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CALIFORNIA SEAROBIN *(PRIONOTUS STEPHANOPHRYS),* A FISH NEW FOR THE FAUNA OF SOUTHERN CALIFORNIA [1]

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Fishes of the genus *Prionotus,* known as searobins, are common members of the Atlantic Coast fauna of the United States and are not rare on either side of tropical Middle America, but have very seldom been found on the Pacific Coast of the United States. In fact, only one of the several species known from waters to the southward has been recorded on valid grounds from as far north as California, and only two or three specimens seem to have been collected north of the Mexican border. It is therefore of interest to report the first taking in southern California of a specimen of this species, *Prionotus stephanophrys* Lockington (1881, pp. 529-532).

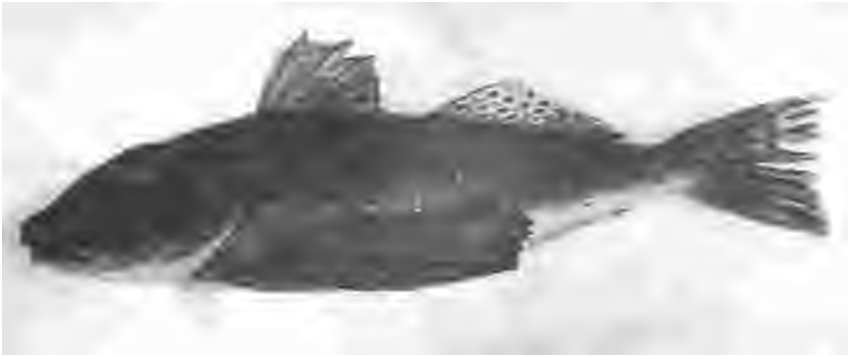

FIG. 62. California searobin, *Prionotus stephanophrys*: a 12k-inch specimen, the first to be recorded from Southern California. Photograph by Paul Williams.

Although the species has so seldom been collected in California, the first described or type specimen was taken in October, 1880, in a paranzella trawl "in the tolerably deep water of the region between the rocky islets known as the Farallones, the entrance of San Francisco Bay, and Point Reyes, a rocky promontory some forty miles north of San Francisco." The discription of the species by Jordan and Gilbert (1883, p. 736) and the revisionary treatment by Jordan and Hughes (1886, pp. 329 and 334) were both drawn up on the basis of Lockington's one example (No. 27048, United States National Museum). No further material appears to have been recorded until 1896, when Jordan and Evermann (p. 487) assigned to this form a range in "deep water, off San Francisco, Point Reyes, and Monterey." Presumably "San Francisco" referred to the type speci-

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men and the Point Reyes record was probably based on a specimen (No. 2001) in the fish collection of Stanford University, but no basis has been found to validate the Monterey report.

All subsequent published records for *Prionotus stephanophrys* are for waters south of California. These records need some consideration, since they are surrounded with confusion. The first southern report was by Jordan and Evermann (1898, p. 2161) who added Lower California to the previously assigned range of the species and drew up their description from "Mr. Lockington 's type, and from two others collected by the *Albatross* at Station 3041, coast of Lower California." This station was in Magdalena Bay at a depth of 27 fathoms (Townsend, 1901, p. 407), but the two specimens apparently came from *Albatross* Station 3039, just off Magdalena Bay, at a depth of 47 fathoms. According to Dr. Leonard P. Schultz of the United States National Museum, Jordan and E vermann apparently transposed the Lower California stations for two species of *Prionotus*, giving Sta. 3041 for *stephanophrys* instead of Sta. 3039, and Sta. 3039 (wrongly located "in the Gulf of California") in place of 3041 for *quiescens.* The next record for *P. stephanophrys* which I find is that of Ulrey (1929, p. 9), repeated by Cuestra Terron (1932, p. 79), for "Gulf of California," but there seems to have been no basis for this report. Some clerical error was probably involved. Later Breder (1936, pp. 39-40, fig. 13) did report *P. stephanophrys* from "Angelus" [Angeles] and San Francisquito bays on the east coast of Baja California, and also from the west coast of Mexico just north of the Guatemala border. Hiyama 's figure of *"Prionotus quiescens,"* which he reports (1937, p. 56, pl. 90, fig. B) to be "common in Gulf of California," seems to represent *P. stephanophrys.*

The validity of these Mexican reports for *P. stephanophrys* are open to some doubt, and the Gulf of California records of *P. quiescens* may all belong with *P. stephanophrys.* Indeed the two nominal species may prove inseparable. Breder 's identifications, cited above, were made with some hesitancy, and his figure shows several points of divergence from *P. stephanophrys,* particularly in the almost unspotted first dorsal fin.

