

## A REVIEW OF THE SPECIES OF THE GENUS PRIONOTUS.

By DAVID S. JORDAN and ELIZABETH G. HUGHES.

In the present paper we have given the synonymy of the species of *Prionotus*, or Sea Robins, together with an analytical key by which they may be distinguished. The material examined by us is chiefly in the museum of the Indiana University, having been collected mostly by Professors Jordan and Gilbert and Mr. Silas Stearns.

Most of the characters in the following analysis have been taken from adult specimens. Young examples in most cases differ from the adults in the following respects, in addition to those characters which usually distinguish young fishes:

The spines on the head are sharper, more conspicuous, and more compressed in the young, and some spines, especially those on the side of the head, disappear entirely with age. The interorbital space is more concave in the young. The pectoral fins are also much shorter. The gill-rakers are longer in the young, and proportionately more slender, and some of the color markings—especially the dark cross-shades—are more conspicuous, while the spots on body and fins are less so.

The following is the synonymy of the genus.

## PRIONOTUS.

PRIONOTUS Lacépède, Hist. Nat. Poiss. III, 37, 1802 (*evolans*).

ORNICHTHYS Swainson, Nat. Hist. Classn. Fishes, II, 1839, 262 (*punctatus*).

CHRIOLAX Jordan & Gilbert, Proc. U. S. Nat. Mus., 1878, 374 (*evolans*).

Type *Prionotus evolans* L.

The species of *Prionotus* so far as known are confined to the waters of America and Japan. They may be compared as follows:

## ANALYSIS OF THE SPECIES OF PRIONOTUS.

- a. Dorsal rays VIII to X—11 to 13. Anal rays 11 or 12.
- b. Mouth comparatively small, the maxillary less than one-third the length of the head, the mandible not extending backward as far as the vertical from the front of the eye; a more or less distinct cross-groove\* on top of head behind eye; black spot on spinous dorsal very distinct, ocellated, confined to the membrane between fourth and fifth spines.
- c. [Pectoral fins very long, reaching base of caudal, the rays graduated, the ninth the longest; scales small, in 109 transverse series, 50 tubes in the lateral line; gill rakers shortish, 1+6 in number; body rather stout, the depth 4 in length; palatine teeth few, feeble; caudal subtruncate; second dorsal spine longest, half the length of head; first spine strongly serrated in front; pre-

\* Not described in *P. alatus*, but probably present.

- opercular spine with a smaller one at its base; head  $2\frac{1}{2}$  in length. D. x-12, A. 11. Body with four faint cross-bands; caudal with black tip, and two paler cross-shades; spinous dorsal with small dark spots besides the large one, soft dorsal plain; pectorals clouded.] (*Goode & Bean*) .....ALATUS, 1.
- cc. Pectoral fins rather short, not reaching last ray of anal and not more than half the length of the body; one or two small spinules on lower edge of preopercle, below the preopercular spine.
- d. Preopercular spine with a smaller one at its base; pectorals reaching past middle of anal, their length not quite half the body; gill-rakers rather long and slender, about 10 developed; maxillary,  $2\frac{1}{2}$  in head; a bluntish spine on edge of snout behind the serræ; behind this, one or two smaller ones, at least in the young; no spine on cheek bone; groove behind the eye evident; interorbital area rather narrow, concave; preocular, supraocular, occipital and nuchal spines rather prominent. Dorsal spines high, the third  $2\frac{1}{3}$  in head; first spine not serrate; caudal truncate. Head,  $2\frac{1}{2}$  in length; depth,  $2\frac{1}{3}$ ; D. x-12, A. 12. Pores about 50. Back obscurely spotted. Dorsal and caudal fins spotted with brown, the first dorsal with a black blotch besides; the pectoral with obscure dark spots, and margined with blue" .....PUNCTATUS, 2.
- dd. Preopercular spine with no smaller one at its base in front; pectoral fin short, reaching little past front of anal, its length less than half the body; gill-rakers of moderate length, about 10 developed; no spine on cheek bone or on sides of snout. D. x-13, A. 12.
- e. Body not very slender, the depth 5 in length; head not very small, its length 3 in body; groove across top of head behind eye, very conspicuous; interorbital area moderately concave, rather broad, about equal to diameter of eye; bones of head comparatively smooth, the preocular, postocular, occipital and nuchal spines low, depressed; temporal ridge conspicuous, without spines. Dorsal spines low, the second  $2\frac{1}{2}$  in head, the first moderately serrate; base of soft dorsal equal to distance from tip of snout to tip of humeral spine; caudal fin lunate, its outer rays  $\frac{1}{3}$  to  $\frac{1}{2}$  longer than inner; pectoral fin somewhat rounded, the longest ray about the fifth; free rays of pectoral expanded toward tip, with decurrent membrane; scales rather large; about 58 pores. Body and fins nearly plain, mottled with darker, but without well-defined spots except the dorsal ocellus; back with four obscure cross-blotches; two or three oblique pale streaks across spinous dorsal. Gill-membranes dusky. Young with head rougher, pectoral fins shorter, dark spots on body more distinct. ...CAROLINUS, 3.
- ee. Body very slender, the depth about  $6\frac{1}{2}$  in length; head short,  $3\frac{1}{3}$  in length; groove across top of head behind eye, little conspicuous; interorbital area narrow, deeply concave; its

