collected to date. If it may be inferred from these limited data that the species is often found in shallow water subjected to surge, the thickened condition of the lower pectoral rays may represent an adaptation for use of these fins to maintain the fish's position wedged in cracks in reefs in the manner observed for hawkfishes. Thus the pectoral fin structure may be the result of convergence rather than indicative of very close phylogenetic relationship. Nevertheless, other characters suggest that *Plectranthias* may not be too distant from postulated ancestral serranid stock that gave rise to the Cirrhitidae.

Plectranthias foresti

Fig. 6

Plectranthias foresti Fourmanoir, 1977. Cah. Pac., no. 20, p. 269, fig. 2 (type locality, Philippine Islands).

DIAGNOSIS: Dorsal rays X, 14 or 15 (one of four with 14); anal rays III, 7; pectoral rays 13 (all unbranched); branched caudal rays 14; lateral line complete, the pored scales 29; scales above lateral line to origin of dorsal fin 2 1/2 to 3 1/2 (depending on method of counting); gill rakers 4 or 5+11 to 13; depth of body 2.62 to 2.77 in SL; lower margin of preopercle without antrorse spines; upper margin of preopercle with 18 to 29 serrae, the rounded corner with 3 or 4 more; subopercle and interopercle without serrae; villiform teeth present on palatines in 2 to 4 irregular rows; a single enlarged recurved tooth in outer row on midside of lower jaw; maxilla nearly reaching a vertical at posterior edge of eye; 5 or 6 diagonal rows of large scales between eye and corner of preopercle; scales dorsally on head nearly reaching midinterorbital space; no scales on maxilla, snout, suborbital, or ventrally on head; fourth or fifth (usually the fourth) dorsal spine the longest, 2.35 to 2.45 in head; last dorsal spine 1.7 to 2 in first dorsal soft ray; all dorsal soft rays branched, the second to fouth filamentous, the third 1.3 to 1.9 in head; pectoral fins long, nearly reaching a vertical at rear base of anal fin, 2.5 to 2.65 in SL; pelvic fins not reaching or barely reaching anus, 1.7 to 1.85 in head; caudal fin emarginate, the rays of the lobes terminating in filaments.

Color in alcohol with small dark blotches on nape (those just in front of origin of dorsal fin transversely linear), five or six dark blotches along back adjacent to base of

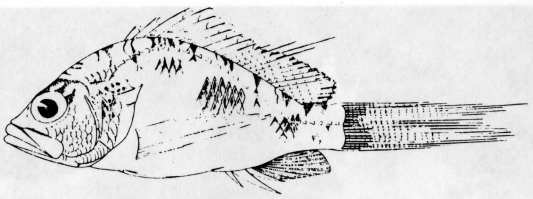

Fig. 6. Holotype of *Plectranthias foresti* Fourmanoir, 72 mm SL, MNHN 1976–377, Philippines (after Fourmanoir, 1977).

dorsal fin and two smaller ones dorsally on caudal peduncle; two large dark blotches on side (less intense than dorsal blotches), the first centered below base of sixth dorsal spine just ventral to lateral line and the second below anterior part of soft portion of dorsal fin, the upper edge usually touching lateral line; two indistinct dark blotches laterally on caudal peduncle, mostly below lateral line. Color in life unknown.

REMARKS: Known from four specimens trawled in 183 to 185 m in the Philippines at 14°01′N, 120°16′E, from the M/V VAUBAN, MUSORSTOM Expedition. The holotype (MNHN 1976–377, 72 mm SL), two paratypes (BPBM 20873, 53–56 mm SL), and a specimen from the University of Philippines 64 mm in SL were examined by the author.

P. foresti is most closely related to *P. maugei* (see Remarks of latter species).

Plectranthias fourmanoiri n. sp.
Fig. 7, Table 7

HOLOTYPE: BPBM 17242, 28.9 mm Sl, Marshall Islands, Enewetak Atoll, Enewetak Island, coral head in lagoon off marine pier at north end of island, 15 m, rotenone, J. E. Randall and M. Watson, 26 April 1968.

PARATYPES: BPBM 9608, 34.8 mm SL, Marshall Islands, Enewetak Atoll, Enewetak Island, patch reef in lagoon off P.O.L. pier, 12 to 24.5 m, rotenone, G. R. Allen and SCUBA club, 29 November 1968; BPBM 9263, 21.4 mm SL, Society Islands, Tahiti, Papara, outside barrier reef about 1/4 mile E of Teavaraa Pass, 40 m, rotenone, J. E. Randall, 11 March 1969; BPBM 15068, 36.6 mm SL, Pitcairn Island, off Bounty Bay, 30.5 to 40 m, reef at edge of sand, little live coral, rotenone, J. E. Randall, D. B. Cannoy, and J. D. Bryant, 26 December 1970; BM(NH) 1974.8.8.1, 33.2 mm SL, Pitcairn Island, N side off Gannet Ridge, 40 to 44 m, patch reef, rotenone, J. E. Randall, D. B. Cannoy, J. R. Haywood, R. R. Costello, J. D. Bryant, and S. Christian, 6 January 1971; ANSP 128436, 36.6 mm SL, same data as preceding; CAS 30867, 31.7 mm SL, Pitcairn Group, Ducie Atoll, off SW side, 30.5 m, rotenone, J. E. Randall, R. R. Costello, D. B. Cannoy, and S. Christian, 15 January 1971; USNM 212176, 36.9 mm SL, same data as preceding; BPBM 13925, 2: 14.0–37.4 mm SL, Cook Islands, Rarotonga, off oil tanker buoy near harbor entrance, 15 m, rotenone, J. E. Randall and D. B. Cannoy, 10 March 1971; MNHN 1971–133,

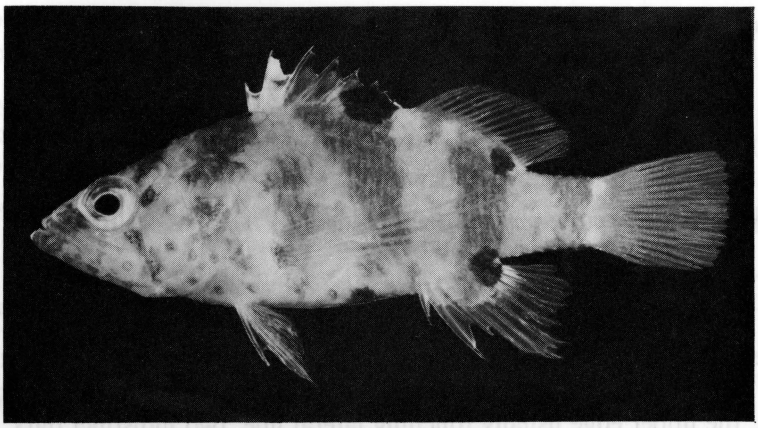

Fig. 7. Holotype of *Plectranthias fourmanoiri*, 28.9 mm SL, BPBM 17242, Marshall Islands.

Table 7. Proportional measurements of type specimens of *Plectranthias fourmanoiri* expressed as a percentage of the standard length.

	HOLOTYPE	PARATYPES				
	BPBM 17242	BPBM 13925	BPBM 9263	CAS 30867	BPBM 15068	BPBM 13925
Standard Length (mm)	28.9	14.0	21.7	31.7	36.6	37.4
Depth of Body	37.1	33.6	37.2	34.7	33.9	36.9
Width of Body	17.9	15.4	17.0	16.4	17.5	17.6
Head Length	45.0	49.2	45.6	45.2	46.1	45.3
Snout Length	9.2	9.3	9.7	9.9	9.6	8.9
Diameter of Orbit	11.1	15.0	12.2	11.3	10.9	10.8
Bony Interorbital Width	2.4	2.9	2.8	2.2	2.7	2.7
Length of Upper Jaw	20.8	22.9	21.2	20.5	20.8	21.4
Least Depth of Caudal Peduncle	13.5	13.6	13.8	12.0	12.0	12.6
Length of Caudal Peduncle	18.7	20.7	19.3	19.9	18.3	18.4
Snout to Origin of Dorsal Fin	42.6	44.9	42.9	44.8	42.6	42.6
Snout to Origin of Anal Fin	69.0	70.1	70.2	67.5	68.2	68.8
Snout to Origin of Pelvic Fins	38.1	38.5	36.9	36.4	36.7	37.7
Length of Dorsal Fin Base	50.9	50.0	47.6	48.3	48.3	49.0
Length of First Dorsal Spine	3.1	3.6	3.0	3.0	3.6	3.5
Length of Longest Dorsal Spine	14.4	16.4	13.4	13.9	13.7	15.7
Length of Longest Dorsal Ray	15.5	15.7	14.8	15.7	15.9	16.2
Length of Anal Fin Base	16.0	17.8	18.4	16.1	16.1	17.6
Length of First Anal Spine	6.1	7.1	7.8	6.6	6.6	8.0
Length of Second Anal Spine	17.9	17.1	18.0	18.2	17.7	19.0
Length of Third Anal Spine	16.6	16.8	16.1	16.7	16.1	16.5
Length of Longest Anal Ray	24.5	25.7	23.0	25.0	23.2	25.7
Length of Caudal Fin	27.7	27.5	25.4	25.2	26.9	26.7
Length of Pectoral Fin	48.8	37.0	41.3	52.5	broken	45.2
Length of Pelvic Spine	14.3	18.5	16.7	13.3	13.1	14.2
Length of Pelvic Fin	24.9	29.3	26.0	23.4	23.2	24.6

17.1 mm SL, Tuamotu Archipelago, Mangareva, Tenoko Islet, 20 m, J. M. Griessinger, 1971; BPBM 17466, 35.7 mm SL, Samoa Islands, Tutuila W side of Aunuu Islet, 27 m, reef, rotenone, J. E. Randall, R. C. Wass, and C. A. Wass, 4 May 1974; WAM P.26085–029, 28.4 mm SL, Indian Ocean, Christmas Island, Ethel Beach, coral reef, 15–20 m, rotenone, G. R. Allen and R. C. Steene, 20 May 1978; WAM P.26113–004, 2: 15.9–20.5 mm SL, Indian Ocean, Christmas Island, off Winifred Beach, coral ledge, 12–14 m, rotenone, G. R. Allen and R. C. Steene, 6 June 1978; WAM P.26126–005, 21.3 mm SL, Indian Ocean, Christmas Island, Flying Fish Cove, coral and sand, 5–10 m, rotenone, G. R. Allen and R. C. Steene, 12 June 1978.

DESCRIPTION: Dorsal rays X, 18 (16 to 18, usually 18); anal rays III, 7; pectoral rays 12 ;(12 or 13, usually 13), unbranched; branched caudal rays 13 (13 or 14, usually 13). Lateral line compete, the tube-bearing scales 25 (an additional tubed scale beyond or mostly beyond end of hypural); lateral line broadly but weakly arched over pectoral region, highest below bases of third to sixth dorsal spines where 2 rows of large scales separate lateral line and dorsal fin base; scales above lateral line to origin of dorsal fin 2 (3 immediately anterior to origin of fin); scales below lateral line to origin of anal fin 8; circumpeduncular scales 12; top of head scaled nearly to midinterorbital space; 4 diagonal rows of large scales on cheek between eye and corner of preopercle; no scales on snout, maxilla, or chin; prepelvic scales 5 and 2 median scales ventral on pelvic base posterior to origin of fins; 1 or 2 rows of small scales along base of most of dorsal fin; 2 to 3 irregular rows of scales of variable size on base of anal fin; pectoral fins scaled only basally, the scales extending farthest out on central portion of fin; approximately the basal third of caudal fin with small scales.

Gill rakers 7 + 12 (4 to 7 + 10 to 12), 6 or 7 elevated, the rest as rudiments; largest gill raker as long or slightly longer than gill filaments; pseudobranch with 11 (11 or 12) lamellae.

Body moderately deep, the depth 2.79 (2.65 to 2.98) in SL; width of body 2.05 (2.09 to 2.19) in depth; head length 2.22 (2.0 to 2.32) in SL; snout 4.82 (4.57 to 5.49) in head; eye 4.06 (3.32 to 4.18) in head; bony interorbital width 2.95 (3.0 to 4.5) in snout; least depth of caudal peduncle 3.34 (3.30 to 3.76) in head.

Mouth large, moderately oblique (forming an angle of about 20°), the lower jaw projecting, the maxilla extending to or slightly posterior to a vertical at hind edge of eye; maxilla expanded posteriorly, its greatest width about two-thirds diameter of eye; teeth in upper jaw in a villiform band, about 6 rows in width anteriorly and 2 or 3 posteriorly, the teeth on each side of symphysis enlarged, slightly incurved, and depressible, especially the innermost ones; a short stout canine in outer row at front of upper jaw separated by a gap of about a half eye diameter from comparable tooth of other side; teeth of lower jaw also in a band, comprised of about 4 irregular rows anteriorly and 1 or 2 posteriorly, but inner row enlarged and depressible as well as those on each side of symphysis; no enlarged tooth in outer row on side of lower jaw; about 3 irregular rows of small teeth on vomer; no teeth on palatines.

Three prominent flat spines on opercle, the middle one about equidistant from

the other two and extending slightly posterior; opercular membrane produced to a pointed flap at level of middle opercular spine, the tip projecting obliquely upward; lower margin of preopercle with 1 (0 to 2, usually 1) antrorse spine (may be poorly developed); upper margin of preopercle (including region at angle) with 2 (1 to 4, except 14-mm juvenile which has 7) serrae; no serrae on lower margin of subopercle or interopercle.

Nostrils about two-fifths eye diameter down from top of eye, the posterior nostril near edge of orbit and having a slight rim, the anterior in a short tube, the posterior edge of which is only slightly elevated.

Origin of dorsal fin above third lateral-line scale; fourth dorsal spine the longest, its length 3.03 (2.87 to 3.41) in head; dorsal fin deeply notched between spinous and soft portions, the very short last spine contained 4.6 (4.25 to 6.6) times in length of first dorsal soft ray; first dorsal soft ray unbranched; longest dorsal soft ray (fifth to ninth subequal) 2.90 (2.71 to 3.18) in head; second anal spine the longest, its length 2.50 (2.31 to 2.91) in head; second anal soft ray longest, 1.83 (1.74 to 1.98) in head; caudal fin rounded, its length 1.63 (1.69 to 1.81) in head; pectoral fins very long, the longest ray (the eighth, but seventh and ninth also very elongate) reaching from base of fourth anal soft ray to beyond base of fin, their length 2.06 (1.92 to 2.70) in SL (eighth pectoral ray of holotype nearly twice length of fifth ray); longer pectoral rays not much thicker than shorter rays; pelvic fins relatively short, 1.81 (1.71 to 1.93) in head, reaching anus only on 14-mm juvenile.

Color in alcohol pale with broad brown bars as follows: from nape just in front of dorsal fin to upper opercle; from below third and fourth dorsal spines slightly above level of gill opening passing below basal part of pectoral fin and ending on abdomen; from basal portion of posterior two-thirds of spinous dorsal fin to abdomen (this bar usually branched dorsally; between posterior two-thirds of soft portion of dorsal and anal fins; and posteriorly on caudal peduncle; also, irregular dark bands or elongate spots radiating from eye (one passing diagonally upward onto nape, one as a spot behind eye, one diagonally downward across cheek and one diagonally downward on snout onto lips where it breaks up into spots; a black spot as large as eye posteriorly on spinous portion of dorsal fin and extending equally onto adjacent part of body (this spot constitutes upper end of posterior branch of third brown bar of body); a black spot about half this size midventrally on abdomen in front of anus, another at axil of dorsal fin and a third at axil of anal fin (about three-fouths of last two spots on body and one-fourth basally on fins); a black spot about size of pupil at origin of dorsal fin (a small amount of pigment extending onto basal part of first interspinous membrane); a faint brown spot on back below second to fourth dorsal soft rays.

Color of holotype while fresh; white with brown bars and scattered small yellow spots (more evident in white interspaces than on brown bars); scales narrowly rimmed with light red, giving a pink cast to the fish; yellow spots on lower part of head, on thorax, and abdomen rimmed with light red, those on posterior part of head and on thorax and abdomen with some dusky pigment; 5 prominent jet black spots, faintly

rimmed with pale, as follows: posterior part of spinous dorsal fin extending onto back; axil of dorsal fin, axil of anal fin, midventrally on abdomen and middorsally at origin of dorsal fin; fins pink, particularly the rays, except for spinous portion of dorsal fin which in addition to the large posterior black spot and upper end of anterior branch of third brown body bar has a large white area basally at the front of fin and cream on the outer anterior part of fin, and a large yellow spot on the outer part of the fourth, fifth and sixth interspinous membranes; pelvic fins with a band of yellowish centered on second soft ray.

REMARKS: *P. fourmanoiri* is known thus far from Christmas Island (Indian Ocean), the Marshall Islands, Samoa Islands, Society Islands, Tuamoutu Archipelago, Pitcairn Group and Cook Islands in the depth range of about 5 to 44 m. All specimens have been collected on coral reefs, both in lagoons and exposed areas.

The species is named in honor of Pierre Fourmanoir who obtained the specimen from Mangareva and realized that it represented a new species. He kindly abandoned his plan to describe the fish when he heard that the author had previously collected this species and intended to revise the genus.

Plectranthias gardineri
Fig. 8

Xenanthias gardineri Regan, 1908. Trans. Linn. Soc. London, ser. 2, vol. 12, p. 223, pl. 28, fig. 1 (type locality, Amirante, Seychelles).

DIAGNOSIS: Dorsal rays X, 14 (Regan counted 14 or 15); anal rays III, 6 or 7; pectoral rays 14 or 15, unbranched, the rays of lower half of fin slightly thickened on some specimens; branched caudal rays 13; lateral line incomplete, ending beneath soft portion of dorsal fin, the tube-bearing scales 17 or 18 (Regan reported 16 to 20); scales above lateral line to origin of dorsal fin 2; gill rakers 4 or 5+9 to 11; depth of body

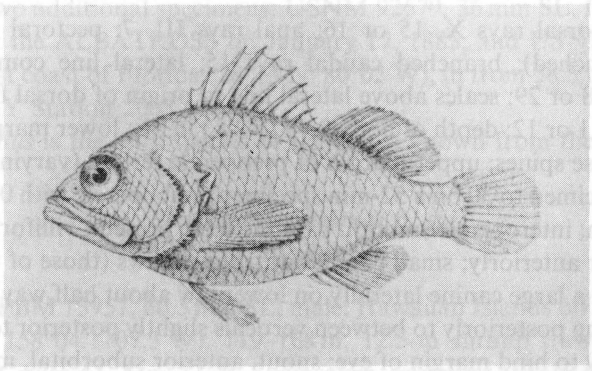

Fig. 8. Syntype of *Plectranthias gardineri* (Regan), BM(NH) 1908. 3. 23. 62, Seychelles (after Regan, 1908).

2.57 to 2.71 in SL; lower margin of preopercle with one antrorse spine (not well developed); upper margin of preopercle, including region at angle, with 14 to 19 coarse serrae; coarse serrae on lower margin of subopercle 3 to 5, and 4 or 5 on interopercle; palatine teeth present; a large incurved canine tooth in outer row on midside of lower jaw; maxilla extending posterior to a vertical at hind edge of eye; maxilla with moderately small scales on upper side, mostly in a single row, not reaching posterior one-eighth to one-fourth of bone (however, maxillary scales variously missing from the type specimens, and Regan's illustration shows 3 rows of scales); 6 diagonal rows of large scales on cheek between eye and corner of preopercle, those of the middle 4 rows the largest; top of head scaled to nostrils; no scales ventrally on head; fourth dorsal spine the longest, 1.9 to 2.16 in head; last dorsal spine contained about 3 times in first dorsal soft ray; first dorsal soft ray unbranched; pectoral fins not very long, about 3.2 in SL, the longest rays extending from above spinous portion of anal fin to third anal soft ray; caudal fin rounded.

Color in alcohol uniformly pale; the only dark markings are scattered small light brown spots on the pectoral rays (noted only under a microscope). Life color unknown.

REMARKS: Four of the five syntypes from the Seychelles [BM(NH) 1908.3.23.62–6, 28.5 to 31.5 mm SL] were sent on loan by A. C. Wheeler. The smallest is selected as lectotype. It bears the lowest catalog number of the syntypic series. No further specimens of this species have been reported.

Simth (1961) and Tyler (1966) presented some additional information to the original description after their examination of type material.

Plectranthias garrupellus

Fig. 9

Plectranthias garrupellus Robins and Starck, 1961. Proc. Acad. Nat. Sci. Phila., vol. 113, no. 11, p. 295, fig. 7 (middle) (type locality, western Atlantic, off central Florida).

DIAGNOSIS: Dorsal rays X, 15 or 16; anal rays III, 7; pectoral rays 13 (all but uppermost branched); branched caudal rays 15; lateral line complete, the tube-bearing scales 28 or 29; scales above lateral line to origin of dorsal fin 3 or 3 1/2; gill rakers 5 or 6+11 or 12; depth of body 2.48 to 2.83 in SL; lower margin of preopercle with two antrorse spines; upper margin of preopercle serrate (varying from 11 serrae on a 36-mm specimen to 30 on a 52-mm specimen); subopercle with 0 to 4 weak serrae on lower margin; interopercle smooth; palatine teeth present; villiform teeth in bands in jaws, broader anteriorly; small canines at front of jaws (those of upper jaw larger than lower) and a large canine laterally on lower jaw about half way along its length; maxilla extending posteriorly to between verticals slightly posterior to hind margin of pupil and nearly to hind margin of eye; snout, anterior suborbital, maxilla, and most of ventral part of head scaleless (a few scales present basally on lower jaw and over central branchiostegal rays); top of head scaled anteriorly almost to nostrils; diagonal

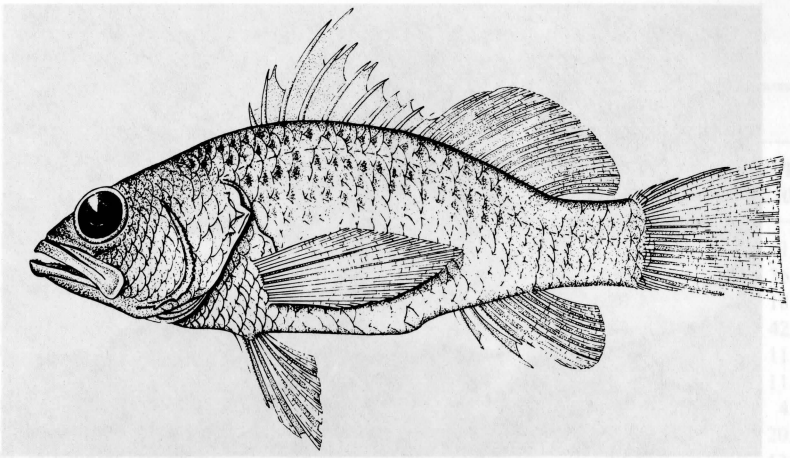

Fig. 9. Paratype of *Plectranthias garrupellus* Robins and Starck, 61 mm SL, FMNH 65811, locality unknown, but probably off east coast of Florida (collected from the "Silver Bay") (drawing by Beth Wiley).

rows of scales on cheek 6 or 7; third dorsal spine the longest, 1.57 to 2.21 in head; flap-like cirrus at tip of third dorsal spine of variable length, 6 to 13 in head; last dorsal spine contained about 1.9 times in first dorsal ray; pectoral fins moderate, reaching to or beyond a vertical at base of second anal spine; pelvic fins not long, generally just reaching anus; caudal fin slightly emarginate, the caudal concavity about 12 in head.

