BREVIORA

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A NEW FAMILY, A NEW GENUS, AND TWO NEW SPECIES OF BATOID FISHES FROM THE GULF OF MEXICO

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The West Indian-Gulf of Mexican region is proverbially poor in skates as compared with the more northerly coastal waters of the Atlantic; so much so, indeed, that two specimens only, of *Raja akleyi* Garman 1881, from the Yucatan Bank and nearby, were the only skates that had been reported in scientific literature from any part of the Gulf prior to 1921. This is fewer than one is likely to find, stranded, along the beaches of Cape Cod during an hour's stroll on any summer day. And while a second species, *R. texana* Chandler 1921, is now known to occur in some numbers around the northern shores of the Gulf from Florida to Texas, it was not until the winter and spring of 1938–1939 that the trawling campaigns of ATLANTIS brought to light the presence of a varied skate fauna at depths greater than 200 fathoms around the coasts of Cuba.

Examination of these, of collections of skates in the U. S. National Museum that had been taken by the ALBATROSS many years ago, and of others taken recently by OREGON of the U. S. Fish and Wildlife Service, had brought to light ten new skates of the genera *Raja*, *Breviraja* and *Cruriraja*,[2] up to 1950, from Cuban waters and from the northern part of the Gulf; also of a new genus, *Springeria* Bigelow and

[1] Contribution No. 657 from the Woods Hole Oceanographic Institution.

[2] These are *Raja lentiginosa* Bigelow and Schroeder 1951; *R. olseni* Bigelow and Schroeder 1951; *R. teevani* Bigelow and Schroeder 1951; *Breviraja atripinna* Bigelow and Schroeder 1950; *B. colesi* Bigelow and Schroeder 1948; *B. cubensis* Bigelow and Schroeder 1950; *B. sinus-mexicanus* Bigelow and Schroeder 1950; *B. yucatanensis* Bigelow and Schroeder 1950; *Cruriraja atlantis* Bigelow and Schroeder 1948 and *C. poeyi* Bigelow and Schroeder 1948.

Schroeder 1951, representing the little known family Anacanthobatidae.

We can now report the capture by OREGON of another new *Raja* from the northern part of the Gulf, and of a skate-like fish, from the southern part, for which a new family seems needed.

Family PSEUDORAJIDAE, Fam. Nov.

Family characters. Rajoidea without dorsal fins; with well developed caudal fin extending around tip of tail and forward along lower side of tail about as far as along upper side, supported by a great number of very slender ray-like strands, apparently cartilaginous;[1] with outer-posterior margins of pelvic fins nearly straight, or even slightly convex if spread widely; anterior wall of spiracle with a transverse row of low vertical ridges, representing the vestiges of the embryonic gill filaments; pelvis with transverse element nearly straight, each of its outer corners with a short projection directed forward.

The batoid fish, described below as *Pseudoraja fischeri*, falls clearly among the Rajoidea because of the shape of its pelvis and of the persistence of vestiges of the embryonic gill filaments on the anterior wall of its spiracles (mentioned above). It is rajoid, too, in general appearance; in the nature of its dermal armature; and in the fact that its snout terminates in a fleshy process, for a corresponding structure tips the snout in the rajoid family Anacanthobatidae, represented in the Gulf of Mexico by the genus *Springeria* Bigelow and Schroeder 1951, and perhaps in the skate *Psammobatis mira*(Garman)1877[2] but is not known to occur in any of the Myliobatoidea. The presence of a rostral projection (albeit a short one) from the front of its cranium, and its lack of a tail spine, point toward a rajoid rather than a myliobatoid relationship, though neither of these two features is strictly alternative, between the two suborders, for a few rajoids lack the rostral cartilage, while it is a matter of common knowledge that some myliobatoids lack the tail spine.

On the other hand, a myliobatoid relationship, rather than a rajoid, is suggested for *Pseudoraja*, superficially, by the shape of its pelvic fins with straight or slightly convex outer contour, and by the large size and the shape of its caudal fin. But, again, we are dealing with

[1] The caudal fin-folds of various species of *Raja*, that we have examined under the microscope, are supported similarly.

[2] Garman (Proc. Boston Soc. Nat. Hist., Vol. 19, 1877, p. 207) described the snout of *mira* as terminating in an "acute point", which is pictured as prickly in his classic monograph (Mem. Mus. Comp. Zool., Vol. 36, 1913, Pl. 27, Figs. 3–5).

characters that are not as strictly alternative as seemed once to be the case. Thus the pelvics of *Pseudoraja* are approached closely, in shape, by those of *Sympterygia* (undoubtedly a rajid) in which they are so weakly concave in outline, when spread, that they can hardly be characterized as "bilobed".[1] And while the caudal fin is a close counterpart, in size and shape, of the caudals of the myliobatoid family Urolophidae, it is similar in shape in the rajid genus *Springeria* Bigelow and Schroeder 1951, though smaller.

