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THE SEA-ROBINS OF AMERICA
A REVISION OF THE TRIGLID FISHES OF THE GENUS *PRIONOTUS*

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A revision of the species of the genus *Prionotus* has long been overdue. While all ichthyologists are agreed upon this point, it is to taxonomists working beyond the reach of types that the present state of the literature has become a really serious problem.

Without wishing to depreciate the great debt that every ichthyologist owes to JORDAN and EVERMANN, it must be admitted that their many collaborators did not always speak with one voice, nor did they confide in their readers the exact bases — often too few in themselves — of the computations upon which their evaluations were founded. And this alone, in appraising a fish with the peculiar morphology of the sea-robin, has constituted a fertile source of error.

With the earnest desire to remove this impediment to the proper understanding of the genus, the writer has undertaken a fresh revision which, whatever its deficiencies, has the merit, he submits, of having been compiled upon common bases of comparison for all the species and with a single criterion.

GENERAL REMARKS

Caudal ray count. This count has been omitted in the description of each species, because a check on all the species with the exception of *birostratus* and *ophryas* (holotype damaged; no other authentic example traceable) reveals that the principal ray formula is constant in the genus, viz. 1 + 9 + 1 (nine branched rays flanked on either side by a simple ray).

Rostral plates. A key without reference to the contour of the rostral plates would be incomplete, but this feature must be used with caution because of its great variability in species in which at maximum development the plates are produced. In *alatus* and *loxias*, for example, the plates are more often near normal, or even normal, in the young than exserted. The term "acutely produced" is employed relatively in contradistinction to the short, rounded projections herein termed "obtusely produced", but does not necessarily mean that distal end of the exsertions is sharp.

Suborbital spine. This spine is nearer obsolescense than any of the other

smaller cranial spines. It is only definitely present from the juvenile stage to the adult in *ruscarius* and *horrens* *. Its inclusion by JORDAN and EVERMANN in their key has led to wrong diagnoses.

Belly line. With but few exceptions (*stearnsi, grisescens* and *scitulus*) there is a clear line of demarcation between the pigmented upper area (dorsum and sides) and the unpigmented ventral region. This line commences anteriorly either at the level of the humeral spine or, at its lowest, just above the origin of the pelvic fin, and terminates at the centre of the caudal base in conjuction with the pored lateral line.

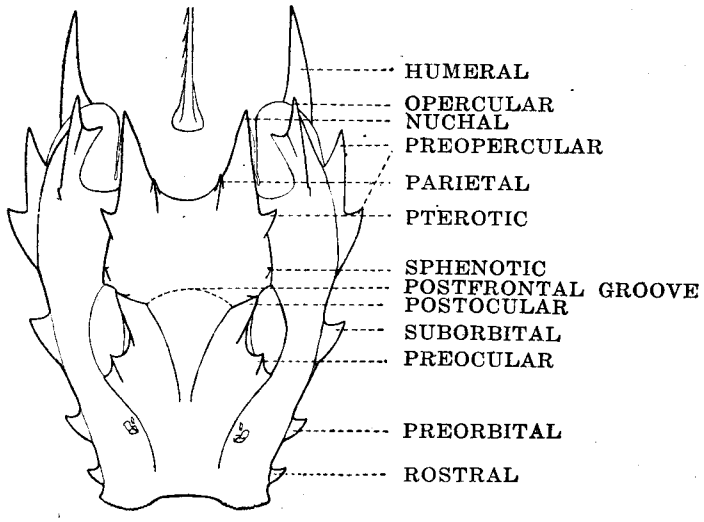
Cranial diagram. The accompanying diagram (text-fig. 1) drawn to scale by Dorothy M. Schultz from a young specimen (112 mm. in standard length) of *horrens,* illustrates the position of the cranial spines in conjunction with the nomenclature adopted for the description. The position of the postfrontal groove in the species that possess it is indicated by a dotted line: it is absent in *horrens.*

Method of taking measurements and counts. Standard length: tip of snout at median indentation to end of hypural fan; *depth*: vertical measurement from highest portion of nape to point midwal between pelvic axillaries; *width*: measurement with caliper tips inside free portion of preopercular spines, gill covers appressed. *Head length*: from tip of snout at median indentation to furthest edge of membranous flap of opercle; *snout length*: from tip of snout at median indentation to anterior portion of orbit, caliper tip inside rim. *Snout width* (greatest): measurement with caliper tips in angle of preorbital spines, gill covers appressed when artificially dilated; or, in absence of spines, at equivalent distance from tip of snout (=distance from inside posterior ocular ridge to outside edge of opercular flap, immediately below opercular spine). *Orbital width*: greatest horizontal width, caliper tips appresssed to inner sides of bony ocular ridge; *interorbital width*: least width between bony ocular ridges, caliper tips within orbital rim of each eye; *maxillary*: from tip of snout at median indentation to end of maxillary bone. *Nape length*: from dorsal origin to edge of occiput, caliper tips not passing proximal articulation of first dorsal spine, nor, anteriorly, are formed by parietal plates; *nape width*: across nape between nuchal spines but not passing, posteriorly, proximal articulation of first dorsal spine, caliper tips appressed to inner sides of spines.

Pectoral fin length: from between base of anterior webbed ray (viz. last ray from above) and that of posterior free ray (but not in axil) to distal end of longest webbed ray; *free pectoral rays*: posterior, or longest ray, from between this ray and proximal webbed ray to tip of ray; *pelvic fin*: from bony base (ignoring membrane at angle) of posterior ray to tip of longest ray; *dorsal spine measurements*: the proximal articulation of the first three spines in *Prionotus* being partially, or entirely, exposed, meas-

* This spine is present in the only known examples (two) of *P. gymnostethus,* but in one it is much worn.

urements taken with lower caliper tip appressed to spine within angle of articulation. *Lateral line pore count*: scales bearing pores to end of hypural fan, plus supplementary pored scales beyond (e.g. 50 to 52+2 to 7); *vertical scale count*: first vertical row containing pored scale, at, or just posterior to, base of last ray of first dorsal fin to margin of vent (n. b. where from the morphology of a species a continuous count leads obliquely to anterior rays of anal fin, lower portion of count taken separately along



Text-figure 1

Cranial diagram drawn to scale by Dorothy M. Schultz from a young specimen of *Prionotus horrens* Richardson, of 112 mm. in standard length, in the U. S. Nat. Mus., to illustrate the distribution of the spines and the respective nomenclature applied in the revision.

vertical line leading from vent to a pored scale). *Gill rakers*: count embraces only definitely developed rakers. *Opercular spine length*: spine measured back from tip of spine to anterior margin of opercle. *Preopercular spine length*: spine measured back from tip to (a) supplementary spine cleft, caliper tip, when possible, inside angle; (b) anterior margin of preopercle, caliper tip resting on suture between suborbital stay and proximal end of spine ridge; (c) centre of radiation on cheek; *humeral spine length*: spine measured back along median ridge to nearest edge of opercular flap, gill covers appressed. *Evaluation of preopercular spine length*: primarily based on

distance to anterior margin of preopercle. *Branched rays*: when the last ray of the soft dorsal or of the anal fin is branched, this is indicated by the addition of ½ to the unit (e.g. A. 11½).

Proportions. The greatest depth and width of body; the head length, the pectoral and pelvic fins; the distance between the pectoral fin base and the posterior end of the anal base, are all shown as proportions of the standard length. All other proportions are obtained by dividing the length, or height, of the part into the head length.

After each evaluation of a character there follows: (a) the average proportion *; (b) the proportional range of the part in the specimens examined; (c) the number of specimens examined when this exceeds, or is short of, the number indicated in the introductory paragraph.

Acknowledgments. The writer gratefully acknowledges his debt to Dr. Leonard P. Schultz and to Dr. Charles R. Breder, Jr, of the National Museum, Washington, D. C. and of the American Museum of Natural History, New York, respectively, and other authorities and curators of these institutions for access to their invaluable collections and the privileged use of a laboratory in each institution

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He has also to record his warm appreciation of the gesture of the present head of his *alma mater* in ichthyology, the Montevideo Museum of Natural History, Dr. Ergasto H. Cordero, in spontaneously putting at the writer's disposition the pages of this journal, and also of the assistance rendered by the Rev. Tudor L. Isaacs in undertaking the proof-reading with him of this paper.

Finally, he feels that it is fitting here to acenowledge his debt to that excellent and devoted ichthyologist, the late Dr. Garibaldi J. Devincenzi of Montevideo: it was while collecting material and compiling biological and ecological data for DEVINCENZI's Systematic Survey of the fishes of the River Uruguay that he first became interested in the taxonomy of fishes.

Washington, D. C. G. W. T.
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* The average proportion is derived from the sum of the proportions.