Color in alcohol pale, the dorsal half of body, especially anteriorly, darker as a result of each scale possessing an underlying dark blotch. Life color unknown.

REMARKS: This species was described from three specimens collected off the Atlantic coast of Florida (28°52′N; 80°05′W) in 119 m, one of unknown locality taken from the SILVER BAY, and one from just west of Bimini, Bahamas from within the depth range of 82 to 210 m. These specimens ranged from 49 to 61 mm SL. The author has examined two additional specimens: USNM 92679, 36 mm SL, from off Havana, Cuba, taken by the ALBATROSS on January 17, 1885; and USNM uncatalogued, 49.5 mm SL, east coast of Florida (28°13′N; 80°02′W), in from 58.5 to 73 m, collected at SILVER BAY Station 2008.

P. garrupellus is the only species of the genus known from the Atlantic.

Plectranthias helenae n. sp.
Fig. 10, Table 8

HOLOTYPE: BPBM 13957, 60.5 mm SL, male, Hawaiian Islands off N shore of Oahu (21°43.6–40′N; 158°04.1–07.3′W), 119–168 m, 12.5-m shrimp trawl, TOWNSEND CROMWELL Cruise 61, Sta. 27, P. Struhsaker, midnight, 17–18 October 1972.

PARATYPES: BPBM 21091, 61.5 mm SL; CAS 40803, 50.3 mm SL; USNM 218367, 53.7 mm SL-all collected with holotype.

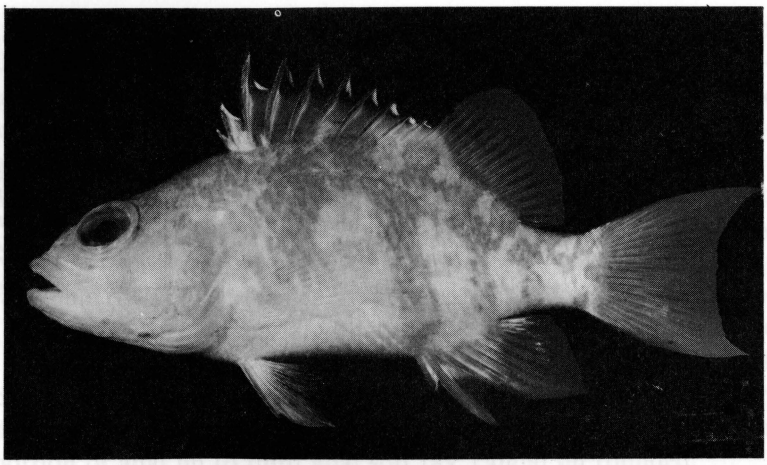

Fig. 10. Holotype of *Plectranthias helenae*, 60.5 mm SL, BPBM 13957, Hawaiian Islands.

DESCRIPTION: Dorsal rays X, 15; anal rays III, 7 (one paratype with 6); pectoral rays 14 (upper 2 and lowermost unbranched); branched caudal rays 15; lateral line complete, the tube-bearing scales 29 (29–30); lateral line broadly arched over pectoral region, highest below bases of sixth to eighth dorsal spines (where only 2 or 3 rows of large scales separate lateral line and dorsal fin base); scales above lateral line to origin of dorsal fin 5 (4 1/2 or 5); scales below lateral line to origin of anal fin 13 (13 or 14); circumpeduncular scales 14; dorsal part of head scaled anteriorly almost to posterior nostrils; diagonal rows of large scales on cheek between eye and corner of preopercle (difficult to count on this species because rows more nearly vertical) 6 (6 or 7); no scales on snout, maxilla, suborbital below anterior half of eye, and ventrally on head; about 16 prepelvic scales; small scales basally on fins, extending more than half way to distal margin on at least the caudal and anal fins (scales from fins variously lost on specimens).

Gill rakers 5+11 (5 or 6+11 or 12), one above and 9 below (including one at angle) elevated; longest raker (at angle) about equal to longest gill filament; pseudobranch lamellae 18 (16 to 18).

Upper profile of head nearly straight, forming an angle of about 30° to the horizontal.

Depth of body 2.63 (2.74 to 2.91) in SL; width of body 1.84 (1.74 to 2.0) in depth; head length 2.31 (2.27 to 2.35) in SL; snout 3.67 (3.55 to 3.74) in head; orbit diameter 3.66 (3.58 to 4.08) in head; bony interorbital width 2.68 (2.74 to 3.02) in snout; least depth of caudal peduncle 3.28 (3.2 to 3.37) in head.

Mouth terminal, moderately large, the maxilla reaching posterior to a vertical at hind edge of pupil; mouth oblique, forming an angle of about 30° to the horizontal; maxilla expanded posteriorly, its greatest depth about half orbit diameter; small teeth in jaws in about 8 rows anteriorly and about 5 along most of side of jaw; teeth on side

Table 8. Proportional measurements of type specimens of *Plectranthias helenae*, expressed as a percentage of the standard length.

	HOLOTYPE	PARATYPES		
	BPBM 13957	CAS 40803	USNM 218367	BPBM 21091
Standard Length (mm)	60.5	50.3	53.7	61.5
Depth of Body	38.0	34.4	36.0	36.5
Width of Body	20.6	17.5	20.7	18.2
Head Length	43.3	42.8	44.1	42.6
Snout Length	11.8	11.5	12.4	11.4
Diameter of Orbit	11.9	10.5	12.3	11.1
Bony Interorbital Width	4.4	4.2	4.1	4.1
Length of Upper Jaw	21.7	19.7	20.7	20.0
Least Depth of Caudal Peduncle	13.2	12.9	13.1	13.3
Length of Caudal Peduncle	19.2	19.5	18.8	19.1
Snout to Origin of Dorsal Fin	41.6	40.4	40.9	40.0
Snout to Origin of Anal Fin	69.6	69.6	68.2	69.8
Snout to Origin of Pelvic Fins	42.2	42.2	41.4	41.7
Length of Dorsal Fin Base	52.9	49.6	48.5	50.1
Length of First Dorsal Spine	6.8	6.9	6.3	6.7
Length of Longest Dorsal Spine	20.5	20.4	18.9	19.5
Length of Longest Dorsal Ray	20.3	21.4	19.0	20.8
Length of Anal Fin Base	16.2	16.1	16.6	16.1
Length of First Anal Spine	10.6	11.1	10.6	10.5
Length of Second Anal Spine	21.8	22.5	21.2	22.4
Length of Third Anal Spine	16.7	17.5	16.2	17.2
Length of Longest Anal Ray	24.9	24.8	24.4	25.1
Length of Caudal Fin	33.4	broken	30.2	33.8
Caudal Concavity	7.3	—	6.9	11.0
Length of Pectoral Fin	36.0	37.1	36.4	35.8
Length of Pelvic Spine	16.2	16.7	16.2	16.6
Length of Pelvic Fin	27.2	24.9	25.5	25.1

of upper jaw about equal in size except posteriorly where those of the outer row are noticeably longer; inner medial depressible teeth at front of upper jaw very long and slender; a stout incurved canine tooth or adjacent pair of teeth on each side at front of upper jaw, the symphyseal gap between the two about 2.7 in orbit diameter; lower jaw with about 6 rows of teeth anteriorly, narrowing to 3 rows along most of side of jaw, the slender teeth of the inner row on side about three times longer than outer, well spaced, and depressible inward; no very large canines at front of lower jaw, but the most anterior teeth about twice as large as those just posterior; a large outer recurved canine half way back in jaw; small teeth in 2 irregular rows on palatines and in 3 on vomer (forming the usual "V" shape). Tongue slender, the tip slightly pointed, without teeth, but with scattered small papillae.

Three prominent flat spines on opercle, the middle one largest and most posterior, slightly closer to upper than lower spine; opercular membrane produced to

a pointed flap which angles upward from region of middle opercular spine; two prominent antrorse spines on lower margin of preopercle; upper preopercular margin with 19 (17 to 23) coarse serrae; lower margin of subopercle with 0 to 4 very weak obtuse serrae; margin of interopercle smooth.

Nostrils relatively small, in front of upper edge of pupil, the anterior in a membranous tube, the posterior slightly more than a nostril diameter from edge of orbit, with a low fleshy rim.

Origin of dorsal fin above second lateral-line scale; third dorsal spine the longest, 2.1 (2.09 to 2.33) in head; a cirrus from tip of dorsal spines, the longest from third spine (cirrus length contained about 2.5 to 3 times in orbit diameter); dorsal fin not deeply notched, the last dorsal spine contained 1.63 (1.55 to 1.84) times in first dorsal ray; all dorsal rays branched; anterior rays of soft portion of dorsal fin a little longer than posterior, the tips filamentous, the longest ray (about the fourth) 2.13 (2.0 to 2.31) in head; second anal spine longest, 1.98 (1.9 to 2.08) in head; second or third anal soft ray longest, 1.74 (1.7 to 1.81) in head; caudal fin emarginate, the second upper branched ray somewhat produced, 1.3 (1.26 to 1.41) in head; caudal concavity 5.98 (3.87 to 6.38) in head; pectoral fins moderately long, the ninth ray longest, 2.77 (2.69 to 2.82) in head, reaching to base of second or third anal soft ray; pelvic fins nearly or just reaching anus, 1.59 (1.69 to 1.73) in head.

Color in alcohol pale with a trace of dark pigment in small blotches on anterior part of lateral line; under a microscope faint concentrations of dark pigment may be seen to form blotches on upper third of body and on nape.

Color from an Ektachrome transparency taken of the holotype by the author after thawing from the frozen state (reproduced in black and white as Fig. 9); pinkish white with five orange bars (orange-red, many of the scales with broad diffuse yellow centers), broader anteriorly, the last two on caudal peduncle broken into large spots in which the centers are mainly yellow and the margins broadly orange-red; first three bars connected in region of lateral line; a series of six large spots colored like posterior spots along the back (the first four extending into base of dorsal fin, the last two on upper caudal peduncle) all connected to the orange-red zone (or posterior spots) along lateral line; nape heavily blotched with orange-red; opercle with indistinct orange-yellow blotches (more yellow in centers more reddish peripherally); a blotch of orange-yellow on cheek and another at pectoral base; snout and front of lips pink, suffused with yellow; dorsal fin translucent whitish except for the large colored blotches which extend basally into fin from back, the first two interspinous membranes and the distal ends of all these membranes white; anal fin whitish with an extension of red-yellow into posterior part of fin from third body bar and an isolated large spot of the same color basally in middle of fin; caudal fin and paired fins whitish, the rays faintly pink.

REMARKS: Known from only the four type specimens trawled in 119–168 m off the north shore of Oahu, Hawaiian Islands.

P. helenae seems most closely related to the western Atlantic *P. garrupellus*. Both

are relatively small species which have been collected only by trawling in about the same depth range. *P. helenae* differs very slightly in finray and scale counts (see Key and Tables 1 and 2, counts of additional specimens, however, may lessen these differences), in having smaller teeth at front of lower jaw, a more emarginate caudal fin, shorter third dorsal spine, and slightly less average body depth.

Named in honor of Helen A. Randall in gratitude for her encouragement and assistance in this and other ichthyological studies.

Plectranthias inermis n. sp.
Fig. 11, Table 9

HOLOTYPE: BPBM 22468, 34.2 mm SL, male, Philippine Islands, Luzon, Batangas, SW side of Caban Island, rubble, *Fungia,* and soft coral bottom, 30 m, rotenone, J. E. Randall, K. E. Carpenter, G. W. Tribble, and R. P. H. Rutherford, 28 July 1978.

PARATYPES: BPBM 21087, 2: 16.7–28.0 mm SL, Indonesia, Molucca Islands, Ceram, Point Tutuhuhur, Teluk Piru, 20–24 m, B. Wilson et al., Muriel King Memorial Expedition, 1 June 1970; BM(NH) 1978.2.27:2, 26.2 mm SL, same data as preceding; CAS 40800, 19.8 mm SL, same data as preceding; NCIP 3768–3769, 2: 24.2–29 mm SL, same data as preceding; USNM 210121, 26.8 mm SL, Indonesia, Molucca Islands, Saparua, off Kampungmahu, coral heads and sand, 14–17 m, rotenone, V. G. Springer and M. F. Gomon, Rumphius Expedition, 17 January 1973; BPBM 20324, 31.9 mm SL, female, New Britain, Bai, near Rabaul; rubble floor of coral cave, 25 m, quinaldine, R. Lubbock, 10 August 1975; BPBM 22460, 3: 27.7–29.2 mm SL, same data as holotype; WAM P.26121–001, 2: 19.0–19.7 mm SL, Indian Ocean, Christmas Island, North West Point, coral rubble and rock ledges, 40–50 m, rotenone, G. R. Allen and M. Kitney, 10 June 1978; WAM P.26125–008,

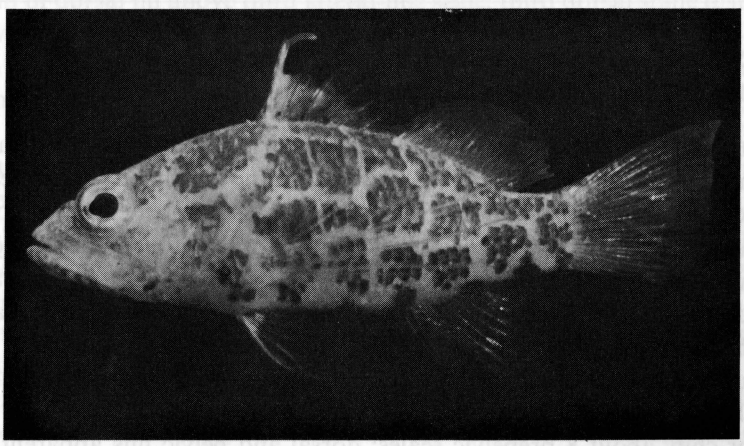

Fig. 11. Holotype of *Plectranthias inermis*, 34.2 mm SL, BPBM 22468, Philippine Islands.

Table 9. Proportional measurements of type specimens of *Plectranthias inermis*, expressed as a percentage of the standard length

	HOLOTYPE	PARATYPES				
	BPBM 20324	BPBM 21087	WAM P. 250/03	USNM 210121	BPBM 21087	BPBM 20324
Standard Length (mm)	31.9	16.7	24.2	26.8	28.0	31.9
Depth of Body	34.5	31.1	32.0	37.3	33.9	34.5
Width of Body	17.2	17.1	16.9	15.7	15.0	17.2
Head Length	45.2	46.0	43.0	44.8	45.3	45.2
Snout Length	11.0	11.1	9.9	10.8	10.6	11.0
Diameter of Orbit	11.6	12.6	11.4	11.8	11.7	11.6
Bony Interorbital Width	3.5	3.6	3.3	3.6	3.7	3.5
Length of Upper Jaw	22.3	23.6	21.5	22.2	21.4	22.3
Least Depth of Caudal Peduncle	14.1	15.5	13.7	15.5	14.3	14.1
Length of Caudal Peduncle	19.8	20.6	20.3	22.0	20.0	19.8
Snout to Origin of Dorsal Fin	43.8	45.9	40.1	45.2	44.0	43.8
Snout to Origin of Anal Fin	68.7	70.7	71.2	68.9	69.0	68.7
Snout to Origin of Pelvic Fins	38.6	40.1	41.7	37.7	39.3	38.6
Length of Dorsal Fin Base	48.4	48.2	45.0	51.9	49.6	48.4
Length of First Dorsal Spine	3.8	3.0	3.3	3.7	3.2	3.8
Length of Longest Dorsal Spine	19.7	18.0	19.8	19.8	17.9	19.7
Length of Longest Dorsal Ray	14.7	15.5	14.8	14.9	13.6	14.7
Length of Anal Fin Base	15.0	14.4	14.9	15.3	14.3	15.0
Length of First Anal Spine	7.5	7.5	7.8	7.5	6.5	7.5
Length of Second Anal Spine	17.8	17.7	16.5	18.2	17.2	17.8
Length of Third Anal Spine	13.8	14.3	12.4	14.4	14.3	13.8
Length of Longest Anal Ray	broken	broken	broken	28.4	broken	broken
Length of Caudal Fin	29.2	broken	26.8	30.5	broken	29.2
Length of Pectoral Fin	broken	44.9	39.7	45.8	43.5	broken
Length of Pelvic Spine	14.8	14.7	15.2	14.7	14.6	14.8
Length of Pelvic Fin	broken	28.1	23.5	25.0	25.7	broken

25.8 mm SL, Indian Ocean, Christmas Island, Flying Fish Cove, 55–65 m, rotenone, G. R. Allen and R. C. Steene, 12 June 1978.

DESCRIPTON: Dorsal rays X, 16 (16 to 18); anal rays III, 7; pectoral rays 13 (all unbranched); branched caudal rays 13; lateral line not complete, the anterior tube-bearing scales 17 (12 to 18); near-vertical scale rows from upper end of gill opening to caudal base 27; lateral line strongly arched over pectoral region, highest beneath bases of fourth to seventh dorsal spines where only 1 row of large scales separate lateral line and dorsal fin base; scales above lateral line to origin of dorsal fin 2; scales below lateral line to origin of anal fin 8 1/2 (8 1/2 to 9 1/2); circumpeduncular scales 14; dorsal part of head scaled anteriorly to posterior interorbital space; diagonal rows of large scales on cheek between eye and corner of preopercle 4; no scales on snout, maxilla or chin; about 8 prepelvic scales; dorsal and pelvic fins apparently lacking scales; small scales basally on caudal and pectoral fins and one or two rows at base of anal fin.

Gill rakers 5+12 (5 or 6+10 to 12), one above and six below elevated, the longest at angle slightly longer than longest gill filaments, the rudiments tending to coalesce and hence difficult to count; pseudobranch lamellae 13 (10 to 12).

Upper profile of head nearly straight to slightly convex, forming an angle of about 30° to the horizontal.

Depth of body 2.88 (2.68 to 3.22) in SL; width of body 1.98 (1.81 to 2.38) in depth; head length 2.28 (2.17 to 2.33) in SL; snout 4.02 (4.11 to 4.34) in head; orbit diameter 4.13 (3.64 to 3.90) in head; bony interorbital width 3.12 (2.95 to 3.14 in snout; least depth of caudal peduncle 3.07 (2.89 to 3.21) in head.

Mouth moderately large, the lower jaw slightly projecting when closed, the maxilla nearly reaching, or reaching slightly beyond a vertical at posterior edge of eye; mouth moderately oblique, forming an angle of about 20° to the horizontal; maxilla expanded posteriorly, its greatest depth about 1.4 in orbit diameter; teeth at front of upper jaw in about five irregular rows, the depressible inner medial teeth very long and slender, the longest about half pupil diameter; teeth along sides of jaws very small, ending in only 2 or 3 rows posteriorly; a small stout projecting canine or pair of canines at corner of front of upper jaw; lower jaw with about four rows of teeth, the depressible inner medial teeth at front of jaw and inner row along side of jaw longest; no canine teeth in lower jaw; palatines and vomer with one or two irregular rows of small teeth. Tongue narrow, without teeth.

Three prominent flat spines on opercle, the middle one the most posterior and about equidistant to the other two; opercular membrane produced to a pointed flap at level of middle opercular spine, the end projecting obquely upward; no antrorse spines on lower margin of preopercle; upper preopercular margin with 0 to 5 tiny poorly developed serrae; subopercle and interopercle without serrae.

Nostrils in front of upper edge of pupil, the anterior in a thin membranous tube, the posterior with a slight rim with two prominent pores above and one below.

Origin of dorsal fin above third lateral-line scale; third dorsal spine distinctly the longest, with a pennant-like flap near tip, the spine length 2.21 (2.17 to 2.54) in head; dorsal fin completely notched between spinous and soft portions; last dorsal spine small, contained about 6 times in first soft ray (which is unbranched); height of soft dorsal fin rather uniform, the 8th or 9th ray the longest, 3.14 (2.96 to 3.33) in head; second anal spine longest, 2.67 (2.47–2.64) in head; second anal soft ray longest, 1.9 (1.6) in head; caudal fin rounded, the longest ray 1.65 (1.29 to 1.65) in head; pectoral fins long, the eighth or ninth pectoral rays longest, reaching beyond rear base of anal fin, 2.31 (2.18 to 2.52) in SL; pelvic fins not reaching anus, the longest ray 1.60 (1.64 to 1.83) in head.

Color in alcohol of holotype uniformly pale with very faint dark blotches formed from concentrations of tiny specks of black pigment.

Color of holotype when fresh; white with large near-quadrangular blotches of orange-red in about three irregular rows on body, the red in the blotches concentrated in a spot on each scale; large blotches of the same color on nape, the largest beginning at origin of dorsal fin and passing two-thirds the distance to eye; small blotches of

light red admixed with yellow on ventral half of head; first three membranes of spinous portion of dorsal fin pale yellowish; remaining membranes whitish with an outer row of yellow spots, one per membrane, and red distal tips; an orange-red spot basally on first, fifth, sixth, and eighth to tenth dorsal spines; soft dorsal whitish with pale pink rays and a faint yellowish stripe near base; caudal and anal fins whitish with pink rays, the anal with some yellow on spinous membranes and three orange-red spots at base; pectoral fin, transparent with pinkish rays; pelvic fins whitish on lateral edge with pink rays and a streak of yellow on the last three membranes; iris a mixture of light red and yellow.

REMARKS: Known thus far only from Christmas Island (Indian Ocean), the Philippine Islands, Molucca Islands and New Britain in the depth range of 14 to 65 m.

Named *P. inermis* from the Latin for unarmed, in reference to the lack of spines and serrae on the preopercle, the small outer canine teeth of the upper jaw, and the lack of canines in the lower jaw.

A small species, the largest specimen (the holotype) measures only 34.2 mm SL. A 31.9-mm paratype is a sexually mature female.

Plectranthias intermedius

Fig. 12

Xenanthias intermedius Kotthanus, 1973. METEOR Forsch.-Ergebn., ser. D, no. 16, p. 26, figs. 293–296 (type locality, near Socotra off Gulf of Aden).