width about  $\frac{2}{3}$  the diameter of the eye; bones of head very smooth, the striations very weak; spines on top of head (preocular, supraocular, occipital and nuchal) short and sharp, not depressed; temporal ridge blunt, without spine. Dorsal spines very high, the second  $1\frac{1}{4}$  in head, the first moderately serrate; soft dorsal high, its base about  $\frac{1}{4}$  longer than head; caudal truncate; pectoral fin truncate; its third ray longest, the others, to the tenth little shorter; free rays of pectoral a little expanded at tip; scales rather small, about 52 pores. Body covered with roundish bronze spots of various sizes; smaller bronze spots on the head; both dorsals, caudal and pectoral fins with similar bronze spots, these especially numerous and distinct on soft dorsal.

SCITULUS, 4.

- bb.** Mouth comparatively large, the maxillary two to two and three-fourths in the length of head, the mandible extending backward to opposite of eye, or nearly so; no distinct cross-groove on top of head; free rays of pectoral tapering, not expanded at tip; black blotch on spinous dorsal diffuse, not ocellated, involving the membranes of more than two spines.
- f.** Preopercular spine without a distinct smaller spine at its base in front.
- g.** Pectoral fins very long, reaching at least to beyond the second third of the dorsal; serræ on preorbital, each ending in a conspicuous point or spine.
- h.** Gill-rakers long and slender, the longest nearly half the eye; body rather stout, the depth 4 in length; head large, nearly plane above, the interorbital space not concave, its width equal to eye; snout very short,  $2\frac{1}{2}$  in head; maxillary  $2\frac{1}{8}$  in head, reaching past front of orbit; bands of palatine teeth, very narrow; bones of head smoothish, little striate. First dorsal spine serrate in front, the third spine nearly half the length of the head; caudal slightly concave; pectoral reaching ninth anal ray, its outline rounded; ventrals not reaching vent. Scales about 55. Color pale olivaceous, back and sides with a few dark spots; second dorsal with three rows of black spots; caudal with three rows of dark blotches; pectorals with dark clouds. D. x-12, A. 11... STEPHANOPHRYS, 5.
- hh.** Gill-rakers very short, tubercle-like, 9 or 10 developed, little if any longer than the interspaces; first dorsal spine nearly smooth; mouth not very large, the maxillary  $2\frac{3}{4}$  to  $2\frac{5}{8}$  in head.
- i.** Interorbital space moderately concave; its width about four-fifths length of eye; no cirrus above the eye; distance from supraocular spine to nuchal scales about equal to eye; supraocular and nuchal spines low; occipital spines wanting; temporal ridge sharp, ending in a blunt spine; preorbital projecting, strongly serrate; a blunt spine on each side of snout, behind serræ preorbital; a blunt spine behind this above angle of mouth; no spine on check-bone, in adult; upper

opercular spine almost obsolete; bones of head rather strongly striate, but not granulate; scales rather large; about 52 pores. D. x-11, A. 10. First dorsal spine not much shorter than second, which is  $2\frac{1}{2}$  in head; caudal very slightly concave; pectorals longer than in any other species (except *alatus*), reaching entirely past bases of dorsal and anal; its tip subtruncate, the longest ray about the ninth; ventrals reaching a little past vent. Head 3; depth 5; color nearly plain brownish, with darker clouds; no distinct spots anywhere on body or fins; the pectorals marbled with paler ..... RUBIO, 6.

**ii. Interorbital** space very deeply concave, its width about  $\frac{2}{3}$  length of eye; a fringed cirrus above the eye; distance from supraocular spine to nuchal scales about half the eye; occipital as well as nuchal spines distinct; temporal ridge with a small spine; no spine on cheek bone; bones of the head with fine, sharply defined striæ, but no granulations; upper opercular spine well developed; scales moderate (about 50 pores); D. viii-13, A. 11. First dorsal spine longest,  $1\frac{1}{2}$  in head; caudal subtruncate; pectorals nearly twice as long as head, reaching nearly to last rays of dorsal; ventrals about reaching to vent; head 3 in length; depth  $4\frac{1}{2}$ . Color crimson red, nearly plain; caudal with two dark cross shades.....OPHRYAS, 7.