With *Sympterygia* and *Pseudoraja* wholly bridging the gap, in shape of pelvic fins, between the typical Rajoidea in which these are definitely bilobed, and the Myliobatoidea, in all of which their outer contour is continuously convex, it is evident that the precise shape of these fins must be abandoned, as alternative between these two suborders. But the shape of the pelvis itself is sharply diagnostic in this regard, for while it is nearly straight transversely, or bowed forward only very slightly, in all the Rajoidea for which its shape is known[2] and has a projection (longer or shorter) directed forward from each of its outer corners, its transverse element is bowed strongly forward, and it has no prepelvic projections at the outer corners in all the myliobatoid families where it has been studied, but has a prepelvic process in the mid-line in some of them.[3]

The presence or absence of vestiges of the embryonic gill filaments on the anterior wall of the spiracle, after birth, seems equally diagnostic, as between the suborders Rajoidea and Myliobatoidea, for these are present in various species of *Raja*, in *Breviraja*, in *Cruriraja*, in *Springeria* and in *Pseudoraja*, whereas no trace of them is to be seen in any of the myliobatoids where we have sought them, which include representatives of *Dasyatis*, *Taeniura*, *Gymnura*, *Urolophus*, *Myliobatis*, *Aetobatus*, *Rhinoptera* and *Mobula*.

The taxonomic significance of this character was forecast, in fact, more than a century ago, by Johannes Mueller's (Arch. Anat. Physiol. Jahrg. 1841, p. 274) discovery that these vestigial gill folds are present after birth in skates and in torpedos, as they are in many sharks, but not in *Myliobatis*, in *Dasyatis* (referred to by him as *Trygon*), or in *Taeniura*. But while the contrast in this respect, between skates and sting rays, has been mentioned repeatedly since Mueller's day,

[1] For illustration of the pelvics in *Sympterygia*, see Garman, 1913, Pl. 27, Fig. 1.

[2] This includes representatives of the genera *Raja*, *Breviraja* and *Cruriraja* (Family Rajidae), and of *Springeria* representing the Anacanthobatidae. The shape of the pelvis is not known for the somewhat problematical family Arhynchobatidae.

[3] See Garman (1913, Pls. 53, 54) for illustrations of the pelvis in Dasyatidae, Potamotrygonidae, Gymnuridae, Urolophidae, Myliobatidae and Mobulidae.

we can not find that any of our predecessors have taken account of it in defining the two subfamilies in question.

Pseudoraja, in short, falls clearly among the Rajoidea. But its lack of dorsal fins with its well developed caudal fin forbid its reference either to the Rajidae or to the somewhat problematical family Arhynchobatidae, while the nature of its pelvic fins, the large size of its caudal, and its well developed dermal armature set it apart, equally sharply, from all known members of the Anacanthobatidae. Hence the necessity for a new family, lest it be left a taxonomic orphan.

Genus PSEUDORAJA Gen. Nov.

Generic characters. Pseudorajidae with shape of disc, and of tail relative to disc, as in skates of the family Rajidae; pelvic fins very large, wing-like, with anterior outline directed outward, about transverse to main axis of disc; front of cranium with a rostral projection, longer or shorter; a deep pit on ventral surface of head on either side, close posterior to nostril but entirely separate from latter. Other characters those of family Pseudorajidae. Type species *Pseudoraja fischeri* Bigelow and Schroeder.

PSEUDORAJA FISCHERI,[1] Sp. Nov.

Figures 1, 2

Type. Female, 479 mm. long, southern part of Gulf of Mexico, near Campeche Bank, Lat. 22°42′N, Long. 86°41′W, 225 fathoms, OREGON Sta. 726; bottom temp. 47.7°F; U. S. Nat. Mus. No. 163368.

Study material. Also female 428 mm.; female 262 mm., and juvenile male 262 mm. from same station.

Description. Proportional dimensions, in per cent of total length, of female 479 mm. long (type) and female, 428 mm.

Disc: Extreme breadth, 48.6, 50.3; length 39.5, 40.0.

Snout length in front of:[2] orbits 9.2, 8.4; in front of mouth 12.3, 12.1.

Orbits: Horizontal diameter 4.4, 4.7; distance between 3.0, 3.0.

Spiracles: length 2.3, 2.2; distance between 6.0, 6.1.

[1] Named in recognition of E. N. Fischer's skillful portrayals of elasmobranchs.

[2] From base of rostral filament.