KEY TO THE SPECIES OF *Prionotus*

1a. Supplementary preopercular spine absent or vestigial

2a. Rostral plates at maximum development acutely produced. Rostral and preorbital spines absent. Opercular flap not scaled. Postfrontal groove present. First and second dorsal spines granular-serrate; first very high: higher than second or third *P. loxias* Jordan

2b. Rostral plates not produced

3a. Rostral and preorbital spines absent

4a. Opercular flap scaled

5a. Postfrontal groove present. First dorsal spine serrate; serrations on distal third clustered; spine of medium height: about two and a third times in head length. Long nasal flap present *P. albirostris* Jordan and Bollman

5b. Postfrontal groove absent

6a. Supraocular cirri absent. Median ridge of first dorsal spine granulate to bluntly serrate; spine low: about two and three quarter times in head length. Preopercular spine very short: not passing opercular flap. Soft dorsal fin traversed by several series of dark spots *P. stephanophrys* Lockington

6b. Supraocular cirri present

7a. Principal cirrus broad, stemmed and digitate

8a. Scales rather small, compact. First dorsal spine strongly serrate; very high, but not higher than second

9a. Pectoral fin long: usually passing posterior end of anal base. Squamation strongly ctenoid *P. grisescens*, new species

9b. Pectoral fin proper of moderate length, but two uppermost rays produced to caudal base as thread-like filaments. Squamation not strongly ctenoid *P. murieli* Mowbray

8b. Scales large; not compact nor strongly ctenoid. First dorsal spine smooth; very high: higher than second or third. Pectoral fin moderately long, but not passing anal base *P. ophryas* Jordan and Swain

7b. All cirri short and slender. Body fusiform. Profile nearly plane from snout to nape. Squamation uniformly pigmented, or, alternatively, with but little albescent gradation on ventro-lateral area. Pectoral fin extremely short: but little longer than pelvic fin. *P. stearnsi* Jordan and Swain

4b. Opercular flap not scaled

10a. Postfrontal groove absent. Soft dorsal fin traversed by a median series of pale, opaque spots. Free pectoral rays slightly expanded on distal half *P. miles* Jenyns

10b. Postfrontal groove vestigial in adult, conspicuous in young. Body very small. Profile from orbital region to snout oblique. Orbit relatively larger than that of any of the other species: less than three times in head length *P. brachychir* Regan

3b. Rostral spine present; preorbital spine absent

11a. Postfrontal groove present

12a. First dorsal spine spiny-granulate; spine very high: less than twice in head length, but not higher than second or third. Head very short. Mouth very small: maxillary more than three times in head length *P. roseus* Jordan and Evermann

12b. First dorsal spine granular-serrate; median ridge unevenly serrate. Pectoral fin traversed by numerous series of blue ocelli; fin long: nearly always passing anal base *P. microlepis* Longley and Hildebrand

11b. Postfrontal groove absent. Median ridge of first dorsal spine lightly granulate; spine very low: usually more than three times in head length; much lower than second or third. Profile from snout to nape nearly as plane as that of *stephanophrys* *P. quiescens* Jordan and Bollman

1b. Supplementary preopercular spine perfectly developed in young; nearly always absent or very weak before maturity. Rostral and preorbital spines present in young; nearly always partially or totally absent before maturity. Postfrontal groove present. Free pectoral rays expanded on distal half

13a. Opercular flap scaled. Scales on dorsum and sides extremely small: 8 to 9+1+29 to 30 in vertical series. Soft dorsal fin traversed by uniform pattern of dark spots *P. scitulus* Jordan and Gilbert

13b. Opercular flap not scaled *. Scales on dorsum and sides of moderate size: 7 to 9+1+20 to 22 in vertical series. Soft dorsal fin traversed by dark and light streaks *P. carolinus* (Linnaeus)

1c. Supplementary preopercular spine always well developed

14a. Rostral plates at maximum development acutely produced

15a. Rostral and preorbital spines present

16a. Opercular flap scaled. Postfrontal groove present. Pectoral fin at maximum development reaching caudal base. First and second dorsal spines spiny-granulate. *P. alatus* Goode and Bean

16b. Opercular flap not scaled. Postfrontal groove absent. Pectoral fin short. First, second and third dorsal granulate *P. birostratus* Richardson

15b. Rostral and preorbital spines absent

17a. Opercular flap not scaled. Postfrontal groove present. Pectoral fin extremely short: much shorter than head length. First

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* Scales embedded.

and second dorsal spines granular-serrate. Scales absent from breast and belly as far as vent. A few small tapering supraocular cirri present *P. gymnostethus* Gilbert

17b. Scales present on breast and belly. Supraocular cirri absent. Number of pored scales lower than that of any of the other species: in principal series less than forty *P. xenisma* Jordan and Bollman

14b. Rostral plates obtusely produced. Rostral and preorbital spines present. Opercular flap scaled

18a. Postfrontal groove present. First three dorsal spines granular-serrate; first and second spines broad, compressed and exceptionally recurved *P. beanii* Goode

18b. Postfrontal groove vestigial. Rudiments of supplementary opercular spine nearly always present. All the usual smaller cranial spines always present and exceptionally developed

19a. Squamation of dorsum and sides strongly ctenoid: rough to the touch. Vomerine teeth in two separate bands. Free pectoral rays expanded over proximal half; stout and short: over four times in standard length. Number of anal rays normal to the genus: 11 to 11½ *P. ruscarius* Gilbert and Starks

19b. Squamation of dorsum and sides, excepting pored scales, not strongly ctenoid: but little rough to the touch. Vomerine teeth in a continuous band. Free pectoral rays but little expanded on basal half; usually slender; long: less than three and a half times in standard length. Number of anal rays abnormally low: 9½ *P. horrens* Richardson

14c. Rostral plates not produced. Rostral and preorbital spines present. Opercular flap scaled

20a. Postfrontal groove present. Pectoral fin long: passing posterior end of anal base *P. pectoralis* Nichols and Breder

20b. Postfrontal groove absent or vestigial

21a. Interorbital space nearly always wider than orbit in adult

22a. Number of gill rakers highest of all the species: 3 to 5+1+13 to 18. First dorsal spine very low: about four times in head length. Pectoral fin, free pectoral rays and soft dorsal fin plain in southern race (*evolans*). Pectoral fin traversed by numerous fine wavy lines; free pectoral rays barred; soft dorsal fin frequently traversed by several series of pin head dots; dots situated directly on rays: adult, northern race (*strigatus*) *P. evolans* (Linnaeus)

22b. Number of gill rakers only moderately high: 2+1+8 to 12. First dorsal spine very low: four or more times in head length. Pectoral fin traversed by wavy lines; these less numerous and of less precise pattern than those of adult *evolans strigatus;* lines in some cases alternately thick and thin; a small number often forked above; less frequently below. Soft dorsal

conspicuously marked by from five to six transverse series of dark spots *P. tribulus* Cuvier

21b. Interorbital space only slightly narrower than orbit: about five and three quarter times in head length

23a. Pectoral fin brown; intensely and irregularly marked on upper half with smallish, dark, round spots. First dorsal spine exceptionally low: about four and a quarter times in head length; distal end not produced beyond interradial membrane. Pectoral fin long, but not passing posterior end of anal base; free rays expanded *P. vanderbilty,* new species

23b. Pectoral fin brown; upper half bearing a number of roundish, dark spots of varying size and uneven distribution. First dorsal spine not exceptionally low: about three times in head length. Pectoral fin long: passing posterior end of anal base; free rays tapering *P. salmonicolor* Fowler

21c. Interorbital space substantially narrower than orbit: more than six times in head length

24a. Caudal fin truncate

25a. Soft dorsal traversed by several series of dark spots; their vertical alignment (axis) slightly forward of radial projection. Vertical scale count, 9+1+23. Second dorsal spine very high: less than twice in head length *P. jamaicensis,* new species

25b. Soft dorsal traversed by several series of dark spots; their vertical alignment coinciding directly with rays; all spots intensely pigmented. Vertical scale count, 7 to 8+1+21 to 22. Second dorsal spine more than 2.10 in head length *P. aspersus* Meek and Hildebrand

25c. Soft dorsal traversed by several series of dark spots; vertical alignment of spots not uniform in all series; only median series intensely pigmented. Vertical scale count, 8 to 9+1+21 to 23 *P. alipionis* Teague and Myers

24b. Caudal fin emarginate

26a. Preopercular, opercular and humeral spines of exceptional length: the first to anterior margin of preopercle, less than two and a half times in head length. Pectoral fin light brown and traversed almost throughout by numerous series of horizontally elongate, sharply delineated, small, white spots of uniform size *P. longispinosus,* new species

26b. Preopercular, opercular and humeral spines not of exceptional length: the first to anterior margin of preopercle, about three and a half times in head length. Pectoral fin black and usually traversed by a few very incomplete series of rather large, slightly diffuse, pale round spots *P. maculatus,* new species

Description of the species

Prionotus loxias Jordan

Prionotus loxias Jordan, *in* Gilbert, 1896, Proc. U. S. Nat. Mus., 452; Jordan and Evermann, 1898, Fishes of North and Middle America, pt. 2:2155-56.

Counts and proportions taken from the holotype and a cotype (47580) and two other specimens (41361 and 41490) in the U. S. Nat. Mus., ranging in standard length from 91 to 100 mm.

Description. Body broad and very deep: width 4.30 (4.05 to 4.55); depth 3.60 (3.50 to 3.70). Head rather long: 2.35 (2.30 to 2.40). All in standard length.

Snout of moderate length but narrow: length 2.20 (2.15 to 2.30); width 2.55 (2.45 to 2.65). Mouth of medium size: maxillary 2.70 (2.65 to 2.75). Orbit large: 4.40 (4.20 to 4.55). Interorbital space very narrow: 9.65 (9.10 to 10.25). Nape extraordinarily short and narrow; length 11.85 (10.50 to 13.65); width 7.00 (6.85 to 7.25). All in head length.

Pectoral fin extremely short: much shorter than head length; 3.10 (2.95 to 3.20). Pelvic fin short: 4.10 (4.00 to 4.15) Both in standard length.