DIAGNOSIS: Dorsal rays X, 17; anal rays III, 6 or 7; pectoral rays 14 or 15, all branched except uppermost; branched caudal rays 15; lateral line compete, the tube-bearing scales 31 to 33; scales above lateral line to origin of dorsal fin 4; gill rakers 5 or 6+12; depth of body 2.55 to 2.65 in SL; eye very large, about 3 to 3.2 in head; lower

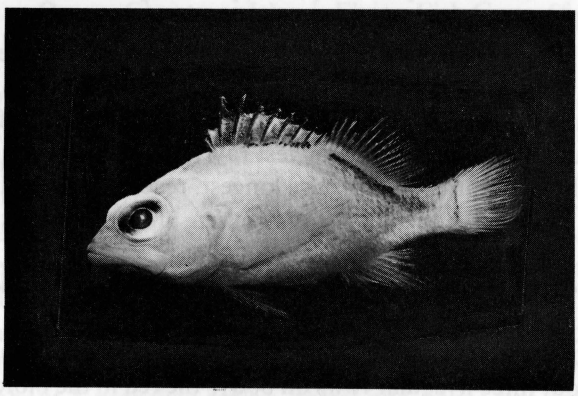

Fig. 12. Holotype of *Plectranthias intermedius* (Kotthaus), 80.8 mm SL, ZIM-Nr. 5132, SW of Socotra, Arabian Sea (after Kotthaus, 1973).

margin of preopercle with 2 antrorse spines; upper margin of preopercle with about 26 serrae; about 4 serrae on subopercle and interopercle; palatine teeth present (in about 3 or 4 irregular rows); one or a closeset pair of canine teeth anteriorly at front of lower jaw on each side of symphysis; a large incurved canine in outer row on side of lower jaw slightly anterior to midlength of jaw; inner row of small teeth on side of lower jaw about 4 or more times longer than teeth of outer row (disregarding canine); maxilla reaching posterior to a vertical at rear edge of pupil; head, including snout, chin and maxilla, entirely scaled (scales on maxilla small); diagonal rows of scales on cheek between eye and corner of preopercle 10; third and fourth dorsal spines subequal, about 2.6 in head length; last dorsal spine contained about 2.2 times in first dorsal soft ray; first dorsal soft ray branched; pectoral fins not very long, their length 3.1 in SL; pelvic fins not reaching anus, about 2 in head length; caudal fin subtruncate with upper rays prolonged to form a lobe (rays easily broken; elongate upper rays perhaps not present in juveniles).

Color in alcohol pale with a blackish band or series of small dark blotches at base of spinous dorsal fin, continuing below soft portion after a gap beneath the juncture of spinous and soft portions of fin, deflected downward posteriorly, ending midlaterally on caudal peduncle; a small dark spot at origin of dorsal fin; a narrow blackish band at base of caudal fin (faint on preserved specimens).

REMARKS: Known from only two specimens which were collected with a trawl during METEOR Station Nr. 102 at 11° 33.9–38′N, 52° 52–54′E (60 nautical miles SW of Socotra off Gulf of Aden) in 190–290 m. The types are in the Zool. Staatsinstitut und Zool. Museum in Hamburg, the holotype (80.8 mm SL) bearing ZIM-Nr.5132 and the paratype (89 mm SL) ZIM-Nr.5133. The latter was sent on loan to the author.

Plectranthias japonicus

Fig. 13

Paracirrhites japonicus Steindachner in Steindachner and Döderlein, 1884. Denkschr. Akad. Wiss. Wien, vol. 48, p. 25 (type locality, Japan).

Sayonara satsumae Jordan and Seale, 1906. Proc. U.S. Natl. Mus., vol. 30, p. 145, fig. 3 (type locality, Yamagawa, Satsuma, Japan).

Sayonara mitsukurii Smith and Pope, 1906. Proc. U.S. Natl. Mus., vol. 31, p. 469, fig. 3 (type locality, Kagoshima, Japan).

DIAGNOSIS: Dorsal rays X, 14 to 16 (usually 15); anal rays III, 7; pectoral rays 15 to 17 (usually 16) (unbranched on juveniles, uppermost and lower 2 to 7 unbranched on adults); branched caudal rays 14 or 15; lateral line complete, the tube-bearing scales 30 to 35; scales above lateral line to origin of dorsal fin 2 1/2 (the 1/2 is a small scale at base of first dorsal spine); gill rakers 6 to 8 + 10 to 12; depth of body 2.32 to 2.94 in SL; width of body 1.85 to 2 in depth; lower margin of preopercle without antrorse spines; upper margin and rounded corner of preopercle evenly serrate (17 serrae on a

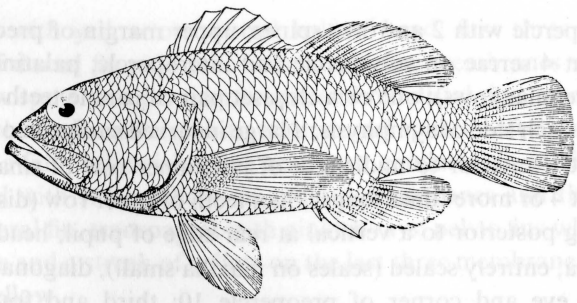

Fig. 13. Holotype of *Sayonara satsumae* Jordan and Seale [=*Plectranthias japonicus* (Steindachner)], 123 mm SL, SU 9259, Japan (after Jordan and Seale, 1906).

35-mm specimen, 31 on an 82-mm specimen, and about 40 on the 123-mm holotype); subopercle and inter-opercle serrate; palatine teeth present; villiform teeth in bands in jaws, the upper with about 8 to 12 irregular rows along side of jaw, and the lower with 4 to 6 rows (more rows anteriorly in jaws); a pair of short canine teeth at front of upper jaw, but no canines in lower jaw; maxilla reaching to or slightly beyond a vertical at posterior edge of eye; maxilla scaled; diagonal rows of large scales between eye and corner of preopercle 6; scales dorsally on head and on suborbital extending anteriorly to level of nostrils; scales on mandible; fourth or fifth dorsal spine the longest, 2.5 to 3.85 in head (spines relatively shorter on larger individuals); last dorsal spine contained about 3 times in first dorsal soft ray; all dorsal soft rays branched; pectoral fins moderately long, 2.7 to 3.1 in SL; pelvic fins not reaching anus, 1.42 to 1.9 in head; caudal fin subtruncate to rounded.

Color in alcohol pale with about six dark blotches along the back (very faint on some specimens). Color in life light red suffused with yellow, the blotches along the back deep orange-yellow; fins light yellow and pink.

REMARKS: Steindachner described this species as a new genus and species of hawkfish, *Parachirrhites japonicus*. He was unaware of *Parachirrhites* Bleeker, so Jordan in Jordan and Herre (1907) provided a new generic name, *Isobuna*. Smith (1951) questioned the placement of this fish in the Cirrhitidae, adding, "If it is a cirrhitid, *Isobuna* would merit subfamily rank." While studying the Cirrhitidae, the author went to the Museo Civico di Storia Naturale in Milan hoping to see the only type specimen of *Isobuna japonica*. He learned that it had been destroyed during World War II. In his review of the hawkfishes, Randall (1963) classified this species in a separate subfamily by itself, the Isobuninae, "but not with assurance". The ctenoid scales, three spines on the opercle, and only two rows of scales above the lateral line set it apart from all other cirrhitids. Other features such as 6 or 7 lower pectoral rays unbranched seemed to ally in with the Cirrhitidae, but some important characters such as the presence or absence of cirri at the tips of spinous dorsal membranes and posteriorly on the anterior nostril were not mentioned by Steindachner.

After the present study was initiated, suspicion was aroused that *Isobuna* was not only an anthiine but probably a *Plectranthias*.

Randall and Heemstra (1970) have concluded that *Sayonara satsumae* Jordan and Seale and *Isobuna japonica* (Steindachner) are conspecific. The holotype of *S. satsumae* (SU 9259, 123 mm SL) was examined at the California Academy of Sciences. So much of Steindachner's description of *Isobuna japonica* fits this specimen that the probability that the two were the same seemed high. There was a problem, however, in the number of unbranched pectoral rays of the holotype of *S. satsumae*- only one upper and two lower unbranched instead of the six or seven described for *I. japonica*. This difficulty was obviated by two specimens trawled in 185 to 200 m off Manila Bay, Philippines (BPBM 20872, 35 and 82 mm SL) which were kindly provided by Pierre Fourmanoir. The smallest specimen has entirely unbranched pectoral rays; the largest has the upper two and the lower six rays unbranched.

The color description given by Steindachner for *I. japonica,* "yellowish brown with a diffuse golden yellow spot in the center of each body scale", was also difficult to equate to information available on the color of *S. satsumae*. The color photograph of a specimen identifed as *Sayonara satsumae* in Masuda, Araga and Yoshino (1975: pl. 49 H), however, helps to resolve this difficulty. Though the illustrated fish is primarily reddish, the centers of the scales are yellowish.

Katayama (1960 : 125, pl. 15) listed the species from various localities in southern Japan and from Korea. Randall and Heemstra extended the range to Luzon.

Masuda, Araga, and Yoshino (1975) stated that this fish is taken by trawls in fairly deep water over sand.

Katayama (1959) made a comparative study of the internal anatomy of this species, *Zalanthias azumanus* (=*Plectranthias kelloggi*) and other serranid fishes of Japan. Katayama (1960) commented on the similarity of the internal structure of *P. japonicus* to that of *P. kelloggi.*

Plectranthias kamii n. sp.

Fig. 14, Table 10

Selenanthias analis Schmidt (non Tanaka), 1931. Trans. Pac. Comm. Acad. Sci. USSR. vol. 2, p. 61, fig. 8 (Tokyo fish market).

?*Plectranthias anthioides* Katayama (non Günther), 1957. Japan. Jour. Ichth., vol. 6, nos. 4/5/6, p. 147, fig. 1 (Izu-Ōshima, Japan).

?*Plectranthias anthioides* Katayama (non Günther), 1960. Fauna Japonica Serranidae, p. 131, pl. 71 (Izu-Ōshima, Japan).

Plectranthias anthioides Yoshino (non Günther), 1972. Japan. Jour. Ichth., vol. 19, no. 2, figs. 1A, 2 (Mekura-Sone, off Yonaguni Island, and Okinawa, Ryukyu Islands).

Plectranthias anthioides Masuda, Araga and Yoshino, 1975. Coastal Fishes S. Japan, p. 219, pl. 50G (Ryukyu Islands).

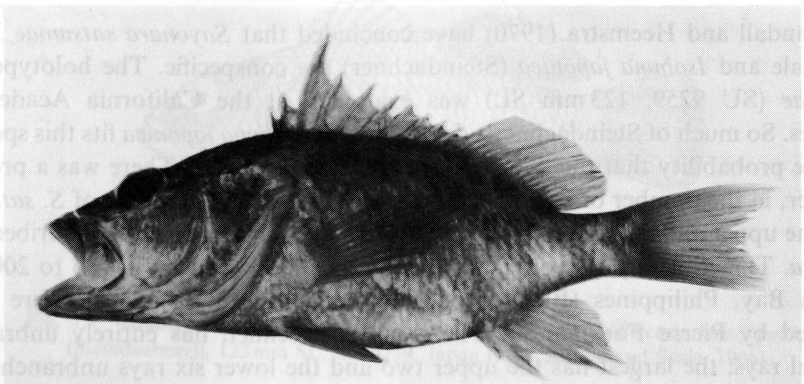

Fig. 14. Holotype of *Plectranthias kamii*, 215 mm SL, BPBM 19636, Okinawa (photo by T. Yoshino).

Table 10. Proportional measurements of type specimens of *Plectranthias kamii*, expressed as a percentage of the standard length.

	HOLOTYPE	PARATYPES	
	BPBM 19636	BPBM 5845	USNM 219329
Standard Length (mm)	215.0	178.5	191.0
Depth of Body	37.1	38.1	38.7
Width of Body	19.5	21.6	20.9
Head Length	44.1	45.5	45.3
Snout Length	13.0	12.9	13.2
Diameter of Orbit	9.8	10.5	9.4
Body Interorbital Width	4.5	4.9	4.8
Length of Upper Jaw	22.1	21.6	22.5
Least Depth of Caudal Peduncle	11.6	12.5	12.5
Length of Caudal Peduncle	18.1	19.0	19.3
Snout to Origin of Dorsal Fin	40.5	43.1	41.6
Snout to Origin of Anal Fin	74.0	70.5	72.5
Snout to Origin of Pelvic Fins	40.0	38.6	41.1
Length of Dorsal Fin Base	51.4	54.8	53.4
Length of First Dorsal Spine	6.0	6.6	7.3
Length of Longest Dorsal Spine	18.1	16.3	19.1
Length of Longest Dorsal Ray	16.5	17.9	17.0
Length of Anal Fin Base	14.1	14.9	15.0
Length of First Anal Spine	7.3	4.7	8.7
Length of Second Anal Spine	14.2	15.3	16.2
Length of Third Anal Spine	13.1	14.6	14.6
Length of Longest Anal Ray	21.9	21.2	20.5
Length of Caudal Fin	30.7	broken	25.6
Caudal Concavity	8.1	broken	3.2
Length of Pectoral Fin	34.4	33.0	32.4
Length of Pelvic Spine	12.9	12.7	13.6
Length of Pelvic Fin	21.0	20.9	20.9

HOLOTYPE: BPBM 19636, 215 mm SL, male, Ryukyu Islands, Okinawa, Naha fish market, T. Yoshino, 15 June 1974.

PARATYPES: BPBM 5845, 178.5 mm SL, male, Mariana Islands, Guam, Camel Rock, Asan, 183 m, hook and line, I. Ikehara, 4 September 1966; USNM 219329, 191.0 mm SL, Palau Islands, Augulpelu Reef, near vertical dropoff, 270 m, trap, B. A. Carlson and D. Imose, 1 November 1978.

DESCRIPTION: Dorsal rays X, 18; anal III, 7; pectoral rays 13 (all branched except uppermost); branched caudal rays 15; lateral line complete, the tube-bearing scales 36 (33 to 34); lateral line broadly arched over pectoral region, highest below bases of fifth to seventh spines where 3 or 4 rows of large scales separate lateral line and dorsal fin base; scales above lateral line to origin of dorsal fin 5 1/2; scales below lateral line to origin of anal fin about 18 (some scales missing ventrally on both type specimens); circumpeduncular scales 15; dorsal part of head scaled anteriorly to anterior third of interorbital space; diagonal rows of large scales on cheek between eye and corner of preopercle 6; no scales on snout, maxilla, suborbital, or ventrally on head; about 13 prepelvic scales; small scales basally on all fins, apparently more than three-fourths distance to distal margin of caudal fin and more than half on soft portion of dorsal and anal fins (many scales missing from fins).

Gill rakers 6+13 (5 or 6 +11 or 12), 1 or 2 above and 8 to 10 below (including one at angle) elevated; longest raker (at angle) about equal in length to longest gill filament; pseudobranch lamellae 37 (39 to 41).

Dorsal profile of head nearly straight, forming an angle of about 26° to the horizontal.

Depth of body 2.69 (2.59 to 2.63) in SL; width of body 1.9 (1.76 to 1.85) in depth; head length 2.27 (2.20 to 2.21) in SL; snout 3.39 (3.44 to 3.52) in head; orbit diameter 4.5 (4.33) in head; bony interorbital width 2.89 (2.64 to 2.78) in snout; least depth of caudal peduncle 3.80 (3.63 to 3.64) in head.

Mouth large, oblique, forming an angle of about 35° to the horizontal, the lower jaw slightly projecting, the maxilla reaching posterior to a vertical at rear edge of pupil; maxilla expanded posteriorly, its greatest depth contained about 1.5 times in orbit diameter; a band of villiform teeth in upper jaw, broader anteriorly (about 9 or 10 irregular rows), and narrowing on midside of jaw to about 6 rows, the inner medial teeth at front of jaw enlarged, incurved and depressible; a pair of stout canine teeth anteriorly on each side of upper jaw, separated by a symphyseal gap equal to about one-third of orbit diameter; a band of villiform teeth in lower jaw, broader anteriorly (about 7 irregular rows), narrowing to 4 rows along side of jaw, the slender innermost teeth well spaced, depressible, and about 3 to 4 times longer than teeth of outermost row; inner medial teeth at front of lower jaw also enlarged and depressible, but lying nearly flat; no very large canines at front of lower jaw but one or two of the most anterior teeth on each side are about twice as large as more posterior teeth; one or two enlarged canine teeth in outer row on lower jaw slightly anterior to midside of jaw; small teeth on palatines in about 2 irregular rows and on vomer in about 3 rows,

forming the usual "V". Tongue slender, the tip slightly pointed to rounded, without teeth or papillae.

Three prominent flat spines on opercle, the middle one largest and most posterior, closer to lower spine than upper (except on right side of holotype where about equidistant); opercular membrane produced to a pointed flap which projects obliquely upward from region of middle opercular spine; 2 antrorse spines on lower margin of preopercle; upper margin of preopercle finely serrate (rather weakly and irregularly on holotype) with 16 (27 to 33) serrae; subopercle with no serrae or a few very small poorly defined projections; interopercle smooth.

Nostrils relatively small, in front of upper third of eye, the anterior in a membranous tube, the posterior nearly 2 nostril diameters from edge of orbit, with a membranous rim.

Origin of dorsal fin over second lateral-line scale; third dorsal spine notably the longest, 2.43 (2.37 to 2.80) in head; cirrus from upper end of interspinous membrane near tip of third dorsal spine contained about 3 times in orbit diameter; dorsal fin not deeply notched, the last dorsal spine contained 1.72 (1.65 to 1.67) times in first dorsal soft ray; all dorsal rays branched; longest dorsal soft ray (about the fifth but second to seventh subequal) 2.67 (2.54 to 2.67) in head; second anal spine longest, 3.1 (2.80 to 2.97) in head; second anal soft ray longest, 2.01 (2.13 to 2.16) in head; caudal fin emarginate, the second upper branched ray (and to a lesser extent the third and fourth) somewhat produced, 1.43 (1.77) in head (broken in one paratype); caudal concavity 5.45 (14.2) in head; pectoral fins moderately long, the eighth ray the longest, reaching to base of first anal soft ray, 2.91 (3.02 to 3.08) in SL; pelvic fins not reaching anus, 2.10 (2.17 to 2.18) in head.

Color in alcohol pale with a series of 8 large diffuse brown blotches along back, progressively smaller posteriorly, the first on nape to base of second dorsal spine (pigment concentrated at scale edges), the second centered on base of fifth dorsal spine, the third beneath base of seventh and eighth dorsal spines, the fourth, fifth and sixth at base of anterior, middle and posterior part of soft portion of dorsal fin, respectively, and the last two dorsally on caudal peduncle; a second row of large brownish blotches adjacent to and below lateral line the first two joining the second and third blotches of the back and the last two narrowly connecting with the upper blotches of the caudal peduncle; a large brownish blotch forming a third row by itself beneath pectoral fin; scattered dark pigment, mainly on edges of scales, on opercle, behind eye and dorsally on nape; fins pale except for extensions of the dark blotches on the back into the basal part of the dorsal fin and a small amount of blackish pigment on tips of many of the caudal and soft dorsal rays.

Color of holotype when fresh (from a 35-mm transparency taken by T. Yoshino): body light red, shading to pink ventrally, with irregular bars and large blotches of yellow containing diffuse brown pigment, the four more posterior bars extending ventrally (the first two to anal fin base, the last to lower caudal peduncle); dorsal half of head light red mixed with yellow, with some brown behind eye, on nape, and opercle (the dark pigment mainly on scale edges); spinous portion of dorsal fin light

red with large blotches of yellow, especially basally where they connect with yellow blotches of back; soft portion of dorsal fin mainly light red; anal fin light red with a very large central and basal region of yellow; caudal fin light red, this color most dense basally, the rays yellow, becoming light red distally; pectoral fins with light red rays and clear membranes; pelvic fins light red with yellow rays, the lateral edge of the spine whitish.

A color description of the paratype from Guam was provided by H. Kami which closely matches the color given above for the holotype.

REMARKS: Although the description of *P. kamii* above is based on only three specimens, additional measurement and meristic data may be obtained from Yoshino (1972) who described five Ryukyu Island specimens 161.8 to 229.5 mm SL from the fish collection at Kyoto University.

It seems likely that the 102-mm *Plectranthias* from Izu-Ōshima, Japan which was identified as *P. anthioides* by Katayama (1957) is *P. kamii*; however, the pectoral count of 15 given by him is 2 rays more than expected and the count of 33 lateral-line scales is a little low. In order to determine if these counts are aberrant or in error, the author wrote Dr. Katayama to check the specimen. Though he made a thorough search of the laboratory at Yamaguchi University, he could not find it; he recalled having made a dissection of the specimen.

The identification of *P. kamii* as *P. anthioides* was made by Masuda, Araga and Yoshino "with some reservation". *P. kamii* seems to be closely related to *P. anthioides,* differing as indicated in the Key by having an emarginate instead of rounded caudal fin, 5 1/2 instead of 3 1/2 scales above the lateral line, pelvic fins not reaching anus, a deeper body, one fewer pectoral rays and lacking a median black band on nape. It is also a close relative of *P. taylori* (see Remarks under this species).

This species is named in honor of Harry T. Kami of the Division of Fish and Wildlife on Guam who donated the specimen to the Bishop Museum. Mr. Kami suspected that it might represent an undescribed species.

The paratype from Guam differs from the Ryukyu specimens in having a shorter third dorsal spine (though still the longest spine of the fin).

P. kamii is one of the larger species of the genus; the largest known of this species is the 229.5 mm one reported by Yoshino (1972).

Plectranthias kelloggi

Fig. 15, Table 11

Anthias japonicus Döderlein in Steindachner and Döderlein, 1883. Denkschr. Acad. Wiss. Wien, vol. 47, p. 227, pl. 3, fig. 2 (type locality, Tokyo) [preoccupied by *Anthias japonicus* Bloch = *Scolopsis vosmeri* (Bloch)].

Anthias kelloggi Jordan and Evermann, 1903. Bull. U.S. Fish Comm., vol. 22, p. 179 (type locality, off Kailua, Hawaii).

Pseudanthias kelloggi Jordan and Evermann, 1905. Bull. U.S. Fish Comm., vol. 23, p. 226, Fig. 92.

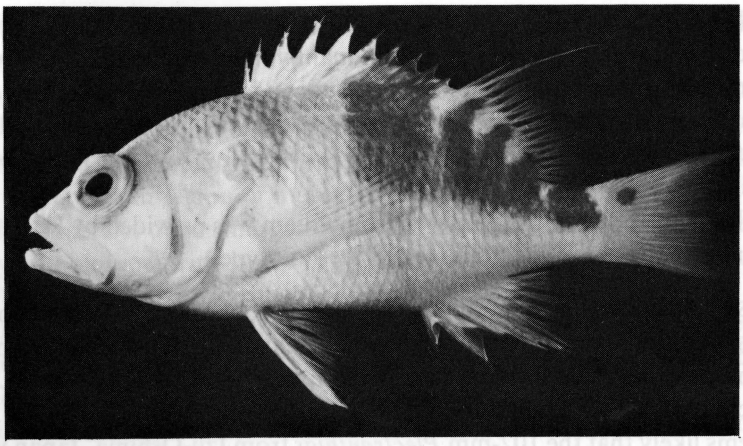

Fig. 15. *Plectranthias kelloggi* (Jordan and Evermann), 147 mm SL, BPBM 14188, Hawaiian Islands.

Table 11. Lateral-line scale and gill-raker counts of *Plectranthias kelloggi*.

Locality	Lateral-line scales							Total gill rakers				
	32	33	34	35	36	37	38	20	21	22	23	24
Hawaii			2	1	4	2	1		2	2	4	2
Japan		2	2	5	2			1	7	2	1	
New Caledonia	1	2	3					2	1	3		

Pseudanthias azumanus Jordan and Richardson, 1910. Proc. U.S. Natl. Mus., vol. 37, p. 470 (new name for *Anthias japonicus* Döderlein).