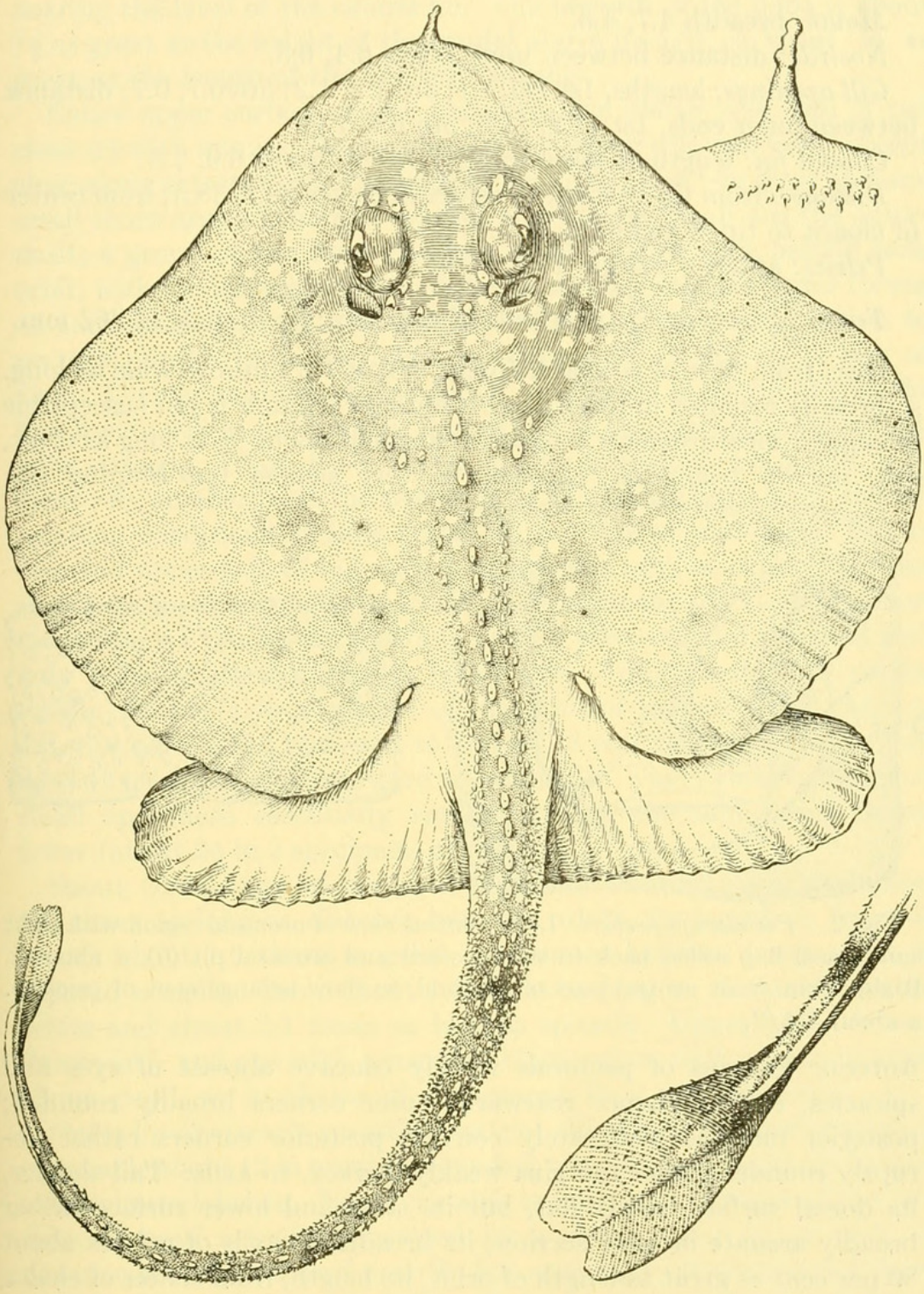

Fig. 1. *Pseudoraja fischeri*, type specimen 479 mm. long. Rostral filament and side view of caudal fin to larger scale. U. S. Nat. Mus. No. 163368.

Mouth: breadth 4.7, 4.6.

Nostrils: distance between inner edges 6.4, 6.3.

Gill openings: lengths, 1st 1.0, 1.1; 3rd 1.2, 1.2; 5th 0.7, 0.7; distance between inner ends, 1st 11.2, 11.8; 5th 6.9, 7.0.

Caudal fin: length of base, upper 7.7, 8.2; lower 6.9, 7.3.

Distance: from tip of snout to center of cloaca 39.5, 38.5; from center of cloaca to tip of tail 60.5, 61.5.

Pelvics: anterior margin 17.7, 17.7.

Teeth: $\frac{28}{26}$ in type; $\frac{30}{26}$ in female of 428 mm.; $\frac{28}{28}$ in male of 262 mm.

Disc, from base of rostral filament, about 1.2 times as wide as long, so broadly rounded in front that its anterior contour is not susceptible to angular measurement; the rostral filament about ⅓ as long as orbit, soft, narrow triangular, tapering to very slender but blunted tip.