First dorsal spine very high: higher than second or third; first spine 1.95 (1.80 to 2.15) 6; second, 2.15 (1.90 to 2.35) 10; third, 2.55 (2.25 to 2.85) 9. Second soft dorsal ray, 2.70 (2.50 to 2.90) 11. Longest anal ray, 3.80 (3.45 to 3.90) 11. Opercular spine of medium length: to anterior margin of opercle, 3.30 (3.10 to 3.50). Preopercular spine rather short: to cleft, 6.25 (4.95 to 7.15); to anterior margin of preopercle, 3.90 (3.65 to 4.10); to centre of radiation on cheek, 2.55 (2.40 to 2.65). Humeral spine short: to edge of opercular flap, 6.30 (5.70 to 7.45). All in head length.

D. XI (rarely X) - 11½ (20). A. 11½. Gill rakers, 0 to 1+1+7 to 8. Vertical scale count, 6 to 7+1+20 to 22. Pored scales, 49 to 52+2 to 8. Pectoral fin rays, 12+3 (6).

Rostral, preorbital and suborbital spines absent; supplementary preopercular spine absent or vestigial. Preocular small, elevated; postocular small, depressed or absent; sphenotic, a granulate stump; pterotic, a granulate ridge; parietal, a granulate ridge ending sometimes in a small spine; nuchal, a granulate ridge without terminal spine. Postfrontal groove broad and conspicuous, shelving upwards posteriorly. Interorbital space concave. Rostral plates, at maximum development, acutely produced; not divergent; strongly serrulate. Opercular flap not scaled. Free pectoral rays tapering. Caudal fin

shallowly emarginate. First dorsal spine: median ridge serrate, flanked, on either side, by a pair of granulate ridges. Second dorsal spine: submedian ridge serrate, flanked on one side by pair of granulate ridges. Third spine: a pair of granulate ridges on opposite side to those of second spine. Median ridge of first soft dorsal ray serrate on basal quarter. Whole of cranial surface very finely granulate. Orbital region abruptly elevated; eyes prominent.

Color in alcohol. Yellowish brown above; lighter below. First dorsal fin plain, translucent, except for scattering of small, round brownish spots between first and third dorsal spines. Soft dorsal fin traversed by three pale, opaque bands: one basal, one median and one distal; median band discontinuous. Caudal fin crossed by conspicuous, narrow, pale, opaque band, slightly above median line of fin, from first branched ray to ninth; this often dipping sharply in centre towards caudal base; a second pale band along fringe of fin within limits of median band; a third, rather broader, bordering dark ferruginous blotch on caudal base. Pectoral fin yellowish brown, vermiculated on distal third with a few fine, wavy lines of darker. Anal and pelvic fins plain.

Remarks. The rostral plates of the holotype and cotype are worn and broken.

Known distribution. The holotype and cotype were taken in 51½ fathoms of water in the Gulf of Panama, in latitude N. 07°56'00"; longitude. W. 79°41'30". Other specimens, in adjacent waters, and also off Clarion (Santa Rosa) Island, North Pacific Ocean, and in the Gulf of California in latitude N. 28°07'00"; longitude, W. 111°39'45". Others again recorded by BREDER (1926. Bull. Bing. Oceanograph. Collec., vol. 2:39-40) below the Gulf of Tehuantepec, in latitude N. 14°48'40"; longitude W. 92°54'40", and also off Hidden Harbor.

PRIONOTUS ALBIROSTRIS Jordan and Bollman

Prionotus albirostris Jordan and Bollman, 1889, Proc. U. S. Nat. Mus., 168; Jordan and Evermann, 1898, Fishes of North and Middle America, pt. 2:2163-64.

Counts and proportions corresponding to the holotype and a cotype (41162) in the U. S. Nat. Mus., of 109 and 60 mm. in standard length respectively.

Description. Body of medium depth and width: depth 4.47 (4.29 to 4.64); width, 5.21 (4.95 to 5.46). Head rather short: 2.58 (2.50 to 2.66). All in standard length.

Snout of medium length but narrow: length, 2.14 (2.10 to 2.18); width, 2.55 (2.53 to 2.56). Mouth rather large: maxillary, 2.43 (2.29 to 2.56). Orbit large: width, 4.12 (3.69 to 4.55). Interorbital space rather narrow: width, 7.15 (6.85 to 7.45). Nape of medium length

and width: length, 5.82 (5.33 to 6.31); width, 4.97 (4.80 to 5.13). All in head length.

Pectoral fin of medum length: 1.79 (1.62 to 1.95); posterior end of anal base from pectoral base, 1.64 (1.61 to 1.67). Pelvic fin short: 4.02 (4.00 to 4.04). All in standard length.

First dorsal spine of medum height: 2.34 (1); second spine, 2.16 (1); third, 2.28 (1). Second soft dorsal ray, 2.48 (1). Longest anal ray, 2.83 (1). Opercular and preopercular spines very short: not passing opercular flap; the first to anterior margin of opercle, 4.05 (4.00 to 4.10); the second to anterior margin of preopercle, 5.05 (4.80 to 5.29); to centre of radiation on cheek, 2.71 (2.53 to 2.88). Humeral spine of medium length: to edge of opercular flap, 5.40 (5.34 to 5.46). All in head length.

D. X - 12½. A. 11½. Gill rakers, 1+1+7 to 8. Vertical scale count, 7+1+18 (1). Pored scales 51+7 (1). Pectoral fin rays, 13+3 (1).

Rostral, preorbital and suborbital spines absent. Supplementary preopercular spine also absent (strongly serrulate ridge with large terminal spinules extending nearly to end of spine, apparently of independent development). Preocular spine strong, elevated; postocular strong, depressed. Sphenotic, two elevated spinules; pterotic strong, slightly elevated; parietal strong, slightly elevated, occupying whole ridge as in *horrens, ruscarius* and in young *evolans* and *tribulus*. Nuchal spine strong, slightly elevated. Postfrontal groove shelving upwards posteriorly as in *loxias, xenisma* and *gymnostethus*, but shallower medially. Eyes prominent but orbital region less abruptly elevated than in the three above mentioned species. Rostral plates bluntly serrulate, slightly rounded. Interorbital space concave. Opercular flap scaled. Caudal fin truncate. Free pectoral rays tapering. Median ridge of first dorsal spine serrate, with two long clusters of from three to four small spines on distal third; second and third dorsal spines smooth. Median ridge of first soft dorsal ray serrate over proximal quarter. Long nasal flap present.

Color in alcohol. Upper parts generally pale, yellowish brown. Snout and interorbital space very pale, yellowish green. First dorsal fin much clouded with darker. Soft dorsal fin with a few scattered brown spots between first ray and sixth; thence posteriorly clouded with darker, as in first dorsal fin. Distal third and proximal quarter of caudal fin dark; ferruginous blotch on base. Anal fin traversed by median dark band. Pelvic fin dusky. Pectoral fin blackish, with traces of lighter markings on upper third; free rays banded with darker.

Known distribution. Holotype and cotype taken in 33 fathoms of water in the Gulf of Panama in latitude N. 07°57'00"; longitude W. 78°55'00"; others, in the Gulf of California in latitude N. 28°28'00"; longitude W. 112°04'30".

PRIONOTUS STEPHANOPHRYS Lockington

Prionotus stephanophrys Lockington,, 1880, Proc. U. S. Nat. Mus., 529; Jordan and Evermann, 1898, Fishes of North and Middle America, pt. 2:2161

Counts and proportions obtained from the holotype (27048) and two paratypes (125612) in the U. S. Nat. Mus., ranging in standard length from 148 to 212 mm.

Description. Body of moderate depth and breadth: depth, 4.35 (4.25 to 4.50); width, 5.15 (4.95 to 5.50). Head rather short: 2.70 (2.50 to 2.85). All in standard length.

Snout narrow and very short: width, 2.55 (2.45 to 2.65); length, 2.55 (2.40 to 2.70). Mouth large: maxillary, 2.30 (2.20 to 2.35). Orbit rather large: width, 4.45 (3.95 to 4.85). Interorbital space broad: breadth, 5.80 (5.25 to 6.55). Nape very broad and long: width, 4.05 (3.85 to 4.20); length, 4.65 (4.15 to 5.60). All in head length.

Pectoral fin of medium length: 2.15 (2.05 to 2.20); posterior end of anal base from pectoral base, 1.70 (1.65 to 1.75). Pelvic fin short: 4.05 (3.90 to 4.25). All in standard length.

First dorsal spine low: 2.95 (2.85 to 3.05), 2; second spine, 2.40 (2.30 to 2.60); third, 2.30 (2.15 to 2.50). Second soft dorsal ray, 2.50 (2.40 to 2.60). Longest anal ray, 3.40 (3.30 to 3.60). Opercular spine very long: to anterior margin of opercle, 2.90 (2.65 to 3.10). Preopercular spine very short: not passing opercular flap; to anterior margin of preopercle, 4.75 (4.15 to 5.15); to centre of radiation on cheek, 2.40 (2.25 to 2.50). Humeral spine of medium length: to edge of opercular flap, 5.50 (5.25 to 5.90). All in head length.

D. X - 12½. A. 11½. Gill rakers, 2+1+10 to 12. Vertical scale count, 6 to 8+1+16 to 21. Pored scales, 51 to 52+1 to 8. Pectoral fin rays, 13+3 (1).