DIAGNOSIS: Dorsal rays X, 14 to 16 (usually 15); anal rays III, 7; pectoral rays 14 to 16 (usually 15), all branched except uppermost; branched caudal rays 15; lateral line complete, the tube-bearing scales 32 to 38; scales above lateral line to origin of dorsal fin 3 1/2; gill rakers 6 to 8 + 14 to 17; depth of body 2.35 to 2.7 in SL; width of body 1.7 to 2 in depth; lower margin of preopercle without antrorse spines; upper margin of preopercle finely serrate (25 above middle of rounded angle of preopercle of a 41.5 mm specimen to about 47 serrae in adults), the lower margin variably serrate (serrae also small); subopercle and interopercle serrate; palatine teeth present; upper jaw with a band of villiform teeth (in about 12 or more irregular rows anteriorly, narrowing to just a few rows posteriorly), these teeth small except for enlarged teeth of inner rows at front of jaw; a stout protruding canine at anterior corner on each side of upper jaw; lower jaw with a band of about 9 irregular rows of villiform teeth anteriorly narrowing to three or four rows on midside of jaw where the inner row is somewhat enlarged; a close-set pair of stout canine teeth on each side at front of lower jaw and two (sometimes three) enlarged recurved canines at side of lower jaw about

one-third distance from front of jaw; maxilla reaching posteriorly to a zone between verticals at rear edge of pupil and rear edge of eye; dorsal part of maxilla with numerous small scales; 7 diagonal rows of large scales on cheek between eye and corner of preopercle (small scales near edge of eye and preopercle); scales dorsally on head extending anteriorly to front of snout; preorbital region naked; mandibles scaled; fifth dorsal spine usually longest (but fourth or sixth often subequal), the length 2.3 to 2.9 in head; last dorsal spine 1.7 to 2.2 in length of first dorsal soft ray; all dorsal soft rays branched; second dorsal soft ray prolonged as a filament, its length 1.1 to 2.3 in head; pectoral fins moderately long, 2.9 to 3.25 in SL; pelvic fins not reaching or barely reaching anus, 1.5 to 1.7 in head; caudal fin emarginate, the upper second branched ray usually prolonged as a filament. The above proportional measurements were based on Hawaiian specimens.

Color in alcohol pale to light brown. Color of Hawaiian specimens when fresh: pale pink to white, the posterior upper part of head and upper part of body red except for a pale pink to white bar below fourth to seventh dorsal spines and a series of five white spots along back and base of dorsal fin between last spine and caudal base; lips and ventral part of head whitish; rest of head (including operculum) reddish suffused with yellowish; fins whitish except for a zone of red over last four dorsal spines and associated membranes and a red spot on upper base of caudal fin. Japanese specimens are similar but instead of a solid block of red (except for whitish spots) posteriorly on the body ending abruptly just above the midlateral line, there is a broad bar of red running from the last four dorsal spines almost to midventral line, a large red spot on the caudal peduncle, and two faint light reddish bars between; the fins are more yellowish.

REMARKS: Previously the Japanese nominal species, *P. azumanus,* has been maintained as distinct from the Hawaiian *P. kelloggi.* The two are here joined as a single species. The Japanese and Hawaiian populations may, however, be regarded as subspecies, hence *P. kelloggi azumanus* and *P. kelloggi kelloggi.* In addition to the color differences mentioned in the diagnosis above, there appear to be slightly higher lateral-line scale and gill-raker counts in Hawaii (see Table 11). There also seems to be a difference in the maximum size attained. Masuda, Araga, and Yoshino (1975) recorded the species in Japan to 150 mm total length. The largest Hawaiian specimen (BPBM 14188) is 162 mm SL and 208 mm total length.

The holotype of *Plectranthias kelloggi* (Jordan and Evermann), USNM 50642, 145.7 mm SL, was examined at the U.S. National Museum of Natural History. It is unusual in having XI dorsal spines.

Two separate lots of Hawaiian specimens of *P. kelloggi* were caught at 275 m depth.

Pierre Fourmanoir kindly provided the author with two lots of small specimens of *P. kelloggi* taken by trawling south of the Isle of Pines, New Caledonia. The life color was noted by him as very similar to the plate of *P. kelloggi azumanus* in Masuda, Araga, and Yoshino (1975: pl. 50F). It is difficult to make comparisons in

proportional measurements of these specimens to Hawaiian and Japanese material because the largest from New Caledonia is smaller than the smallest available museum specimens from Hawaii or Japan. The fin-ray counts show no differences, but the number of lateral-line scales, though overlapping, is significantly lower than those from Hawaii or Japan (Table 11). If the Hawaiian and Japanese populations are recognized as subspecies, then this distinction would seem in order for fish from New Caledonia. Therefore the subspecific name *P. k. melanesius* is proposed.

The largest Isle of Pines specimen (BPBM 22484, 74.3 mm SL), collected on April 13, 1978, in 360 m is selected as the holotype of *Plectranthias kelloggi melanesius*. Its principal characters are as follows: dorsal rays X, 15; anal rays III, 7; pectoral rays 15; lateral-line scales 34; gill rakers 6+14; upper preopercular serrae 34; depth of body 2.54 in SL, head 2.48 in SL, orbit diameter 3.14 in head; fourth and fifth dorsal spines the longest, subequal, 2.15 in head; first dorsal ray 2.21 in head; prolonged second dorsal ray 1.05 in head; longest caudal ray 3.52 in SL; pectoral fins 2.59 in SL; pelvic fins 1.63 in head.

The paratypes of this subspecies are BPBM 21067, 41.5 mm SL, taken in 300 m in October, 1977 and BPBM 22485, 4: 64–72 mm SL, collected with the holotype.

Plectranthias longimanus

Fig. 16

Pteranthias longimanus Weber, 1913. Siboga-Exped. Fische (Leiden), p. 209, fig. 54 (type locality, Paternoster Islands, Indonesia) (see Remarks).

DIAGNOSIS: Dorsal rays X, 13 to 15 (rarely 15); anal rays III, 6 or 7; pectoral rays 12 or 13 (26 of 28 with 13), unbranched, none thickened; lateral line incomplete, ending beneath soft portion of dorsal fin, the tubed scales 12 to 15; scales above lateral line to

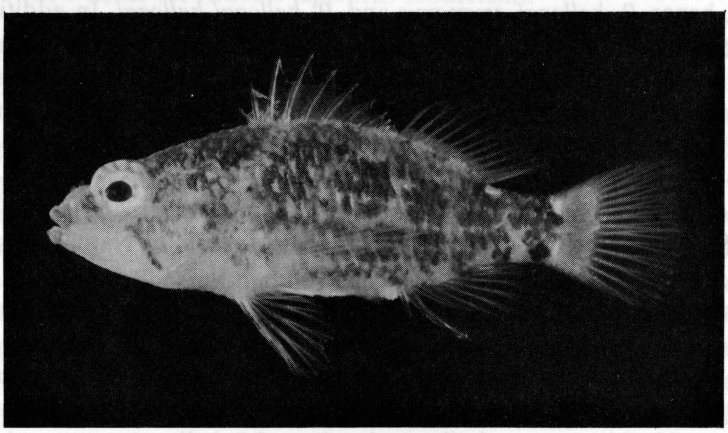

Fig. 16. *Plectranthias longimanus* (Weber), 23 mm SL, BPBM 18518, Ambon, Molucca Islands.

origin of dorsal fin 2; gill rakers 4 to 6+9 to 12; depth of body 2.6 to 3.1 in SL; upper margin of preopercle with 9 to 19 coarse serrae (increasing with age, see Fig. 1), the lower margin with 2 antrorse spines; subopercle with 2 to 7 coarse serrae on lower margin and 1 to 8 on interopercle; teeth present on palatines; a single enlarged tooth in outer row on side of lower jaw, but no canines at front of jaw; maxilla scaleless; diagonal rows of large scales on cheek between eye and corner of preopercle 4 or 5; top of head scaled anteriorly to midinteroribtal space; fourth dorsal spine the longest, 2.3 to 2.7 in head; last dorsal spine contained about 3 times in first dorsal soft ray; first dorsal soft ray unbranched; pectoral fins long, 2.4 to 2.8 in SL; caudal fin slightly rounded.

Color in alcohol pale with large brown blotches which tend to interconnect to form broad irregular bars on body; a row of 5 small dark brown spots along base of anal fin and lower edge of caudal peduncle, the ones at rear base of anal fin and just in front of caudal base the most distinct; three similar spots dorsally on caudal peduncle, the ones at rear base of dorsal fin and just in front of caudal base the darkest (the caudal base spots and the spot at axil of dorsal may have a white spot adjacent and posterior to them); an irregular dark blotch at midcaudal base, two posterior extensions of which appear as dark spots on either side of midbase of caudal fin; a broad dusky band on snout from eye to upper lip, with some dark pigment extending onto lower lip; fins pale except for some dark markings basally in median fins.

Color when fresh of a specimen 23 mm SL collected at Ambon, Molucca Islands: whitish with large dark brown blotches, those on postorbital head, upper thorax, and abdomen brownish red; blotches on snout and front of lips brown; a diagonal streak of brownish red extending across lower cheek from ventral part of eye; a small pinkish white spot dorsoanteriorly on caudal peduncle behind rear base of dorsal fin; two small bright white spots, one above other, at caudal base; brown blotches immediately anterior and below upper caudal white spot and anterior to lower spot and the pinkish white spot at rear base of dorsal fin more heavily pigmented than other blotches on body; fins pale, the dorsal with a red spot at base between first and third spines; smaller red spots basally on fifth, sixth, and seventh dorsal spines; tips of dorsal spines faintly light red; iris light yellow with a spoke-like pattern of brownish red.

REMARKS: Weber (1913) described *Pteranthias longimanus* as a new genus and new species from seven specimens (23 to 31 mm TL) taken at four Siboga stations in the East Indies in the depth range of 27 to 54 m. Han Nijssen kindly sent four of the syntypes of *P. longimanus* on loan from the Zoölogische Museum in Amsterdam. The smallest (19.8 mm SL) of the two specimens of ZMA 100.478 is here selected as the lectotype (now catalogued as ZMA 113.364), thus establishing the type locality as the Paternoster Islands (E of Sailus Besar, N of Sumbawa), Indonesia, in 36 m. Tyler (1966) noted that the 20 mm specimen of ZMA 100.477 is "not a *Pteranthias*". This damaged specimen was also examined by the author; it appears to be an apogonid.

Smith (1961) extended the range of *P. longimanus* to the western Indian Ocean when he reported five specimens 17 to 26 mm SL. taken by trawling in about 73 m

off Lamu, Kenya. One of these specimens has been lost, but the remaining four were sent on loan by Margaret M. Smith of the J. L. B. Smith Institute of Ichthyology of Rhodes University.

Plessis and Fourmanoir (1966) listed *Plectranthias longimanus* from the Île des Pins, New Caledonia from a single 24 mm specimen.

Tyler (1966) recorded the species from the Amirante Islands, Seychelles from eight specimens collected in 21.3 to 30.5 m which were deposited in the Academy of Natural Sciences of Philadelphia. These were also loaned to the author as were three specimens from Viti Levu, Fiji (ANSP 128644–46), 16–17 mm SL collected in April, 1974 by William F. Smith-Vaniz.

Six specimens in three lots, which were obtained in the Philippine Islands within the range in latitude of 7° to 20°N by the ALBATROSS in 1908, were sent on loan by the U.S. Natioanl Museum of Natural History. These specimens (USNM 150725, 3: 18–24.5 mm SL; USNM 168421, 2: 15–17 mm; USNM 195958, 18.5 mm) have apparently not been reported previously in the literature.

A loan was requested of specimens of *Isobuna japonica* reported by Araga and Tanase (1966) as stranded in the vicinty of the Seto Marine Biological Laboratory at Shirahama, southern Honshu, Japan as a result of a typhoon in 1965. These authors noted that this species had not been observed locally while diving with scuba, nor had it been exhibited in the laboratory's public aquarium. Among the other species of fishes washed upon the shore by the storm were some that normally inhabit 100 m or more. Araga complied by sending four specimens (SMBL 1965.9.10, 25–27 mm SL). These proved to be *Plectranthias longimanus*.

Pierre Fourmanoir kindly sent a color photograph taken by J. Rivaton of a specimen of *P. longimanus* from Lifou, Loyalty Islands. Later he loaned specimens collected by P. Laboute and Y. Magnier at Maré, Loyalty Islands in 45 m. *P. nanus* and *P. winniensis* were taken in the same station.

The author and associates have collected *P. longimanus* at Guadalcanal, Solomon Islands in 18 m (BPBM 16008, 18 mm SL), three localities at Ambon, Molucca Islands, Indonesia, in 6 to 36.5 m (BPBM 18518, 23 mm SL; BPBM 19309, 20 mm SL; and BPBM 19376, 21.5 mm SL), Sumilon Island, S Cebu, Philippines in 24 m (BPBM 21088, 23 mm SL), Caban Island, S Luzon, Philippines in 20–23 m (BPBM 21089, 26 mm SL), and Ulithi, Caroline Islands in 6 to 15 m (BPBM 21111, 19 mm SL).

Roger Lubbock and M. Stewart Moore collected two specimens of *P. longimanus* [BM(NH) 1974.4.22.2–3, 15.3–28 mm SL] among large coral boulders in 20 m at Shazu, Kenya which were sent on loan by the British Museum (Natural History). Lubbock wrote that the behavior of these fish was very much like that of a cirrhitid.

William F. Smith-Vaniz sent on loan three specimens of *P. longimanus* (ANSP 128644–46, 16–17 mm SL) which he and Bruce A. Carlson collected at Viti Levu, Fiji Islands, in April, 1974.

J. E. McCosker and M. D. Lagios collected a specimen of *P. longimanus* (CAS 33129, 17 mm SL) in 30–35 m at Grande Comore Island on 18 February 1975.

Masuda, Araga and Yoshino (1975: 221, pl. 51I) recorded a specimen of *P. longimanus* 28.4 mm SL from Rukan Reef, SW of Okinawa, and illustrated it in color.

From the known localities of *P. longimanus,* this species seems more likely to be found on coral reefs of continental areas or large islands. By contrast, the closely related *P. nanus,* the color pattern of which is almost identical to *P. longimanus,* is more apt to be found around small oceanic islands.

Plectranthias maculicauda

Fig. 17

Serranops maculicauda Regan, 1914. Ann. Mag. Nat. Hist., ser. 8, vol. 13, p. 15 (type locality, Cape North, New Zealand).

Serranops maculicauda Regan, 1914. Fishes, in British Antarctic TERRA NOVA Expedition, 1910. Zoology, vol. 1, p. 16, pl. 11, fig. 3.

DIAGNOSIS: Dorsal rays X, 15; anal rays III, 7; pectoral rays 14 to 16 (uppermost and sometimes lowermost unbranched); branched caudal rays 15; lateral line complete, the pored scales 32 to 34; scales above lateral line to origin of dorsal fin 3 1/2; gill rakers 6 to 8+15 to 17; depth of body 3 to 3.15 in SL; lower margin of preopercle without antrorse spines; upper margin of preopercle (above middle of rounded corner) with 23 (52 mm specimen) to 30 (82 mm specimen) serrae; a few widely spaced serrae on lower margin; subopercle smooth (or with at most a single small obtuse projection on margin); interopercular margin smooth; villiform teeth in bands in jaws, those in outer row on side of upper jaw the longest, the inner medial teeth on each on each side of symphysis of the jaw recumbent, notably enlarged but slender; a stout canine tooth on each side at front of upper jaw; a slightly smaller more projecting pair at front of lower jaw; a large recurved canine on each side of lower jaw about one-third length of jaw from the symphysis; maxilla reaching a vertical to or slightly beyond center of eye; diagonal rows of large scales between eye and corner of preopercle 7; scales dorsally on top of head extending anteriorly nearly to front of

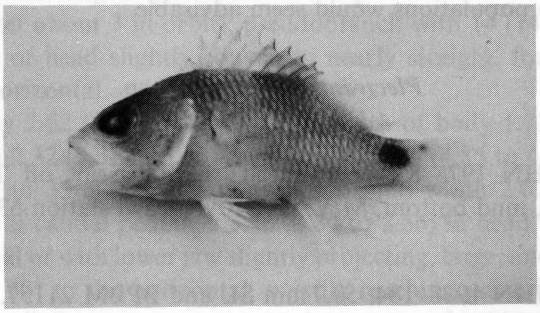

Fig. 17. *Plectranthias maculicauda* (Regan), 54.5 mm SL, AMS I. 20605–001, New South Wales, Australia (from color slide by Ken Grahan).

snout (scales anterior to nostrils very small; absent in smaller specimens); scales present on mandibles; a few small scales usually present on upper side of maxilla; no scales on side of snout or suborbital region; fourth or fifth dorsal spines longest, 2.1 to 2.4 in head; last dorsal spine 1.5 to 1.7 in first dorsal soft ray; first dorsal ray unbranched; second dorsal soft ray prolonged, the first ray about 1.7 in length of second; longest pectoral ray reaching slightly beyond a vertical at end of spinous portion of anal fin, its length 1.2 to 1.35 in head; pelvic fins nearly reaching, just reaching, or extending slightly beyond anus; caudal fin truncate to slightly emarginate, the second upper branched ray prolonged.

Color in alcohol pale with an oval blackish spot about two-thirds the size of eye posteriorly on side of caudal peduncle. Color from Kodachrome transparencies of New South Wales specimens taken by Ken Grahan: pink, the scales on upper part of body edged with red, this color denser in two broad saddle-like areas, one on nape and below first few dorsal spines and the other centered on last five spines and first soft rays of dorsal fin; abdomen, thorax, and lower head whitish; a dusky area extending above and obliquely posteriorly from upper part of eye; cheek, snout and front of lower jaw with a wash of yellow; blackish caudal peduncular spot suffused with red; spinous portion of dorsal fin light red; remaining fins pale yellowish; a small red spot basally in upper part of caudal fin.

REMARKS: Regan's description was based on eight specimens [BM(NH) 1913.12.4.12–19], 60 to 100 mm in total length, which were collected 7 miles east of Cape North, New Zealand on a sand bottom in 128 m. Four of these syntypes, 52 to 83 mm SL, were kindly sent on loan by A. C. Wheeler. The largest of these is here selected as the lectotype.

Nine additional specimens, 48 to 76 mm SL, which were trawled from the fisheries research vessel KAPALA in 110 to 155 m off New South Wales (30 to 31°S; 153°E) were sent on loan from the Australian Museum through Gerald R. Allen. These specimens constitute the first record of *P. maculicauda* for Australia.

A noteworthy difference was found in the gill-raker count of the four New Zealand syntypes and the nine specimens from New South Wales. The former have the very high count of 7 or 8 + 17 (highest for the genus), the latter 6 or 7 + 15. More study of these two populations would seem advisable.

Plectranthias maugei n. sp.
Fig. 18, Table 12

HOLOTYPE: MNHN 1978–83, 56.2 mm SL, Madagascar, off Tuléar (23°36′3″S, 43°32′5″E), 250 m, mud bottom, M/V VAUBAN trawl station 63, L. A. Maugé, 28 February 1973.

PARATYPES: MNHN 1978–184, 50.7 mm SL and BPBM 21157, 57.6 mm SL-both collected with holotype.

DESCRIPTION: Dorsal rays X, 15; anal rays III, 7; pectoral rays 13 (all unbranched);

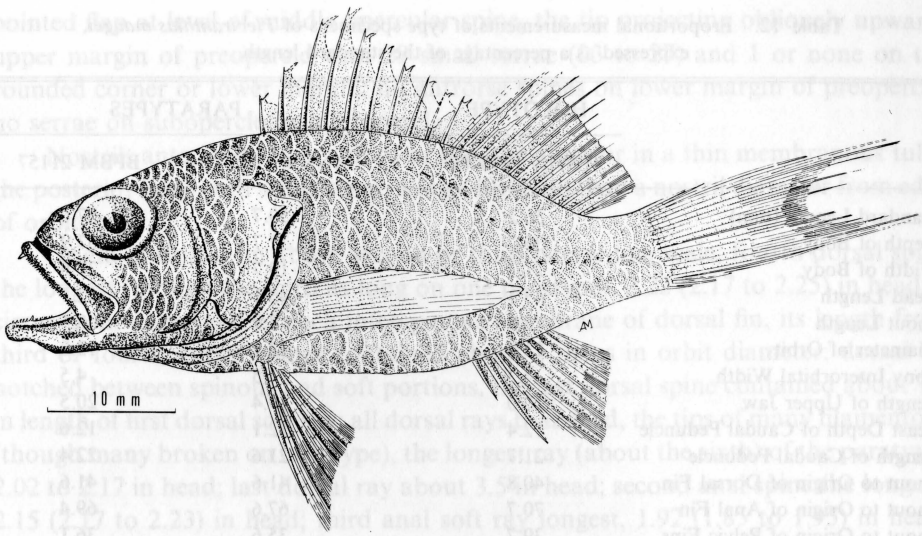

Fig. 18. Holotype of *Plectranthias maugei*, 56.2 mm SL, MNHN 1978–83, Madagascar (drawing by L. A. Maugé).

branched caudal rays 14; lateral line complete, the tube-bearing scales 30 (29); lateral line broadly arched over pectoral region, the highest part beneath bases of fourth to seventh dorsal spines (where 2 rows of scales lie between lateral line and dorsal fin base); scales above lateral line to origin of dorsal fin 2 1/2 to 3 1/2 (depending on method of counting); scales below lateral line to origin of anal fin 9 1/2; circumpeduncular scales 14; dorsal part of head scaled almost to posterior nostrils; diagonal rows of large scales on cheek between eye and corner of preopercle 6; no scales on snout, suborbital, maxilla, or ventrally on head; scales present basally on caudal fin (perhaps half the distance to ends of shortest caudal rays) and pectoral fins and seemingly absent or present only on extreme bases of remaining fins (variable loss of scales on fins makes assessment of extent of squamation difficult).

Gill rakers 5+11 (5+11 or 12), one upper and 8 or 9 lower elevated, the longest (at angle) longer than longest gill filaments (longest filament about 1.4 in longest raker) (longest raker about 3 in orbit); pseudobranch with 14 (14 or 15) lamellae.

Upper profile of head slightly convex to nearly straight, forming an angle of about 30° to the horizontal.

Depth of body 2.62 (2.64 to 2.65) in SL; width of body 1.73 (1.75 to 1.91) in depth; head length 2.32 (2.32 to 2.38) in SL; snout 4.85 (4.85 to 4.96) in head; orbit diameter 3.62 (3.5 to 3.62) in head; bony interorbital width 2.07 (1.89 to 1.97) in snout; least depth of caudal peduncle 3.48 (3.34 to 3.56) in head.

Mouth terminal or with lower jaw slightly projecting, large, and oblique, forming an angle of about 30° to the horizontal; maxilla reaching posterior to a vertical at hind margin of pupil (in one paratype nearly to rear of orbit); maxilla expanded posteriorly, its greatest depth about half orbit diameter; a band of small teeth in jaws

Table 12. Proportional measurements of type specimens of *Plectranthias maugei*, expressed as a percentage of the standard length.