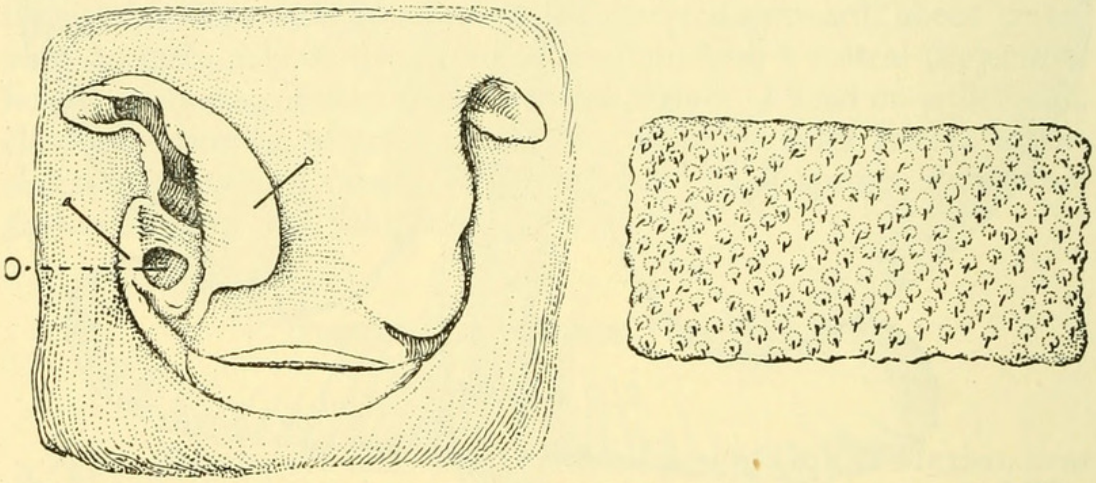

Fig. 2. *Pseudoraja fischeri.* Left, ventral view of oronasal region with right hand nasal flap rolled back to show nostril and oronasal pit (0). x about 1. Right, skin from central part of pectoral, to show arrangement of prickles. x about 3 1/2.

Anterior margins of pectorals weakly concave abreast of eyes and spiracles, convex thence rearward; outer corners broadly rounded; posterior margins moderately convex; posterior corners rather abruptly rounded; inner margins weakly convex, to axils. Tail slender, its dorsal surface nearly flat, but its sides and lower surface rather broadly arcuate in cross section; its breadth at axils of pelvics about 80 per cent as great as length of orbit, its length, from center of cloaca to tip, about 1.5 times as great as distance from center of cloaca to base of rostral filament; the lateral caudal folds confined to about posterior ⅓ of tail and extending a little beyond origin of caudal fin, very narrow along their anterior part, but widening rearward until

nearing the level of the caudal fin. The breadth of the folds is about ½ as great as the height of the caudal above its axis, or about ⅔ as great as the length of the first gill openings.

Entire upper surface of disc including skin above eyes, and of tail close set with minute, sharp pointed prickles curving rearward, except close along extreme posterior edge of pectorals; also two large and one small thorn around anterior contour of orbit, the small one the outermost; a group of two large and one smaller thorn close behind each orbit, with the largest member of the group the outermost; two thorns on each shoulder, with a median line of three from nuchal region to pectoral girdle; these are followed, after a short gap, by a row of about 32 along mid-line of disc and of anterior ⅔ of length of tail, the first five to pelvic girdle small, the next 17 or 18 large and conspicuous, with strongly striate bases, those farther rearward, along tail, progressively smaller; and the posterior ¼ of tail without large thorns, recalling conditions in *Raja senta*. Either side of mid-dorsal belt of disc and upper side of tail with 3–4 irregular rows of closely crowded thornlets; no thorns large or small (apart from the prickles) anywhere on pectorals. Caudal fin generally prickly above caudal axis, but with only a few scattered prickles below axis. Upper surface of pelvics wholly naked. Lower surface of disc and of pelvics naked, also of anterior part of tail rearward to abreast of rear corners of pelvics, but densely prickly thence rearward to caudal fin. The dermal armature of small specimens essentially similar, except the mid-dorsal thorns fewer (about 26 in 2 specimens of 262 mm.).

Snout (from base of terminal filament) to front of orbits about 2.9 times as long as distance between orbits, its length in front of mouth about 1.9 times as great as distance between inner edges of exposed nostrils. Orbit about 1.5 times as long as distance between orbits and about 2.1 times as long as spiracle. Upper eyelid bowed downward, and eye with a rounded black velum with crenate margin above pupil, as in skates of the genera *Raja* and *Breviraja*.

Outer lip of spiracle smooth; vestigial gill-ridges on anterior surface of spiracle about 12 in number, rounded, their edges completely fringed with minute lobelets. Nasal curtains smooth edged; those of the two sides of head actually separated by a space about ½ as wide as distance between exposed nostrils, but seemingly interconnected there by a weakly outlined fold of skin. Outer (posterior) margin of nostril smooth, slightly expanded in scoop-like form; the exposed nasal aperture noticeably small.