Rostral, preorbital and suborbital spines absent. Supplementary preopercular ridge and spine absent or vestigial. Preocular spine stout, elevated; postocular spine proper absent, posterior angle of ridge spinulate; inframarginal spine present at foot of ridge (see below) as in *quiescens*. Sphenotic, a granulate stump; pterotic, a vestigial granulate ridge; parietal, a low granulate ridge with vestigial spine; nuchal spine stout, depressed. Postfrontal groove absent. Free pectoral rays tapering. Rostral plates rounded; anterior serrulations recurved inwardly. Opercular flap scaled. Orbital region nearly plane not abruptly elevated above snout; interorbital space not con-

cave*; separation of supraocular rim from interspace conspicuously marked along posterior two-thirds of interorbital space by fan-like, granulate striations, the ultimate of which terminating in a backwardly directed, small, slightly elevated conical spine; the pair of spines slightly divergent. Caudal fin subtruncate. In holotype, proximal two-thirds of median ridge of first dorsal spine bluntly serrate; in remaining specimens, proximal third barely granulate; in all, median ridge flanked on either side by a granulate ridge. Second and third spines: one or two granulate ridges on alternate sides. First soft dorsal ray: median ridge of proximal quarter granulate.

Color in alcohol. In specimen 125612 of 212 mm. in standard length: upper parts russet brown, changing rather abruptly to yellowish white on belly. Lower half of first dorsal fin opaque; upper half translucent; dark ocellate blotch between fourth and fifth spines with less intense posterior and anterior extensions; other diffuse blotches scattered over both translucent and opaque areas. Transverse series of dark spots on soft dorsal, commencing with five about at second ray and falling to four, then less, at fourth ray and beyond. Pectoral fin brown; traversed by some five to eight roughly aligned, oblique series of rather diffuse, horizontally elogate, dark spots; series commencing at superior basal angle and extending strongly athwart upper half of fin, fading out below. Diffuse spots present on caudal fin, these forming a nearly continuous dark band proximal to distal end of fin. Caudal base covered by large dark blotch. Anal and pelvic fins plain; free pectoral rays unbarred.

In the holotype (27048) of 159 mm. in standard length colors much faded: not more than a four-three series of spots apparent on soft dorsal; pectoral series of spots rather more rounded than elongate. In smallest specimen (148 mm.) spots intensely pigmented and much crowded together.

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* The antero-interorbital hump to which HUBBS refers in his paper on this species (see *Known distribution,* page 14), is present in the two paratypes (125612) but not in the holotype (27048). The conformation of the hump does not appear to be stable, there being some difference of conformation in the two cases.

The hump is not present in *quiescens,* nor in any other species. In every other respect, the cranium of the paratypes appears to agree with that of the holotype, so that the writer is unable to explain the significance of the hump.

In the holotype, as has been pointed out, the colors are much faded, but, in so far as the writer could discern, the number of transverse series of spots on the soft dorsal fin is lower, and the spots on the pectoral fin more rounded, than in the paratypes. Both these differences, however, may be simple variants.

A further investigation of the status of the paratypes (and of *quiescens*) in relation to the holotype of *stephanophrys,* with fresh material, is evidently needed.

Known distribution. Holotype taken in deep water off Punta de los Reyes, San Francisco, California; paratypes, off Lower California (México) in latitude N. 24°27'00"; longitude W. 111°59'00. Other specimens recorded by BREDER (Bull. Bing. Oceanograph. Collec. Vol. 2:39-40; 1926) from below the Gulf of Tehuantepec, in latitude N. 14°48'40"; longitude W. 92°54'40", and from San Francisquito and Angelus * Bays, Mexico. Finally, a specimen recorded by HUBBS: (California Fish and Game, Vol. 31, N. 4:195-200; 1945) from the U. S. Coast of California (approximate locality of take given as latitude N. 33°53'00"; longitude W. 118°30'30").

PRIONOTUS GRISESCENS, new species

Figures 1-2

Prionotus ophryas, Longley and Hildebrand, 1941, Papers from Tortugas Laboratory, Carnegie Institute of Washington, D. C., 34:170-73.

Counts and proportions compiled from the holotype (117269) and four cotypes (111980) in the U. S. Nat. Mus., ranging in standard length from 47 to 125 mm.

Description. Body of medium depth and width: depth, 4.30 (3.85 to 4.70); width, 5.15 (4.90 to 5.50). Head rather short: 2.70 (2.55 to 2.90). All in standard length.

Snout long and narrow: length, 2.05 (1.95 to 2.15); width, 2.55 (2.25 to 2.85). Mouth rather large: maxillary, 2.40 (2.05 to 2.60). Orbit moderately large: width, 4.40 (3.70 to 5.10). Interorbital space narrow: 7.40 (6.10 to 8.20). Nape broad, but very short: width, 4.75 (4.55 to 5.05); length, 7.50 (7.10 to 8.20). All in head length.

Pectoral fin long: usually passing anal base, 1.55 (1.45 to 1.60); posterior end of anal base from pectoral base, 1.65 (1.60 to 1.70). Pelvic fin of medium length: 3.58 (3.38 to 3.92). All in standard length.

First dorsal spine extremely high: as high, or nearly as high, as second; first spine, 1.60 (1.50 to 1.80) 7; second, 1.55 (1.45 to 1.75) 6; third, 1.65 (1.50 to 1.85) 9. Second soft dorsal ray, 2.05 (1.85 to 2.30) 9. Longest anal ray, 2.55 (2.45 to 3.10) 9. Opercular spine very short: to anterior margin of opercle, 4.18 (3.75 to 4.65). Preopercular spine also very short: not passing opercular flap; to anterior margin of preopercle, 5.25 (4.80 to 5.70); to centre of radiation on cheek, 2.60 (2.20 to 2.80). Humeral spine very short: to edge of opercular flap, 8.50 (7.10 to 10.25). All in head length.

D. X - 11½ to 12½. A. 11 to 11½. Gill rakers 0+1+4 to 6. Ver-

* Bahía de los Angeles, Gulf of California?.

tical scale count, 8+1+24 to 25. Pored scales, 50 to 51+2 to 7. Pectoral fin rays, 14+3 (10).

Rostral, preorbital, suborbital and supplementary preopercular spines absent. Preocular strong, elevated; postocular strong, depressed; sphenotic usually short, elevated, but sometimes developed on one side or the other as a small, recurved, slightly depressed, sharp, conical spine as in *jamaicensis*. Pterotic and parietal spines small, depressed; parietal ridge usually somewhat serrulate; nuchal spine moderately strong; median ridge serrulate. Postfrontal groove absent. Interorbital space deeply concave. Eyes prominent. Rostral plates rounded, granulate. Opercular flap scaled. Free pectoral rays tapering. Caudal fin obliquely truncate. Broad, stemmed and digitate supraocular cirrus present, followed below by two or more short, supplementary cirri. Long, tapering nasal cirrus present. Scales of dorsum and sides rather small, compact and strongly ctenoid. First dorsal spine: median ridge strongly serrate; second and third dorsal spines and first ray of soft dorsal, smooth.

Color in alcohol. Body uniformly olive-brown above lateral line; mottled below; no sharp dividing line between this and ventral area; belly mainly white. Head olive-brown; greenish on snout. First dorsal fin strongly pig-

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Principal measurements in millimetres of the holotype and cotypes of *Prionotus grisescens*.

	Holotype	Cotypes			
Standard length in mm.	108	125	82	54	47
Depth	28	29½	20	11½	10
Width	22	25½	16	10	8½
Head length	39	43	30½	20½	18½
Snout length	20	22	15	10	8½
Snout, greatest width	16½	19	12	7½	6½
Maxillary	15	16½	12½	9	9
Orbit	9	9	6	5	5
Interorbital (bony) width	5	6½	5	2½	2¼
Nape length	5½	6	4	2½	2½
Nape width	8	8½	6½	4½	4
Pectoral fin	71	82	51	37	29
Pectoral fin base to posterior end of anal base	64	78	48	32	28
Opercular spine to anterior margin of opercle	10	11½	7½	4½	4
Preopercular spine to anterior margin of preopercle	7½	9	5½	4	3¼
First dorsal spine	26	26½	18	—	—
Second dorsal spine	26	27	—	—	—

mented with dark chromatophores; black diagonal streak crossing distal third of each of first three interradial membranes; ocellus absent. Soft dorsal similarly pigmented but chromatophores more concentrated in blotches and spots; dark blotch extending from distal half of first ray to proximal half of seventh; another from distal half of eighth ray to end of fin. Caudal fin greenish, crossed by three broad, brown bars: one terminal, one median and one basal. Anal and pelvic fins blotched and spotted with darker. Pectoral fin from uppermost ray to sixth, pepper-gray with light rivulations, like watered silk, on interradial membranes; upper portion of fin traversed by several rather irregular series of brown spots as far as ninth ray from above, these large and intensely pigmented. Free pectoral rays crossed by alternate broad and narrow stripes of dark brown; nasal flap also striped.

Remarks. This species, while closely related to *murieli* *, differs trenchantly from *ophryas* in the very exceptionally rich pigmentation of all its parts; the strongly serrate and rather shorter first dorsal spine; the long pectoral fin; the rather small, compact and strongly ctenoid scales, and in the presence of supplementary supraocular cirri.