**gg. Pectoral fins** short, not reaching beyond middle of dorsal; head much smoother than in any other species, the bones of the head faintly striate, with small granulations; the cranial spines little developed; the supraocular, occipital and temporal spines wholly wanting, there being only 3 pairs of spines on the head; mouth large, the maxillary 2 in head. Gill-rakers short and thick in adult, slender in young, about 10 developed; interorbital space concave, rather broad, its width, in adult, rather more than length of eye; first dorsal spine granulated; caudal slightly lunate; pectoral subtruncate, the second ray the longest, as long as head in adult; scales large, 48 pores in the lateral line. Head large,  $2\frac{2}{3}$  in length; depth  $3\frac{2}{3}$ ; D. x-12, A 11. Color crimson, with darker clouds and small spots; both dorsals with dark cross-streaks; head and pectoral fins conspicuously reticulated with blackish (in adult); anal plain, whitish; free rays of pectoral unspotted .....STEARNSI, 8.

**ff. Preopercular spine** with a distinct smaller one at the base; gill-rakers slender.

**k. Scales moderate** (50 to 60 pores); caudal fin very slightly innate; pectoral fin subtruncate.

**l. Cheek-bone** without distinct spine at the center of radiation.

**m. Edge of preorbital granular-serrate**, without distinct spine, the serræ about 12 in number on each side; temporal ridges roughish but without spines; bones of the head with the striæ coarsely granular; mouth moderate, the maxillary about  $2\frac{2}{3}$  in head; head not very broad,

the spines on its upper surface, except the nuchal spine, inconspicuous; head  $2\frac{1}{4}$  in length; depth about 4: D. X—12. A. 11. Gill-rakers longer and slenderer than in other species; 15 to 20 developed. Coloration brownish: side with a very distinct dusky bronze band below the lateral line and parallel with it; this becoming broken posteriorly into a series of roundish dark spots; some dark streaks and clouds below this stripe; fins with dark clouds, the soft dorsal with two dark blotches, which extend as bars on the back; head with scattered dark spots; dusky area below eye.

- n.* Pectoral with its rays each crossed by fine black bars, these especially distinct towards the base of the fin; free rays spotted; scales comparatively small, 10+1+23 in a vertical line from last dorsal spine to vent; interorbital area broad and almost flat, its width a little more than length of eye; first dorsal spine granulated; second spine  $2\frac{1}{2}$  in head; pectorals about half the length of the body.....STRIGATUS, 9
- nn.* Pectoral fin with its rays all plain blackish; free rays plain dusky; scales larger, 8+1+21 in a vertical line from last dorsal spine to vent; interorbital space more deeply concave, its width in adult not quite length of eye; first dorsal spine nearly smooth; second spine 3 in head; pectorals a little more than half of the body.....EVOLANS, 10
- mm.* [Edge of preorbital with six spinous teeth on each side; cheeks and temples without spine; pectoral fin reaching fourth anal ray.].....MILES, 11.
- ll.* Cheek-bone with a spine (small in the adult, larger in the young) at the center of radiation; temporal ridge with two bluntish spines; bones of the head very sharply striate; young with four sharp, knife-like spines on side of cheek and snout, in a line before the preocular spine; these nearly disappearing with age; maxillary about  $2\frac{1}{2}$  in head; sides without dark longitudinal stripe.
- o.* Gill-rakers slender in the young, becoming shorter and thicker with age, about 10 developed on lower part of arch; head broad, the spines on its upper surface very prominent, all of them more or less compressed and knife-like, especially in the young. Second dorsal spine  $2\frac{1}{2}$  in head; head  $2\frac{1}{2}$ ; depth  $4\frac{1}{2}$ ; D. X—12. A. 11. Pectorals moderate, 2 in body in the adult,  $2\frac{1}{2}$  in the young. Body brownish, much mottled with grayish and dusky, and with three or four obscure dark cross-bands; head and dorsal fins with many dark spots; caudal with two dusky shades; free rays of pectoral spotted, dusky area below eye.  
TRIBULUS, 12.
- oo.* Gill-rakers (in young) long and slender, 5 developed; scales small; spines as in *P. tribulus*, but still larger and more knife-like; pectoral fins short, 3 in body (in young).....HORRENS, 13.

