

A REVIEW OF THE GENERA AND SPECIES OF JULIDINÆ FOUND
IN AMERICAN WATERS.

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In the present paper we have attempted to collect the synonymy of the American species of *Labridæ* belonging to *PlatyGLOSSUS* and related genera, and to give analytical keys by which these species may be distinguished. The specimens examined belong to the U. S. National Museum and to the museum of the Indiana University.

The subfamily or group of *Julidinæ*, as here understood, may be characterized as follows:

Labridæ with the body oblong, more or less compressed, covered with scales which are large (*PlatyGLOSSUS*, *Thalassoma*, &c.) or small (*Julis*, *Coris*, *Hologymnosus*, &c.), the lateral line continuous, but abruptly bent downward under the last rays of the dorsal. Head naked or nearly so. Preopercle entire. Teeth large, each jaw with 2 to 4 strong canines in front (usually 2 above, 4 below), and sometimes an antrorse posterior canine. Dorsal spines slender, stiff or flexible, 8 or 9 in number; the outline of the dorsal fin continuous. Anal spines 3, graduated, weak. Gill membranes slightly joined to the narrow isthmus. Gill-rakers weak. Lower pharyngeals T-shaped or Y-shaped, with rounded teeth; those on the cross-piece larger. Bright-colored fishes of the tropical seas.

The American species of this group are certainly very closely related, and might without violence be all placed in a single genus (*Thalassoma*), as the characters separating the current genera are to some extent artificial and of slight importance, and not altogether constant in individuals. In such large groups, however, subdivision becomes very convenient, and on the whole it is perhaps best to continue to regard the American species as belonging to four genera, for which the names *PlatyGLOSSUS*, *OxyJULIS*, *PseudoJULIS*, and *Thalassoma* should be used. These may be thus defined:

ANALYSIS OF GENERA.

- a. Scales large, 25 to 30 in the course of the lateral line; no scales on head; canine teeth $\frac{3}{4}$ or $\frac{2}{3}$, none of them directed strongly outwards or backwards; scales on the breast not larger than the others; snout of moderate length; dorsal rays about VIII or IX, 11 or 12; anal, III, 12.
- b. Dorsal spines normally 9 (rarely 8).
- c. Posterior canine tooth present.....PLATYGLOSSUS, 1.
- cc. Posterior canine tooth wanting (or reduced to a rudiment).
- d. Dorsal spines flexible; body elongateOXYJULIS, 2.
- dd. Dorsal spines pungent; body oblong.....PSEUDOJULIS, 3.
- bb. Dorsal spines 8; no posterior canine tooth; dorsal spines pungent.
THALASSOMA, 4.

Genus 1. PLATYGLOSSUS.

- > PLATYGLOSSUS Klein, Pisces. Missus. IV, 40, 1744 (*marginalus*, &c.).
 = HALICHERES Rüppell, Neue Wirbelthiere, Fische, 16, 1835 (*bimaculatus*, &c.), (name preoccupied, as *Halichærus* for a genus of seals).
 = HALICHERES Günther, Ann. Mag. Nat. Hist., 1861, VIII, 386.
 > HALICHERES Bleeker, Proc. Zool. Soc., Lond., 1861, 411 (sense restricted).
 ? PLATYGLOSSUS* Bleeker, Proc. Zool. Soc. Lond., 1861, 411 (*marginalus*).
 = PLATYGLOSSUS Günther, Cat. Fish. Brit. Mus., IV, 1862, 143, and of most subsequent authors.
 ? MACROPHARYNGODON† Bleeker, l. c., 412 (*geoffroyi*).
 ? GÜNTHERIA ‡ Bleeker, l. c., 413 (*cæruleovittatus*).
 ? HEMITAUTOGA§ Bleeker, l. c., 413 (*centiquadrus*).
 > CHEROJULIS Gill, Proc. Acad. Nat. Sci. Phila. 1862, 142 (substitute for *Halichæres*).

The genus *PlatyGLOSSUS*, as left by Günther, does not appear to require any further subdivision. The American species are certainly all very closely related and belong to the same group, apparently that called *Halichæres* by Rüppell and Bleeker, and *Cherojulis* by Gill. We have not examined any specimens of the groups called *PlatyGLOSSUS*, *Macropharyngodon*, *Güntheria*, and *Hemitautoga*; but as Günther lays no stress on the distinctions pointed out by Dr. Bleeker, they are probably of insignificant value. If these subordinate groups are regarded as genera the American species are all referable to *Cherojulis*, distinguished from *Güntheria* and *Hemitautoga* by the naked head, from *PlatyGLOSSUS* by the absence of a scaly sheath at base of dorsal and anal, and from *Macropharyngodon* perhaps by the form of the pharyngeals. Without further information as to the East Indian species we cannot admit these nominal genera.

The generic names, *Chlorichthys* and *Ichthycallus* of Swainson, based in part on species of *PlatyGLOSSUS*, but distinguished by imaginary characters, and including species of earlier genera, have been very properly set aside by Dr. Gill as synonyms of *Coris* and *Julis*.

* *PlatyGLOSSUS* is defined as follows by Bleeker: "Squamæ corpore 27 ad 30 in linea laterali. Pinnae dorsalis et analis basi squamatæ. Maxilla superior dente angulari. Corpus oblongum. Dentes maxillis uniseriati."

PlatyGLOSSUS Klein (sp. typ., *Julis* [*Halichæres*] *annularis* K. v. H.).

† *Macropharyngodon* is thus defined by Dr. Bleeker: "Os pharyngeale inferius corpore margine posteriore valde convexo, corpore ipso dentibus 3 tantum, et horum medio molari maximo. Squamæ 28 in linea laterali. Pinnae dorsalis et analis basi alepidotæ. Maxillæ superior dente angulari. Dentes canini in maxilla superiore 4, maxilla inferiore 2. Dentes intermaxillares cristales, ad maxillam adnati vix conspicui. Corpus oblongum."

Macropharyngodon Blkr. (sp. typ. *Julis geoffroyi* Q.).

‡ *Güntheria* is thus defined by Bleeker: "Squamæ capitis in operculo superne tantum."

Güntheria Blkr. (sp. typ. *Halichæres cæruleovittatus* Rüpp.).