It is obvious that a critical revision of the Pacific species of *Prionotus* is much needed. Material for such a study is now rather plentiful, in the fish collections of the New York Zoological Society, American Museum of Natural History, Bingham Oceanographical Collections, United States National Museum, Stanford University, California Academy of Sciences and the Allen Hancock Foundation of the University of Southern California.

The one previous report of a searobin from southern California was probably an error. In "A Check-list of the Fishes of Southern California and Lower California" Ulrey (1929, p. 9) indicated by symbol that *Prionotus gymnostethus* occurs in southern California. No *Prionotus*, however, is mentioned in Ulrey and Greeley's report (1938) on their southern California collections and no specimen of any Pacific species of the genus could be found in examining Ulrey 's collection, now in the Allen Hancock Foundation. Nor is any *Prionotus* listed in Barnhart's book on the "Marine Fishes of Southern California" (1936). No evidence whatever could be found to substantiate the inclusion of southern California in the range of *P. gymnostethus.*

To summarize what is known of the distribution of searobins in California, it may be stated that only one species, *frionotus stephanophrys* Lockington, has been recorded on authentic grounds from the State. Only two California specimens, both collected long ago near Point Reyes, have been located in any of the museums that might be expected to have material from the State. The one other locality record, for Monterey, has not been validated. The same species probably occurs on the outer coast of Baja California and in the Gulf of California, and perhaps in still more southerly waters, but there appears to be no valid record for the occurrence of this or of any other species of *Prionotus* in southern California.

That *Prionotus stephanophrys* does live in southern California may now be affirmed. A specimen 12⅛ inches in overall length was caught in Santa Monica Bay on October 24, 1944, 64 years after the type was trawled near San Francisco. The new specimen was taken on a hand-line by Michael Waxman four to five miles off El Segundo. According to Hydrographic Office charts this locality is at approximately Lat. 33° 53' N., Long. 118° 30' 30" W. Here the depth is indicated as about 30 fathoms and the bottom as of sand and gravel. The example, a female with eggs approaching ripeness, is illustrated on Fig. 62. It is deposited in the Natural History Museum of Stanford University (No. 39788).

Like other searobins this specimen has the upper parts and sides of the head covered by an armature of bony plates ornamented with granulated ridges. These bones, however, are less roughened than in most species of *Prionotus* and the spines of the head are relatively weak. The main part of the blackish pectoral fin is a large flabby structure resembling the "wing" of the distantly related flying gurnard, to which some biologists with free imagination attribute the power of flight Below this membranous part of the pectoral there are the three separate finger-like rays that are an outstanding feature of the family (Triglidae) in which *Prionotus* is classified.

The southern California example corresponds well with the published descriptions of *P. stephanophrys.* The main discrepancies—a smaller eye and lower ridges and shorter head spines—are attributable to a difference in size, for the new specimen is an adult and those previously described were only half-grown.

For the benefit of ichthyologists who may undertake a critical study of the characters and distribution of *Prionotus stephanophrys* and other Pacific species of the genus, there follows a detailed description of the new specimen, which is the first adult to be described. The figures in parentheses are the proportional measurements expressed in thousandths of the standard length (252 mm.).

The body is moderately robust for a gurnard, with the greatest depth (260) below the middle of the first dorsal base. The dorsal and ventral contours are nearly horizontal along most of the trunk but then converge backward to the rather slender caudal peduncle (depth, 71). The body throughout is slightly compressed, except above the end of the anal base, where it is as wide as deep (greatest width, across scapular spines, 229).

The head is long and massive (length to end of opercular membrane, 390; to end of opercular spine, 384; to occiput, 291). Then depth of the head below the occiput (230) approximates the greatest width across the preopercular spines. The dorsal contour is gently concave from the tip of the snout to a rather prominent hump in front of the eye, thence less steep and slightly convex to the front of the dorsal (the respective angles formed with the mandibular edge are 51° and 23°) . As seen from

above the front of the snout is widely truncated but scarcely emarginate. Measured between the centers of radiation on the suborbitals the width of the snout (169) somewhat exceeds the depth (158) below the preocular spine. The snout length (148) enters the head length about 2.6 times. The eye (61) is contained about 2.4 times in the snout; the bony orbit (95), 1.6 times.