	HOLOTYPE	PARATYPES	
	MNHN 1978–83	MNHN 1978–184	BPBM 21157
Standard Length (mm)	56.2	50.7	57.6
Depth of Body	36.7	37.7	37.9
Width of Body	21.2	19.7	21.6
Head Length	43.1	43.1	42.1
Snout Length	8.9	8.9	8.5
Diameter of Orbit	11.9	12.2	12.0
Bony Interorbital Width	4.3	4.5	4.5
Length of Upper Jaw	20.0	19.4	20.5
Least Depth of Caudal Peduncle	12.4	12.1	12.6
Length of Caudal Peduncle	21.7	21.6	22.4
Snout to Origin of Dorsal Fin	40.8	41.6	41.6
Snout to Origin of Anal Fin	70.7	67.6	69.4
Snout to Origin of Pelvic Fins	39.7	35.6	36.1
Length of Dorsal Fin Base	51.7	51.7	51.9
Length of First Dorsal Spine	6.2	6.1	6.6
Length of Longest Dorsal Spine	19.4	19.1	19.4
Length of Longest Dorsal Ray	broken	19.8	20.8
Length of Anal Fin Base	15.0	15.5	14.8
Length of First Anal Spine	9.2	9.5	9.1
Length of Second Anal Spine	20.0	19.3	19.4
Length of Third Anal Spine	15.7	broken	15.5
Length of Longest Anal Ray	22.5	23.3	21.5
Length of Longest Caudal Ray	39.4	44.6	broken
Length of Middle Caudal Rays	24.0	24.4	22.3
Length of Pectoral Fin	38.1	37.7	broken
Length of Pelvic Spine	17.2	16.6	17.7
Length of Pelvic Fin	27.6	26.0	27.0

in about 7 irregular rows anteriorly, narrowing to 4 on midside of jaw and 2 or 3 posteriorly, the inner teeth at front of jaw elongate, nearly horizontal, and depressible, the outer teeth along side of jaw the largest; a large canine or pair of canines at corner of front of upper jaw, the symphyseal gap between them contained about 2.5 times in orbit; a band of small teeth in lower jaw in about 6 irregular rows anteriorly, narrowing to 3 on midside of jaw and 1 or 2 posteriorly, many of the inner row of teeth on the side of the jaw about 3 times longer than outer teeth; no canine teeth at front of lower jaw; a large fixed recurved canine tooth on outside of lower jaw just anterior to midpoint of jaw; small teeth in 3 irregular rows on palatines; small teeth in 2 or 3 rows forming the usual "V"-shape on vomer, a few of the posterior teeth slightly enlarged; tongue slender, the tip rounded, without teeth but with scattered small papillae.

Three prominent flat spines on opercle, the middle one the largest and most posterior, about equidistant to the other two; opercular membrane produced to a

pointed flap at level of middle opercular spine, the tip projecting obliquely upward; upper margin of preopercle with 29 small serrae (23 to 27) and 1 or none on the rounded corner or lower margin; no antrorse spines on lower margin of preopercle; no serrae on subopercle or interopercle.

Nostrils anterior to upper third of eye, the anterior in a thin membranous tube, the posterior large with a slight rim, lying a little less than a nostril diameter from edge of orbit.

Origin of dorsal fin above second or third lateral-line scale; fourth dorsal spine the longest (though the third as long on one paratype), 2.22 (2.17 to 2.25) in head; a cirrus from upper end of each interspinous membrane of dorsal fin, its length from third or fourth dorsal spines contained about 3 times in orbit diameter; dorsal fin notched between spinous and soft portions, the last dorsal spine contained about 1.8 in length of first dorsal soft ray; all dorsal rays branched, the tips of many filamentous (though many broken on holotype), the longest ray (about the sixth) of the paratypes 2.02 to 2.17 in head; last dorsal ray about 3.5 in head; second anal spine the longest, 2.15 (2.17 to 2.23) in head; third anal soft ray longest, 1.92 (1.85 to 1.95) in head; many caudal rays filamentous, the longest ray 1.09 (0.97) in head; shortest middle caudal rays 1.79 (1.76 to 1.89) in head; pectoral fins long, the eighth ray longest (ninth nearly as long), nearly reaching a vertical at rear base of anal fin, 2.63 (2.65) in SL; pelvic fins relatively short, not reaching anus, 1.56 (1.56 to 1.65) in head.

Color in alcohol pale with a series of eight irregular dark blotches dorsally on the head and body, the first in posterior interorbital space and behind eye, the second on nape ending at origin of dorsal fin, third beneath fourth to ninth dosal spines (small portions extending into basal part of fin), extending below lateral line, the fourth below last dorsal spine and first 4 or 5 rays, this blotch extending more than half way ventrally on body, the fifth and sixth small, beneath posterior half of soft portion of dorsal fin and the last two small, dorsally on caudal peduncle; two irregular dusky bars on lower two-thirds of caudal peduncle and a small dusky spot at midbase of caudal fin; some irregular dusky blotches on opercle. Color in life unknown.

REMARKS: Known only from the three type specimens trawled in 250 m off Madagascar.

Named *P. maugei* in honor of L. A. Maugé of the Muséum National d'Histoire Naturelle in Paris who collected the type specimens and made the drawing of the holotype.

This species is closely allied to *P. foresti* Fourmanoir from the Philippines. Both share a number of features such as an emarginate caudal fin with filamentous rays, filamentous dorsal rays, 13 simple pectoral rays, a complete lateral line with 29 (or 30) tube-bearing scales, no antrorse spines on preopercle, and in color pattern. *P. foresti* differs in having 14 or 15 instead of 16 dorsal rays and in lacking scales on the anterior half of the interorbital space.

Plectranthias megalepis
Fig. 19

Anthias megalepis Günther, 1880. Voyage of H. M. S. Challenger, Zool., pt. 6, Shore Fishes, p. 37, pl. XVI, fig. E (type locality, Ki Islands=Kei or Kai Islands).

DIAGNOSIS: Dorsal rays X, 15; anal rays III, 7; pectoral rays 13, unbranched; lateral line complete, tube-bearing scales 29; scales above lateral line to origin of dorsal fin 3; gill rakers 5+12; depth of body 2.58 in SL; lower margin of preopercle without antrorse spines; upper margin of preopercle, including region at angle with 18 (21) small serrae; no serrae on lower margin of subopercle or interopercle; villiform teeth on palatines in 1 to 3 irregular rows; canines at front of upper jaw (one on one side, two on the other) separated by a gap equal to one-third orbit diameter; small teeth at front of upper jaw in about 9 irregular rows; no canine teeth at front of lower jaw; a large canine tooth in outer row on midside of lower jaw; small teeth at front of lower jaw in about 6 irregular rows; inner row of teeth on side of lower jaw about 2 to 3 times longer than those of outer row; maxilla reaching to or slightly beyond a vertical at hind edge of pupil; maxilla scaleless; diagonal rows of large scales between eye and corner of preopercle 6; circumpeduncular scales 14; top of head scaled anteriorly to midinterorbital space; fourth and fifth dorsal spines the longest, 2.4 in head; last dorsal spine contained about 1.8 times in first dorsal soft ray; first dorsal soft ray unbranched; pectoral fins moderately long, about 2.7 in SL, the longest rays extending to a vertical at midbase of anal fin; pelvic fins 1.8 in head; caudal fin truncate.

Color in alcohol pale with small dark blotches on upper postorbital head and nape, six prominent dark blotches along base of dorsal fin, two faint small dark blotches dorsally on caudal peduncle and two large dark blotches on upper side of body (one just below lateral line, centered below base of seventh dorsal spine and the other in middle of body below about fourth dorsal soft ray); fins pale. Color in life rose with irregular blackish patches on the back.

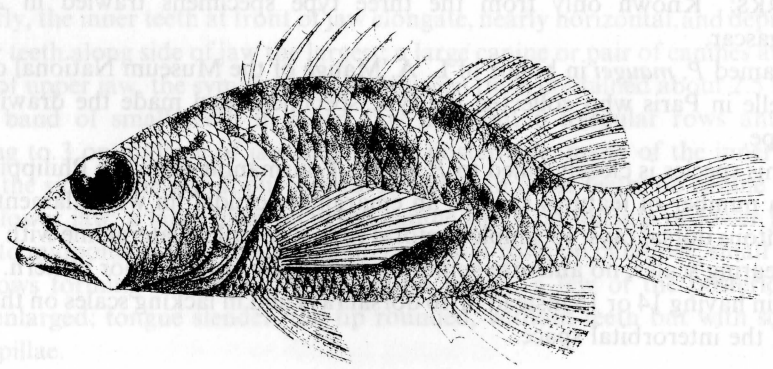

Fig. 19. Lectotype of *Plectranthias megalepis* (Günther), 62 mm SL, BM(NH) 1879. 5. 14. 180, Kai Islands, Indonesia (after Günther, 1880).

REMARKS: Günther described *Anthias megalepis* from specimens taken by a trawl during CHALLENGER Station 192 in the Ki (Kai) Islands (5°–6°S; 132°–133°E) at the edge of the Arafura sea in September, 1874. The depth was 129 fathoms (=236 m); the bottom was blue mud with large pieces of honeycombed *Globigerina* rock. He did not state how many specimens he had for his description, but A. C. Wheeler of the British Museum (Natural History) believes there were three. These syntypes were sent on loan. Surprisingly, all three are different species. The lectotype is herein designated as the specimen 62 mm in SL [BM(NH) 1879.5.14.180] which was illustrated by Günther (reproduced here as Fig. 19). Each of the other two specimens represent new species which are described herein as *P. wheeleri* and *P. whiteheadi.*

The fins of the lectotype are abraded, thus some of the characters listed in the Diagnosis above (shape of caudal fin, relative length of last dorsal spine and first dorsal ray) were obtained from the figure.

Plectranthias megalophthalmus

Fig. 20

Plectranthias megalophthalmus Fourmanoir and Randall, 1979. Micronesica, vol. 15 p. 316, fig. 1 (type locality, Isle of Pines, New Caledonia).

DIAGNOSIS: Dorsal rays X, 15; anal rays III, 7; pectoral rays 15 (all but upper and lower branched); branched caudal rays 15; lateral line complete, the tube-bearing scales 31; scales above lateral line to origin of dorsal fin 3; circumpeduncular scales 12; gill rakers 5+12; body relatively elongate, the depth. 3.4 in SL; eye very large, the orbit diameter 2.9 in head; preopercular margin smooth, without serrae or antrorse spines; subopercular and interopercular margins smooth; teeth in villiform bands in jaws; no canine teeth (one fixed tooth in outer row on each side at front of jaw about twice as large as other teeth, but too small to regard as a canine); a narrow band of small villiform teeth on palatines; maxilla reaching a vertical at hind edge of pupil; maxilla scaled; snout and ventral part of head scaleless; dorsal part of head scaled anteriorly to posterior nostrils; diagonal rows of large scales between eye and corner of preopercle 7; fourth dorsal spine the longest, 2.85 in head (though fifth spine nearly as long); last dorsal spine contained slightly more than 2 times in length of first dorsal

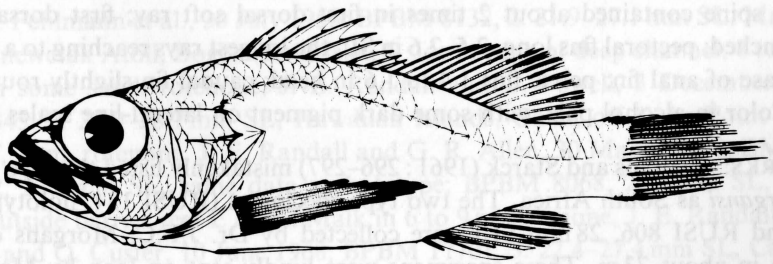

Fig. 20. Holotype of *Plectranthias megalophthalmus* Fourmanoir and Randall, 61 mm SL, BPBM 22486, Isle of Pines, New Caledonia (after Fourmanoir and Randall, 1979).

soft ray; pectoral fins reaching a vertical just posterior to spinous portion of anal fin; pelvic fins not long, not reaching anus; caudal fin rays partly broken, but posterior margin seems to have been emarginate.

Color in alcohol pale with a few extremely faint dark blotches. Color after two days in formalin yellow, hence probably yellow when fresh.

REMARKS: *P. megalophthalmus* is known from a single specimen (BPBM 22486, 61 mm SL) taken with a trawl south of the Isle of Pines, New Caledonia at a depth of 360 m; it was collected along with some specimens of *P. kelloggi*. This is the deepest record for the genus. The large eye of this species probably represents an adaptation for life in relatively deep water.

P. megalophthalmus is perhaps the most distinctive of the known species of the genus *Plectranthias*. It is unique in lacking canine teeth in the jaws, having the largest eye of the genus, in being one of two species with the most elongate body, and among the few lacking serrae or spines on the preopercular margin. It is also unusual in its yellow color.

Plectranthias morgansi

Fig. 21

Pelontrus morgansi Smith. 1961. Ichth. Bull. Rhodes Univ. (Grahamstown), no. 21, p. 365, fig. 3 (type locality, Lamu, Kenya).

DIAGNOSIS: Dorsal rays X, 13 to 15; anal rays III, 7; pectoral rays 13 or 14, unbranched, none thickened; branched caudal rays 15; lateral line complete, the tube-bearing scales 29; scales above lateral line to origin of dorsal fin 4; gill rakers 5 or 6+11 or 12; depth of body 2.5 to 2.6 in SL; lower margin of preopercle without antrorse spines; upper margin of preopercle, including region at angle, relatively finely serrate (23 to 26 serrae); 2 to 3 small weak serrae on subopercle and 6 or 7 on interopercle; palatine teeth present; a large incurved canine tooth (may be flanked by a slightly smaller teeth) in outer row on side of lower jaw; maxilla reaching a vertical at hind edge of pupil; maxilla scaleless; diagonal rows of large scales on cheek between eye and corner of preopercle 5; top of head scaled to nostrils; third dorsal spine prolonged, its length 1.63 to 1.79 in head, and bearing a pennant-like flap near tip; last dorsal spine contained about 2 times in first dorsal soft ray; first dorsal soft ray unbranched; pectoral fins long, 2.5–2.6 in SL, the longest rays reaching to a vertical at rear base of anal fin; pelvic fins 1.4 to 1.6 in head; caudal fin slightly rounded.

Color in alcohol pale, with some dark pigment on lateral-line scales 9 to 16.

REMARKS: Robins and Starck (1961 : 296–297) mistakenly listed the type locality of *P. morgansi* as South Africa. The two type specimens (RUSI 134, holotype, 36 mm SL, and RUSI 806, 28 mm SL) were collected by Dr. J.F.C. Morgans off Lamu, Kenya in about 73 m. These specimens were kindly sent on loan by Margaret M. Smith of the J.L.B. Smith Institute of Ichthyology, Rhodes University.

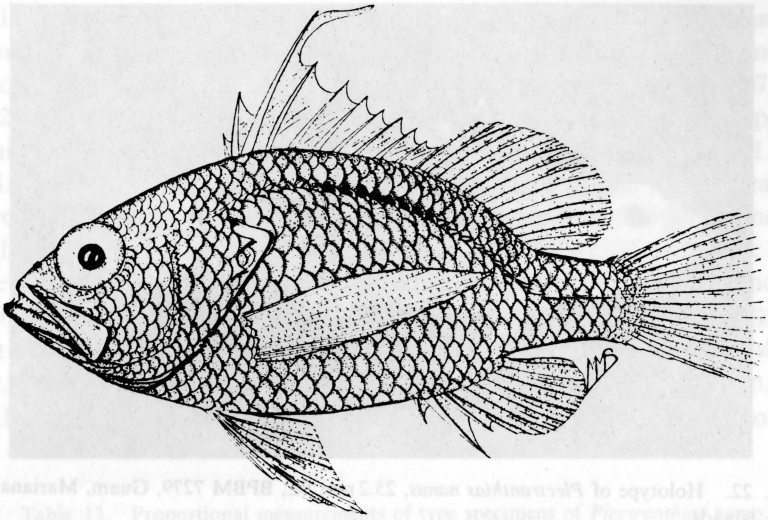

Fig. 21. Holotype of *Plectranthias morgansi* (Smith), 36 mm SL, RUSI 134, Kenya (after Smith, 1961).

Kotthaus (1973 : 26, figs. 291, 292) recorded a third specimen, 48 mm SL, taken by Agassiz trawl in 208 to 267 m, 5 miles east of Mombasa, Kenya.

Plectranthias nanus n. sp.
Fig. 22, Tables 13, 14

Pteranthias longimanus Gosline and Brock, 1960 (non Weber). Handbook of Hawaiian Fishes, pp. 155–156 (Oahu, Hawaiian Islands).

HOLOTYPE: BPBM 7279, 25.2 mm SL, Mariana Islands, Guam, reef off NW side of Cocos Island; dropoff in 29 to 36.5 m, rotenone, J. E. Randall, P. Helfrich, R. S. Jones, and H. T. Kami, 28 May 1968.

PARATYPES: CAS 24405, 27.5 mm SL, Palau Islands, Babelthuap Island, western barrier reef 3.5 miles W of entrance to West Passage (7°32′10″N; 134°24′20″E), TNT charge, A. Fehlmann et al., 30 July 1955; BPBM 8132, 2: 21.9–27.1 mm SL, Marshall Islands, Enewetak Atoll, Bogen (Rex) Islet, S side at edge of deep channel, 8 to 21 m, coral with some sand, rotenone, J. E. Randall and C. Powell, 3 December 1967; BPBM 6345, 2: 27.0–28.7 mm SL, Hawaiian Islands, Oahu, off Kahe Point Beach Park, reef, 11 m, rotenone, J. E. Randall and G. R. Allen, 30 March 1968; BM(NH) 1974.8.8.2, 23.9 mm SL, same data as holotype; BPBM 8068, 27.5 mm SL, Palau Islands; outside barrier reef E of Eil Malk in 6 to 9 m, rotenone, J. E. Randall, E. S. Helfman, and O. Custer, 10 June 1968; BPBM 17701, 3: 22.4–27.4 mm SL, Caroline Islands, Ulithi, Falalop Island, S side off boat landing, sea side of reef front, coral and sand, 6 to 15 m, rotenone, J. E. Randall and R. S. Jones, 18 June 1968; BPBM 8444,

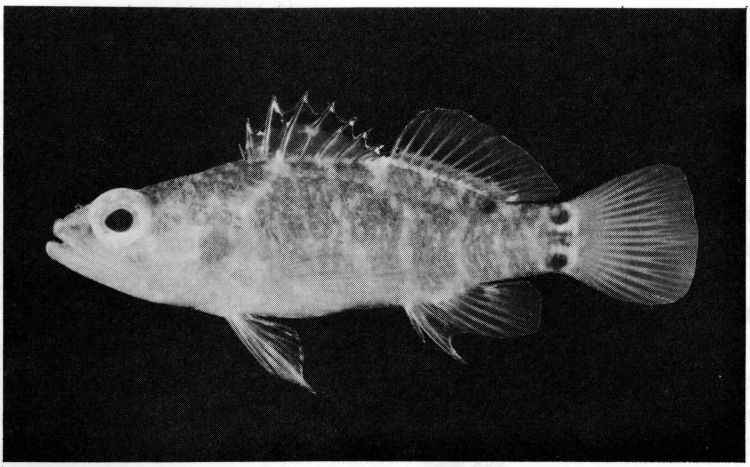

Fig. 22. Holotype of *Plectranthias nanus*, 25.2 mm SL, BPBM 7279, Guam, Mariana Islands.

15.2 mm SL, Mariana Islands, Guam, outside reef off NW side of Cocos Island, 21 to 30.5 m, rotenone, J. E. Randall et al., 30 June 1968; BPBM 6928, 17.7 mm SL, Society Islands, Tahiti, outside barrier reef about 1/4 mile east of Teavaraa Pass, Papara, 27.5 to 30.5 m, rotenone, J. E. Randall, G. R. Allen, and B. B. Baker, 26 February 1969; BPBM 12283, 3: 15.0–19.5 mm SL, Hawaiian Islands, Oahu, off Pokai Bay, 24.5 m, rotenone, J. E. Randall, S. N. Swerdloff, and E. Chave, 29 July 1969; AMS I.17902–001, 2: 17.3–28.1 mm SL, Hawaiian Islands, Oahu, off Waikiki, 24.5 m, bottom mainly *Porites compressa,* rotenone, J. E. Randall and S. N. Swerdloff, 3 September 1969; ANSP 128437, 2: 22.8–30.9 mm SL, same data as preceding; USNM 212228, 2: 19.8–20.5 mm SL, same data as preceding; BPBM 9905, 26.0 mm SL Palau Islands, Aurapushekaru Island, edge of channel off S side of island, 15 m, coral rubble with some sand, rotenone, J. E. Randall and A. R. Emery, 16 April 1970; BPBM 9768, 10.7 mm SL, Hawaiian Islands, Oahu, off the Makaha Shores condominium, 14 m, small caves in reef, rotenone, J. E. Randall and A. R. Emery, 26 April 1970; BPBM 17181, 26.0 mm SL, Tuamotu Archipelago, Gambier Group, Temoe Atoll, outside reef on N side, 41 m, head of dead coral on sand near fringing reef, quinaldine, J. E. Randall, 16 December 1970; BPBM 16542, 4: 22.0–37.2 mm SL, Pitcairn Group, Oeno Atoll, N side off small boat passage, 12 to 18 m, coral reef, rotenone, J. E. Randall and crew of WESTWARD, 18 December 1970; RUSI 3646, 2: 31.8–32.0 mm SL; same data as preceding; BPBM 16847, 30.8 mm SL, Pitcairn Island, off Bounty Bay, 30.5 to 40 m, reef at edge of sand, little coral, rotenone, J. E. Randall, D. B. Cannoy, and J. D. Bryant, 26 December 1970; BPBM 17027, 35.6 mm SL, Pitcairn Island, off West Harbor, 12 to 15 m, caves, rotenone, J. E. Randall, D. B. Cannoy, S. Christian, C. Christian, and N. Young, 27 December 1970; MNHN 1974–83, 31.3 mm SL, same data as preceding; BPBM 16744, 2: 25.0–27.5 mm SL, Pitcairn Island, off W side, 55 m, small coral patch on sloping sand bottom, quinaldine, J. E.

Randall, 2 January 1971; BPBM 16891, 2: 31.1–34.8 mm SL, Pitcairn Island, N side off Gannet Ridge, 40 to 44 m, patch reef, rotenone, J. E. Randall, D. B. Cannoy, J. R. Haywood, R. R. Costello, J. D. Bryant, and S. Christian, 6 January 1971; BPBM 13909, 24.9 mm SL, Cook Islands, Rarotonga, off laundry at E end of airport, 18 m, reef, quinaldine, J. E. Randall and D. B. Cannoy, 7 March 1971; BPBM 13926, 3: 17.3–24.9 mm SL, Cook Islands, Rarotonga, off oil tanker bouy near harbor entrance, 15 m, small pocket of coarse sand and surrounding coral, rotenone, J. E. Randall and D. B. Cannoy, 10 March 1971; BPBM 14042, 15.3 mm SL, Tuamotu Archipelago, Takaroa Atoll, in pass off concrete quay, 9 to 15 m, rotenone, J. E. Randall and R. M. McNair, 13 April 1971; ANSP 128454, 5: 9.7–30.4 mm SL, Cocos-Keeling Islands, North Keeling Island, off landing on W shore, about 45° slope in 21 to 24 m, corals, rock and sand, rotenone, P. L. Colin and W. E. Chapman, 6 March 1974; ANSP 128435, 23.3 mm SL, Cocos-Keeling Islands, West Island, about 1.5 km

Table 13. Proportional measurements of type specimens of *Plectranthias nanus*, expressed as a percentage of the standard length.