§ *Hemitautoga* is defined by Bleeker as follows: "Squamæ capitis in regione postoculæ et operculo superne tantum."

Hemitautoga Blkr. (sp. typ. *Labrus centiquadrus* Comm., Lac.).

Of the brilliant life-coloration in the species of this genus, specimens preserved in alcohol unfortunately retain few traces. The features of coloration noted in the following key are for the most part persistent.

ANALYSIS OF AMERICAN SPECIES OF PLATYGLOSSUS.

- a.* Caudal fin very slightly concave, the middle rays shortest; body robust, the depth about $2\frac{1}{2}$ in the length; ventral fins with the outer ray produced, more than twice as long as inner ray; scales before dorsal not crossing the median line, and arranged in about 5 series; color bluish or bronze, with many sky-blue spots, most distinct posteriorly; sky-blue spots and streaks on head; a stripe passing from snout to nape through upper part of eye; fins with blue stripes; a dark axillary spot; end of pectoral dusky.....*RADIATUS*, 1.
- aa.* Caudal fin rounded or subtruncate; the outer rays not produced, shorter than the middle rays.
- b.* Scales before dorsal reduced in size, extending across the median line and in 10 to 13 rows; ventral short, its rays not filamentous; snout rather blunt; body moderately elongate, the depth $3\frac{1}{2}$ in length; color olivaceous, with some blue and bronze markings; males with a broad indigo-blue cross-band behind pectorals; females with inky spots on the scales of the upper posterior part of back; pectorals yellow, with a black axillary spot.....*SEMICINCTUS*, 2.
- bb.* Scales* before dorsal large, in 5 or 6 rows, not crossing the median line; snout moderately pointed.
- c.* Ventral fin† with the outer rays produced, more than twice the length of the inner.
- d.* Sides without conspicuous dark lateral band and with a dark vertical bar, more or less distinct, extending downward from spinous dorsal; axillary spot obscure.
- e.* Body rather deep, the depth $3\frac{1}{2}$ in length; profile rather steep; posterior canines very strong; no black spots on head; caudal fin nearly plain; vertical bar obscure.....*NICHOLSI*, 3.
- ee.* Body rather elongate, the depth about $3\frac{1}{2}$ in length; profile not steep; posterior canines rather small; head with black streaks and spots above; caudal sharply barred; vertical dark bar distinct.
GARNOTI, 4.
- dd.* Side with a broad blue-black lateral band extending from eye to tip of caudal.
- f.* Spinous dorsal fin with no conspicuous black spot; a dark stripe from eye to nape; fins mostly dark, with pale edgings; axil and tip of pectoral dark; profile rather steep; body rather robust, the depth $3\frac{1}{2}$ in length.....*DIMIDIATUS*, 5.
- ff.* "Spinous dorsal fin with a conspicuous blue-black spot between the fifth and seventh spines; a dark spot under last dorsal ray; a blue band from snout through eye; another from eye upward and backward through operculum; three bluish bands across nape and three white ones across cheek; base of pectoral with a small black spot." (Günther.).....*MACULIPINNA*, 6.

* The character has not been verified in *P. nicholsi* nor in *P. maculipinna*, both of which we place provisionally in this group.

† Not verified in *P. maculipinna*.

co. Ventral fin with the outer rays not produced, its length not half more than that of inner ray; body slender, the depth 4 in length; opercle with a conspicuous black spot; a blue-black band from snout through eye to base of caudal; a narrower and fainter band from lower base of pectoral to above anal, these bands growing fainter with age and sometimes disappearing; no axillary spot; fins mostly pale, with bright colors in life; angles of caudal black in adult; lower pharyngeals T-shaped, the anterior limb shorter than any other species examined..... BIVITTATUS, 7.

aaa. Caudal fin double concave, the median portion convex, the outer rays somewhat produced.

g. A round jet-black spot on lateral line below fourth and fifth dorsal spine; no spot behind eye; ventrals with the outer ray little produced, not reaching nearly to tips of pectorals; body rather stout, the depth about $3\frac{1}{2}$ in length; profile steep; snout moderately pointed; scales before dorsal in about 6 rows; a variegated blotch behind pectorals; fins mostly pale, with paler streaks; no axillary spot..... DISPIIUS, 8.

gg. A round jet-black spot close behind eye; no spot on lateral line; ventrals with the outer rays somewhat produced, reaching to opposite tips of pectorals, but scarcely twice length of inner rays; body slender, the depth 4 to $4\frac{1}{2}$ in length; profile not steep; snout pointed; eye rather large; scales before dorsal in 7 rows, not crossing median line; sides with an orange band and numerous sky-blue spots; fins pale, with many streaks of orange and blue; no axillary spot..... CAUDALIS, 9.

1. *PlatyGLOSSUS radiatus*. *Pudding-wife*; *Doncella*.

Pudiano verde Maregrave, Hist. Pisc. Brasil., 146, 1648 (Brazil; on a drawing by Prince Maurice, of Nassau).

Turdus oculo radiato (Pudding-wife) Catesby, Nat. Hist. Carol., II, 12, tab. xii, fig. 1, 1743 (Bahamas).

Labrus radiatus Linnæus, Syst. Nat., ed. X, 288, 1758 (based on Catesby).

PlatyGLOSSUS radiatus Günther, Cat. Fish. Brit. Mus., IV, 163, 1862 (copied); Jordan, Proc. U. S. Nat. Mus., 135, 1884 (Key West); Jordan, Proc. U. S. Nat. Mus., 194, 1884 (identification of Catesby's figure); Jordan, Bull. U. S. Fish Com., 78, 1884 (Key West); Jordan, Cat. Fish. N. Am., 98, 1885; Jordan, Proc. U. S. Nat. Mus., 1885 (Havana).

Cherophilus radiatus Goode, Bull. U. S. Nat. Mus., V, 35, 1875 (Bermudas).

Doncella Parra, Desc. Dif. Piez. Hist. Nat. Cuba, 95, lam. 37, fig. 1, 1787 (Havana).

Labrus brasiliensis Bloch, Ichth., taf. 280, about 1787 (Brazil; on a drawing by Prince Maurice, of Nassau, of the Pudiano Verde); Bloch & Schneider, Systema Ichthyol., 242, 1801 (copied).