The holotype and only known specimen of *P. ophryas* (U. S. Nat. Mus. 36944) was not in good condition when taken from the spewings of a red snapper at Pensacola, Florida, over sixty years ago, and has further deteriorated with time It is no longer possible to make a vertical scale count in the usual position; but between the lateral line and both the third and fourth soft dorsal rays, it has one pored scale plus seven, as compared with one plus eight in *grisescens.* A direct comparison of individual scales reveals that those of *ophryas* are much less ctenoid and broader; their length being about equal to those of *grisescens;* but in the latter species, the scales are very tightly packed and adherent, whereas in *ophryas* the opposite prevails, which would account for the lower vertical count. No supplementary supraocular cirri are observable or appear ever to have been present in *ophryas.* The existence of a long nasal flap in this species is suppositious (1941, LONGLEY and HILDEBRAND), there being no factual evidence for it. In all except the largest specimen of *grisescens* the body is strangely constricted along the lateral line, leaving a distinct bulge both above and below.

Known distribution. Holotype and cotypes taken off the Tortugas Islands, Gulf of Mexico.

PRIONOTUS MURIELI Mowbray

Prionotus murieli Mowbray: *in* Borodin, 1928, Scientific Results of the Yacht *Ara* Expedition, during the years 1926 to 1928. Fishes. Bull. Vand. Mar. Mus., Vol. 1; Art. 1:26; Plate 5; fig. 2.

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* As shown in the key, *grisescens* differs from *murieli* in the long pectoral fins without filaments and in the strongly ctenoid scales. These two species, together with *ophryas,* form a small digitate cirrus bearing group that also differs from the other species of the genus in the pectoral fin ray formula (viz. 14+3).

Counts and proportions of the holotype in the Vand. Mar. Mus., (404 F.) of 56 mm. in standard length.

Description. Body deep and rather broad: depth, 4.00; width, 4.65. Head rather short: length, 2.60. All in standard length.

Snout of medium length, but very narrow: length, 2.15; width, 2.70. Mouth rather large: maxillary, 2.40. Orbit very large: width, 3.90. Interorbital space wide: breadth, 6.15. Nape rather broad, but very short: width, 4.80; length, 7.15. All in head length.

Pectoral fin: two uppermost rays produced to caudal base as thread-like filaments; fin proper (without filaments) of medium length: 1.80; posterior end of anal base from pectoral base, 1.65. Pelvic fin of moderate length: 3.61. All in standard length.

First dorsal spine very high: 2.05; second spine, 1.85; third, 1.85. Third soft dorsal ray, 2.15. Longest anal ray, 2.39. Opercular spine very short: not passing opercular flap; to anterior margin of opercle, 3.90. Preopercular spine also very short: not passing opercular flap; to anterior margin of preopercle, 5.40; to centre of radiation on cheek, 2.55. All in head length. Humeral spine very small, keeled.

D. IX - 12½. A. 11½. Gill rakers, 0+1+6. Vertical scale count, 8+1+21 ?. Pored scales, 51+4. Pectoral fin rays, 14+3.

Rostral, preorbital, suborbital and supplementary preopercular spines absent. Preocular, small spinules; postocular short, slightly elevated; sphenotic, small, elevated; pterotic, a low serrulate ridge; parietal, compressed, serrulate ridge; nuchal, a compressed, serrulate ridge with small spine. Postfrontal groove absent. Interorbital space deeply concave. Rostral plates entirely hidden by dermal covering: no serrulations, nor granulations discernible; rounded. Opercular flap scaled. Caudal fin obliquely truncate; lower angle produced. Free pectoral rays tapering. Superior angle of opercle produced as small spine; about equal in length to opercular spine proper. Broad, stemmed and digitate supraocular cirrus present: followed below on right by three small, tapering, supplementary cirri, as in *grisescens*, but on left, preceded by four similar cirri. Squamation of dorsum and sides not strongly ctenoid. Long, tapering nasal cirrus present. First dorsal spine: median ridge strongly serrate (not spiny, as described); second and third spines smooth; first soft dorsal ray also smooth.

Color in alcohol. Bleached white above and below. Median fins plain, translucent. Caudal and free pectoral fins plain. Pectoral fin mottled with darker.

Known distribution. Holotype taken in eight fathoms of water on Cay Sal Bank, Gulf of Mexico.

Remarks. This species and *grisescens* are very closely related. Figure 2 is fantastically distorted: among other features the artist misinterpreted the morphology of the pectoral fin. By chance, on both fins, the third membrane from above had split horizontally, isolating the three uppermost rays, and these becoming congealed, led the artist to treat the two thread-like filaments as processes originating at the pectoral base; but the thickening of the exserted filaments to harmonize with the supposedly basal halves can only be written off as an artistic exuberance.

PRIONOTUS OPHRYAS Jordan and Swain

Prionotus ophryas Jordan and Swain, 1884, Proc. U. S. Nat. Mus., 542; Jordan and Evermann, 1898, Fishes of North and Middle America, pt. 2:2164-65.

Counts and proportions corresponding to the holotype (36944) in the U. S. Nat. Mus., of 139 mm. in standard length.

Description. Body of moderate depth and width: depth, 4.35; width, 5.35. Head short: length, 2.90. All in standard length.

Snout rather long and very narrow: length, 2.10; width, 2.65. Mouth of medium size: maxillary, 2.55. Orbit of moderate size: width, 4.80. Interorbital space narrow: breadth, 7.40. Nape of medium length but broad: length, 5.35; width, 4.35. All in head length.

Pectoral fin moderately long: length, 1.60; posterior end of anal base from pectoral base, 1.50. Pelvic fin of moderate length: 3.75. All in standard length.

First dorsal spine extremely high: higher than second or third: 1.65; second spine, 1.70; third, 1.90. Second soft dorsal ray, 2.20. Longest anal ray, 2.65. Opercular spine of medium length: to anterior margin of opercle, 3.70. Preopercular spine very short: not passing opercular flap; to anterior margin of preopercle, 4.55; to centre of radiation on cheek, 2.65. Humeral spine very short: to edge of opercular flap, 8.00. All in head length.

D. IX - 12½. A. 11½. Gill rakers, 0+1+7. Vertical scale count, 7+1+?. Pored scales, 51+?. Pectoral fin rays, 14+3.

Rostral, preorbital, suborbital and supplementary preopercular spines absent. Preocular spine small, elevated. Postocular small, depressed. Sphenotic, small, elevated; pterotic, small, depressed. Parietal spine strong, depressed (ridge with vestige of serrulations); nuchal spine moderate, depressed. Small spine present on upper angle of opercle. Postfrontal groove absent. Interorbital space deeply concave, striated. Rostral plates rounded; bluntly serrulate. Supraocular cirrus present; stemmed, broad, digitate. Nasal cirrus absent; thought to have been lost (1941: LONGLEY and HILDEBRAND). Free pectoral rays tapering. Caudal fin much damaged. Dorsal spines

smooth. First anal ray smooth. Opercular flap scaled. Scales on dorsum and sides large, not compact, nor strongly ctenoid.

Color in alcohol. Salmon-pink above; lighter below belly line. Head and dorso-lateral area tinged with yellowish brown. Some black on fibrous pectorals; free rays barred.

Known distribution. Holotype taken off Pensacola, Florida, from spewings of red snapper.

PRIONOTUS STEARNSI Jordan and Swain

Prionotus stearnsi Jordan and Swain, 1884, Proc. U. S. Nat. Mus., 541; Jordan and Evermann, 1898, Fishes of North and Middle America, pt. 2:2168-69.

Counts and proportions taken from three specimens in the U. S. Nat. Mus. (117268), ranging in standard length from 85 to 102 mm.

Description. Body fusiform, low, compressed: depth, 5.08 (4.86 to 5.31); width, 6.12 (5.69 to 6.38). Head rather short, 2.73 (2.68 to 2.76). All in standard length.

Snout narrow and rather short: length, 2.19 (2.17 to 2.21); width, 2.55 (2.44 to 2.62). Mouth large: maxillary, 2.15 (2.06 to 2.23). Orbit rather small: width, 5.10 (5.08 to 5.17); interorbital space narrow: 7.56 (7.34 to 7.75). Nape very long and rather narrow: length, 4.82 (4.22 to 5.17); width, 5.71 (5.43 to 6.20). All in head length.

Pectoral fin extremely short: but little longer than pelvic fin; length, 4.17 (3.93 to 4.33). Pelvic fin very short: 4.55 (4.25 to 4.86). Both in standard length.

First dorsal spine low: 3.04 (2.82 to 3.17); second and third spines rather short: second, 2.51 (2.48 to 2.54) 2; third, 2.55 (2.38 to 2.72). Second soft dorsal ray, 2.40 (2.28 to 2.53). Longest anal ray, 3.18 (3.00 to 3.45). Opercular spine of medium length: to anterior margin of opercle, 3.63 (3.44 to 3.80). Preopercular spine extremely short: not passing opercular flap; to anterior margin of preopercle, 6.62 (6.20 to 7.34); to centre of radiation on cheek, 2.77 (2.64 to 2.95). Humeral spine extremely short: to edge of opercular flap, 10.19 (8.45 to 12.40). All in head length.

D. X - 11½ to 12. A. 11½. Gill rakers, 1+1+9 to 10. Vertical scale count, 9+1+17 to 19. Pored scales, 50 to 51+1 to 5. Pectoral fin rays, 13+3 (2).