	HOLOTYPE	PARATYPES				
	BPBM 7279	BPBM 8444	BPBM 8132	BPBM 6345	BPBM 16891	BPBM 17027
Standard Length (mm)	25.2	15.2	21.9	27.0	34.8	35.6
Depth of Body	30.5	30.2	29.2	30.4	30.0	28.4
Width of Body	17.9	17.8	16.9	15.9	17.8	17.2
Head Length	40.1	44.7	41.5	40.4	39.8	40.0
Snout Length	8.9	8.6	9.6	8.5	9.2	9.0
Diameter of Orbit	11.9	13.5	11.4	11.8	11.2	11.0
Bony Interorbital Width	2.8	3.0	3.2	2.9	2.9	2.8
Length of Upper Jaw	20.2	22.3	20.1	19.6	19.8	20.2
Least Depth of Caudal Peduncle	13.3	14.4	12.8	14.0	13.5	12.5
Length of Caudal Peduncle	22.2	23.0	19.7	21.3	20.1	19.7
Snout to Origin of Dorsal Fin	40.1	44.1	41.8	40.4	39.7	39.0
Snout to Origin of Anal Fin	68.7	71.2	68.5	67.9	66.2	67.0
Snout to Origin of Pelvic Fins	36.9	40.2	37.9	36.1	34.7	35.4
Length of Dorsal Fin Base	49.6	49.9	49.2	49.7	48.8	47.8
Length of First Dorsal Spine	3.2	—	3.2	3.3	3.9	5.3
Length of Longest Dorsal Spine	13.8	17.1	14.1	13.3	16.0	16.2
Length of Longest Dorsal Ray	15.5	17.7	—	15.7	15.2	15.9
Length of Anal Fin Base	15.1	14.5	14.6	15.9	14.5	15.5
Length of First Anal Spine	9.2	8.9	9.1	8.4	8.3	8.7
Length of Second Anal Spine	19.4	17.2	17.9	19.2	17.2	18.2
Length of Third Anal Spine	13.9	14.5	12.8	14.0	12.7	13.2
Length of Longest Anal Ray	20.2	20.4	19.2	19.6	18.0	19.3
Length of Caudal Fin	25.4	27.3	25.1	24.2	23.1	23.8
Length of Pectoral Fin	34.9	39.4	36.0	35.8	31.7	34.0
Length of Pelvic Spine	15.8	17.8	16.0	15.5	14.6	16.6
Length of Pelvic Fin	24.8	26.8	23.8	22.6	21.3	23.6

S of N end of island on ocean side, 46 m, quinaldine and spear, W. F. Smith-Vaniz and P. L. Colin, 9 March 1974; ANSP 128434, 2: 19.0–24.8 mm SL, Cocos-Keeling Islands, West Island, about 1.5 km S of N end of island on ocean side, 46 to 49 m, spear and quinaldine, W. F. Smith-Vaniz and P. L. Colin, 18 March 1974; BPBM 17467, 23.5 mm SL, Samoa Islands, Tutuila, W side Aunuu Islet, 27 m, reef, rotenone, J. E. Randall, R. C. Wass and C. A. Wass, 4 May 1974; BPBM 19571, 28.1 mm SL, Line Islands, Fanning Island, outer reef in 9 m, E. Chave and P. Lobel, 7 August 1975; BPBM 20462, 39.8 mm SL, Hawaiian Islands, Oahu, off Waikiki, red buoy about 300 m SE of Ala Wai Harbor entrance, 9 m, rotenone, G. Ludwig, 6 December 1976; WAM P.26090–002, 32.4 mm SL, Indian Ocean, Christmas Island, Smith Point, rock and coral, 10–15 m, rotenone, G. R. Allen and R. C. Steene, 23 May 1978; WAM P.26122–003, 2: 25.5–26.1 mm SL, Indian Ocean, Christmas Island, North West Point, large cave, 8–10 m, rotenone, G. R. Allen and R. C. Steene, 10 June 1978.

DESCRIPTION: Dorsal rays X, 14 (13 to 15, rarely 13); anal rays III, 7 (two of 47 paratypes with 6 and one with 8); pectoral rays 14 (14 to 16, only two with 16), unbranched; branched caudal rays 13 (13 to 15, usually 13).

Vertical scale rows from first lateral-line scale to base of caudal fin 28 (27 to 29, usually 28); tube-bearing lateral-line scales in anterior series ending beneath soft portion of dorsal fin 20 (16 to 22); scales in peduncular portion of lateral line usually pored; scales above lateral line to origin of dorsal fin 2; scales below lateral line to origin of anal fin 8 (7 to 9); anterior portion of lateral line broadly arched over pectoral fin, the highest part below bases of third to eighth dorsal spines where 2 rows of large scales separate lateral line and dorsal fin base; circumpeduncular scales 14; dorsal part of head scaled anteriorly to midinterorbital space (scales often lost in interorbital); diagonal rows of large scales on cheek between eye and corner of preopercle 4 or 4 1/2; no scales on snout, maxilla, suborbital, or ventrally on head; 6 prepelvic scales and 2 median scales ventral on pelvic base posterior to origin of fins; dorsal fin naked; a few small scales basally on anal fin; approximately basal third of caudal and pectoral fins scaled.

Gill rakers 5+11 (4 to 7+11 to 14), 7 or 8 elevated, the others as rudiments; largest gill raker nearly as long as gill filaments; pseudobranch with 11 (10 to 12) lamellae.

Depth of body 3.27 (2.90 to 3.60) in SL; width of body 1.71 (1.65 to 1.90) in depth; head length 2.49 (2.23 to 2.58) in SL; snout 4.49 (4.33 to 4.73) in head; orbit diameter 3.37 (3.32 to 4.0) in head; bony interorbital width 3.22 (2.88 to 3.55) in snout; least depth of caudal peduncle 3.01 (2.87 to 3.25) in head.

Mouth large, moderately oblique (forming an angle of about 27° to the horizontal), the lower jaw slightly protruding, the maxilla extending to a vertical at hind edge of eye (or ending slightly before or slightly behind this vertical); maxilla expanded posteriorly, its greatest depth about two-thirds orbit diameter; teeth in upper jaw in a villiform band, about 6 or 7 rows in width anteriorly and 3 or 4 on posterior side of jaw, the teeth of inner rows at front of jaw progressively more

elongate and depressible; a short stout canine in outer row at front of jaw, separated from the one of the other side by a gap equal to about half greatest width of maxilla; lower jaw with a villiform band of teeth consisting of 4 or 5 irregular rows anteriorly, and narrowing to 2 posteriorly, those of the inner row about 3 times longer than outer teeth, particularly on side of jaw; no enlarged canine teeth at front or side of lower jaw; a narrow space at symphysis of both jaws without teeth; about 3 irregular rows of small teeth on vomer; 2 irregular rows of small teeth on palatines, narrowing posteriorly to 1 row; tongue narrow, without teeth.

Three prominent flat spines on opercle, the middle one equidistant from the other two and extending slightly posterior; opercular membrane produced to a pointed flap at level of middle opercular spine, the tip projecting obliquely upward; lower margin of preopercle with 2 antrorse spines; upper margin of preopercle with 12 coarse serrae (4 to 17, increasing with age—see Fig. 1); lower margin of subopercle with 1 (0 to 2) (one Cocos-Keeling specimen with 4) weak serrae; lower margin of interopercle without serrae (except one specimen with 1), but ventroposterior corner acutely angular.

Nostrils about one-third eye diameter down from top of eye, the posterior nostril close to edge of orbit, the anterior a short tube with an elevated posterior flap.

Origin of dorsal fin above second lateral-line scale; fourth dorsal spine the longest, its length 2.89 (2.46 to 3.03) in head; dorsal fin deeply notched betweeen spinous and soft portions, the last interspinous membrane connecting to first ray near its base, the very short last spine contained about 5 to 6 times in first dorsal soft ray; first dorsal soft ray unbranched; longest dorsal soft ray (fifth to seventh) 2.59 (2.45 to 2.80) in head; second anal spine the longest, 2.06 (1.98 to 2.61) in head; third anal soft ray longest, 1.98 (2.06 to 2.19) in head; caudal fin rounded, 1.58 (1.55 to 1.80) in head; pectoral fin 2.87 (2.46 to 3.16) in SL, the longest ray (seventh or eighth) generally reaching a vertical at base of first to third anal soft rays (nearly to end of fin on small juveniles), the longest rays only slightly thicker than shorter upper rays; pelvic fins short, 2.52 (2.34 to 2.60) in head, not reaching anus.

Color in alcohol pale with large brown blotches which tend to fuse on body, forming irregular broad bars; two round black spots, slightly smaller than pupil, posteriorly on caudal peduncle, one near upper edge and the other near lower edge; centered between these spots a larger diffuse squarish dark brown spot; a black spot below and adjacent to base of last few rays of dorsal fin, a small amount of pigment extending onto basal part of rays; black dorsal axil spot followed by a pale spot confluent with its fellow on the other side, thus forming a light saddle-like area anteriorly on caudal peduncle; a smaller less intense dark spot above rear base of anal fin; a large roundish dusky spot on opercle in line between upper pectoral base and eye; a bilobed median brown band dorsally on snout; a median brown spot on upper lip; an irregular diagonal brown band running from eye across snout onto upper and lower lips; a diagonal brown band across cheek and another at pectoral base; upper postorbital part of head and nape dominated by large diffuse dark blotches; fins pale

except for a brown spot anteriorly at base of dorsal fin, some dark pigment at base of most spines and some rays in line with dark body blotches below, and a vertical row of dark blotches (fused to form a line on most specimens) on caudal base separated by a narrow whitish band from the above-mentioned dark spots posteriorly on caudal peduncle.

Color of holotype from an Ektachrome transparency: broad dark bands on body olivaceous brown, some scales edged in light red, the pale interspaces whitish; large reddish spot on opercle; lower half of head, thorax, and to a lesser extent the abdomen light yellowish; broad diagonal brownish red band on snout, the light zone above this salmon; a diagonal band of brownish yellow with flecks of pink on cheek, another on pectoral base, and a third on opercle and subopercle below red opercular spot; a brownish yellow blotch on chin; a yellow spot on maxilla below front of pupil; basal two-thirds of spinous portion of dorsal fin light olive with a brown spot on base of first two interspinous membranes continuous with large brown area of nape, a white spot on base of fourth dorsal spine (which represents a point of convergence of a diagonal narrow whitish band from upper end of gill opening and another diagonal whitish band from abdomen which passes beneath basal third of pectoral fin), a brown blotch at the base of fifth dorsal spine, a white spot at base of sixth in line with another diagonal whitish band on body parallel with the previously mentioned pale band, a brown spot basally on seventh and eighth dorsal spines and white on last two; outer part of interspinous membranes clear except for a white blotch near each spine tip; soft portion of dorsal fin with the rays olive, membranes clear except for a narrow white band at base, a narrow zone of olive above this, and olivaceous yellow above this (tricolored band representing basal fourth to fifth of height of fin); a white spot posteriorly in dorsal fin near base; anal fin light olive-yellow with a large whitish spot basally in center of fin and a diagonal whitish band crossing last five rays; caudal membranes largely clear, the rays light olive tinged with pink, especially basally; paired fins pale olive-yellow, the spine and first ray of pelvic fins whitish; iris with an inner ring of red.

In Hawaii the species is much more red, even from shallower zones. The band at the base of the soft portion of the dorsal fin is entirely red and the caudal rays are red, especially basally.

REMARKS: The complex color pattern of *P. nanus* is remarkably similar to that of *P. longimanus,* the latter differing mainly in lacking the narrow dark vertical band on the caudal base. As indicated in the Key, the two species are easily separated by certain counts, depth of body, and nature of the serration of the preopercle, subopercle, and interopercle.

P. nanus has been obtained in the Mariana Islands, Caroline Islands, Palau Islands, Loyalty Islands (collected at Pede, Maré in 40 m by P. Laboute and Y. Magnier of 20 November 1975), Marshall Islands (2 specimens, 26.8 and 30 mm SL have been deposited in the reference collection of the Mid-Pacific Marine Laboratory on Enewetak), Samoa Islands, Cook Islands, Society Islands, Tuamotu Archipelago,

Pitcairn Group, Marquesas Islands, Line Islands, Hawaiian Islands, Christmas Island and the Cocos-Keeling Islands in the depth range of about 6 to 57 m. It has not yet been taken in any continental area or large islands such as New Guinea and those of Indonesia and the Philippines. *P. longimanus,* on the other hand, has been collected mainly in continental areas or large islands near continents. Thus far, only in the Loyalty Islands, and Ulithi in the Caroline Islands have the two species been taken at the same locality.

All of the specimens of *P. nanus* have been taken on coral reefs or rubble bottoms in exposed areas or in passes. The species is evidently secretive, at least by day, for the author cannot recall having observed it in life. Ones collected with quinaldine have all been the result of an initial effort to obtain other species,.

Table 14. Meristic data of *Plectranthias nanus.*

Fin Rays

	Dorsal Rays			Anal Rays			Pectoral Rays		
	13	14	15	6	7	8	14	15	16
SE Oceania	1	15	4	1	18	1	3	15	2
W Oceania	1	9			10		10		
Cocos-Keeling Is.	1	7		1	7		6	2	
Hawaiian Is.		7	5		12		7	5	
Marquesas Is.		1			1		1		

Anterior series of tube-bearing lateral-line scales

	16	17	18	19	20	21	22
SE Oceania			4	4	6	3	3
W Oceania			4	5	1		
Cocos-Keeling Is.		1	4	2	1		
Hawaiian Is.	1	3	4	2	2		
Marquesas Is.	1						

Gill rakers

	Upper Limb				Lower Limb			
	4	5	6	7	11	12	13	14
SE Oceania	2	12	4	2	4	6	6	4
W Oceania		6	4		3	4	2	1
Cocos-Keeling Is.		5	3		3	2	2	1
Hawaiian Is.	4	7	1		8	4		
Marquesas Is.			1			1		

Named *P. nanus* from both the Greek and the Latin for dwarf, in reference to its small size. The largest specimen (BPBM 20462) of a total of 62 available for study measures only 39.8 mm SL.

A single specimen (BPBM 16429, 18.7 mm SL) from the Marquesas is not designated as a paratype, though there is little adoubt that it is *P. nanus*. The tubed lateral-line scales of this specimen (16 one side, 17 on the other) place it at the extreme of the range for this count. Its dark markings have largely faded, but it is possible to detect most of the principal spots characteristic of *P. nanus* under a low-power microscope. This fish was collected in Haava Straits between Tahuata and Hiva Oa in 57 m with a dredge by the crew of the "Pele" on October 1, 1967.

Also, seven Hawaiian specimens in four lots in the reference collection of the University of Hawaii obtained by William A. Gosline, the author, and others are not regarded as paratypes.

Judging from the available meristic data (see Table 14), there is some population differentiation of *P. nanus* within major areas of the Pacific, particularly the Hawaiian Islands and SE Oceania (Pitcairn Group to Samoa). Also, as mentioned, this fish appears to be more red in Hawaii.

Plectranthias retrofasciatus

Fig. 23

Plectranthias retrofasciatus Fourmanoir and Randall, 1979. Micronesica, vol. 15, p. 318, fig. 2 (type locality, New Caledonia).

DIAGNOSIS: Dorsal rays X, 16; anal rays III, 7; pectoral rays 13 (branched except upper two and lowermost); lateral line complete, the tube-bearing scales 29; scales above lateral line to origin of dorsal fin 4; circumpeduncular scales 14; gill rakers 5+11; depth of body 2.7 in SL; lower margin of preopercle with two antrorse spines;

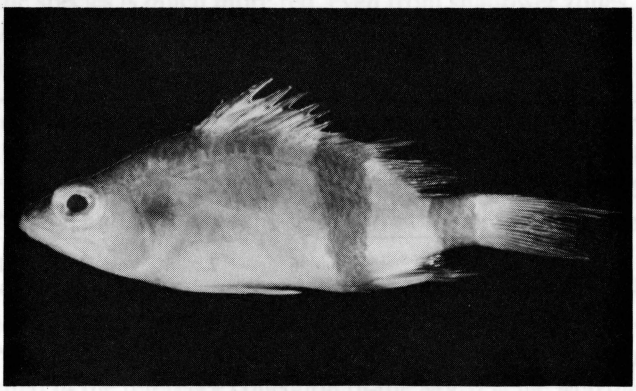

Fig. 23. Holotype of *Plectranthias retrofasciatus* Fourmanoir and Randall, 61.8 mm SL, BPBM 22487, New Caledonia (after Fourmanoir and Randall, 1979).

upper margin of preopercle coarsely serrate; margins of subopercle and interopercle with serrae; villiform teeth in bands in jaws, an inner row on side of lower jaw about twice as large as largest teeth in outer rows; a stout canine tooth on each side at front of upper jaw, and a pair of close-set canines nearly halfway back on side of lower jaw; a band of small villiform teeth in about 4 irregular rows on palatines; maxilla nearly reaching a vertical at hind edge of orbit; maxilla, snout, and ventral part of head scaleless; dorsal part of head scaled anteriorly to level of posterior nostrils; third dorsal spine the longest, 2.2 in head (though fourth spine nearly as long as third); last dorsal spine contained about 2 times in length of first dorsal soft ray; pectoral fins moderately long, the longest rays reaching a vertical at base of fourth anal soft ray; pelvic fins nearly reaching anus; caudal fin emarginate, the rays filamentous.

Color in alcohol pale. Color when fresh pale pinkish with two prominent orange-red bars posteriorly on body, one passing from the edge of the dorsal fin where most deeply notched to the front of the anal fin, and the second posteriorly on the caudal peduncle; dorsal part of head and anterior body dusky orange-red suffused with yellow; opercular region of head and anterior part of body just above pectoral fin with scattered small yellow spots (mostly vertically elongate).

REMARKS: This species is known from a single specimen (BPBM 22487, 61.8 mm SL) taken by trawling north of New Caledonia at a depth of 200 m. It appears to be most closely related to *P. rubrifasciatus*.

Plectranthias rubrifasciatus

Fig. 24

Plectranthias rubrifasciatus Fourmanoir and Randall, 1979. Micronesica, vol. 15, p. 321, fig. 3 (type locality, New Caledonia).

DIAGNOSIS: Dorsal rays X, 15; anal rays III, 7; pectoral rays 14 (upper four and lowermost simple, the rest branched at tips); lateral line complete, the tube-bearing scales 29; scales above lateral line to origin of dorsal fin 3; circumpeduncular scales 14; gill rakers 5+11; depth of body 2.65 in SL; lower margin of preopercle with two antrorse spines; upper margin of preopercle coarsely serrate; margin of subopercle with a few small serrae; interopercle entire; a stout canine tooth on each side at front of upper jaw and a close-set pair of stout canines on each side about halfway back on side of lower jaw, in addition to villiform teeth in bands in jaws; vomer with about three rows of villiform teeth forming a "V" and palatines with two to three rows of villiform teeth; maxilla reaching posterior to a vertical at hind edge of eye; maxilla, snout, and ventral part of head scaleless; dorsal part of head scaled anteriorly to anterior third of interorbital space; fourth dorsal spine the longest, 2.3 in head; tenth dorsal spine contained nearly 2 times in length of first dorsal soft ray; pectoral fins moderately long, the longest ray reaching a vertical at base of second anal soft ray; pelvic fins not reaching anus; caudal fin emarginate, the caudal concavity about 10 in head.

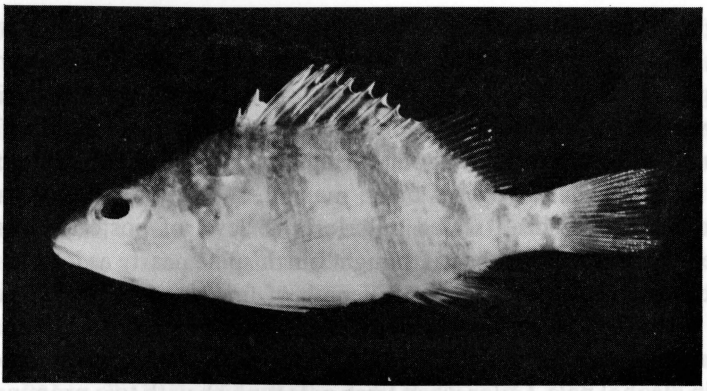

Fig. 24. Holotype of *Plectranthias rubrifasciatus* Fourmonoir and Randall, 49 mm SL, BPBM 22513, New Caledonia (after Fourmanoir and Randall, 1979).

Color in alcohol pale. Color when fresh pink, shading to white ventrally and posteriorly with a "Y"-shaped orange-red bar posteriorly on head and three orange-red bars on body; an orange-red streak behind eye; an orange-red spot dorsally between third and fourth bars and a group of orange-red spots on caudal peduncle.

REMARKS: This species is also known from only a single specimen (BPBM 22513, 49 mm SL) from New Caledonia. It was caught in a crab pot in Bulari Pass at a depth of 100 m.

Plectranthias sagamiensis

Fig. 25

Zacallanthias sagamiensis Katayama, 1963. Bull. Fac. Educ. Yamaguch Univ., vol. 13, pt. 2, p. 28, fig. 1 (type locality, Amadaiba fishing ground off Nagai, Kanagawa Prefecture, Japan).

DIAGNOSIS: Dorsal rays X, 15 to 17 (usually 16); anal rays III, 7 or 8 (rarely 8); pectoral rays 13 or 14, unbranched; branched caudal rays 12 to 14; lateral line complete, tube-bearing scales 27 to 29; scales above lateral line to origin of dorsal fin 3 or 4 (depending on method of counting); gill rakers 5 or 6–11 to 13; depth of body 2.33 to 2.68 in SL; lower margin of preopercle with two prominent antrorse spines; upper margin of preopercle, including region at angle, with 19 to 29 serrae; a few small serrae present on subopercle and interopercle (though they may be very small); small villiform teeth present on palatines in 3 to 5 irregular rows; no canine teeth at front of lower jaw; a large canine tooth (or close-set pair of teeth) in outer row at midside of lower jaw; inner teeth on side of lower jaw notably longer than those in outer rows; maxilla not scaled, nearly reaching or reaching beyond a vertical at rear edge of pupil, but not to posterior edge of orbit; diagonal rows of large scales between eye and corner of preopercle 6; top of head scaled anteriorly to midinterorbital space

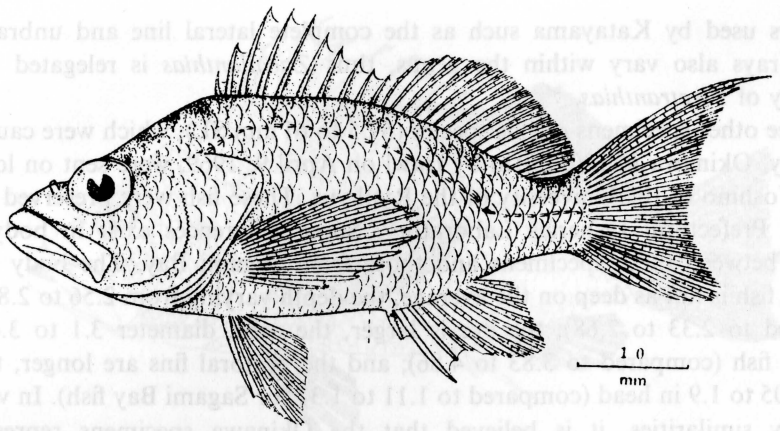

Fig. 25. Holotype of *Plectranthias sagamiensis* (Katayama), 49.3 mm SL, Biol. Lab. Imp. House. Emperor of Japan No. 1325, Japan (after Katayama, 1963).

or slightly anterior to this; fourth dorsal spine the longest (though third and fifth are nearly as long), 2.1 to 2.4 in head; last dorsal spine contained 1.6 to 1.9 times in length of first dorsal soft ray; first dorsal soft ray branched; pectoral fins of moderate length, 2.4 to 2.95 in SL, the longest ray extending to a vertical beyond base of second anal soft ray to slightly beyond base of anal fin; pelvic fins short, not reaching anus, 1.56 to 1.9 in head; caudal fin emarginate, the upper lobe more prolonged (longest ray the second branched ray, not as in Katayama's illustration), the caudal concavity of the holotype 2.7 in head.