Chlorichthys brasiliensis Swainson, Class. Fish., &c., 232, 1839 (name only).

Julis crotaphus Cuvier, Règne Anim., ed. II, 1828 (based on *Doncella* of Parra; no description).

Julis cyanostigma Cuv. & Val., Hist. Nat. Poiss., XIII, 391, 1839 (Martinique).

PlatyGLOSSUS cyanostigma Günther, Cat. Fish. Brit. Mus., IV, 161, 1862 (Caribbean Sea); Cope, Trans. Am. Phil. Soc., 464, 1870 (St. Croix); Günther, Shore Fishes, Challenger, 4, 1880 (St. Paul's Rocks, mid-Atlantic).

Cherophilus cyanostigma Poey, Synopsis Pisc. Cub., 334, 1868 (Havana); Poey, Enumeratio, 1875, 107 (Havana).

Julis opalina Cuv. & Val., Hist. Nat. Poiss., XIII, 392, 1839 (Martinique).

PlatyGLOSSUS opalinus Günther, Cat. Fish. Brit. Mus., IV, 163, 1862 (copied).

Julis patatus Cuv. & Val., Hist. Nat. Poiss., XIII, 398, 1839 (Martinique, Cuba).

Julis principis Cuv. & Val., Hist. Nat. Poiss., XIII, 402, 1839 (Bahia).

PlatyGLOSSUS principis Günther, Cat. Fish. Brit. Mus., IV, 164, 1862 (copied).

Habitat.—West Indian fauna; Florida Keys to Brazil.

This is the largest in size of the American species of this genus, and one of those most readily recognized. It has been well described by Professor Goode, who has noted the variations due to age, and by Professor Jordan (Proc. U. S. Nat. Mus., 1884, 194), who has indicated the several variations in the adult.

This species is evidently the Pudiano Verde of Maregrave, the Pudding-wife of Catesby, and the Doncella of Parra.

The *Labrus radiatus* of Linnæus, in the tenth edition, is based solely on the Pudding-wife of Catesby. The Linnæan name, *radiatus*, must therefore be taken for this species. In the twelfth edition the *Labrus radiatus* disappears, and the Pudding-wife appears as a doubtful synonym of a *Sparus radiatus*, which is based on a specimen of *P. bivittatus* sent by Dr. Garden from South Carolina.

The *Labrus brasiliensis* of Bloch is a fairly good figure of the female of this species, except that the coloration is made bright yellow and orange, rather than olive and bronze.

The *Julis erotaphus* of Cuvier is based solely on a reference to Parra's Doncella, and must therefore be referred to this species, although the fish subsequently described as *Julis erotaphus* by Valenciennes seems to be our *P. caudalis*. The names *cyanostigma*, *patatus*, and *principis* are regarded by Goode as referring to different stages in the growth of this species. This view seems to be correct, and we may add *opalina* also as apparently the adult female.

The specimens of this species examined by us are all adult (15 to 18 inches long) and are from Key West and Havana.

2. *PlatyGLOSSUS semicinctus*. *Kelp-fish*.

Julis semicinctus Ayres, Proc. Cal. Acad., 32, 1859 (Cerro Island; male).

PlatyGLOSSUS semicinctus Günther, Cat. Fish. Brit. Mus., IV, 161, 1862 (copied); Steindachner, Ichthy. Beiträge, V, 151, 1876 (San Diego); Jordan & Gilbert, Proc. U. S. Nat. Mus., 455, 1880 (San Pedro); Jordan & Gilbert, Proc. U. S. Nat. Mus., 10, 1881 (Wilmington, Cal.); Jordan & Gilbert, Proc. U. S. Nat. Mus., 52, 1881 (Santa Catalina, San Pedro); Jordan & Gilbert, Synopsis Fish., N. Am., 603, 1883; Jordan, Cat. Fish. N. Am., 99, 1885.

Charojulis semicinctus Gill, Proc. Ac. Nat. Sci. Phil., 223, 1863 (no description).

Habitat.—Lower California fauna; Los Angeles to Panama.

This species reaches a length of about a foot. It has been described with sufficient accuracy by Steindachner and by Jordan & Gilbert (Synopsis). The coloration is comparatively plain, but that of the female is notably different from that of the male.

The specimen before us is from San Diego.

3. *PlatyGLOSSUS nicholsi*.

PlatyGLOSSUS nicholsi Jordan & Gilbert, Proc. U. S. Nat. Mus., 231, 1881 (Braithwaite Bay, Socorro Isl.); Jordan, Proc. U. S. Nat. Mus., 384, 1885 (name only).

Habitat.—Revillagigedo Islands; one specimen known.

Of this species only the original type is known. This is dull in color and is, perhaps, a female faded in alcohol.

4. *PlatyGLOSSUS garnoti*.

Julis garnoti Cuv. & Val., XIII, 390, 1839 (Martinique); Guichenot in Sagra, Hist. de Cuba, 218, about 1855 (Havana).

PlatyGLOSSUS garnoti Günther, IV, 162, 1862 (Martinique); Jordan, Proc. U. S. Nat. Mus., 1885 (Havana).

Julis cinctus Poey, Mem. Cuba, II, 211, tab. 13, fig. 19, 1860 (Havana).

Charojulis cinctus Poey, Synopsis, 334, 1868 (Havana); Poey, Enumeratio, 108, 1875 (Havana).

Julis ruptus Poey, Mem. Cuba, II, 212, tab. 13, fig. 20, 1860.

Charojulis ruptus Poey, Synopsis, 334, 1868 (Havana).

PlatyGLOSSUS ruptus Cope, Trans. Am. Phil. Soc., 464, 1870 (St. Croix).

Habitat.—West Indian fauna.

Of this small species we have but two specimens, each about 8 inches long, from Havana. Poey notes that this species varies much in color-markings, and includes in his Enumeratio his *Julis ruptus* as a synonym of *Julis cinctus*. After making reasonable allowance for variation in specimens, and for the lack of detail in description, we see no reason why the *Julis garnoti* may not be the same species, and we therefore so regard it.