*kk.* [Scales very small; preorbital produced into an obtuse process, projecting beyond the snout; spines on head well developed; pectoral fins truncated.]

BIROSTRATUS, 14.

*aa.* [Dorsal rays IX-14. A. 14. Scales 45 to 50; vertex and snout without spines; preorbital terminating in a flat, short, triangular, serrated disk; palatine teeth very minute, in a very narrow band; pectorals reaching to tenth anal ray and marked by a very large black blotch.]

JAPONICUS, 15.

### 1. *Prionotus alatus*.

*Prionotus alatus* Goode & Bean, Bull. Mus. Comp. Zoöl., xix, 210, 1833 (deep sea off Charleston, S. C.); Jordau, Cat. Fish N. Am., 114, 1885 (copied).

*Habitat.*—Gulf Stream.

This species is known only from the original type. It seems to be a very well marked species, distinguished especially by its very long pectoral fins.

### 2. *Prionotus punctatus*.

? *Trigla punctata* Bloch, Ichthyol., taf. 353, about 1790 (Martinique, on a drawing by Plumier); Bloch & Schneider, Syst. Ichth., 13, 1801 (copied), Cuvier, Règne Animal, 1829 (name only).

*Prionotus punctatus* Cuv. & Val., Hist. Nat. Poiss., iv, 93, 1829 (Antilles; Brazil; Martinique); Günther, Cat. Fish. Brit. Mus. 193 1860 (Brazil; Jamaica; Caribbean Sea; Patagonia).

*Habitat.*—West Indies and coast of South America; not known from the coasts of the United States.

This species is known to us from two small specimens collected (probably at Tuxpan) on the east coast of Mexico, by Mr. T. Salt. The characters given in our analysis are in part from these specimens, and in part from the specimens in the museum at Paris, the types of Cuvier and Valenciennes.

We feel absolutely certain that this species is the *Prionotus punctatus* of Cuvier and Valenciennes, but not that it is identical with the species figured by Plumier, to which Bloch has given the name of *Trigla punctata*.

The figure of Plumier shows a bright red body, with many small spots of a darker red, while red spots are scattered over all of the fins, except the spinous dorsal and the ventrals. In general form, and in the armature of the head, so far as this is shown in the plate, Plumier's figure most resembles the present species, but the red color suggests a possibility that some of the deep-water species may have been intended.

We know little of the life-coloration of the specimens referred by us to *P. punctatus*, as they are now faded. At present, but two species are positively known from the West Indian fauna, *P. rubio*, which could by no means have been the original of Plumier's figure, and the present one, which much resembles it.

Bloch's figure of "*Trigla carolina*," usually identified with *P. punctatus*, is almost certainly *P. tribulus*.

**3. *Prionotus carolinus*.**

*Trigla carolina* Linnæus, "Mantissa, 528" (Carolina) Gmelin, Syst. Nat., 1347, 1788 (copied); Cuvier, Règne Animal, 1829 (name only).

*Prionotus carolinus* Cuv. & Val., Hist. Nat. Poiss., iv, 90, 1829 (New York; Carolina); Storer, Report of Fishes Mass., 14, 1839 (Martha's Vineyard); DeKay, New York Fauna, Fishes, 46, 1842, plate v, fig. 15 (New York Harbor); Ayres, Bost. Journ. Nat. Hist., iv, 258, 1842 (Brookhaven, L. I.); Linsley, "Cat. Fish. of Conn., 1844"; Storer, "Synopsis, 51, 1846"; Günther, Cat. Fish. Brit. Mus., ii, 192, 1860 (New York); Gill, Cat. Fish. East Coast N. Am., 21, 1873 (name only); Jordan & Gilbert, Proc. U. S. Nat. Mus., 373, 1878 (Beaufort Harbor); Bean, Proc. U. S. Nat. Mus., 84, 1880 (Noank, Conn.); Wood's Holl, Mass.); Goode & Bean, Bull. Essex Inst., 12, 1879 (Salem).

*Trigla palmipes* Mitchill, Trans. Lit. & Phil. Soc. New York, 431, 1814, plate iv, fig. 5 (New York Harbor).

*Prionotus palmipes* Storer, Hist. Fish. Mass., 66, 1867, plate v, fig. 1 (Tisbury, Mass.); Jordan & Gilbert, Proc. U. S. Nat. Mus., 614, 1883; Jordan & Gilbert, Synopsis Fish. N. Am., 734, 1882; Jordan, Cat. Fish. N. A., 114, 1885 (name only); Goode, Nat. Hist. Aquatic Animals, 255, 1886, plate 71 (Beesley's Point, N. J.).