An interesting feature of this new skate is that if the nasal curtain, on either side, be rolled inward, and the skin between nostril and corner of mouth be spread outward, a deep pit is exposed, close behind the nostril, but its entrance separated from the latter by a bar of stiff tissue. The pit is directed forward-upward, and it extends so far that a probe inserted into it can be felt clearly from the dorsal side of the head, through the overlying skin. And it is so voluminous on the two larger specimens as to allow the entrance of an ordinary match stick, or of a slender lead pencil. The presence of this pit was wholly unexpected, for nothing comparable to it is to be seen, either in *Raja*, in *Dasyatis*, or for that matter in any of the other batoids that we have examined in this respect, and these include representatives of all known families, both of Rajoidea and of Myliobatoidea, excepting only the Arhynchobatidae.

Mouth nearly straight transversely in females and in juvenile males, its contour not known for adult males. Teeth $\frac{28\,(\text{type})-30}{26\,(\text{type})-28}$; those of females and of juvenile males low, rounded, in quincunx mosaic; those of mature males not seen; the tooth bands attached rather loosely to the jaws.

First gill openings about $\frac{1}{6}$ as long as distance between exposed nostrils; third gills a little longer than first; fifth gills about 7/10. Distance between inner ends of first gills about 1.8 times as long as between inner edges of exposed nostrils and about 1.7 times between inner ends of fifth gills.

No dorsal fins. Caudal fin a little longer than distance between exposed nostrils, its height above caudal axis about $\frac{1}{4}$ as great as its length, its depth below axis about $\frac{4}{5}$ as great as its height above latter; upper and lower caudal origins about even. Upper margin continuously rounded; lower margin less strongly so; tip broadly rounded, notched abreast of tip of axis in type specimen, but merely ragged there on slightly smaller specimen (428 mm.) and continuously rounded terminally in small specimens (262 mm.), evidence that its terminal contour on the type has resulted from mutilation.

Pelvic fins more widely spreading than in most other rajoids, and of very diagnostic shape, the anterior outline directed nearly transversely to the main axis of disc and tail, and so long that the tips of the pelvics reach outward considerably beyond the margins of the overlying portion of the pectorals. Anterior margin nearly straight; outer corners broadly rounded; outer posterior (distal) margin straight, or

very weakly convex if spread widely; only very weakly scalloped to conform to positions of tips of radial cartilages; the rear corner abruptly rounded. The inner margin is so short that the pelvics of the two sides appear to be separated only by a shallow notch. But the condition of the clasper described below shows that this is not evidence of a partial fusion of the inner edges of the pelvics with the sides of the tail, but only that these edges are relatively shorter than they are in the skates of the genera *Raja* and *Breviraja*. The anterior margin of the fin soft and fleshy; the first radial cartilage noticeably stout, especially toward its base; the other radialia slender and flexible.

Point of separation of clasper from inner margin of pectoral, in juvenile male, about even with the axil of the fin; tip of clasper already reaching a little beyond rear corner of pelvic. Claspers of mature male not seen.

It is interesting, in this connection, that the claspers of juveniles of *Springeria* originate considerably in advance of the apparent axils of the fins, evidence of partial fusion of the inner margins of the latter with the sides of the tail (Bigelow and Schroeder, 1951, Fig. 1).

Front of cranium with a low, blunt tipped rostral projection, reaching forward a little beyond level of fronts of nasal capsules; tips of anterior rays of pectorals reaching nearly to tip of snout. Pelvis with transverse element nearly straight, each outer corner with a short prepelvic projection.

Color. Upper surface ashy gray, deepening rearward to sooty gray along posterior $\frac{4}{5}$ of tail; disc rearward from orbits with many small vaguely outlined pale spots, most conspicuous on head, and along mid-belt thence rearward, less so outward over pectorals; outer parts of pectorals unspotted. The large thorns white basally, their tips gray. Anterior part of disc also with a rather conspicuous pattern of black dots marking the mucous pores as follows: a) an irregular row along outer margin of each pectoral from a little behind tip of snout to about abreast of axis of greatest breadth; b) a row of 7–8 on each side, diverging from tip of snout to a little in front of level of front of orbits; c) a row of four, extending in anterior-posterior direction close in front of each orbit; d) a larger black spot, marking a cluster of three or four pores a little outward and rearward from the posterior edge of each orbit; e) a similar black spot (3 or 4 pores) either side of the mid-line in nuchal region, close in front of the first large mid-dorsal thorn; f) one black dot (1 pore) on inner part of each pectoral, in shoulder region; a second in line of orbit a little rearward from shoulder

region; and a third about midway thence toward axil of pectoral. Tail irregularly pale spotted along anterior ½, with a few scattered pale spots thence rearward to caudal fin; also with a vaguely outlined dark cross-bar a little posterior to level of tips of pelvics, followed, after a short gap, by a second such bar. Upper surface of pelvics ashy gray, without pale spots.