The life coloration in our specimens of *Pl. garnoti* was as follows:

Head olive, shaded with brown; bright violet-blue on the lower jaw. Dark violet dots and streaks behind and above eye. Shoulders deep yellow-olive; behind this a blackish cross-band, behind which the back and the base of the dorsal is a rich maroon-crimson; body below this livid purplish, shaded with olive. Spinous dorsal olive, with blue dots; soft dorsal bluish, banded with bronze, and edged with dusky. Caudal bluish-gray, with sharply-defined, narrow bronze bands. Anal olive-reddish, with streaks of crimson, violet, and blue. Pectorals light reddish, their tips black; axil violet. Ventrals pale. A diffuse dusky spot at upper base of caudal.

5. *PlatyGLOSSUS dimidiatus*.

Julis dimidiatus Agassiz, in Spix, Pisc. Braz., 96, pl. 53, 1829 (Brazil); Cuv. & Val., XIII, 407, 1839 (Martinique; Brazil).

Ichthyallus dimidiatus Swainson, Class. Fish. & c., 232, 1839 (name only).

PlatyGLOSSUS dimidiatus Jordan, Proc. U. S. Nat. Mus., 1885 (Havana).

Julis internasalis Poey, Mem. Cuba, II, 421, 1860 (Havana).

PlatyGLOSSUS internasalis Günther, Cat. Fish. Brit. Mus., IV, 164, 1862 (Caribbean Sea); Cope, Trans. Am. Phil. Soc., 463, 1870 (St. Martin's).

Charojulis internasalis Poey, Synopsis, 334, 1868 (Havana); Poey, Enumeratio, 108, 1875 (Havana).

Habitat.—West Indian fauna: south to Brazil.

There seems to be no important reason for regarding the Cuban *internasalis* as different from the Brazilian *dimidiatus*, the alleged differences in color being doubtless due to omissions in the original description. The colors in all these fishes rapidly fade in dried or preserved specimens,* and descriptions or figures drawn from such cannot be closely compared with fresh examples.

Two male specimens of *P. dimidiatus* from Havana are each about 15 inches in length. In life they showed the following coloration:

Deep light olive-green on head and back, the head bluer, then a broad lateral band of deep indigo, below this light clear green, then darker bluish-green; clear blue on lower jaw below, and clear greenish-blue on lower part of cheek; lateral band becoming faint on head; a dark streak along profile from snout to nape; a dark bluish band upward and backward from eye to nape, rather conspicuous, narrowed posteriorly; dorsal indigo, edged with sky-blue; caudal green, indigo in center, yellowish at tip; anal indigo, then dull orange, then sky-blue; ventrals green; pectorals plain greenish, indigo above; axil dark.

6. *PlatyGLOSSUS maculipinna*.

Julis maculipinna Müller & Troschel in Schomburgh, Hist. Barbadoes, 674, 1848 (Barbadoes).

PlatyGLOSSUS maculipinna Günther, Cat. Fish. Brit. Mus., IV, 1862, 165 (Trinidad); Jordan, Cat. Fish. N. Am., 1885, 99 (Beaufort, N. C.); Jordan, Proc. U. S. Nat. Mus., 1885 (Beaufort).

Charojulis maculipinna Poey, Synopsis, Pisc. Cub., 1868, 336; Poey, Enumeratio, 109, 1875 (Havana).

Pusa radiata* Jordan & Gilbert, Proc. U. S. Nat. Mus., 1878, 374 (Beaufort).

Habitat.—West Indian fauna; north to Beaufort.

This species is known to us chiefly from descriptions. A small example taken by Professors Jordan & Gilbert at Beaufort in 1877† is regarded as belonging to it, but this individual is now destroyed, and we are unable to verify this identification. No other known species has, however, the black dorsal spot.

The character of the predorsal scales and of the ventrals should be known before the place of this species in our analytical key can be given.

* The rather curious blunder involved in the use of the name "*Pusa*" for this genus came about in this way: Professor Gill once informed the writer that the name *Pusa* of Scopoli must probably supersede *Halicharus*, the latter being a genus of seals. The writer adopted the statement as referring to *Halichares*, the genus of fishes.

† The life colors of this specimen were thus described: "Bright green; a dark brown lateral band covering two rows of scales; above this three bronze bands, with green interspaces, below it a band of crimson; these bands running forward and meeting on the snout; dorsal fin bright vermilion, with a large blue spot, ocellated with yellow near its middle; a smaller dark blue spot at base of last dorsal ray and another at base of caudal; anal red, with a yellowish streak; caudal nearly plain; iris red. Length, 1½ inches."

7.—*Platyglossus bivittatus*. *Slippery Dick*; *Doncella*.

Sparus radiatus Linnaeus, Syst. Nat., ed. XII, 472, 1766 (Carolina; based on a specimen from Charleston, sent by Dr. Garden); Gmelin, Syst. Nat., 1278, 1788 (copied); Walbaum, Artedi Piscium, 289, 1792 (copied); Bloch & Schneider, Syst. Ichth., 207, 1801 (copied), (not *Labrus radiatus* L., ed. X).

Platyglossus radiatus Jordan & Gilbert, Proc. U. S. Nat. Mus., 608, 1882 (Charleston).

Labrus bivittatus Bloch, Ichth., taf. 284, fig. 1, about 1787 (from a painting by Plumier, made at Martinique).

Ichthyallus bivittatus Swainson, Class. Fish. & c., 232, 1839 (name only).

Platyglossus bivittatus Günther, Cat. Fish. Brit. Mus., IV, 164, 1862 (Jamaica); Steindachner, Ichth. Notiz., VI, 49, 1867 (Barbadoes and Surinam); Cope, Trans. Am. Phil. Soc., 463, 1870 (St. Martin's); Jordan, Proc. U. S. Nat. Mus., 40, 1884 (foot-note); Jordan, Proc. U. S. Nat. Mus., 136, 1884 (Key West); Bean & Dresel, Proc. U. S. Nat. Mus., 153, 1884 (Jamaica); Jordan, Bull. U. S. Fish Com., 79, 1884 (Key West); Jordan, Cat. Fish. N. Am., 98, 1885; Jordan, Proc. U. S. Nat. Mus., 1885 (Havana).

Charojulis bivittatus Poey, Syn., 335, 1868 (Havana).

Labrus psittaculus Lacépède, Hist. Nat. Poiss., III, 522, 1800 (Martinique; from a copy of Plumier's painting).