*Prionotus pilatus* Storer, "Proc. Bost. Soc. Nat. Hist., ii, 77, 1845" (Massachusetts Bay); Storer, "Synopsis, 270, 1846"; Storer, Hist. Fish. Mass., 68, 1867, plate vi, fig. 1 (Mass. Bay); Gill, Cat. Fish. East Coast N. Am., 21, 1873 (name only); Goode & Bean, Bull. Essex Inst., 12, 1879.

*Habitat*.—Cape Ann to South Carolina, chiefly northward.

This species is very abundant on the coasts of Southern New England and New York, but is rarely taken as far south as Charleston. Our specimens are from Menemsha Bight, Martha's Vineyard.

This is evidently the *Trigla palmipes* of Mitchill, and the *Prionotus carolinus* of Cuvier and Valenciennes and of most authors. The description of Linnæus of *Trigla carolina* is very brief, and Professors Jordan & Gilbert have recently rejected the name *carolina* as too uncertain for adoption. Of the species found in Carolina, the description of Linnæus best fits this species and *P. scitulus*, and the expression "cauda bifida" certainly points to the present species and excludes the other.

We are unable to see anything in the description or figure of *P. pilatus* that would show that it is a species distinct from *P. carolinus*. Goode and Bean say that it may be *P. punctatus*, and they intimate that its type may not have come from Massachusetts. The figure given by Storer is, however, much more like *P. carolinus* than like any other species known to us.

**4. *Prionotus scitulus*.**

*Prionotus punctatus* Jordan & Gilbert, Proc. U. S. Nat. Mus., 373, 1-78 (Beaufort, N. C.); Goode, Proc. U. S. Nat. Mus., 111, (Saint Augustine); Goode & Bean, Proc. U. S. Nat. Mus., 338, 1879 (Clear Water Harbor, Fla.); Jordan & Gilbert, Synopsis Fish. N. Am., 734, 1883 (Beaufort), (not *Trigla punctata* Bloch).

*Prionotus scitulus* Jordan & Gilbert, Proc. U. S. Nat. Mus., 283, 1882 (West Florida; Beaufort);\* Jordan & Gilbert, Proc. U. S. Nat. Mus., 614, 1882 (Charleston); Jordan, Cat. Fish. N. A., 114, 1885.

\*The mutilated specimens from Pensacola heretofore referred to this species prove to belong to one as yet undescribed. An account of it will be given later.

*Habitat*.—South Atlantic Coasts of United States, Beaufort to Saint Augustine.

This well-marked species is rather common within the region from which it is known. The specimens before us are from Charleston and Beaufort.

It was for a time regarded by American authors as the original *punctatus* of Bloch; but the evidence at present indicates that such is not the case.

#### 5. *Prionotus stephanophrys*.

*Prionotus stephanophrys* Jordan & Gilbert, Proc. U. S. Nat. Mus., 454, 1880 (San Francisco); Lockington, Proc. U. S. Nat. Mus., 529, 1880 (Point Reyes, near San Francisco); Jordan & Gilbert, Proc. U. S. Nat. Mus., 62, 1881 (Point Reyes); Jordan & Gilbert, Synopsis Fish. N. Am., 736, 1883 (San Francisco); Jordan, Cat. Fish. N. Am., 115, 1885 (name only).

This species is known only from the original type, obtained in the nets of the "parranzelle," in deep water, between San Francisco and Point Reyes. From this specimen (in the National Museum), the description of Jordan and Gilbert, as well as that of Lockington, was taken.

#### 6. *Prionotus rubio*.

*Rubio Volador* Parva, Deser. Dif. Piezas de Hist. Nat., 1787., lam. 38 (Havana).

*Prionotus punctatus* Poey, Synopsis Pisc. Cubens., 1868, 304 (Havana); Poey, Enumeratio, 1875, 41; Jordan & Gilbert, Synopsis Fish. N. A., 1883, 956 (Deser. from Cuban specimens); ? Bean and Dresel, Proc. U. S. Nat. Mus., 1884, 151 (Jamaica).

*Prionotus rubio* Jordan, Proc. U. S. Nat. Mus., 1886, 50 (Havana).

*Habitat*.—West Indian fauna; not rare about Cuba.

We have two specimens from Cuba of this species, which Poey has considered the *Prionotus punctatus*. The only basis of this identification so far as we can see is the assumption that only this species of *Prionotus* inhabits the West Indian fauna. As we have examples of a different one from the Mexican coast, this supposition is not well founded. It is evident from a comparison of this species with Bloch's figure that it has little or nothing in common with the fish painted by Plumier.