Lower surface of disc ash gray with irregular sooty cloudings, these most conspicuous on abdominal region; the pectorals of a more brownish, the mid-belt of a more bluish cast. Lower surface of pelvics ashy gray, with bluish cast; lower surface of tail pale grayish white with irregular ashy-gray cloudings, and with the dark cross-bars of the upper surface encroaching downward across the sides rather conspicuously.

The pale spots on the disc are much less conspicuous, and less definitely outlined on small specimens than on large, but the dark cross-bars on the tail are more conspicuous.

Size. The larger specimens being female, and our only male a juvenile, their sizes give no clue to the dimensions to which this skate may grow.

Habits. Apparently confined to rather deep water.

Range. So far known only from the southern side of the Gulf of Mexico, at the locality listed above, page 4.

Family RAJIDAE

Raja fuliginea, Sp. Nov.

Figures 3, 4

Study material. Type specimen. A juvenile male, 306 mm. long, OREGON Sta. 534, northwestern part of Gulf of Mexico, Lat. 27°32′N, Long. 93°02′W; trawl haul at 400–450 fathoms, April 11, 1952; U. S. Nat. Mus., No. 163367.

Distinctive characters. This skate resembles *R. bathyphila* Holt and Byrne 1908 so closely in the general arrangement of thorns and prickles, in proportional dimensions in general, and especially in the very dark coloration of the lower surface of disc and tail that we took it for a specimen of *bathyphila* on our first cursory glance. But a closer examination showed that it differs from *bathyphila* in a considerably more obtuse anterior contour of its disc (Fig. 3A) and especially in the fact that the entire lower surface of the tail, apart from a very narrow median stripe, is densely prickly from base to tip (naked in

bathyphila). The prickles, also, on the upper surface of disc and tail are coarser than on *bathyphila*, and there are no naked areas, while its pelvics are largely prickly on the upper surface (naked in *bathyphila*)

The only skate yet known from the northwestern Atlantic, or from the Gulf of Mexico, other than *R. bathyphila*, with which *fuliginea* shares a uniformly dark colored lower surface is *R. olseni*. But it differs from *olseni* in blunter snout and tail prickly below. It shares a tail prickly below with *R. mollis*. However, it is marked off from *mollis*, not only by its dark lower surface (*mollis* is pale yellowish or whitish below) but also by a much thornier tail and disc, by its considerably more convex anterior contour, also by its harder rostral cartilage. Since these divergences concern characters that are not generally subject to much individual variation among the members of its genus, a new specific name seems requisite for it. We suggest *fuliginea* because of the sooty chocolate hue of its lower surface.

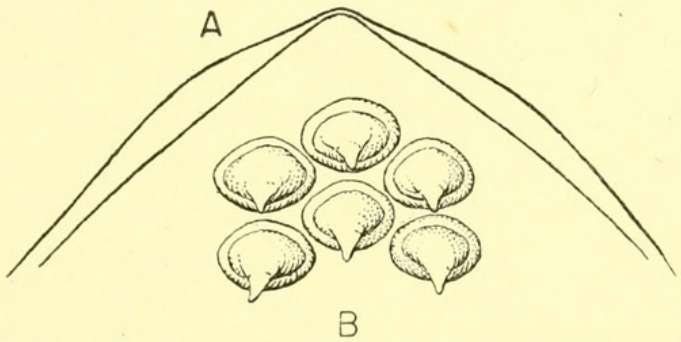

Fig. 3. A. Outlines of front of disc; outer, *Raja fuliginea*, type specimen, and inner, *Raja bathyphila* from southern slope of Georges Bank to show difference in shape. B. Upper teeth of *Raja fuliginea* from near center of mouth. x about 15.

R. fuliginea, like *bathyphila* and *olseni*, parallels *R. badia* Garman 1899, *R. trachura* Gilbert 1892, and *R. abyssicola* Gilbert 1895 of the Pacific coast of Central and North America in its uniformly dark lower surface. But it differs sharply from all three of these in various respects.

Description. Proportional dimensions, in per cent of total length. Juvenile male, 306 mm. long; OREGON Sta. 534, northwestern part of Gulf of Mexico, Lat. 27°32′N; Long. 93°02′W; 400–450 fathoms.

Disc: Extreme breadth 46.3; length 42.8.

Snout length in front of: orbits 9.8; mouth 12.1.

Orbits: horizontal diameter 3.9; distance between 3.6.