Julis psittaculus Cuv. & Val., Hist. Nat. Poiss., XIII, 387, 1839 (Martinique and Surinam).

Julis humeralis Poey, Mem. Cub., II, 212, 1860 (Havana).

Charojulis humeralis Poey, Syn., 335, 1868 (Havana); Poey, Enumeratio, 108, 1875 (Havana).

Platyglossus humeralis Günther, Cat. Fish. Brit. Mus., IV, 165, 1862 (Cuba); Jordan & Gilbert, Syn. Fish. N. Am., 603, 1882.

Charojulis humeralis Goode & Bean, Proc. U. S. Nat. Mus., 338, 1879 (Clear Water Harbor).

Charojulis grandisquamis Gill, Proc. Acad. Nat. Sci. Phil., 206, 1863 (Beaufort, N. C.).

Pusa grandisquamis Jordan & Gilbert, Proc. U. S. Nat. Mus., 374, 1879 (Beaufort).

Platyglossus grandisquamis Jordan & Gilbert, Syn. Fish. N. Am., 603, 1882 (copied).

Charojulis arangoi Poey, Enumeratio Pisc. Cub., 109, 1875 (Havana).

Platyglossus florcalis Jordan & Gilbert, Proc. U. S. Nat. Mus., 287, 1882 (Pensacola).

Habitat.—West Indian fauna; Beaufort, N. C., to Brazil. Excessively abundant along rocky or weedy shores and reefs.

This species reaches a smaller size than any other of our representatives of the genus. It is also by far the most common in the waters of Florida and Cuba, and its range extends considerably farther north than any of the others.

The variations due to age and to character of the bottom are very considerable, having caused the establishment of several nominal species. In the descriptions above mentioned by Professors Jordan & Gilbert of specimens from Charleston, Pensacola, and Key West these variations have been sufficiently indicated. Our Cuban specimens (from coral sand) are much paler in color than those from farther north. The dark markings, however, remain similar. In old examples the

dark lateral bands fade, sometimes becoming more or less broken; the corners of the caudal become dark, and there is usually a dark spot at base of last dorsal ray.

The earliest specific name, *radiatus*, is untenable, because preoccupied. The name next in date, *bivittatus*, is based on a rather poor figure, which could, however, have been intended for no other known species. This name must therefore be retained. The name *psittaculus* is said to be based on the same figure. The *humeralis* of Poey seems to be unquestionably the adult of this fish, common in the Havana markets, and his *arangoi* is a young example of the same, from different bottom, and showing a coloration more like our Florida specimens. The *granai-squamis* of Gill is based on an adult example in which the coloration is less sharply defined, and finally the *florealis* of Jordan & Gilbert is the gaily-colored young. None of this synonymy seems to us subject to any serious question.

8. *Platyglossus dispilus*.

Platyglossus dispilus Günther, Proc. Zool. Soc. London, 25, 1864 (Panama); Günther, Fish. Cent. Am., 447, 1869 (Panama); Steindachner, Ichth. Beiträge III, 64, 1875 (Acapulco); Jordan & Gilbert, Bull. U. S. Fish Com., 108, 1882 (Mazatlan); Jordan, Proc. U. S. Nat. Mus., 384, 1885 (Mazatlan; name only); Jordan, Cat. Fish. N. Am., 99, 1885.

Habitat.—Panama fauna; Mazatlan to Panama.

This species has been well figured and described by Dr. Günther. It was found by Dr. Gilbert to be rather common in the rock-pools about Mazatlan. It reaches but a small size. The characters in our analysis of species are taken from the figure of Dr. Günther.

9. *Platyglossus caudalis*.

Julis crotaphus Cuv. & Val., Hist. Nat. Poiss., XIII, 395, tab. 395, 1839 (Bahia), (not of Cuvier).

Platyglossus crotaphus Günther, Cat. Fish. Brit. Mus., IV, 163, 1862 (Bahia, Jamaica); Cope, Trans. Am. Phil. Soc., 463, 1870 (St. Croix).

Chorojulis crotaphus Poey, Enumeratio, 109, 1875 (Havana).

Julis caudalis Poey, Mem. Cuba, II, 213, 1861 (Havana); Günther, Cat. Fish. Brit. Mus., IV, 191, 1862 (copied).

Platyglossus caudalis Günther, Cat. Fish. Brit. Mus., IV, 166, 1862 (copied); Jordan & Gilbert, Proc. U. S. Nat. Mus., 286, 1882 (Pensacola); Jordan, Proc. U. S. Nat. Mus., 37, 1884 (Pensacola).

? *Julis pictus* Poey, Mem. Cuba, II, 214, 1861 (Havana).

? *Platyglossus pictus* Günther, Cat. Fish. Brit. Mus., IV, 166, 1862 (Cuba).

? *Platyglossus poeyi* Steindachner, Ichth. Notiz., VI, 49, 1867 (Surinam).

Habitat.—West Indian fauna; Pensacola to Bahia.

This species is known to us only from several specimens taken in deep water near Pensacola by Mr. Silas Stearns, and described as *Platy-glossus caudalis* by Jordan & Gilbert.

The synonymy of the species is not wholly satisfactory. The original descriptions of *crotaphus*, *caudalis*, *pictus*, and *poeyi* all show some of the distinctive characters of our specimens; but these specimens, while agreeing closely with each other, all diverge more or less from

all the above-mentioned accounts. It is possible that three or four species of this type exist, but our knowledge of the variations in *P. bivittatus* leads us to doubt this, and to regard all as one. *PlatyGLOSSUS pictus* seems the most different from our examples of any of these nominal species.

We have rejected the name *croTAPHUS*, because in the Règne Animal, where the name first appears, it is accompanied only by a reference to the Doncella of Parra, which is *P. radiatus*.

Genus 2. OXYJULIS.

Oxyjulis Gill, Proc. Ac. Nat. Sci. Phila., 1863, 330 (*modestus*).

This group is intermediate between *PlatyGLOSSUS* and *Pseudojulis*, differing from either only in trifling respects. The single known species is very slender, with very feeble dorsal spines, and with the posterior canine characteristic of *PlatyGLOSSUS* either represented by a small rudiment or else altogether wanting. Occasionally but eight dorsal spines are present, as in *Thalassoma*. The genus seems, however, to be as well worthy of retention as many others among the *Labridæ*.