Rostral, preorbital, suborbital, supplementary preopercular, preocular, postocular, sphenotic and pterotic spines absent; parietal, a ridge without terminal spine; nuchal spine small, depressed. Profile

from tip of snout to nuchal region nearly plane as in *quiescens;* supraocular ridge but little elevated. Postfrontal groove a barely perceptible vestigial trace. Rostral plates rounded, minutely serrulate. Opercular flap scaled. Free pectoral rays long and tapering. Caudal fin subtruncate. Several small, tapering, supraocular cirri and a long nasal flap present. First dorsal spine: median ridge minutely serrate; second spine, submedian ridge granulate; third, smooth. First soft dorsal ray: proximal third of median ridge minutely granulate.

Color in alcohol. (a) Light olive-brown above merging into silvery on ventro-lateral area; (b) golden brown, with no albescent gradation below. Dorsal fins intensely clouded with dark chromatophores. Caudal plain, but blackish at distal end. Anal and pelvic fins plain. Scales on dorsum and sides dotted with melanophores; general appearance as though cured by smoking.

Known distribution. Holotype taken off Pensacola, Florida; above specimens, off the Tortugas Islands, Gulf of Mexico.

PRIONOTUS MILES Jenyns

Prionotus miles Jenyns, 1842, Zool. *Beagle.* Fishes, 29; pl. 6; Jordan and Evermann, 1898, Fishes of North and Middle America, pt. 2:2161.

Counts and proportions taken from two specimens in the U. S. Nat. Mus. (41468 and 41438) of 170 and 210 mm. respectively in standard length.

Description. Body of moderate depth and width: depth, 4.55 (4.38 to 4.72); width, 5.13 (4.77 to 5.48). Head rather short: length, 2.69 (2.63 to 2.74). All in standard length.

Snout rather short and narrow: length, 2.18 (2.14 to 2.22); width, 2.45 (2.42 to 2.48). Mouth large: maxillary, 2.37 (2.34 to 2.39). Orbit rather small: width, 5.08 (5.00 to 5.16). Interorbital space of medium width: 6.74 (6.20 to 7.28). Nape of moderate width but rather long: width, 4.84 (4.71 to 4.96); length, 4.87 (4.57 to 5.16). All in head length.

Pectoral fin of medium length: 2.37 (2.30 to 2.44); posterior end of anal base from pectoral base, 1.68 (1.61 to 1.74). Pelvic fin of moderate length, 3.70 (3.53 to 3.86). All in standard length.

First dorsal spine low, 2.93 (2.76 to 3.10); second spine, 2.48 (1); third, 2.30 (2.29 to 2.30). Second soft dorsal ray, 2.90 (2.76 to 3.08). Longest anal ray, 3.50 (3.44 to 3.56). Opercular spine of medium length: to anterior margin of opercle, 3.55 (3.54 to 3.56). Preopercular spine extremely short: not passing opercular flap; to anterior margin of preopercle, 5.25 (5.16 to 5.33); to centre of radiation on cheek, 2.84 (2.82 to 2.86). Humeral spine rather short: to edge of opercular flap: 5.96 (5.71 to 6.20). All in head length.

D. X - 12½. A. 11½. Gill rakers, 1+1+9 to 10. Vertical scale count, 8 to 9+1+24 to 26. Pored scales, 52+7 to 8. Pectoral fin rays, 13+3.

Rostral, preorbital, suborbital and supplementary preopercular spines absent. Preocular small, elevated; postocular small, depressed; sphenotic, a small, depressed ridge; pterotic and parietal spines small, depressed; nuchal short, depressed, usually worn. Postfrontal groove absent or vestigial. Interorbital space rather flat. Rostral plates slightly rounded; bluntly serrulate. Opercular flap not scaled. Caudal fin subtruncate. Free pectoral rays slightly expanded on distal half. First dorsal spine: median ridge granulate, flanked by a granulate ridge on either side. Second and third spines: a pair of granulate ridges on alternate sides. First soft dorsal ray: median ridge of basal quarter granulate.

Color in alcohol. Brownish gray above; lighter below. Dark patch between fourth spine and sixth of first dorsal fin; soft dorsal fin traversed by a single median series of light, opaque spots; fringe of fin also light, opaque. Caudal fin plain; brownish gray. Other fins and free pectoral rays, plain.

Known distribution. Holotype taken in the Galapagos (Colon) Archipelago, off Chatham (San Cristobal) Island; the above specimens, off nearby Charles (Santa Maria) Island.

PRIONOTUS BRACHYCHIR Regan

Prionotus brachychir Regan, 1914, Diagnoses of New Marine Fishes collected by the British Antarctic (*Terra Nova*) Expedition. An. and Mag. Nat. Hist., Ser. 8, Vol. 13:11-17.

Counts and proportions pertaining to two specimens in the U. S. Nat. Mus., (111735) of 47½ and 61 mm. in standard length respectively.

Description. Anterior profile of orbital region strikingly oblique like that of *Trigla lineata;* body very small but relatively very deep and rather broad: depth, 3.61 (3.52 to 3.70); width, 4.52 (4.51 to 4.53). Head somewhat short: length. 2.61 (2.57 to 2.65). All in standard length.

Snout narrow and very short: width, 2.52 (2.47 to 2.56); length, 2.60 (2.56 to 2.64). Mouth rather large: maxillary, 2.45 (2.42 to 2.47). Orbit exceptionally large: larger than in any of the other species; width, 2.86 (2.85 to 2.88). Interorbital space narrow, 7.53 (7.40 to 7.66). Nape short and very broad: length, 6.38 (6.17 to 6.58); width, 3.94 (3.70 to 4.18). All in head length.

Pectoral fin extremely short: little longer than pelvic fin; length,

3.38 (3.17 to 3.58). Pelvic fin also very short: 4.33 (4.14 to 4.51). Both in standard length.

First dorsal spine high: 2.13 (2.06 to 2.19); second and third spines higher still: second, 1.80 (1.68 to 1.92); third, 1.76 (1.68 to 1.84). Second soft dorsal ray, 2.64 (1). Longest anal ray, 2.56 (1). Opercular spine of exceptional length: to anterior margin of opercle, 2.18 (2.06 to 2.30). Preopercular spine long: to anterior margin of preopercle, 2.59 (2.47 to 2.71); to centre of radiation on cheek, 1.93 (1.92 to 1.95). Humeral spine short: to edge of opercular flap, 6.36 (6.13 to 6.58). All in head length.

D. X - 11. A. 11 to 11½. Gill rakers, 1+1+7 to 10 (3). Vertical scale count, 5 to 6+1+13 to 14. Pored scales, 48+1 to 3. Pectoral fin rays (damaged) 11 to 12?+3.

With the exception of a small nuchal spine, all smaller cranial spines absent. Postfrontal groove vestigial in adults, but conspicuous in young. Interorbital space moderately concave. Free pectoral rays, long and tapering. Caudal fin emarginate. Rostral plates rounded; a few anterior serrulations of exceptional length. Opercular flap not scaled. First dorsal spine: median ridge unevenly and sharply serrate. Second and third spines: a pair of granulate ridges on alternate sides; first soft dorsal ray: proximal quarter of median ridge granulate.

Color in alcohol. Light yellowish brown above; lighter below; lower part of belly darkening again between vent and caudal base. First dorsal fin plain, except for small ocellate blotch between fourth and sixth dorsal spines. Neither transverse series of pin head spots on soft dorsal, nor three dark crossbars on caudal fin, as described and figured in respect of this species (1914, REGAN) apparent. Distal two-thirds of pectoral fin black, fringed with white; basal third of fin and uppermost ray light.

Known distribution. Holotype and above specimens taken at a depth of 40 fathoms off Cape Frio, Brazil, in latitude S. 22°56'00"; longitude W. 41°34'00".

PRIONOTUS ROSEUS Jordan and Evermann

Prionotus roseus Jordan and Evermann, 1886, Proc. U. S. Nat. Mus., 470; ibid. 1898, Fishes of North and Middle America, pt. 2:2158-59.

Counts and proportions of the holotype (37989) in the U. S. Nat. Mus., of 130 mm. in standard length.

Description. Body depressed and rather narrow: depth, 5.90; width, 5.40. Head very short: length, 3.10. All in standard length.

Snout long and rather narrow: length, 2.00; width, 2.45. Mouth

very small: maxillary, 3.35. Orbit rather small: width, 5.25. Interorbital space very narrow: breadth, 8.40. Nape short and narrow: length, 6.45; width, 6.00. All in head length.

Pectoral fin long but not passing anal base: rays ending in threads (due to maceration): length, 1.65; posterior end of anal base from pectoral base, 1.50. Pelvic fin long (ending in threads): 3.40. All in standard length.

First dorsal spine very high: 1.91. Second and third spines higher still: second, 1.68; third, 1.71. Second soft dorsal ray, 2.21; longest anal ray, 2.47 (last two ending in threads). Opercular spine long: to anterior margin of opercle, 3.10. Preopercular spine very short: to anterior margin of preopercle, 4.20; to centre of radiation on cheek, 2.45. Humeral spine of moderate length: to edge of opercular flap, 5.60. All in head length.

D. X - 12½. A. 11½. Gill rakers, 1+1+7. Vertical scale count, 6+1+21 (approximately). Pored scales, 51+?. Pectoral fin rays, 13+3.