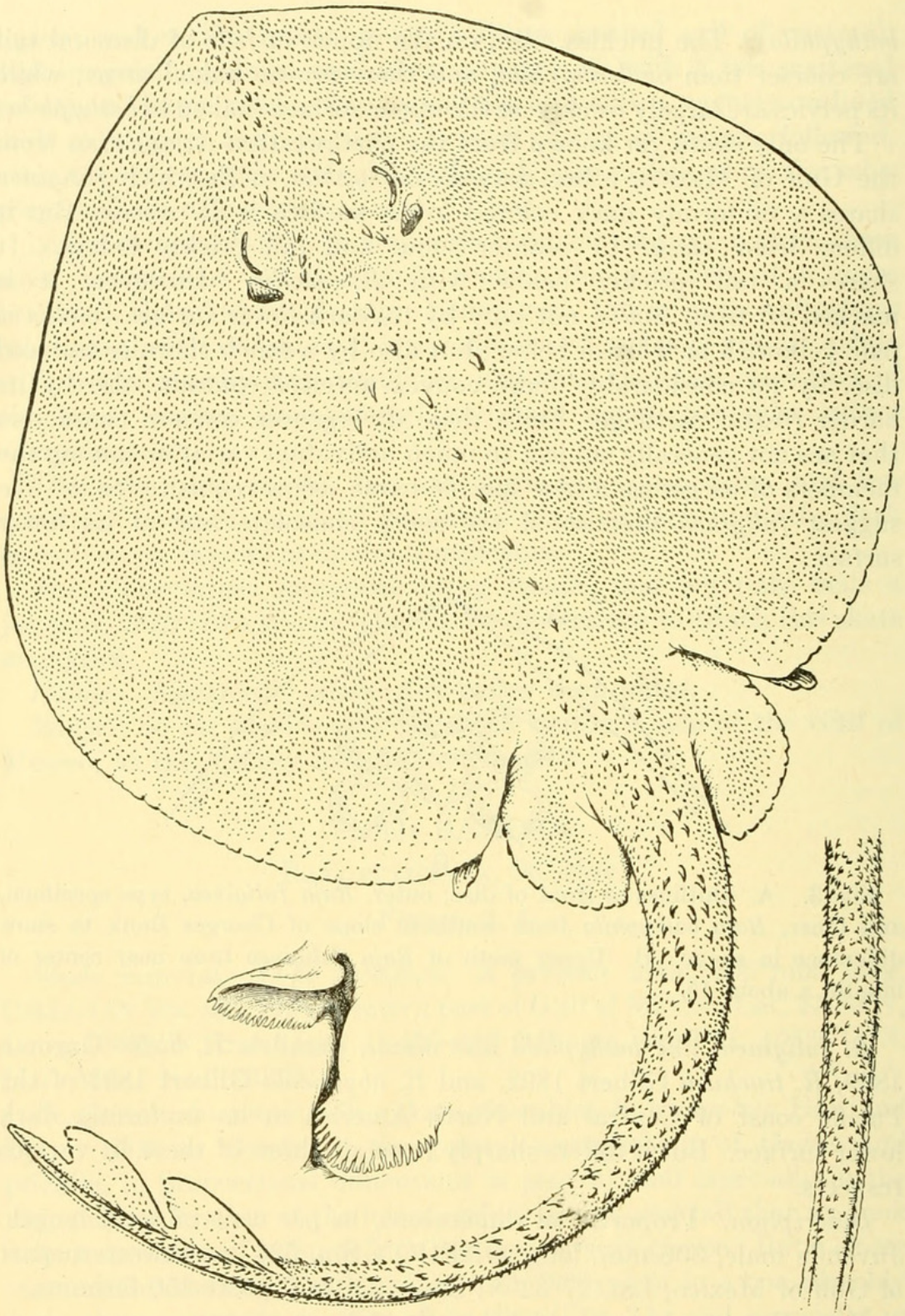

Fig. 4. *Raja fuliginea,* type specimen 306 mm. long, U. S. Nat. Mus. No. 163367, with right hand nostril and nasal curtain x about 3.4, and under side of tail in advance of first dorsal fin, x about 1.1.

Spiracles: length 2.3; distance between 6.7.

Mouth: breadth 5.9.

Nostrils: distance between inner ends 6.2.

Gill openings: lengths 1st 1.3; 3rd 1.3; 5th 1.0; distance between inner ends, 1st 12.9; 5th 7.5.

Distance: from tip of snout to center of cloaca 39.3; from center of cloaca to 1st dorsal 45.4; to tip of tail 60.7.

First dorsal fin: vertical height 2.9; length of base 5.9.

Second dorsal fin: vertical height 2.6; length of base 5.6.

Interspace between: 1st dorsal and 2nd dorsal 0.0.

Pelvics. anterior margin 14.4.

Teeth: $\frac{41}{42}$.

Disc about 1.1 times as broad as long, so broadly and continuously rounded in front that the anterior contour is not susceptible to angular measurement; the tip of the snout projecting slightly, and blunted. The pectoral margins only very slightly concave abreast of eyes and spiracles, and broadly and continuously rounded thence rearward, around to posterior corners, without definitely marked outer corners; posterior corners rather abrupt; inner margins nearly straight.