ANALYSIS OF SPECIES OF OXYJULIS.

- a. Body elongate, strongly compressed, the back not elevated, the head slender and sharp; depth, $4\frac{1}{2}$ in length of body; snout 3 in head; eye 5; posterior canine weak or wanting, rarely present on both sides; scales before dorsal much reduced, in 10 to 12 rows, those on breast considerably smaller than those on sides; caudal truncate; ventrals short, the first ray not twice the length of the inner ray; dorsal spines flexible; olive-brown; centers of scales orange-brown; belly cream color; sides of head with alternate streaks of bluish and brown; a large inky blotch at base of caudal, covering one-third the fin; membrane of base of spinous dorsal largely indigo-blue; fins otherwise pale; lower pharyngeals formed as usual in *PlatyGLOSSUS*, the large teeth less obtuse.

CALIFORNICUS, 10.

10. *Oxyjulis californicus*. *Señorita*; *Pesce Rey*.

Julis modestus Girard, Proc. Ac. Nat. Sc. Phil., VII, 151, 1854 (copied); Girard, U. S. Pac. R. R. Sur. Fish., 163, 1859 (San Diego, Monterey, San Miguel); Gill, Proc. Ac. Nat. Sci. Phil., 142, 1862 (foot-note), (not *Julis modestus* Bleeker).

Pseudojulis modestus Günther, Cat. Fish. Brit. Mus., IV, 168, 1862 (San Diego); Jordan & Gilbert, Proc. U. S. Nat. Mus., 455, 1880 (Monterey, San Diego); Jordan & Gilbert, Proc. U. S. Nat. Mus., 10, 1881 (Monterey, Santa Barbara); Jordan & Gilbert, Proc. U. S. Nat. Mus., 225, 1881 (Guadalupe Isl.); Jordan & Gilbert, Synopsis Fish. N. A., 1883, 604; Jordan, Cat. Fish. N. A., 99, 1885.

Oxyjulis modestus Gill, Proc. Ac. Nat. Sci. Phil., 331, 1863 (coast of California).
Halichares californicus Günther, Proc. Zool. Soc. London, 1861 (name only; substitution for *Julis modestus* preoccupied).

Habitat.—Coast of California; Monterey to Guadalupe Island.

This pretty little fish is well described in the Synopsis of the Fishes of North America above cited. It is common in the kelp along the coast of

Lower and Southern California and reaches a length of 7 inches. On the rule that "once a synonym, always a synonym," now adopted by most American ornithologists and ichthyologists, the name *modestus* must give place to *californicus*.

Genus 3. PSEUDOJULIS.

Pseudojulis Bleeker, Proc. Zool. Soc. London, 1861, 412 (*girardi*).

This genus contains two or three species similar to *PlatyGLOSSUS* in all respects except in the absence of the posterior canines. From *Oxyjulis* they differ in having the dorsal spines sharp. But one American species is known.

ANALYSIS OF AMERICAN SPECIES OF PSEUDOJULIS.

a. Caudal fin rounded; ventral fin with the outer ray not produced, its length not nearly twice that of inner ray; its tip not reaching tip of pectoral; scales before dorsal in about six series; body rather stout, the depth $3\frac{1}{2}$ in the length; snout pointed; profile not steep; dorsal spines pungent; olive, young with a silvery lateral streak; back with four or five indistinct broad dark cross-bands, these forming blotches on the dorsal fin, one of these on the first three soft rays, largest and black; angles of caudal pale; ventrals whitish, with a broad black outer margin NOTOSPILUS, 11.

11. *Pseudojulis notospilus*.

Pseudojulis notospilus Günther, Proc. Zool. Soc. London, 26, 1864 (Panama); Günther, Fish. Cent. Am., 447, 1869 (Panama); Jordan & Gilbert, Bull. U. S. Fish Comm., 1882, 108 and 111 (Mazatlan, Panama); Jordan, Proc. U. S. Nat. Mus., 1885, 384 (Mazatlan, Panama); Jordan, Cat. Fish. N. Am., 99, 1885.

Habitat.—Panama fauna; Mazatlan to Panama.

This species reaches a length of about 4 inches. Several specimens were taken by Dr. Gilbert in the rock-pools about Mazatlan, and others were found at Panama. As these specimens are not now accessible to us we have taken our analysis from the description and figure of Dr. Günther.

Genus 4. THALASSOMA.

Julis species, Cuvier & Valenciennes, XIII, 1839 (not type).

Thalassoma Swainson, Nat. Hist. Class'n Fishes, II, 1839, 224 (*purpureus*).

*Chlorichthys** Swainson, l. c., II, 1839, 232 (*bifasciatus*, &c.).

Julis Günther, Cat. Fish. Brit. Mus., IV, 1862, 179 (not of Cuvier nor of Swainson).

This genus as here understood comprises numerous species, similar in most respects to the species of *PlatyGLOSSUS*, but with only 8 spines in the dorsal fin and without posterior canines. The species belong mostly to the Pacific and Indian Oceans, those of the Atlantic being few.

The group *Thalassoma* of Swainson, distinguished by him from

* "*Chlorichthys* and *Ichthyællus*, confused jumbles of species, may well be disposed of as synonyms of *Thalassoma* and *Coris*, respectively, although several other genera are represented in each." (Swain, Proc. Ac. Nat. Sci. Phila., 1882, 275.)

Xyriethys by the form of the head, the position of the eyes, &c., was based on ignorance. *Thalassoma* is, however, the oldest generic name applied to any members of the present group, and it must be retained. If the group be reunited with *PlatyGLOSSUS*, &c., the name *Thalassoma* should be used for all.

The generic name *Julis* was first given by Cuvier especially to the *Labrus julis* of the Mediterranean, a species referred by Dr. Günther to the genus *Coris* of Lacépède. Numerous other species were included in the group by Cuvier, but by Swainson all these others were removed, leaving *Labrus julis* as the sole species of *Julis*. Whether *Julis*, as thus restricted, is distinguishable from *Coris* or not we cannot say, and this question does not concern the American species. All the American *Julidinae* have large scales, while most of those found in the eastern Atlantic (*Julis*, *Coris*) have the scales small.