Rostral spine small, elevated, retrorse. Preorbital, suborbital and supplementary preopercular spines absent. Preocular small, elevated; postocular, a serrulate ridge. Sphenotic, pterotic and parietal spines, absent. Nuchal spine stout, depressed. Postfrontal groove conspicuous. Interorbital space rather deeply concave. Rostral plates rounded; rather sharply serrulate. Opercular flap scaled. Free pectoral rays: fibrous threads. Caudal fin subtruncate. First dorsal spine: median ridge spiny, flanked on either side by a granulate ridge. Second spine: submedian ridge serrate, flanked on one side by a granulate ridge. Third: submedian ridge serrate, flanked on opposite side to second by a granulate ridge. First soft dorsal ray: basal quarter of median ridge granulate.

Color in alcohol. Yellow-brown above; ligth below well defined belly line. Black spot at distal end of caudal fin; pectoral blackish.

Known distribution. Taken off Pensacola, Florida, from spewings of red snapper.

PRIONOTUS MICROLEPIS Longley and Hildebrand

Prionotus microlepis Longley and Hildebrand, 1940, Papers from Tortugas Laboratory (Carnegie Institute of Washington), Vol. 32:254-57.

Counts and proportions corresponding to three specimens in the U. S. Nat. Mus. (holotype, 108869; cotypes, 117267) ranging in standard length from 88 to 103 mm.

Description. Body depressed; of medium width: depth, 5.06 (4.90 to 5.18); width, 5.25 (5.15 to 5.35). Head short: 2.96 (2.93 to 3.00). All in standard length.

Snout long and narrow: length, 2.04 (2.00 to 2.06); width, 2.61 (2.59 to 2.62). Mouth small: maxillary, 2.87 (2.83 to 2.92). Orbit very small: width, 5.08 (5.00 to 5.23). Interorbital space very narrow: breadth, 9.06 (7.78 to 10.90). Nape very short and narrow: length, 7.40 (6.66 to 8.75); width, 6.62 (6.19 to 7.00). All in head length.

Pectoral fin long: nearly always passing anal base, 1.55 (1.52 to 1.58); posterior end of anal base from pectoral base, 1.56 (1.54 to 1.57). Pelvic fin long, 3.46 (3.29 to 3.67). All in standard length.

First dorsal spine very high: 1.97 (1.94 to 2.00) 2; second and third spines higher still: second, 1.75 (1.70 to 1.84); third, 1.75 (1.67 to 1.79). Second-soft dorsal ray, 2.30 (2.22 to 2.34). Longest anal ray, 2.57 (2.50 to 2.62). Opercular spine very long: to anterior margin of opercle, 2.98 (2.79 to 3.18). Preopercular spine of medium length: to anterior margin of preopercle, 3.55 (3.40 to 3.75); to centre of radiation on cheek, 2.23 (2.19 to 2.31). Humeral spine of moderate length: to edge of opercular flap, 5.63 (4.86 to 6.66). All in head length.

D. X - 11½ to 12½. A. 11½. Gill rakers, 0 to 1+1+7 to 8. Vertical scale count, 7 to 8+1+22 to 25. Pored scales, 50 to 51+3 to 6. Pectoral fin rays, 12 to 13+3 (2).

Rostral spine retrorse, minute; preorbital, suborbital and supplementary preopercular spines absent. Preocular moderate (with serrulations); postocular, serrulations; sphenotic small, serrulate spine; pterotic, a serrulate ridge; parietal spine, stout, long, depressed; nuchal much keeled, serrulate. Postfrontal groove conspicuous. Free pectoral rays tapering. Scales on dorsum and sides strongly ctenoid. Caudal fin subtruncate. Rostral plates serrulate. Opercular flap scaled. Interorbital rather deeply concave. First dorsal spine: unevenly and sharply serrate median ridge flanked on either side by a pair of granulate ridges. Second spine: submedian serrate ridge flanked on one side by a pair of granulate ridges. Third spine, on opposite side to that of second: submedian granulate ridge flanked by a pair of granulate ridges. First soft dorsal ray: proximal quarter serrate along median ridge.

Color in alcohol. Upper parts, darkish brown, spotted with darker; belly line, well marked; white below. Dark ocellus between fourth and fifth spines of first dorsal fin. Soft dorsal fin traversed by a five-four series of dark spots. Caudal fin crossed by a basal, median and distal bar, with a finer bar between each; distal end fringed with black. Pectoral fin brown; from fourth upper ray downwards, strikingly ornamented by as many as twelve transverse series of blue ocelli; these bordered by a sharply delineated brown rim.

Known distribution. Holotype and cotypes taken in from 45 to 64 feet of water, west of White Shoal, Tortugas Islands, Gulf of Mexico.

PRIONOTUS QUIESCENS Jordan and Bollman

Prionotus quiescens Jordan and Bollman, 1889, Proc. U. S. Nat. Mus., 166; Jordan and Evermann, 1898, Fishes from North Middle America, pt. 2:2161-62.

Counts and proportions pertaining to four specimens in the U. S. Nat. Mus. (holotype and cotype, 41153; two other specimens, 41460) ranging in standard length from 86 to 90 mm.

Description. Body of medium depth and width: depth, 4.65 (4.30 to 5.05); width, 5.20 (4.85 to 5.40). Head long: 2.45 (2.43 to 2.49). All in standard length.

Snout very short and narrow: length, 2.50 (2.40 to 2.55); width, 2.70 (2.50 to 2.85). Mouth large: maxillary, 2.20 (2.15 to 2.30). Orbit of medium size: width, 4.80 (4.40 to 5.30). Interorbital very wide: breadth, 5.15 (4.60 to 5.70). Nape broad and rather long: width, 4.40 (4.05 to 4.65); length, 5.25 (4.95 to 5.40). All in head length.

Pectoral fin of medium length: 1.95 (1.90 to 2.05); posterior end of anal base from pectoral base, 1.75 (1.65 to 1.90). Pelvic fin short: 4.05 (3.90 to 4.30). All in standard length.

First dorsal spine very low: 3.20 (2.90 to 3.35) 6; second spine, 2.60 (2.45 to 2.75) 8; third, 2.35 (2.15 to 2.45) 7. Second soft dorsal ray, 2.60 (2.50 to 2.70). Longest anal ray, 3.15 (2.85 to 3.45) 3. Opercular spine very long: to anterior margin of opercle, 3.00 (2.75 to 3.20). Preopercular spine very short: not passing opercular flap; to anterior margin of preopercle, 4.50 (4.10 to 4.95); to centre of radiation on cheek, 2.55 (2.45 to 2.70). Humeral spine of moderate length: to edge of opercular flap, 5.05 (4.95 to 5.30). All in head length.

D. X - 12½. A. 11½. Gill rakers, 2+1+10 to 12. Vertical scale count, 6 to 7+1+16 to 18. Pored scales, 48 to 51+2 to 9. Pectoral fin rays 13+3 (3).

Rostral spine minute, retrorse; preorbital and suborbital spines absent; supplementary preopercular spine: vestigial trace of ridge and spine often discernible; preocular small, elevated; postocular absent or very small, depressed; directly below this and just within the interorbital area, a depressed, or slightly elevated, inframarginal spine present as in *stephanophrys;* sphenotic absent; pterotic, a vestigial granulate ridge sometimes ending in a minute, depressed spine; nuchal, a slightly serrulate ridge ending in a short, stout, depressed spine. Opercular and preopercular spines: median longitudinal ridge lightly serrulate. Humeral spine smooth. Postfrontal groove absent. Rostral plates rounded; bluntly serrulate; anterior serrulations recurved inwards. Interorbital space shallowly concave; supraocular

ridge very low; in larger specimens, profile, from snout to nape, nearly as plane as in *stephanophrys*. Opercular flap scaled. Caudal fin subtruncate. Free pectoral rays tapering. First dorsal spine: median ridge lightly granulate. Second and third spines: lightly granulate ridge on alternate sides. First soft dorsal ray: median ridge, on basal quarter, lightly granulate.

Color in alcohol. Dark yellowish brown above, turning yellow below. First dorsal fin much clouded with darker; dark ocellate blotch between fourth and fifth spines. Soft dorsal similarly clouded in smaller specimens; in larger, a four-three transverse series of dark, roundish spots discernible. Distal two-thirds of caudal fin dark; ferruginous brown blotch on base. Distal quarter of anal ray speckled. Free pectoral rays darkish, but unbarred. Pelvic fin pale. Pectoral fin, in smaller specimens, black, with three to four incipient whitish bars crossing fin rays, but not membranes, from uppermost ray to ninth; in larger specimens (41195 and 41386, U. S. Nat. Mus., of 105 and 90 mm. in standard length, respectively) the beginnings of an oblique series of dark spots discernible.

Known distribution. Holotype and cotypes taken off the Galapagos (Colon) Islands; other specimens obtained in the Gulf of Panama in latitude N. 08°38'00"; longitude W. 79°31'30" and in adjacent waters; others again at the mouth of the Rio Mulege, Bahia de Santa Ines, Gulf of California, and also off the U. S. coast of Southern California, in latitude N. 33°55'30"; longitude W. 120°28'00".

Remarks. This species differs from *P. stephanophrys* in the presence of a small rostral spine, the rather lower dorsal fins, and, also, in the shallowly concave interorbital space. On the other hand, these two species not only agree closely in every other particular, but in both there are to be found a similar vestigial supplementary preopercular ridge and spine, an inward recurvature of the anterior serrulations of the rostral plates, and, furthermore, a unique (and hitherto unnoticed) inframarginal postocular spine.