From related species, *P. rubio* is well distinguished by its long pectorals, and by its very short gill-rakers, much shorter than in any other species. *P. ophryas* coming nearest it in this respect.

#### 7. *Prionotus ophryas*.

*Prionotus ophryas* Jordan & Swain, Proc. U. S. Nat. Mus., 542, 1884 (Pensacola); Jordan, Cat. Fish. N. Am., 115, 1885.

*Habitat*.—Gulf of Mexico; in deep water. Known only from the Snapper Banks, near Pensacola.

Only the original type of this species is known. It was taken from the stomach of a Red Snapper (*Lutjanus aya*), near Pensacola, by Mr. Silas Stearns.

A second specimen, in very bad condition, has since been obtained by us from the same source. In this the undigested parts of the head and body are of a deep crimson. Probably all the deep-water species of this genus will be found to be red in life.

#### 8. *Prionotus stearnsi*.

*Prionotus stearnsi* Jordan & Swain, Proc. U. S. Nat. Mus., 541, 1884 (Pensacola; young); Jordan, Cat. Fish. N. Am., 115, 1885; Jordan, Proc. U. S. Nat. Mus., 1886, (Pensacola; adult.)

*Habitat*.—Gulf of Mexico; in deep water. Known only from the Snapper Banks, off Pensacola.

This species is known only from two specimens, both taken on the Snapper Banks, at Pensacola, by Mr. Silas Stearns. The original type is a small specimen, not four inches long. The other is very large, about 13 inches long, larger than any other specimen of *Prionotus* which we have ever seen. Both specimens have been already described in detail in these Proceedings. In spite of the remarkable differences in appearance of the two specimens, there is little reason to doubt their specific identity, as very similar differences distinguish the young and old of *P. tribulus*. According to Mr. Stearns, the large specimen above referred to was in life of a bright crimson red. Of all the species of the genus the present one has the spines of the head least developed, its upper surface being almost smooth.

#### 9. *Prionotus strigatus*.

*Trigla lineata* Mitchill, Trans. Lit. & Phil. Soc. New York, i, 430, 1814, plate iv, fig. 4 (New York Harbor); (not *Trigla lineata* Bloch).

*Prionotus lineatus* Dekay, New York Fauna, Fishes, 45, 1842, plate iv, fig. 12 (New York Harbor); Storer, Synopsis 50, 1846; Günther, Cat. Fish. Brit. Mus., ii, 192, 1860.

*Prionotus evolans* var. *lineatus* Jordan & Gilbert, Synopsis Fish. N. Am., 736, 1883.

*Trigla strigata* Cuvier, Règne Animal, Ed. 11, 1829 (after *evolans* Linnæus or *lineata* Mitchill).

*Prionotus strigatus* Cuv. & Val., Hist. Nat. Poiss., 86, 1829 (New York); Storer, Report Fish. Mass., 12, 1839 (Holmes' Hole); Ayres, Bost. Journ. Nat. Hist., iv, 252, 1842 (Brookhaven, L. I.); Linsley, "Cat. Fish Conn., 1844"; Jordan & Gilbert, Synopsis Fish. N. Am., 974, 1882 (note); Jordan, Cat. Fish. N. Am., 115, 1885 (foot-note).

*Prionotus pilatus* Baird, Ninth Smithsonian Report, 13, 1855 (Beasley's Point, N. J.).

*Prionotus evolans* Goode & Bean, Bull. Essex Inst., 12, 1879; Bean, Proc. U. S. Nat. Mus., 84, 1880 (Wood's Holl, Mass.; Noank, Conn.; Newport, R. I.); Goode, Nat. Hist. Aquatic Animals, 255, 1886, plate 71 (Wood's Holl, Mass.).

*Habitat*.—Atlantic coast of the Northern States, Cape Cod to Virginia.

Our specimens of this species are from near Martha's Vineyard.

It is extremely close to *Prionotus evolans*, of which it should most likely be regarded as a geographical variety. We have, however, as yet

seen no intermediate examples. It is, however, true that we have seen no specimens of either, from near the point of meeting in their geographical range.

The name *lineatus* cannot be retained for this species, on account of the prior *Trigla lineata* of Bloch, a European species of *Trigla*, with which Mitchill erroneously identified his specimens.

#### 10. *Prionotus evolans*.

*Trigla evolans* Linnaeus, Systema Nat., 498, 1766 (Carolina); Bean, Proc. U. S. Nat. Mus., 1885, 204 (description of Linnaean type).