Color in alcohol pale with indistinct dark blotches, the most prominent being middorsally on nape. Color from color transparencies: whitish, densely mottled with light red and yellow, the red being more concentrated on the edges of scales and the yellow in centers; a pattern of large blotches results from areas which are almost totally red and yellow; yellow blotches predominate over the red on cheek and postorbital head; fins mainly yellowish, the pectoral rays and basal portions of dorsal and anal rays light red.

REMARKS: *P. sagamiensis* was described from 13 specimens 46 to 61 mm SL taken in the eastern part of Sagami Bay at depths of 50 to 90 m. The specimens are in the collection of the Biological Laboratory of the Imperial Household of the Emperor of Japan. The holotype (No. 1325, 49.3 mm SL) and a second specimen (No. 2020, 59 mm SL) collected in Sagami Bay in 70 m on March 17, 1971 were kindly sent on loan by Itiro Tomiyama, Chief of the Biological Laboratory, along with color slides of two specimens.

Katayama created a new genus, *Zacallanthias*, for this species. Among his criteria for separating the new genus from *Plectranthias* was the absence of strong antrorse spines on the lower border of the preopercle. Two such spines are present, however. As indicated previously, the presence or absence of these spines is not of generic significance in the expanded concept of the genus *Plectranthias* herein. Other

characters used by Katayama such as the complete lateral line and unbranched pectoral rays also vary within the genus, thus *Zacallanthias* is relegated to the synonymy of *Plectranthias*.

Three other specimens of this species (57.5 to 61 mm SL), which were caught at Nago Bay, Okinawa in 120–270 m by trawl on April 9, 1969, were sent on loan by Tetsuo Yoshino of the University of the Ryukyus. These fish were preserved at the Okinawa Prefectural Fisheries Laboratory. Some differences exist in body proportions between these specimens and those from Sagami Bay. The body of the Okinawa fish is not as deep on the average, the depth varying from 2.56 to 2.8 in SL (compared to 2.33 to 2.68); the eye is larger, the orbit diameter 3.1 to 3.47 for Okinawa fish (compared to 3.83 to 4.86); and the pectoral fins are longer, the fin length 1.05 to 1.9 in head (compared to 1.11 to 1.31 for Sagami Bay fish). In view of the many similarities, it is believed that the Okinawa specimens represent a geographical variant from the more northern Japanese population.

Katayama's description of *P. sagamiensis* includes a section on the osteology of the species.

Plectranthias taylori n. sp.
Fig. 26, Table 15

HOLOTYPE: BPBM 22489, male?, 237.5 mm SL, Phoenix Islands, Canton Island, west side off distillation plant, 183 m, trap, L. Taylor, B. A. Carlson, A. Reed, and G. Enos, 9 June 1978.

PARATYPE: USNM 219328, female, 177.0 mm SL, collected with holotype.

DESCRIPTION: Dorsal rays X, 18; anal rays III, 7; pectoral rays 14 (all but uppermost branched); branched caudal rays 15; lateral line complete, the tube-bearing scales 41 (40); lateral line broadly arched over pectoral region, the highest portion below bases of fifth to seventh dorsal spines where 3 1/2 scales separate lateral line and dorsal fin base; scales above lateral line to origin of dorsal fin 5; scales below lateral line to origin of anal fin 19 (17); circumpeduncular scales 18; dorsal part of head scaled anteriorly nearly to front of interobital space; diagonal rows of large scales on cheek between eye and corner of preopercle 8 or 9; no scales on snout, maxilla, suborbital, or ventrally on head; prepelvic scales about 17; small scales basally on all fins except spinous portions of dorsal and anal fins, the scales extending at least three-fourths distance to distal ends of fins.

Gill rakers 5+12 (5+13), two above and 11 below (including the one at angle) elevated; longest gill raker about equal to longest gill filament, 2.2 in orbit diameter of holotype.

Dorsal profile of head nearly straight, forming an angle of about 36° to the horizontal.

Body relatively deep, the depth 2.44 (2.49) in SL; width of body 1.97 (1.95) in depth; head length 2.33 (2.26) in SL; snout 3.27 (3.23) in head; orbit diameter 4.94

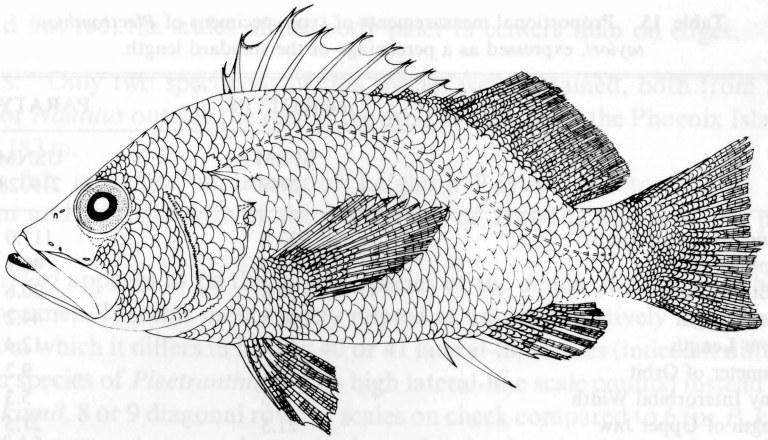

Fig. 26. Holotype of *Plectranthias taylori*, 237.5 mm SL, BPBM 22489, Canton Island, Phoenix Islands (drawing by Helen A. Randall).

(4.80) in head; bony interorbital width 2.01 (2.33) in snout; least depth of caudal peduncle 3.0 (3.13) in head.

Mouth large, oblique, forming an angle of about 32° to the horizontal, the lower jaw projecting when mouth is closed, the maxilla reaching or nearly reaching a vertical at hind edge of orbit; maxilla expanded posteriorly, its greatest depth contained 1.2 (1.3) in diameter of orbit; a dense band of villiform teeth in jaws, the teeth in about 10 irregular rows anteriorly, narrowing to 3 rows posteriorly; two or three short stout canines on each side at front of upper jaw; eight to ten short stout canines in outer row at front of lower jaw, the most medial one slightly the largest (medial tooth much the largest on the paratype and fewer enlarged teeth laterally); two to four close-set stout canines about halfway back on side of lower jaw; villiform teeth in bands on vomer and palatines in about 6 or 7 irregular rows. Tongue slender, the tip rounded, the upper surface without teeth or papillae.

Three flat spines on opercle, the middle one largest and most posterior, closer to lower than upper(upper spine blunt and nearly obtuse); opercular flap not very long, projecting slightly upward from region of middle opercular spine; two antrorse spines on lower margin of preopercle; upper margin of preopercle with 34 (33) serrae; margin of subopercle with 12 (8) serrae; margin of interopercle with 8 (5) serrae.

Nostrils relatively small, the anterior in front of middle of eye, in a membranous tube with a posterior flap; posterior nostril diagonally upward and behind the anterior, with a membranous rim, and located about 3.5 nasal aperture diameters from edge of orbit.

Origin of dorsal fin over first or second lateral-line scale; fourth dorsal spine longest (abnormally short in holotype, the spine of paratype 2.7 in head), the third spine nearly as long as fourth; cirrus from upper end of interspinous membrane near

Table 15. Proportional measurements of type specimens of *Plectranthias taylori*, expressed as a percentage of the standard length.

	HOLOTYPE	PARATYPE
	BPBM 22489	USNM 219328
Standard Length (mm)	237.5	117.0
Depth of Body	40.8	40.1
Width of Body	20.8	20.6
Head Length	42.8	44.2
Snout Length	13.1	12.4
Diameter of Orbit	8.7	9.2
Bony Interorbital Width	6.5	5.3
Length of Upper Jaw	21.3	21.5
Least Depth of Caudal Peduncle	14.3	14.1
Length of Caudal Peduncle	19.7	19.1
Snout to Origin of Dorsal Fin	41.8	42.8
Snout to Origin of Anal Fin	71.2	70.5
Snout to Origin of Pelvic Fins	39.2	37.8
Length of Dorsal Fin Base	57.5	54.8
Length of First Dorsal Spine	5.7	6.6
Length of Longest Dorsal Spine	abnormal	16.4
Length of Longest Dorsal Ray	16.5	17.9
Length of Anal Fin Base	16.2	16.4
Length of First Anal Spine	9.5	10.2
Length of Second Anal Spine	16.4	18.9
Length of Third Anal Spine	15.4	17.2
Length of Longest Anal Ray	20.6	22.5
Length of Longest Caudal Ray	24.5	25.7
Length of Pectoral Fin	31.0	34.1
Length of Pelvic Spine	13.4	14.1
Length of Pelvic Fin	21.3	22.8

tip of third dorsal spine contained nearly two times in orbit diameter; dorsal fin not deeply notched, the tenth dorsal spine about 1.6 in first dorsal soft ray; all dorsal rays branched; soft portion of dorsal fin relatively uniform in height, the third or fourth ray the longest, 2.60 (2.47) in head; second anal spine longest, 2.61 (2.34) in head; second anal soft ray longest, 2.08 (1.96) in head; caudal fin truncate (slightly emarginate in paratype), the rays filamentous, the longest 1.67 (1.72) in head; eighth pectoral ray longest, reaching slightly beyond origin of anal fin (to base of third soft ray in paratype), 3.23 (2.94) in SL; pelvic fins not reaching anus, 1.92 (1.94) in head.

Color in alcohol pale with traces of dark pigment dorsally, but not enough to form any distinct blotches or other markings; some blackish pigment on first two dorsal spines and associated membranes; tips of rays on posterior half of soft portion of dorsal fin blackish.

Color from a 35 mm Kodachrome transparency taken by Linda Taylor: head,

body, and fins red, the scales of the body paler in centers than on edges.

REMARKS: Only two specimens of this species were obtained, both from a baited trap set for *Nautilus* outside the reef at the atoll of Canton in the Phoenix Islands at a depth of 183 m.

This fish is named in honor of Leighton Taylor, director of the Waikiki Aquarium and ichthyologist of the University of Hawaii, who was the principal collector.

P. taylori appears to be the largest species of the genus, the holotype being the largest specimen. It seems most closely related to another relatively large species, *P. kamii,* from which it differs in having 40 or 41 lateral-line scales (indeed it differs from all known species of *Plectranthias* by its high lateral-line scale counts) instead of 33 to 36 for *P. kamii,* 8 or 9 diagonal rows of scales on cheek compared to 6 for *P. kamii,* 14 instead of 13 pectoral rays, a deeper body, and in having the third and fourth dorsal spines subequal (third distinctly longer in *P. kamii*).

Plectranthias vexillarius n. sp.
Fig. 27, Table 16

HOLOTYPE: USNM 213545, 82.4 mm SL, male, Gulf of Oman (23°43′–46′N, 58°23′E), 49–63 m, trawl, ANTON BRUUN Cruise 4B, Sta. 269A, 3 December 1963.

DESCRIPTION: Dorsal rays X, 17 (last branched to base); anal rays III, 7 (last branched to base); pectoral rays 13 (all unbranched); branched caudal rays 15; lateral line complete, the tube-bearing scales 29; scales above lateral line to origin of dorsal fin appear to be 3 (some missing both sides); scales below lateral line to origin of anal fin 11; circumpeduncular scales 14; dorsal part of head scaled anteriorly almost to

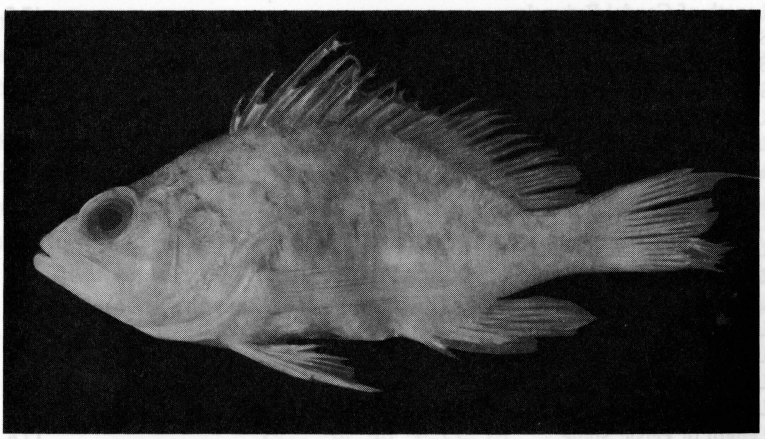

Fig. 27. Holotype of *Plectranthias vexillarius*, 82.4 mm SL, USNM 213545, Gulf of Oman.

nostrils; about 7 diagonal rows of large scales on cheek between eye and corner of preopercle; no scales on snout, maxilla or chin; about 12 prepelvic scales; dorsal fin naked (one small scale present basally on soft portion suggests that other basal scales may have been lost) scales present only basally on anal, caudal, and paired fins.

Gill rakers 6+13, most elevated, none as completely sessile rudiments; longest raker (at angle) about 3 in orbit; pseudobranch with 22 (20) lamellae; longest gill filament nearly half orbit diameter.

Upper profile of head nearly straight, forming an angle of about 28° to the horizontal.

Depth of body 2.69 in SL; width of body 2.43 in depth; head length 2.05 in SL; snout 4.61 in head; orbit diameter 3.86 in head; bony interorbital width 2.38 in snout; least depth of caudal peduncle 4.09 in head.

Mouth moderately large, oblique, forming an angle of about 30°; lower jaw very slightly projecting; maxilla extending just past a vertical at posterior edge of pupil; maxilla expanded posteriorly, its greatest depth one-half orbit diameter; teeth in upper jaw in a villiform band, about 6 irregular rows at front, the inner medial teeth the longest, 4 rows on midside of jaw, and 2 posteriorly; 2 stout canines on each side

Table 16. Proportional measurements of the holotype of *Plectranthias vexillarius* (USNM 213545), expressed as a percentage of the standard length.

Standard Length (mm)	82.4
Depth of Body	37.1
Width of Body	15.8
Head Length	48.7
Snout Length	10.6
Diameter of Orbit	12.6
Bony Interorbital Width	4.4
Length of Upper Jaw	20.4
Least Depth of Caudal Peduncle	11.9
Length of Caudal Peduncle	17.7
Snout to Origin of Dorsal Fin	39.6
Snout to Origin of Anal Fin	67.4
Snout to Origin of Pelvic Fins	39.9
Length of Dorsal Fin Base	56.7
Length of First Dorsal Spine	7.2
Length of Longest Dorsal Spine	23.5
Length of Longest Dorsal Ray	23.3
Length of Anal Fin Base	18.8
Length of First Anal Spine	10.5
Length of Second Anal Spine	22.8
Length of Third Anal Spine	18.9
Length of Longest Anal Ray	26.1
Length of Longest Caudal Ray	42.5
Length of Middle Caudal Rays	36.7
Length of Pectoral Fin	40.1
Length of Pelvic Spine	17.6
Length of Pelvic Fin	27.5

at front of jaw, each pair separated by a distance about equal to base of one of them; innermost canine of each side separated by a gap at symphysis which is contained about 3.5 times in the eye; lower jaw with about 4 or 5 irregular rows of small teeth at front, 2 to 3 rows on side (inner row about 3 times longer than outer) and 1 posteriorly; a close-set pair of canine teeth slightly anterior to midside of lower jaw; small teeth on vomer and palatines in 2 or 3 irregular rows; tongue narrow, without teeth.

Three prominent flat spines on opercle, the middle one the most posterior and closer to lower than upper; opercular membrane produced to a pointed flap at level of middle opercular spine, the tip projecting obliquely upward; lower margin of preopercle irregular, but without definite spines; rounded corner and upper margin of preopercle with 33 (34) small serrae; no serrae on subopercle or interopercle.

Anterior nostril a thin membranous tube; posterior nostril with a slight rim, the edge about a nostril diameter from edge of orbit.

Origin of dorsal fin above second to third lateral-line scale; third dorsal spine the longest, its length 2.07 in head; a long cirrus from upper end of each interspinous membrane of dorsal fin, that from third spine 2.4 in head; dorsal fin notched between spinous and soft portions, the last spine contained 1.51 times in first soft ray; soft portion of dorsal fin not uniform in height, longest dorsal ray (fifth) 2.09 in head; the last dorsal ray 4.05 in head; second anal spine 2.13 in head; longest anal soft ray 1.86 in head; caudal fin emarginate, the upper and lower lobes produced, the longest upper ray (third branched) 1.15 in head, shortest median ray 1.82 in head; longest lower ray (fourth branched from bottom) 1.43 in head; pectoral fins long, 2.50 in SL, the longest ray just reaching a vertical at rear base of anal fin; pelvic fins 1.77 in head, reaching slightly beyond anus.

Color in alcohol pale, the body with 4 irregular rows of large brown blotches (some as large as eye), those along back roundish with pale centers or "U"-shaped; upper postorbital head and nape blotched with brown; a faint broad brown band extending posteriorly from middle of eye onto anterior opercle; a second faint brown band passing posteriorly from lower part of eye; all fins pale. Color in life not recorded.

REMARKS: Known only from the holotype taken during the International Indian Ocean Expedition. The bottom was noted as black sand, clay, and shell fragments.

Named *P. vexillarius* in reference to the long, banner-like extnesion from membrane tip of each dorsal spine, a character which is shared by *P. morgansi*. In a number of other features *P. vexillarius* resembles *P. morgansi*, but the two differ notably in the shape of the caudal fin and soft dorsal and anal fins and the number of soft dorsal rays.

Plectranthias wheeleri n. sp.

Figs. 28, 29, Table 17

Anthias megalepis Günther, 1880, in part, Voyage of H.M.S. Challenger, Zool., pt. 6,

Shore Fishes, p. 37 (type locality, Ki Islands = Kai or Kei Islands).

HOLOTYPE: BPBM 22401, 82.8 mm SL, male, Indonesia, Celebes, Manado Bay, 100 m, hook and line, local fisherman for J. E. Randall, 4 September 1978.

PARATYPE: BM(NH) 1890.2.26.28, 70.7 mm SL, male, Indonesia, Kai Islands northern Arafura Sea (5°–6°S, 132°–133°E), 236 m, trawl, CHALLENGER Sta. 192, September, 1874.

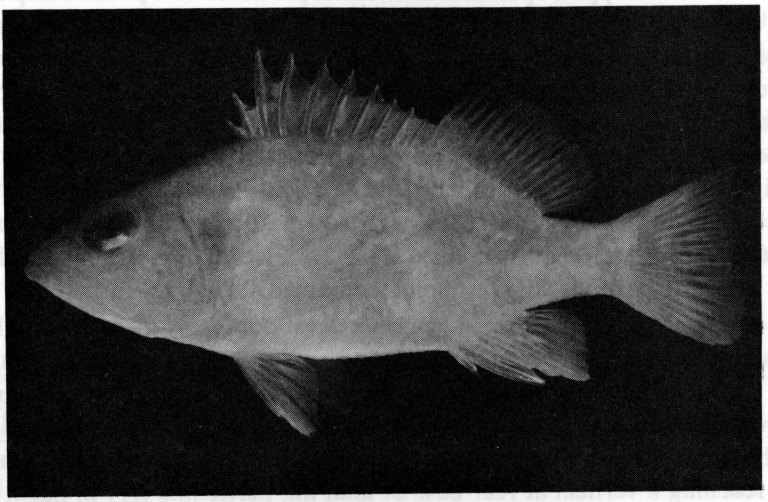

Fig. 28. Holotype of *Plectranthias wheeleri*, 82.8 mm SL, BPBM 22401, Manado Bay, Celebes.

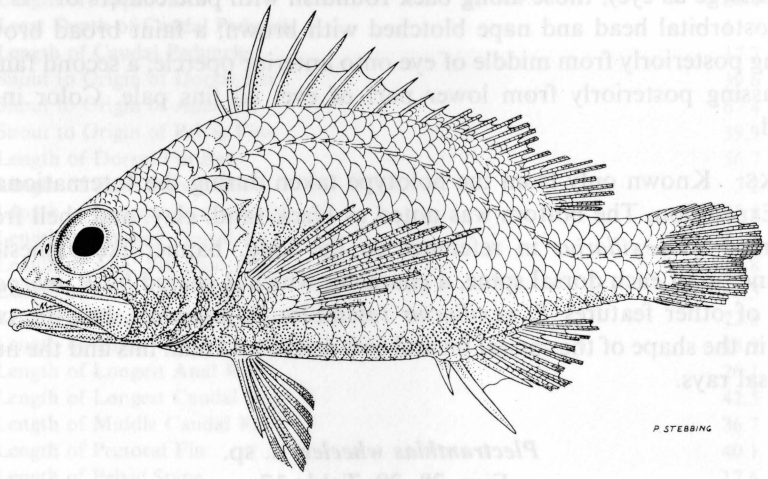

Fig. 29. Paratype of *Plectranthias wheeleri*, 70.7 mm SL, BM(NH) 1890. 2. 26. 28, Kai Islands, Indonesia (drawing by Peter Stebbing).

Table 17. Proportional measurements of type specimens of *Plectranthias wheeleri*, expressed as a percentage of the standard length.

	HOLOTYPE	PARATYPE
	22401	1890.2.26.28
Standard Length (mm)	82.8	70.7
Depth of Body	37.2	37.9
Width of Body	19.8	19.8
Head Length	43.4	43.3
Snout Length	9.9	9.6
Diameter of Orbit	11.7	11.5
Bony Interorbital Width	4.2	4.2
Length of Upper Jaw	22.1	21.2
Least Depth of Caudal Peduncle	12.5	12.3
Length of Caudal Peduncle	20.1	21.7
Snout to Origin of Dorsal Fin	42.1	42.3
Snout to Origin of Anal Fin	69.4	65.8
Snout to Origin of Pelvic Fins	37.2	35.4
Length of Dorsal Fin Base	53.1	53.8
Length of First Dorsal Spine	6.4	6.8
Length of Longest Dorsal Spine	17.6	18.4
Length of Longest Dorsal Ray	18.0	—
Length of Anal Fin Base	15.0	15.7
Length of First Anal Spine	9.9	8.8
Length of Second Anal Spine	19.3	19.4
Length of Third Anal Spine	14.8	15.6
Length of Longest Anal Ray	20.7	22.8
Length of Caudal Fin	23.0	22.6
Length of Pectoral Fin	33.1	35.3
Length of Pelvic Spine	15.7	15.7
Length of Pelvic Fin	21.4	22.2

DESCRIPTION: Dorsal rays X, 16; anal rays III, 7; pectoral rays 13 (all branched except short uppermost ray); branched caudal rays 15; lateral line complete, the tube-bearing scales 29; scales above lateral line to origin of dorsal fin 3; scales below lateral line to origin of anal fin 11 (12); circumpeduncular scales 14; dorsal part of head scaled anteriorly to posterior nostrils; diagonal rows of large scales on cheek between eye and corner of preopercle 6; no scales on snout, maxilla or chin; about 12 prepelvic scales; all fins scaled basally except pelvics and anterior part of spinous portion of dorsal fin, the scales on the anal and caudal fins extending more than three-fourths length of fins.