Of the American species of *Thalassoma*, but one (*lucasanum*) has been examined by us. The characters given below are, therefore, drawn entirely from descriptions.

ANALYSIS OF AMERICAN SPECIES OF THALASSOMA.

- a. Caudal subtruncate, the outer rays not at all produced; body slender, the depth about 4 in length; ventrals shorter than pectorals; upper half of body dark purplish, lower half becoming abruptly rosy; dorsal dark, margined with whitish; anal brownish, outer half pale; caudal yellowish, with two purplish bands; axil with a purple dot..... LUCASANUM, 12.
- aa. Caudal sublunate, the lobes very slightly produced; body slender, compressed, the depth about 4 in length; no posterior canine; dorsal spines pungent; ventrals much shorter than pectorals; top of head and back brilliant yellow, this color extending on sides of head and to ventrals; a large yellow blotch on caudal fin; lower parts rosy white; a maroon band backward from eye, breaking up on body into a series of six quadrate spots of bottle-green, the last blotch extending on outer rays of caudal; dorsal mostly greenish, with pale margin, a dark blotch between second and fifth spines; pectorals pale; ventrals yellow (*Goode*)..... NITIDUM, 13.
- aaa. Caudal forked, the lobes much produced.
- b. Pectoral without conspicuous dark spot; anterior half of body deep blue; head paler; posterior half of body bottle-green; a deep blue band across body covered by pectoral; a fainter one behind gill-opening, the two perhaps sometimes coalescing; spinous dorsal dark; tip of pectoral dark; caudal pale, its lobes dark blue on the outer part; soft dorsal greenish; anal and ventrals bluish..... BIFASCIATUM, 14.
- bb. Pectoral fin with a conspicuous spot of indigo-blue behind its middle; head and caudal fin entirely violet-blue; obscure paler streaks on side of head; breast violet, paler than the head; body violaceous, its anterior third paler, the scales posteriorly edged with dull violet (*Steindachner*).... MELANOCHIR, 15.

Thalassoma lucasanum.

Julis lucasanus Gill, Proc. Ac. Nat. Sci. Phil., 142, 1862 (Cape San Lucas); Günther, Cat. Fish. Brit. Mus., IV, 184, 1862 (Cape San Lucas); Jordan & Gilbert, Proc. U. S. Nat. Mus., 367, 1882 (Cape San Lucas); Jordan & Gilbert, Bull. U. S. Fish Comm., 1881.

Thalassoma lucasanum Jordan. Cat. Fish. N. Am., 98, 1885; Jordan, Proc. U. S. Nat. Mus., 1885, 351 (Mazatlan).

Habitat.—Gulf of California.

This little fish was found in some abundance at Cape San Lucas by Xnatus and at Mazatlan by Gilbert. It reaches a length of about 3 inches.

Thalassoma nitidum.

Julis nitida Günther, Cat. Fish. Brit. Mus., IV, 190, 1862 (Jamaica).

Julis nitidissima Goode, Am. Jour. Sci. and Art, 293, 1877 (Bermuda).

Habitat.—West Indian fauna.

This species is unknown to us. In describing *J. nitidissima*, Professor Goode indicates his suspicion that it is identical with *Julis nitida*. One can hardly think otherwise on comparing his description, taken from a single fresh specimen, with that of Dr. Günther, taken from three preserved examples. The agreement seems to us perfect, when we take into account the variations to which the *Labridæ* are subject. The only tangible distinction would be in the length of the ventrals, two thirds the pectorals in *J. nitida* and three-sevenths in *J. nitidissima*. -

Thalassoma bifasciatum.

Labrus capite obtuso Gronow, Zoophyl., No. 243, 1781 (Antilles).

Labrus bifasciatus Bloch, Ichthy., 131, pl. 283, about 1787 (East Indies); Bloch & Schneider, Syst. Ichthy., 243, 1801 (after Bloch).

Chlorichthys bifasciatus Swainson, Nat. Hist. Class'n. Fish., II, 1839, 232 (name only).

Julis bifasciata Günther, Cat. Fish. Brit. Mus., IV, 186, 1862 (Jamaica).

Julis bifasciatus Poey, Enumeratio, 107, 1875 (Jamaica).

Labrus bifasciatus var. *torquatus* Bloch & Schneider, Syst. Ichth., 1801, 243 (Antilles; after Gronow).

Julis detorsor Cuv. & Val., Hist. Nat. Poiss., XIII, 408, 1839 (San Domingo, Martinique); Günther, IV, 186, 1862 (copied).

Labrus ornatus Gronow, Syst., ed. Gray, 83, 1854 (Antilles; after *Labrus capite obtuso*), (not of Carmichael).

Julis gillianus Poey, Mem. Cuba, II, 214, 1860 (Cuba); Poey, Syn., 332, 1868 (Cuba).

Habitat.—West Indian fauna.

There seems to be little room for doubt that the *Julis detorsor* is identical with *Th. bifasciatum*. The agreement is, as Poey has noticed, very close in all respects, except that implied in the remark of Valenciennes that the "spinous dorsal is low and scaly" ("basse et couverte d'écaïles"). This expression, if intended to mean that the fin is scaly, must be an error.

Thalassoma melanochir.

Julis melanochir Bleeker, "Act. Soc. Sc. Indo-Nederl., II, Amboyna, VIII, 77, 1859, and Atl. Ichth., 89, tab. 33, fig. 2, 1862;" Günther, Cat. Fish. Brit. Mus., IV, 182, 1862 (Amboyna); Stenidaehner, Ichth. Beiträge, III, 63, 1875 (Acapulco, Sandwich Isl.). *Thalassoma melanochir* Jordan, Proc. U. S. Nat. Mus., 1885, 384 (name only).

Habitat.—Pacific Ocean, East Indies, and Sandwich Islands; a single specimen recorded from Acapulco.

Dr. Steindachner observes, "An example caught at Acapulco agrees on the whole so closely with *Julis melanochir* that I can only, on account of its color, regard it as a variety of that species."

"*Julis melanochir* comes very abundantly on the coast of the Sandwich Islands, and it may from thence extend its range to the west coast of North America, which, on the whole, possesses but few Labroids."