*Prionotus evolans* Gill, Cat. Fish. East Coast N. Am., 21, 1873 (name only); Jordan & Gilbert, Proc. U. S. Nat. Mus., 374, 1878 (Beaufort, N. C.); Jordan & Gilbert, Synopsis Fish. N. Am., 735, 1883; Jordan, Cat. Fish. N. Am., 115, 1885; Jordan, Proc. U. S. Nat. Mus., 541, 1884 (foot-note).

*Prionotus sarritor* Jordan & Gilbert, Proc. U. S. Nat. Mus., 615, 1882 (Charleston); Beanfort); Jordan & Gilbert, Synopsis Fish. N. Am., 974, 1883 (name only); Jordan & Swain, Proc. U. S. Nat. Mus., 541, 1884 (foot-note).

*Habitat*.—South Atlantic coast of United States; known only from North and South Carolina.

This species is abundant along the Carolina coast, but we have not noticed it elsewhere. The description of *Trigla evolans* given by Linnaeus is of very little value, but the redescription of the type given by Dr. Bean leaves little doubt that it is the species formerly called *Prionotus sarritor* by Jordan & Gilbert. In this species the gill-rakers are longer than in any other except its analogue, *P. strigatus*.

#### 11. *Prionotus miles*.

*Prionotus miles* Jenyns, Zool. Beagle, Fishes, 29, pl. 6, 1842 (Chatham Island; Galapagos); Günther, Cat. Fish. Brit. Mus., ii, 196, 1860 (copied).

*Habitat*.—Galapagos Archipelago.

Nothing seems to be known of this species beyond what is contained in the original description. It seems to be related to *P. evolans*, or it may prove to be the adult form of *P. horrens*.

#### 12. *Prionotus tribulus*.

*Trigla carolina* Bloch, Ichthyologia, 352, about 1790 (Carolina); (not of Linnaeus.)

*Trigla tribulus* Cuvier, Règne Animal, 1829 (name only).

*Prionotus tribulus* Cuv. & Val., Hist. Nat. Poiss., iv, 98, 1829, pl. 74 (New York; Carolina); Dekay, New York Fauna, Fishes, 48, 1842 (New York; Charleston); Günther, Cat. Fish. Brit. Mus., ii, 195, 1860 (New Orleans; Texas); Jordan & Gilbert, Proc. U. S. Nat. Mus., 373 and 374, 1878 (Beaufort); Goode, Proc. U. S. Nat. Mus., iii, 1879 (St. Augustine); Goode & Bean, Proc. U. S. Nat. Mus., 128, 1879 (Pensacola); Jordan & Gilbert, Proc. U. S. Nat. Mus., 288, 1882 (Galveston); Jordan & Gilbert, Proc. U. S. Nat. Mus., 615, 1882 (Charleston); Jordan & Gilbert, Synopsis Fish. N. A., 735, 1883; Bean, Cat. Fishes, London Intern. Exhib., 1883, 49 (Galveston); Jordan & Swain, Proc. U. S. Nat. Mus., 233, 1884 (Cedar Keys, Fla.); Jordan, Cat. Fish. N. A., 1855, 115.

*Habitat*.—South Atlantic and Gulf coasts of the United States; north to New York.

This abundant species is well distinguished from the others of the Atlantic by the greater development of the spines of the head. The young have these spines much larger and more compressed than the adult, and in the very young, three or four strong knife-like spines are developed on each side of the snout, as in the types of *P. horrens*. In very young examples the spine at the base of the preopercular spine is much larger than the latter.

The synonymy of this species offers no difficulty. In our opinion, this is the species intended by Bloch in his figure of *Trigla carolina*, and not the *P. punctatus* as supposed by Cuvier & Valenciennes.

### 13. *Prionotus horrens*.

*Prionotus horrens* Richardson, "Voy. Sulph. Ichth., 79, 1843, t. 42, fig. 1-3;" (Gulf of Fonseca); Günther, Cat. Fish. Brit. Mus., ii, 195, 1860 (copied); Jordan, Proc. U. S. Nat. Mus., 387, 1885 (name only).

*Habitat*.—Pacific coast of Central America.

This species is known from several young examples now in the British Museum. These are almost exactly like the young of *P. tribulus*, differing chiefly in the still larger proportionate size of the knife-like spines on the head. It is not unlikely that they may prove to be the young of *P. miles* or possibly of *P. birostratus*, but a more accurate knowledge of both these species is needed before such an identification can be more than suggested. The following notes on the types of *Prionotus horrens* were taken by Professor Jordan in London.