Upon analyzing the differences, it may be shown, or inferred by analogy, that they are juvenile characters: the rostral spine may well disappear before maturity (e.g. *carolinus* and *scitulus*); the dorsal fins are lower proportionally to head length, but not to standard length; the concavity of the interorbital is flattening out even at 105 mm. in standard length. Still further, the absence of color pattern on the fins of all but the largest specimens, and even then, presumably, incomplete, indicates that no mature specimen of *quiescens* has yet been located, unless it be that *quiescens* is the young of *stephanophrys*.

PRIONOTUS SCITULUS Jordan

Prionotus scitulus Jordan, *in* Jordan and Gilbert, 1882, Proc. U. S. Nat. Mus., 288; Jordan and Evermann, 1898, Fishes of North and Middle America, pt. 2:2157-58.

Counts and proportions of the holotype (5148) and two other specimens (111571) in the U. S. Nat. Mus., ranging in standard length from 69 to 116 mm. (holotype).

Description. Body low and slender: depth, 5.90 (5.25 to 6.45); width, 5.75 (5.10 to 6.45). Head short: 2.95 (2.80 to 3.20). All in standard length.

Snout rather long, narrow and pointed: length, 2.10 (2.09 to 2.15); width, 2.45 (2.35 to 2.55). Mouth moderate: maxillary, 2.60 (2.50 to 2.75). Orbit rather small: width, 5.20 (4.80 to 5.60). Interorbital space extremely narrow: breadth, 11.80 (11.20 to 12.00). Nape very short and rather narrow: length, 7.80 (6.85 to 9.35); width, 5.70 (5.35 to 6.20). All in head length.

Pectoral fin short: length, 2.60 (2.40 to 2.85); posterior end of anal base from pectoral base, 1.50 (1.45 to 1.60). Pelvic fin short, 4.05 (3.75 to 4.45). All in standard length.

First dorsal spine of medium height: lower than second or third; first, 2.40 (2.30 to 2.55); second, 1.95 (1.90 to 2.00); third, 1.80 (1.70 to 1.90). Second soft dorsal ray, 2.60 (2.30 to 2.95). Longest anal ray, 3.05 (3.00 to 3.10). Opercular spine very short: not passing opercular flap; to anterior margin of opercle, 3.85 (3.75 to 4.00). Preopercular spine of medium length: to cleft, 6.25 (6.00 to 6.55); to anterior margin of preopercle, 3.65 (3.45 to 3.80); to centre of radiation on cheek, 2.35 (2.20 to 2.50). Humeral spine very short: to edge of opercular flap, 7.60 (7.20 to 8.00) 2. All in head length.

D. X - 13½. A. 12½. Gill rakers, 1+1+9 to 10. Vertical scale count, 8 to 9+1+29 to 30. Pored scales, 49 to 52+4 to 8. Pectoral fin rays, 13+3 (1).

Rostral and preorbital spines small, retrorse; suborbital vestigial, retrorse. Supplementary preopercular spine of moderate size, depressed. Preocular strong, elevated; postocular strong, depressed; sphenotic, a serrulate stump; pterotic, a serrulate ridge; parietal, in young, strong and slightly elevated. Nuchal spine moderate; slightly elevated. Caudal fin evenly truncate. Postfrontal groove broad, medially shallow. Free pectoral rays: distal half expanded. Scales on dorsum and sides extremely small. Rostral plates rounded, serrulate. Opercular flap scaled. Interorbital space concave. First dorsal spine: median ridge minutely and rather unevenly serrate (in holotype proximal two thirds doubly serrate). Second and third spines: serrate ridge on alternate sides. First soft dorsal ray: proximal quarter of median ridge, serrate.

Color in alcohol. Olive brown above; lighter below. Dorsum crossed from lateral line to lateral line by seven dark bars; ventro-lateral area much spotted above belly line. First dorsal fin darkish, crossed by two opaque

light streaks between first and fourth dorsal spines, one distal and one median; a dark streak on distal half between first and second spines; dark ocellus, margined by light opaque band below, between fourth and fifth spines. Soft dorsal traversed from first to sixth ray by five series of smallish brown spots, these aligned vertically on rays, but overlapping on to anterior interradial membrane from second ray to proximal third of fifth ray; thence to sixth, overlapping posterior membrane; thence, again, spots of increased size occupying principally interradial membranes. Pectoral fin light brown above, barred with darker; from sixth ray from above to last ray, dark brown. Broad, dark brown, transverse median bar on anal fin, leaving light opaque margin above and below. Caudal fin dark olive brown, traversed on upper half by four diffuse whitish bars, these becoming resolved into spots with fin extended. Pelvic fin light.

Known distribution. From Newport River, North Carolina, to west coast of Florida.

Remarks. The holotype is by far the largest specimen in the U. S. Nat. Mus. and far larger than any in the Am. Mus. of Nat. Hist.; it probably represents a very mature stage of development. Rostral, preorbital and suborbital spines are absent; on the preopercular spine there is a vestigial trace of the supplementary preopercular spine on one side; this is accompanied by a minute, additional spine in front.

PRIONOTUS CAROLINUS (Linnaeus)

Trigla carolina Linnaeus, Mantissa, 176,528. *Prionotus carolinus* Jordan and Evermann, 1898, Fishes of North and Middle America, pt. 2:2156-57. *Prionotus affinis* Hildebrand and Schroeder, 1927, General Index to Fishes of Chesapeake Bay. U. S. Bureau of Fisheries, Vol. 43, Pt. 1:315-16.

Counts and proportions corresponding to one specimen (18835)in the Am. Mus. of. Nat. Hist., and four (67708; 91083; 76708 and 76709) in the U. S. Nat. Mus., ranging from 82 to 204 mm. in standard length.

Description. Body low and rather narrow: width, 5.40 (4.90 to 5.85); depth, 5.45 (4.65 to 6.30). Head short: 2.90 (2.80 to 3.15). All in standard length.

Snout long, but rather narrow: length, 2.00 (1.90 to 2.25); width, 2.50 (2.35 to 2.75). Mouth small: maxillary, 2.85 (2.45 to 3.00). Orbit small: width, 5.45 (4.20 to 6.00). Interorbital space rather narrow: breadth, 7.10 (6.50 to 8.45). Nape very short and rather narrow: length, 7.35 (6.35 to 9.30); width, 5.60 (4.90 to 6.15). All in head length.

Pectoral fin of medium length: 2.25 (2.05 to 2.45); posterior end of anal base from pectoral base, 1.55 (1.50 to 1.70). Pelvic fin of moderate length: 3.85 (3.65 to 4.05). All in standard length.

First dorsal spine very low: 3.15 (3.10 to 3.20) 4; second spine, 2.40 (2.35 to 2.50) 4; third, 2.20 (2.15 to 2.25) 2. Second soft dorsal ray, 2.65 (2.50 to 2.70) 4. Longest anal ray, 2.65 (2.50 to 2.75) 3. Opercular spine of medium length: to anterior margin of opercle, 3.45 (3.10 to 3.70). Preopercular spine of moderate length: to cleft, 6.00 (5.35 to 7.50); to anterior margin of preopercle, 3.60 (3.35 to 3.75); to centre of radiation on cheek, 2.30 (2.20 to 2.45). Humeral spine rather long: to edge of opercular flap, 4.85 (4.30 to 4.90) 3. All in head length.

D. X - 12½ to 13½. A. 11½ to 12½. Gill rakers, 1+1+10 to 11. Vertical scale count, 7 to 9+1+20 to 22. Pored scales, 52+2 to 7. Pectoral fin rays, 13+3 (2).

Rostral, preorbital and supplementary preopercular spines minute, retrorse; suborbital spine absent. Preocular spine strong, elevated; postocular strong, depressed; sphenotic, a small, elevated stump; pterotic, ridge ending in small spine. Parietal and nuchal spines strong, depressed. Spinal ridges serrulate in juvenile fishes; most spines present until young reach about 100 mm. in standard length, but disappearing long before fish reaches fully adult stage. Postfrontal groove deep, conspicuous. Interorbital space moderately concave. Rostral plates bluntly serrulate; serrulations recurved inwards. Opercular flap not scaled *. Caudal fin emarginate, upper lobe the longer. Pectoral fin rounded. Free pectoral rays: distal half expanded, broadly lanceolate. First dorsal spine: median ridge sharply (juvenile fishes) to bluntly serrate; second and third spines: submedian ridge, on alternate sides, bluntly serrate. First soft dorsal ray: proximal quarter of median ridge bluntly serrate.

Color in alcohol. The following observations were made on eight specimens, ranging in standard length from 107 to 120 mm., in the U. S. Nat. Mus., taken on September 14, 1932, between Brigantine Inlet and Barnegat Bay, New Jersey, which had preserved their color patterns to a remarkable degree: vinaceous ** brown above, lighter below; body from median line of dorsum as far down as belly line, crossed by from four to five broad, dark bands; these slightly oblique in an anterior direction. First dorsal fin with dark cloudings broken up by a translucent streak across lower third from first spine to fifth; another stronger streak from first spine to beyond fifth, just above median line of fin and partially encircling lower and posterior sections of margin of dark ocellate blotch between fourth and fifth spines. Soft dorsal also clouded with darker, and traversed by two translucent streaks, one basal and one median. Caudal fin plain with dark blotch on base. Pectoral fin black with lightish area between uppermost ray and third; this area crossed by from five

* Scales embedded.

** The vinaceous tinge of the brown may be attributed to the medium in which these specimens were preserved.