The characters in our analysis are taken from Steindachner's account of the specimen from Acapulco.

RECAPITULATION.

The following is a list of American species of *Julidinae* admitted by us. The distribution of each is indicated by the letters W. (West Indian fauna), P. (Panama fauna), C. (Lower California fauna), U. (coasts of United States):

1. PLATYGLOSSUS (Klein) Bleeker.

§ *Chorojulis* Gill.

1. *PlatyGLOSSUS radiatus* L. (W. U.)
2. *PlatyGLOSSUS semicinctus* Ayres. (C. U.)
3. *PlatyGLOSSUS nicholsi* Jordan & Gilbert. (P.)
4. *PlatyGLOSSUS garnoti* Cuv. & Val. (W.)
5. *PlatyGLOSSUS dimidiatus* Agassiz. (W.)
6. *PlatyGLOSSUS maculipinna* Müller & Troschel. (W. U.)
7. *PlatyGLOSSUS bivittatus* Bloch. (W. U.)
8. *PlatyGLOSSUS dispilus* Günther. (P.)
9. *PlatyGLOSSUS caudalis* Poey. (W. U.) (Perhaps more than one species included in the synonymy.)

2. OXYJULIS Gill.

10. *Oxyjulis californicus* Günther. (C. U.)

3. PSEUDOJULIS Bleeker.

11. *Pseudojulis notospilus* Günther. (P.)

4. THALASSOMA Swainson.

12. *Thalassoma lucasanum* Gill. (P.)
13. *Thalassoma nitidum* Günther. (W.)
14. *Thalassoma bifasciatum* Bloch. (W.)
15. *Thalassoma melanochir* Bleeker. (P., East Indies.)

LIST OF NOMINAL SPECIES, WITH IDENTIFICATIONS.

The following is a list of the nominal species of American *Julidinae*, arranged in order of description, together with our identification of each. Tenable specific names are indicated by a star (*):

Nominal species.	Year.	Identification.
<i>Labrus radiatus</i> ,* Linnaeus.....	1758	<i>PlatyGLOSSUS radiatus</i> .
<i>Sparus radiatus</i> , Linnaeus.....	1766	<i>Pl. bivittatus</i> .
<i>Labrus brasiliensis</i> , Bloch.....	1787	<i>Pl. radiatus</i> .
<i>Labrus bifasciatus</i> ,* Bloch.....	1787	<i>Tbalassoma bifasciatum</i> .
<i>Labrus bivittatus</i> ,* Bloch.....	1787	<i>Pl. bivittatus</i> .
<i>Labrus psittaculus</i> , Lacépède.....	1800	<i>Pl. bivittatus</i> .
<i>Julis erotaphus</i> , Cuvier.....	1828	<i>Pl. radiatus</i> .
<i>Julis dimidiatus</i> ,* Agassiz.....	1829	<i>Pl. dimidiatus</i> .
<i>Julis garnoti</i> ,* Cuv. & Val.....	1839	<i>Pl. garnoti</i> .
<i>Julis cyanostigma</i> , Cuv. & Val.....	1839	<i>Pl. radiatus</i> .
<i>Julis opalina</i> , Cuv. & Val.....	1839	<i>Pl. radiatus</i> .
<i>Julis erotaphus</i> , Cuv. & Val.....	1839	<i>Pl. caudalis</i> .
<i>Julis patatus</i> , Cuv. & Val.....	1839	<i>Pl. radiatus</i> .
<i>Julis principis</i> , Cuv. & Val.....	1839	<i>Pl. radiatus</i> .
<i>Julis detorsor</i> , Cuv. & Val.....	1839	<i>Tb. bifasciatum</i> .
<i>Julis maculipinna</i> ,* Müller & Troschel.....	1848	<i>Pl. maculipinna</i> .
<i>Julis modestus</i> , Girard.....	1854	<i>OxyJulis modestus</i> .
<i>Labrus ornatus</i> , Gronow.....	1854	<i>Th. bifasciatum</i> .
<i>Julis semicinctus</i> ,* Ayres.....	1859	<i>Pl. semicinctus</i> .
<i>Julis melanochir</i> ,* Bleeker.....	1859	<i>Th. melanochir</i> .
<i>Julis cinctus</i> , Poey.....	1860	<i>Pl. garnoti</i> .
<i>Julis raptus</i> , Poey.....	1860	<i>Pl. garnoti</i> .
<i>Julis humeralis</i> , Poey.....	1861	<i>Pl. bivittatus</i> .
<i>Julis caudalis</i> ,* Poey.....	1860	<i>Pl. caudalis</i> .
<i>Julis gillianni</i> , Poey.....	1860	<i>Th. bifasciatum</i> .
<i>Julis pictus</i> , Poey.....	1860	<i>Pl. caudalis</i> .
<i>Julis interstitialis</i> , Poey.....	1860	<i>Pl. dimidiatus</i> .
<i>Halichoeres californicus</i> ,* Günther.....	1861	<i>Ox. californicus</i> .
<i>Julis lucasanni</i> ,* Gill.....	1862	<i>Th. lucasanni</i> .
<i>Julis nitida</i> ,* Günther.....	1862	<i>Th. nitidum</i> .
<i>Cherophilus grandisquamis</i> , Gill.....	1863	<i>Pl. bivittatus</i> .
<i>PlatyGLOSSUS dispilus</i> ,* Günther.....	1864	<i>Pl. dispilus</i> .
<i>PseudoJulis notospilus</i> ,* Günther.....	1864	<i>PseudoJulis notospilus</i> .
<i>PlatyGLOSSUS poeyi</i> , Steindachner.....	1867	<i>Pl. caudalis</i> .
<i>Cherophilus arangoi</i> , Poey.....	1875	<i>Pl. bivittatus</i> .
<i>Julis nitidissima</i> , Goode.....	1877	<i>Th. nitidum</i> .
<i>PlatyGLOSSUS nicholsi</i> ,* Jordan & Gilbert.....	1881	<i>Pl. nicholsi</i> .
<i>PlatyGLOSSUS florealis</i> ,* Jordan & Gilbert.....	1882	<i>Pl. bivittatus</i> .

INDIANA UNIVERSITY, December 15, 1885.