The interorbital is broad and nearly flat, though shallowly grooved on either side of the low rounded median ridge. Its least width (57) is a little less than the length of the eye. The edges of the interorbital are deeply concave (width across preocular bony rim, 61; between preocular spines, 78; between edges of crest posteriorly, 90). The width between the occipital spines (94) is a little greater than the distance (87) from the occiput to the dorsal origin. The least distance from the bony orbit to the preorbital edge (63) barely exceeds the length of the eye. The distance from the preopercular ridge to the tip of the opercular spine is 116 thousandths of the standard length.

The head spines are very weakly developed. The lateral margin of the snout is roughened by about 20 tubercular spinelets directed forward. The upper anterior border of the orbit bears indistinct points at the tips of short ridges. The strongest of these points forms the scarcely differentiated preocular spine. The postocular spine has a free projection of less than 1 mm. on one side and of even less on the other side. The edge of the gentle slope in front of the postocular spine has fine, rather indistinct serrations at the ends of tuberculate ridges. Behind the postocular spines the bony margin forms a semicircular indentation and the surface of the head becomes abruptly flatter, but there is no definite transverse groove. There is a rather large bony excrescence at the anterior end of the lateral line a short distance in advance of and slightly below the weak low-lying occipital spine, which does not extend to opposite the dorsal origin.

The suborbital margin is very finely and indistinctly serrated. There is no trace of a spine at the center of radiation on the suborbital. Measured from the suture between the suborbital and the preopercle, the length of the preopercular spine (60) almost equals the length of the eye, but the spine is free for only half its length and its tip does not reach the free margin of the subopercle. The indistinct upper opercular spine is flat and far removed from the opercular margin. The outer edge of the thin opercular bone is nearly semicircular between this spine and the flattish, somewhat upturned main opercular spine, which extends slightly beyond the opercular membrane.

The mouth is rather large, as the upper jaw (163) reaches slightly beyond the vertical from the front of the orbit and measures 2.35 in the head. The proportional length of the mandible is 175. Fine villiform teeth form rather narrow bands with the following maximum widths, expressed in ten-thousandths of the standard length: premaxillary, 102; vomer, 83; palatine, 100; mandible, 91. The vomerine patch is weakly convex. The gill-rakers on the outer arch number 4 above the angle, with only one well developed, and 19 below, becoming rudimentary at about the tenth. Interpolated between the main rakers are small denticulate tubercles. There are seven branchiostegals.

Of the 10 dorsal spines the third and largest is about two-fifths as long as the head. The proportional lengths of the first four spines are: first, 123; second, 137; third, 163; fourth, 155. The others become progressively shorter to the tenth, which is largely imbedded. The front edge of the first spine is finely granulated along the basal half. The soft-rays number 12, with the first one unbranched but articulated. The anal formula is I, i, 9 (the anal formula of *Prionotus* has apparently been misinterpreted; in **P.** *stephanophrys,* as presumably in the other species, the first of the two unbranched rays is a true though somewhat flexible spine, whereas the second anal ray, like the first ray of the second dorsal, is a paired and articulated though unbranched soft-ray). The proportional lengths of the anal rays are: spine, 42; unbranched soft-ray, 72; first branched ray, 88; fifth and longest branched ray, 98. The caudal fin, which has 12 principal rays (10 branched), is weakly lunate (length of shortest median ray, 189; of longest ray, 231). The main part of the pectoral fin has a very weakly convex posterior edge from the first to the ninth of the 13 rays, of which the first and the last are simple, the others once branched (the lengths of the rays on the right side—the left fin was injured—are as follows: first, 339; seventh and longest, 424; ninth, 420, graduating to the eleventh which is 229). The fin extends to above the base of the sixth anal ray. The tips of the free pectoral rays are scarcely swollen and these rays are graduated in length (219, 190, and 158). The pelvic fin (254) extends three-fourths the distance to the anus.

* The morphological and systematic aspects of fin structure in teleosts are discussed in a recent paper (H[illegible], 1944) and will be further considered in forthcoming papers.

The thin, weakly ctenoid and rather poorly imbricated scales are probably characteristic of the species. They are reduced in size on the nape, near the midline of the belly and about the isthmus, but are rather large near the center of the breast and just behind the pelvic fins. Over the pubic bone medically the scales are slightly imbricated, but just in front of each pelvic and over most of the belly they are nonimbricate. A scaleless strip extends from behind the pectoral base to just behind the pelvic base, but the main part of the breast is scaly. The head bears a few scales on the upper part of the subopercle, between the two opercular spines. There are 52 pores in the lateral line.