Axis of greatest breadth about $\frac{2}{3}$ (66%) of distance rearward from tip of snout toward level of axils of pectorals.

Tail with very narrow lateral folds along posterior $\frac{2}{5}$ (38–39%) of its free length posterior to axils of pelvics; its length from center of cloaca about 1.2 times as great to first dorsal and about 1.5 times as great to tip as from center of cloaca to tip of snout.

Upper surface of disc, also upper surface and sides of tail, densely set everywhere with rather coarse prickles curving rearward, or minute thornlets, a very narrow band close along posterior edges of pectorals being the only naked area.

Also a group of small recurved thorns along anterior part of rostral ridge; four larger thorns in a line around inner side of each orbit; one thorn in mid-line in nuchal region; six large thorns on scapular region, two of these on either side with two in mid-line in pattern shown in Figure 4; a line of six smaller thorns along mid-line of disc from scapular region nearly to level of axils of pectorals, followed, thence rearward, by 3–4 irregular rows along anterior $\frac{4}{5}$ of tail, succeeded by two thorns in mid-line, to first dorsal fin. First and second dorsals, and caudal membrane sparsely prickly; anterior lobes of pelvics

naked; posterior lobes rather densely prickly over inner and posterior portions.

Lower surface of disc naked throughout. Lower surface of tail densely set with prickles or thornlets similar to those of upper surface, except that a very narrow median stripe is naked, both along anterior ⅔ of tail, and, again, rearward from level of origin of first dorsal fin.

Snout in front of orbits about 2½ times as long as orbit; its length in front of mouth about twice as great as distance between exposed nostrils. Orbit about as long as distance between orbits and about 1.7 times as long as spiracle. Nasal curtain deeply fringed, with about 18 lobelets; expanded posterior (outer) margin of nostril fringed, also. Mouth nearly straight, the lower jaw arched forward only a very little centrally; its breadth about 1/5 (21%) as great as breadth of disc at level of mouth, and only about 6 per cent as great as distance from tip of snout to tip of tail. Teeth $\frac{41}{42}$, with low triangular cusp, blunted at tip, arranged in quincunx in juvenile male, probably also in female.

First pair of gill openings about 22 per cent as long as breadth of mouth; distance between inner ends of first gills about 2.1 times as long as between inner edges of exposed nostrils, and about 1.2 times between inner ends of fifth gills.

Dorsal fins about alike in shape and equal in size, their bases confluent, without intervening thorn or prickles. Caudal membrane, posterior to second dorsal, about ⅔ as long as base of second dorsal.

Pelvic fins deeply concave outwardly; outer margin strongly scalloped around the concavity with three marginal lobes on the one fin, four on the other; but with the positions of the radial cartilages only faintly indicated thence rearward; anterior lobe narrow, fleshy with rounded tip; posterior lobe strongly convex; rear corner abrupt; anterior margin of anterior lobe about 90 per cent as long as distance from its point of origin to rear corner of posterior lobe; rear corners extending back from about ¼ of distance from level of axils of pectorals toward first dorsal fin.

Firm rostral cartilage detectable by touch as reaching very nearly to extreme tip of snout; tips of anterior rays of pectorals falling a little short of level of tip of rostral cartilage.

Color. Upper surface of disc, tail and pectorals uniform dark ashy gray, darkest on anterior lobes of pelvics, but without definite dark markings anywhere. Lower surface of disc sooty chocolate to nearly black, and noticeably darker than upper surface on head and around

outer belts of pectorals. A sub-triangular area in region of cloaca reaching forward about to pelvic girdle, and vaguely outlined, irregularly interrupted areas on the inner parts of the pectorals rearward from the gill region are of a somewhat paler sooty chocolate hue, perhaps partly as a result of rough treatment in the trawl. Lower surfaces of pelvics dark sooty, except pale on tips of anterior lobe; sides and lower surface of tail of a very dark ashy-gray, except somewhat paler along a narrow median stripe.

Size: The type (and only known) specimen being a juvenile male, it gives no clue to the size to which this skate may grow.

Habits and range. The depth of capture (400–450 fathoms), added to the dark color of its lower surface, marks *fuliginea* as a deep water species. Present indications are that the upper boundary to its usual range lies not far from 400 fathoms, else specimens of a skate made so conspicuous by its dark lower surface would almost certainly have been noticed among the catches of the many trawl hauls that have been made in the Gulf at lesser depths. Nothing more than this is known of its habits.

The locality of capture lies in the northwestern part of the Gulf, some 100 miles off Galveston. It is an interesting question for the future whether *fuliginea* is restricted to the Gulf, or whether it has simply been overlooked in the open Atlantic.

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