Three young specimens, allied to *P. tribulus*, but the spines still larger and more knife-like. First spine on edge of snout broad and serrate, three behind this progressively larger, then two large spines on preopercle, the posterior one the largest. Two smaller ones on opercle and one very large on the scapula; two sharp ones over each eye; one behind the eye; two on top of head and two on occiput. Mouth large, maxillary reaching front of eye,  $2\frac{1}{2}$  in head; gill-rakers long and slender, 5. Scales small. Pectorals short, 3 in body, reaching somewhat past second dorsal front; pectorals and tip of caudal dusky. No groove behind the eye. Belt of palatine teeth narrow.

### 14. *Prionotus birostratus*.

*Prionotus birostratus* Richardson, "Voy. Sulph. Ichth., 81, 1843, pl. 42, fig. 4-6, Gulf of Fonseca"; Günther, Cat. Fish. Brit. Mus., ii, 196, 1860, (copied); Jordan, Proc. U. S. Nat. Mus., 387, 1885 (Panama).

*Habitat*.—Pacific coast of Central America.

Several specimens of this species were obtained by Professor Gilbert, in Panama, at 1883. These were destroyed by fire before any description was taken, and now the species is only known from the original account of Richardson.

### 15. *Prionotus japonicus*.

*Prionotus japonicus* Bleeker, "Japan, 398, 1854" (Japan); Bleeker, Verhand. Batav. Genootsch., xxvi, Japan, 75, tab. 5, fig. 1"; Günther, Cat. Fish. Brit. Mus., ii, 196, 1860.

*Habitat.*—Coasts of Japan.

This species is unknown to us. Not having access to Bleeker's description and figure, we are unable to assign it its proper place in the genus.

RECAPITULATION.

W = West Indian fauna; U = Atlantic coast of United States; C = California; P = Panama; J = Japan.

PRIONOTUS Lacépède.

1. *Prionotus alatus* Goode & Bean. U.
2. *Prionotus punctatus* Bloch. W. (Identification not quite certain.)
3. *Prionotus carolinus* Linnæus. U.
4. *Prionotus scitulus* Jordan & Gilbert. U.
5. *Prionotus stephanophrys* Lockington. C.
6. *Prionotus rubio* Jordan. W.
7. *Prionotus ophrys* Jordan & Swain. U.
8. *Prionotus stearnsi* Jordan & Swain. U.
9. *Prionotus strigatus* Mitchill. U. (Probably a northern variety of *P. evolans*.)
10. *Prionotus evolans* Linnæus. U.
11. *Prionotus miles* Jenyns. P.
12. *Prionotus tribulus* Cuvier & Valenciennes. U.
13. *Prionotus horrens* Richardson. P. (Based on young specimens, perhaps of *P. miles*.)
14. *Prionotus birostratus* Richardson. P.
15. *Prionotus japonicus* Bleeker. J.

*List of nominal species, with identifications.*

[Tenable specific names are in italics.]

Nominal species.	Year.	Identification.
<i>Trigla evolans</i> Linnæus	1766	<i>Prionotus evolans</i> .
<i>Trigla carolina</i> Linnæus	*1770	<i>P. carolinus</i> .
<i>Trigla punctata</i> Bloch	*1790	<i>P. punctatus</i> .
<i>Trigla lineata</i> Mitchill	1814	<i>P. strigatus</i> .
<i>Trigla palmipes</i> Mitchill	1814	<i>P. carolinus</i> .
<i>Trigla strigata</i> Cuvier	1829	<i>P. strigatus</i> .
<i>Prionotus tribulus</i> Cuvier and Valenciennes	1829	<i>P. tribulus</i> .
<i>Prionotus miles</i> Jenyns	1842	<i>P. miles</i> .
<i>Prionotus horrens</i> Richardson	1843	<i>P. horrens</i> .
<i>Prionotus birostratus</i> Richardson	1843	<i>P. birostratus</i> .
<i>Prionotus pilatus</i> Steyer	1845	<i>P. carolinus</i> .
<i>Prionotus japonicus</i> Bleeker	1854	<i>P. japonicus</i> .
<i>Prionotus stephanophrys</i> Lockington	1880	<i>P. stephanophrys</i> .
<i>Prionotus scitulus</i> Jordan and Gilbert	1882	<i>P. scitulus</i> .
<i>Prionotus sarritor</i> Jordan and Gilbert	1882	<i>P. evolans</i> .
<i>Prionotus alatus</i> Goode and Bean	1883	<i>P. alatus</i> .
<i>Prionotus stearnsi</i> Jordan and Swain	1884	<i>P. stearnsi</i> .
<i>Prionotus ophrys</i> Jordan and Swain	1884	<i>P. ophrys</i> .
<i>Prionotus rubio</i> Jordan	1886	<i>P. rubio</i> .

\*About.

INDIANA UNIVERSITY, February 15, 1886.