In formalin the body is rather sharply bicolored. The side above the upper edge of the pectoral fin is warm purplish brown with scattered blackish brown specks and small blotches, but is not barred. The lower side and the ventral surfaces are white. A trace of yellow remains on the under side of the head. Above, the head is scarcely spotted, except for obscure speckling on the upper part of the eye. Both dorsal fins and the caudal are dusky purplish with blackish purple spots. Of the numerous spots on the first dorsal the two that are most conspicuous lie, respectively, between the fourth and the fifth and between the fifth and the sixth spines, but there is no large black blotch in this area. The second dorsal bears conspicuous rounded spots, which do not quite reach the upper margin and mostly lie along the front of the rays. These spots are alignable into three or four rows and indefinitely into about two more rows. The spots on the caudal are less distinct and the submarginal ones are elongated, though not fused to form a band. On the upper lobe the spots comprise about five bars, but those on the lower lobe are much less distinct. The anal and pelvic fins are white, with some sooty color on the rays. When folded the pectoral fin is purplish black, but when spread it is dusky purplish with numerous, irregularly elongated blackish spots.

The taking of this specimen once again illustrates how incomplete is our knowledge of the fish life of the moderate depths along the coast of southern California. It is quite possible that this and some other species being discovered in these waters may prove of some commercial significance, when federal restrictions that now hold down the coastal fisheries may be lifted. It is reported that in 1943 more than 300,000 pounds of searobins were taken in the commercial fisheries of the New England and North Atlantic states.

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Literature Cited

Barnhart, Percy S.
1936 Marine fishes of southern California. University of California Press, Berkeley. iv + 209 pp., 292 figs.

Breder, C. M., Jr.
1936 Scientific results of the Second Oceanographic Expedition of the "Pawnee" 1926. Heterosomata to Pediculati from Panama to Lower California. Bull. Bingham Oceanogr. Coll., 2: 1-56, figs. 1-19.

Cuesta Terron, Carlos
1932 Lista de los peces de las costas de la Baja California. Anal. Inst. Biol. Mexico, vol. 3, pp. 75-80 (list selected from Ulrey's paper of 1929 with annotations).

Hiyama, Yosio
1937 Marine fishes of the Pacific coast of Mexico. Odawara, Japan: The Nissan Fisheries Institute, pp. 1-75, pls. 1-102 (edited by Tosio Kumada).

Hubbs, Carl L.
1944 Fin structure and relationships of the phallostethid fishes. Copeia, vol. for 1944, no. 2, pp. 69-79.

Jordan, David Starr, and Evermann, Barton Warren
1896 A check-list of the fishes and fish-like vertebrates of North and Middle America. Rep. U. S. Comm. Fish and Fish., pt. 21, for 1895, pp. 209-584.
1898 The fishes of North and Middle America: a descriptive catalogue of the species of fish-like vertebrates found in the waters of North America, north of the Isthmus of Panama. Part II. Bull. U. S. Nat. Mus., no. 47, pt. 2; i-xxx, 124-2183.

Jordan, David S., and Gilbert, Charles H.
1883 A synopsis of the fishes of North America. Bull. U. S. Nat. Mus., 16, "1882," pp. i-lvi, 1-1018.

Jordan, David S., and Hughes, Elizabeth G.
1886 A review of the species of the genus Prionotus. Proc. U. S. Nat. Mus., vol. 9, pp. 327-338.

Lockington, W. N.
1881 Description of a new species of Prionotus (Prionotus stephanophrys), from the coast of California. Proc. U. S. Nat. Mus., vol. 3, for 1880, pp. 529-532.

Townsend, C. H.
1901 Dredging and other records of the United States Fish Commission Steamer Albatross, with bibliography relative to the work of the vessel. Rep. U. S. Comm. Fish and Fish., pt. 26, for 1900, pp. 387-562, pls. 1-7.

Ulrey, Albert B.
1929 A check list of the fishes of southern California and Lower California. Jour. Pan-Pac. Res. Inst., vol. 4, no. 4, pp. 2-11.

Ulrey, Albert B., and Greeley, Paul O.
1928 List of marine fishes (Teleostei) of southern California with their distribution. Bull. Sou. Calif. Acad. Sci., vol. 27, pp. 1-53, 3 maps.

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