Gill rakers 5+11, the longest at angle about equal to the longest gill filament, one on upper limb and 8 (7) (including one at angle) on lower limb elevated; pseudobranch with 19 (17) lamellae; longest gill filament about 3.5 in eye.

Upper profile of nearly straight, forming an angle of about 30° to the horizontal.

Depth of body 2.59 (2.64) in SL: width of body 1.88 (1.91) in depth; head length 2.30 (2.31) in SL; snout 4.47 (4.5) in head; orbit diameter 3.81 (3.8) in head; bony

interorbital width 2.35 (2.26) in snout; least depth of caudal peduncle 3.54 (3.52) in head.

Mouth terminal, moderately large, and slightly oblique, forming an angle of about 7°; maxilla just reaching a vertical at rear edge of eye; maxilla expanded posteriorly, its greatest depth 1.8 (1.6) in orbit diameter; teeth in upper jaw in a villiform band, about 9 irregular rows at front of jaw, the depressible inner medial teeth on each side of symphysis notably the longest, about 5 rows at midside of jaw and about 3 posteriorly; a fixed canine tooth in outer row on each side at front of upper jaw, the two separated by a gap at symphysis contained about 2.5 times in orbit diameter; lower jaw with about 6 irregular rows of small teeth at front, about 4 on midside (inner row not notably longer than those of outer row), and 2 or 3 posteriorly; no fixed canine teeth anteriorly in lower jaw; a fixed canine tooth (pair on one side) in outer row slightly anterior to midpoint of side of lower jaw; tongue narrow, without teeth.

Three prominent flat spines on opercle, the middle one the largest and most posterior, equidistant to the other two; opercular membrane produced to a pointed flap at level of middle opercular spine, the tip projecting obliquely upward; lower margin of preopercle with 2 prominent antrorse spines and upper margin with 28 (19) serrae; 1 to 4 serrae on subopercle and interopercle.

Anterior nostril in a thin membranous tube; posterior nostril with a slight rim, the margin a little more than a nostril diameter from edge of orbit.

Upper end of gill opening anterior to origin of dorsal fin. Third dorsal spine the longest (though fourth spine of holotype nearly as long), its length 2.47 (2.43) in head length; dorsal fin notched between spinous and soft portions; last dorsal spine 5.9 (7.7) in head; longest dorsal soft ray (eighth) 2.44 in head length; second anal spine 2.25 (2.23) in head length; longest anal soft ray (second or third) 2.14 (1.9) in head length; caudal fin slightly emarginate with exserted rays, the longest 1.94 in head; pectoral fins 3.02 (2.84) in SL, the longest ray reaching a vertical at base of third anal spine (to second soft ray on paratype); pelvic fins 2.08 (1.95) in head length, not reaching anus.

Color in alcohol pale with faint smudges of dark pigment on scales of nape (especially middorsally), along back, below lateral line (a slight concentration below base of fifth dorsal spine and another centered below origin of soft portion of dorsal fin), and more faintly behind eye; a dark spot anteriorly at base of first dorsal spine; a dusky spot about halfway out on third interspinous membrane of dorsal fin.

Color when fresh: upper half of body, pectoral region, and caudal base with large irregular orange-red blotches, mixed with yellow, the narrow interspaces whitish; thorax, abdomen, and lower posterior half of body whitish with three faint irregular pink bars in region posterior to origin of anal fin; an orange-red blotch anterior to origin of anal fin; head orange-red above a line along upper end of maxilla, the suborbital region with some yellow and the operculum faintly blotched with whitish; lower part of head pale pink; spinous portion of dorsal fin with spines largely pink, membranes mottled light yellow and whitish, the cirri at tips red; soft portion of

dorsal fin with membranes whitish, grading outwardly to hyaline, the rays pinkish except for a broad zone of yellow in lower center of fin, some of which appears as blotches on membranes; caudal fin whitish, blotched with light yellow, the rays tinged with pale pink, especially distally; anal fin mainly yellow; pectoral fins with the rays light yellow, the membranes nearly clear; pelvic fins whitish, the rays pink, the second soft ray tinged with light yellow.

REMARKS: Günther did not indicate how many specimens he had when he described *Anthias megalepis* from CHALLENGER Station 192 in 129 fathoms (236 m) off the Kai Islands at the northern edge of the Arafura Sea; however, A. C. Wheeler found three syntypes with this name at the British Museum (Natural History) under two different register numbers. He explained that the "Challenger" fishes were divided into duplicate lots, the first of which was sent to London for accessioning in 1897. Later lots were sent to Paris, Ireland, and again the British Museum (Natural History) at London, thus specimens from the same collection could have different numbers. The specimen of *P. megalepis* which was illustrated was chosen by the author as the lectotype and is assigned the 1879 register number. The second number, from 1890, is given to the paratype of *P. wheeleri*. A new number is needed for the third specimen, as it also represents an undescribed species (see following account of *P. whiteheadi*).

Named in honor of Alwyne C. Wheeler of the British Museum (Natural History) as an expression of gratitude for the assistance he has provided the author for many years.

Plectranthias whiteheadi n. sp.
Fig. 30, Table 18

Anthias megalepis Günther, 1880, in part, Voyage H. M. S. Challenger, Zool., pt. 6. Shore Fishes, p. 37 (type locality, Ki Islands = Kei or Kai Islands).

HOLOTYPE: BM(NH) 1975.1.14.1, 76.8 mm SL, female, Indonesia, Kai Islands, northern Arafura Sea (5°–6°S, 132°–133°E), 236 m, trawl, CHALLENGER Sta. 192, September, 1874.

DESCRIPTION: Dorsal rays X, 17; anal rays III, 7; pectoral rays 14 (uppermost and lowermost unbranched); branched caudal rays 15; lateral line complete, the tube-bearing scales 30; scales above lateral line to origin of dorsal fin 3 1/2; scales below lateral line to origin of anal fin 11; circumpeduncular scales 14; dorsal part of head scaled anteriorly to nostrils; diagonal rows of large scales on cheek between eye and corner of preopercle 6; no scales on snout, maxilla, or mandibles; about 11 prepelvic scales; all fins with small scales extending one-half or more the distance to fin margins except spinous portion of dorsal fin where scales are found only basally.

Gill rakers 5+11, one upper and seven lower (including one at angle) elevated, the longest slightly shorter than longest gill filament; pseudobranch lamellae 19 (20).

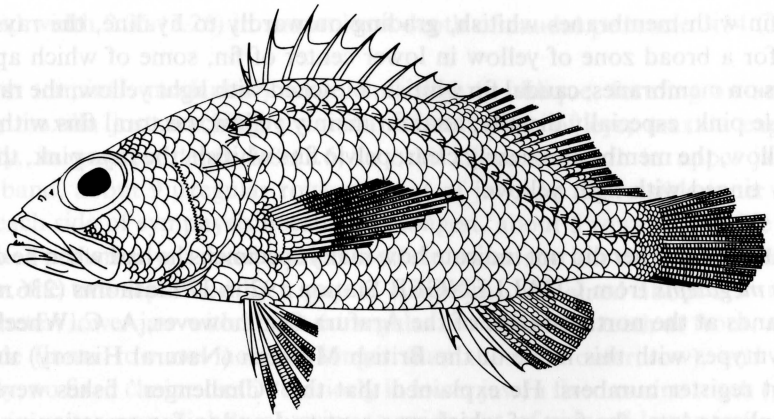

Fig. 30. Holotype of *Plectranthias whiteheadi*, 76.8 mm SL, BM(NH) 1975. 1. 14. 1, Kai Islands, Indonesia (drawing by Arnold Y. Suzumoto).

Table 18. Proportional measurements of the holotype of *Plectranthias whiteheadi* (BM[NH] 1975. 1. 14. 1), expressed as a percentage of the standard length.

Standard Length (mm)	76.8
Depth of Body	33.8
Width of Body	19.1
Head Length	42.3
Snout Length	10.2
Diameter of Orbit	11.1
Bony Interorbital Width	3.5
Length of Upper Jaw	20.2
Least Depth of Caudal Peduncle	12.1
Length of Caudal Peduncle	19.5
Snout to Origin of Dorsal Fin	42.4
Snout to Origin of Anal Fin	69.5
Snout to Origin of Pelvic Fins	38.4
Length of Dorsal Fin Base	5.5
Length of First Dorsal Spine	5.2
Length of Longest Dorsal Spine	14.7
Length of Anal Fin Base	15.9
Length of First Anal Spine	9.1
Length of Second Anal Spine	19.1
Length of Third Anal Spine	16.2
Length of Middle Caudal Rays	20.9
Length of Pectoral Fin	32.0
Length of Pelvic Spine	13.8
Length of Pelvic Fin	20.3

Upper profile of head nearly straight, forming an angle of about 32° to the horizontal.

Depth of body 2.95 in SL; width of body 1.78 in depth; head length 2.36 in SL;

snout 3.96 in head; orbit diameter 3.92 in head; interorbital space flat, the bony width 2.88 in snout; least depth of caudal peduncle 3.5 in head.

Mouth terminal, moderately large, and oblique, the maxilla forming an angle of about 20° to the horizontal; maxilla nearly reaching a vertical at posterior edge of eye; depth of expanded posterior part of maxilla 1.8 in orbit diameter; upper jaw with a band of villiform teeth consisting of about 9 or 10 irregular rows anteriorly, the depressible inner teeth enlarged, about 6 or 7 rows of very small teeth at midside of jaw, and about 4 posteriorly in jaw; a large incurved canine tooth anteriorly at corner of upper jaw; lower jaw with villiform teeth in a band of about 6 irregular rows anteriorly and four along side of jaw, the inner row on side of jaw about three times as long as the outer, erect, and well spaced; an enlarged canine tooth on each side at front of lower jaw, slightly medial to its couterpart in upper jaw, angling laterally, and slightly incurved; an enlarged near-erect canine tooth (a close-set pair on one side) about halfway back on side of lower jaw; palatine teeth small, in two irregular rows; vomerine teeth small, in two to three irregular rows, forming a "V"-shape. Tongue narrow, the tip rounded, the upper surface without teeth but with scattered tiny papillae.

Three prominent flat spines on opercle, the middle one largest, most posterior and only slightly oblique, a little closer to the lower than the upper spine; opercular membrane produced to a somewhat pointed flap slightly dorsal to middle opercular spine, the tip projecting slightly upward; lower margin of preopercle with two prominent antrorse spines; corner of preopercle well rounded, the upper margin with 24 (22) serrae; subopercle with no serrae on one side and one small one on the other; interopercle with two serrae on one side and none on the other.

Nostrils in front of center of eye the anterior in a membranous tube, the posterior with a slight rim; posterior nostril a little more than a nostril diameter from bony edge of orbit.

Upper edge of opercle partially linked by membrane to shoulder region; upper end of gill opening anterior to origin of dorsal fin.

Fourth dorsal spine longest, its length 2.88 in head length; dorsal fin notched, the last dorsal spine 6.1 in head; all dorsal and anal soft rays broken (but can determine that all rays are branched); second anal spine 2.21 in head; most upper and lower caudal rays broken so caudal fin shape not known; longest middle caudal ray 2.03 in head; pectoral fins 3.13 in SL, the longest ray reaching a vertical at anterior end of soft portion of anal fin; pelvic fins short, not reaching anus, 2.09 in head.

Color in alcohol light brown with two rows of large dark blotches on back, the upper row consisting of a median spot on nape, six blotches between dorsal fin base and lateral line and two small ones dorsally on caudal peduncle (all blotches smaller than eye); lower row consisting of five blotches the first three horizontally elongate (first two cojoined), larger than eye, running just below lateral line, and the last two on caudal peduncle smaller, partially above and partially below lateral line.

Günther gave the life color as rose with irregular blackish patches on the back.

REMARKS: As mentioned, the holotype and only known specimen of *P. whiteheadi* was taken in the same CHALLENGER station as the single specimens of *P. megalepis* and *P. wheeleri*. *P. megalepis* differs from both *P. whiteheadi* and *P. wheeleri* in lacking antrorse spines on the lower edge of the preopercle and in having 15 instead of 16 or 17 dorsal soft rays. *P. whiteheadi* differs from *P. wheeleri* in being more elongate (depth 2.95 in SL, compared to about 2.6 for *P. wheeleri*), having the fourth dorsal spine longest (about 2.9 in SL) instead of the third (which is about 2.4 in SL of *P. wheeleri*), in having a longer snout (about equal to orbit diameter, whereas it is shorter than the orbit diameter in *P. wheeleri*). Also there is a difference of one in the number of dorsal and pectoral rays and of lateral-line scales; however, this may not prevail when additional specimens are examined.

This species is named in honor of P. J. P. Whitehead of the British Museum (Natural History).

Plectranthias winniensis
Fig. 31

Pteranthias winniensis Tyler, 1966. Notul. Nat., no. 389, p. 2, fig. 1 (type locality, vicinity of St. Joseph Island, Amirante, Seychelles).

DIAGNOSIS: Dorsal rays X, 16 or 17; anal rays III, 7; pectoral rays 16 to 18 (usually 17), unbranched; branched caudal rays 13; lateral line incomplete, ending beneath soft portion of dorsal fin, the tube-bearing scales 14 to 20; gill rakers 4 to 6+11 to 15; depth of body 3.0 to 3.43 in SL, lower margin of preopercle with 2 antrorse spines; upper margin of preopercle with 6 to 17 coarse serrae (increasing with age, see Fig 1); subopercle with 0 to 2 weak serrae, and interopercle with none; teeth present on palatines; a single (sometimes a close-set pair) enlarged recurved tooth in outer row on midside of lower jaw; no canines at front of lower jaw; maxilla scaleless; diagonal

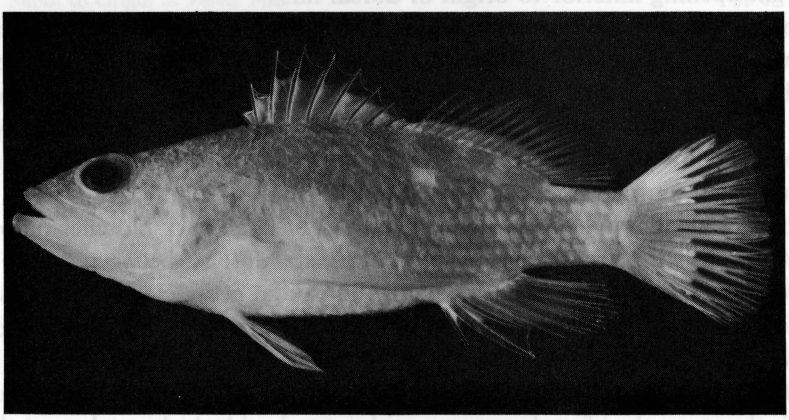

Fig. 31. *Plectranthias winniensis* (Tyler), SL 40 mm, BPBM 13528, Tuamotu Archipelago.

rows of large scales on cheek between eye and corner of preopercle 4 or 5; top of head scaled anteriorly to midinterobital space; fourth dorsal spine the longest, 2.6 to 3.1 in head; last dorsal spine contained about 3 times in first dorsal soft ray; first dorsal soft ray unbranched; pectoral fins moderately long, 2.7 to 3.2 in SL; caudal fin rounded.

Color in alcohol pale or faintly mottled, leaving pale a saddle-like spot anteriorly on caudal peduncle and often 3 diagonal pale bands on lower side of caudal peduncle.

Color in life mottled orange anteriorly and blotched with red posteriorly, the red tending to form diagonal bands alternating with whitish on lower two-thirds of caudal peduncle and body above posterior part of anal fin; also red is concentrated in spots along base of soft portion of dorsal fin, anal fin and caudal fin; a large red spot on first 2 to 4 interspinous membranes of dorsal fin, extending onto adjacent part of back; a prominent white or pinkish white spot dorsally on caudal peduncle immediately behind last dorsal ray; lower part of head, thorax, and anterior abdomen whitish to pale yellowish; fins light yellowish, the pectoral and caudal rays tinged with pink.

REMARKS: This species was known previously from a single specimen 31.8 mm SL collected in the Seychelles (ANSP 103583). It was sent on loan by the Academy of Natural Sciences of Philadelphia.

Between 1968 and 1976 the author and associates have taken *P. winniensis* with rotenone and quinaldine at the following localities: Oahu and Hawaii, Hawaiian Islands (BPBM 7340, 22.1 mm SL; BPBM 9761, 22.2 mm SL; BPBM 9275, 17 mm SL; BPBM 15497, 2: 16.5–34 mm SL); Temoe Atoll and Rangiroa Atoll, Tuamotu Archipelago (BPBM 13528, 4: 17.5–40 mm SL; BPBM 14002, 2: 25–28.3 mm SL); Pitcairn Island (BPBM 16743, 31 mm SL; BPBM 16901, 33 mm SL); Rurutu, Austral Islands (BPBM 13728, 21.5 mm SL), Mauritius (BPBM 16338, 32.5 mm SL; BPBM 16368, 24.8 mm SL); and Gulf of Aqaba, Red Sea (off Ras Abu Galum, Sinai Peninsula, in 55 m). A total of 20 specimens, 19 to 32 mm SL, were collected at the last-mentioned locality. Twelve were lost in shipment from Israel to Hawaii. Eight remain in the collection of the Hebrew University, Jerusalem (HUJF 8324, 22 to 29 mm SL).

In addition, Leighton Taylor and Paul Allen collected a specimen on the Kona coast of Hawaii in 1973 (BPBM 15059, 27 mm SL); Gerald R. Allen, Walter A. Starck, II, and Dan Popper collected one in the New Hebrides in 1973 (AMS I.17475–021, 33.5 mm SL) (sent on loan); Pierre Laboute collected one at Uvea, Loyalty Islands (MNHN 2.6.73, 33 mm SL) and another at New Caledonia (MNHN 13.5.73), both in 1973. Pierre Fourmanoir sent a color photo of the former.

All of the above specimens were obtained in outer coral reef areas in the depth range of 23 to 58 m (only three, however, in less than 30 m).

On two occasions the author has collected *P. winniensis* and *P. nanus* together from the same small coral head with quinaldine (at Temoe in 41 m and Pitcairn in 55 m). Tyler (1966) mentioned that the holotype of *P. winniensis* was taken in the same rotenone station with three specimens of *P. longimanus*.

Plectranthias yamakawai
Fig. 32

Plectranthias anthioides (non Günther) Kamohara and Yamakawa, 1968. Rep. Usa Mar. Biol. Sta., vol. 15, no. 1, p. 8, fig. 4. (Izu-Ōshima).
Plectranthias yamakawai Yoshino 1972. Japan. Jour. Ichth., vol. 19, no. 2, p. 53, Figs. 1B and 3 (type locality, Okinawa, Ryukyu Islands).

DIAGNOSIS: Dorsal rays X, 16 to 18; anal rays III, 7; pectoral rays 13 (only the uppermost unbranched); branched caudal rays 15; lateral line complete, the tube-bearing scales 31 to 33; scales above lateral line to origin of dorsal fin 5; circumpeduncular scales 14; gill rakers 5 or 6+11 to 13; depth of body 2.4 to 2.7 in SL; lower margin of preopercle with two antrorse spines; upper margin of preopercle with 26 to 32 serrae; subopercle without serrae; interopercle with 0 to 2 tiny serrae; villiform teeth on vomer and palatines in about three irregular rows; upper jaw with about 10 irregular rows of villiform teeth anteriorly, narrowing to about 5 posteriorly, with one or two canines at each corner of front of jaw; lower jaw with fewer rows of villiform teeth (inner row 2 to 3 times longer than outer), one to three canines on each side of symphysis, and one to three canines about half-way back on side of jaw; maxilla extending to or nearly to a vertical at posterior edge of eye; maxilla and mandible scaleless; diagonal rows of large scales on cheek between eye and corner of preopercle 6 or 7; top of head scaled to front of interorbital space; fourth or fifth dorsal spines longest, 2.9 to 3.25 in head; last dorsal spine about 1.5 in first dorsal soft ray; first dorsal soft ray unbranched; pectoral fins reaching beyond a vertical at base of first anal soft ray, 2.65 to 2.95 in SL; pelvic fins not reaching anus, 1.8 to 2.1 in head; caudal fin emarginate, a few of the upper rays somewhat produced.

Color in alcohol light brown with numerous dark brown blotches, generally smaller in area than half the exposed part of a body scale, on about upper two-thirds of body and head, those on head more numerous and smaller; fins pale.

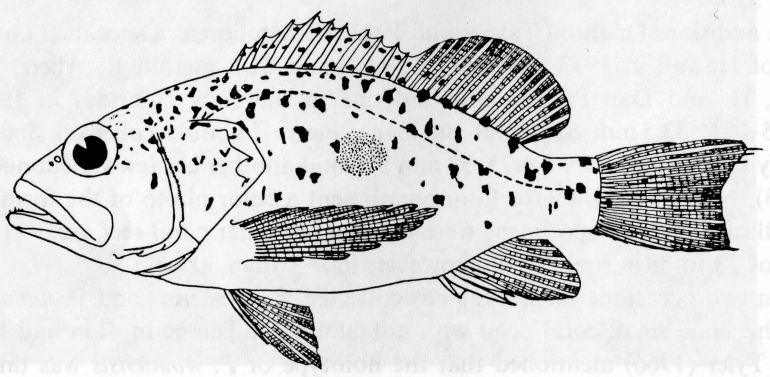

Fig. 32. Holotype of *Plectranthias yamakawai* Yoshino, 173.2 mm SL, FAKU 44565, Okinawa (after Yoshino, 1972).

Color in life as given by Yoshino, reddish yellow above and whitish below; many dark greenish flecks, fringed with yellow, scattered on upper half of body; similar but smaller and lighter flecks on spinous dorsal fin and base of soft dorsal and caudal fins; a large round red spot about equal to orbit rimmed with pale on side of body below lateral line; median fins reddish yellow, pectoral fins reddish; pelvic fins whitish.

REMARKS: This species has been illustrated in color by Gushiken (1972: Fig. 118) and Masuda, Araga and Yoshino (1975: pl. 50H). It is known to date only from the Ryukyu Islands. Masuda, Araga and Yoshino stated that it occurs in fairly deep water over rocky bottoms. Yoshino kindly made a gift of two specimens to the Bishop Museum (BPBM 18059, 169 mm SL; BPBM 19625, 175 mm SL). Meristic data of Tables 1 to 3 are from these two specimens. Yoshino has given complete meristic and measurement data for the holotype and five paratypes of *P. yamakawai.* His largest specimen mearures 191.7 mm SL.

Katayama (1975) recorded four specimens of *P. yamakawai,* 175 to 195 mm, from Okinawa and Amami -Ōshima, Ryukyu Islands.

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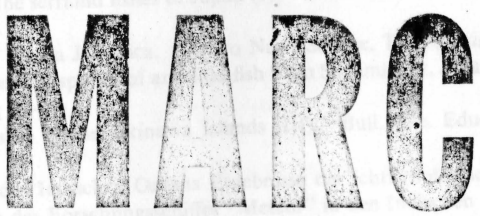
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