

A NEW GENUS AND SIX NEW SPECIES OF FISHES OF THE FAMILY CYCLOGASTERIDÆ.

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An examination of the Cyclogasteridæ represented in the United States National Museum in Washington and the Museum of Comparative Zoology in Cambridge has revealed the six new species described in the present paper. Certain of these species are represented by specimens in the United States Bureau of Fisheries and the Stanford University Zoological Museum. The types of five of the species have been selected from among the specimens in the United States National Museum. The remaining species, *Rhinoliparis attenuatus*, is represented by a single specimen and this is deposited in the Museum of Comparative Zoology.

The opportunity is taken here to present also the description of a new genus. This genus, *Polypera*, is based upon the number of pyloric cæca, a character heretofore not utilized in distinguishing the genera and species of the family. The genus *Polypera* is formed to include the single species *Neoliparis greeni* Jordan and Starks. This species has about 300 pyloric cæca. As none of the other species of the family have as many as 100 pyloric cæca it seems advisable to recognize this great difference in the number of pyloric cæca as of generic importance.

POLYPERA, new genus.

Disk large; dorsal fin notched; nostrils, 2; teeth weakly trilobed and simple; pyloric cæca numerous, more than 200; branchiostegals, 6.

The genus *Polypera* differs from *Cyclogaster* solely in the number of pyloric cæca. None of the 30 species of the latter genus has as many as 100 pyloric cæca. The pyloric cæca in *Polypera* are matted closely together and can be distinguished without counting from those of any of the species of *Cyclogaster*. The dentition in *Polypera* is distinct from that found in any of the species of *Cyclogaster* in which the dorsal fin is notched and supplements the difference found

in the pyloric cæca in support of the view that in *Polypera* we are dealing with an aberrant line of development. The larger teeth in *Polypera greeni* are simple or have the lateral lobes but faintly indicated. The nearest approach to this type of dentition found among the species of *Cyclogaster* is in *Cyclogaster major* (Gill). In this species some of the larger teeth are simple, but in other characters the species is so widely divergent from *Polypera greeni* that we are led to believe that the similarity in dentition is due to parallel development.

Type of the genus.—*Polypera greeni*¹ (Jordan and Starks).

CYCLOGASTER BRISTOLENSE Burke, new species.

Liparis agassizii GILBERT, Rept. U. S. Fish Comm., 1893, 1896, p. 446.

Type.—Female, Cat. No. 53790, U.S.N.M. Vicinity of Bristol Bay, Bering Sea; *Albatross* station 3514.

Distribution.—Southeastern Bering Sea, *Albatross* stations 3247, 3301, 3514, 3518; depth, 17 to 36 fathoms.

Relationships.—The distribution, shape of body, and the presence of prickles suggest a close relationship between *Cyclogaster bristolese* and *Cyclogaster megacephalus*. The latter species, however, appears to be distinct in having a larger number of dorsal rays, a larger gill-slit, and the dorsal notch entirely absent. *Cyclogaster bristolese* differs from *Cyclogaster tunicatus* and *Cyclogaster herschelini* in the smaller number of dorsal rays, the coloration, and the presence of prickles. It differs from *Cyclogaster agassizii* in the smaller number of dorsal rays and pyloric cæca, the coloration, the presence of prickles, and the smaller gill-slit.

Description of type.—Dorsal, 38; anal, 32; pectoral, 35. Depth, 4.3 in length of body; head, 3.7. Eye, 4 in head; disk, 1.8.

Body robust, deepest at front of first dorsal. Head moderate; cheeks slightly swollen; width of head a little greater than depth of head; profile depressed over the eyes; occiput swollen. Mouth broad; maxillary reaching vertical from pupil. Teeth trilobed, stout, arranged in about 9 oblique rows in the half of each jaw. Snout short, rather deep; nasal region strongly convex. Anterior nostril in a short tube; posterior nostril without tube. Eye moderate; the lower half silvery. Gill-slit extending down in front of the two upper pectoral rays. "Thumb-tack" prickles present in all the specimens, scattered thickly over the top of the head and sparsely along the sides of the body. Pyloric cæca few, not counted in the type, varying from 16 to 22 in the other specimens.

Dorsal fin with a shallow notch, the fifth and sixth rays being slightly shortened. Caudal slightly rounded, connected to the dorsal for two-fifths its length; the anal connection a little greater; a shallow notch between caudal and dorsal, none between caudal and

¹ Proc. Cal. Acad. Sci., 1895, p. 829.

anal. Pectoral notched; the lower lobe of 7 rays, reaching slightly past the disk. Disk large, less than 2 in the head, nearly round and with a broad flap. Vent separated from disk by two-thirds diameter of disk.

Body grayish; large, irregular brown blotches on head and body, these extending on dorsal and anal fins; caudal with a broad bar near the base; lower jaw with 3 bars on each side; peritoneum with scattered black dots.

Remarks.—The anterior 5 or 6 dorsal rays usually are set off by a shallow notch; sometimes the 3–4–5–6 rays are equal, but they never increase regularly in length. The notch between the dorsal and caudal is either present or absent. The connection between the caudal and the dorsal is normally greater than one-fifth the length of the caudal; in one cotype it was just one-fifth the length of the caudal. All the specimens have “thumb-tack” prickles. The coloration is of two types; (1) that described for the type, (2) body grayish or olive brown; dorsal and anal mottled and barred with brown; pectoral speckled with brown; caudal with a broad bar near the base.

Specimens examined.

Museum No.	Specimens.	Locality.	Collector.
53790, U.S.N.M.	1	Station 3514.	<i>Albatross.</i>
64115, U.S.N.M.	1do.	Do.
43583, U.S.N.M.	1	Station 3301.	Do.
34114, U.S.N.M.	2	Station 3518.	Do.
3070, S.U.Z.M.	7	Station 3247.	Do.

CYCLOGASTER MEGACEPHALUS Burke, new species.

Type.—Female, Cat. No. 53791, U.S.N.M. Southeastern Bering Sea, *Albatross* station 3519; depth, 37 fathoms.

Distribution.—Southeastern Bering Sea, *Albatross* stations 3518, 3519, 3520; depth, 36 to 38 fathoms.

Relationships.—*Cyclogaster megacephalus* resembles *Cyclogaster major* in the heavy head and body, but is otherwise distinct. It can readily be distinguished from *Cyclogaster gibbus* and related species by the heavy head and body. For a comparison with *Cyclogaster bristolense* see description of the latter species.

Description of type.—Dorsal, 43; anal, 36; pectoral, 36; pyloric cæca, 29. Depth, 3.7 in the length; head, 3.6. Eye, 5.8 in the head; disk, 2.

Body heavy anteriorly, deep and broad, deepest at the origin of the dorsal fin, tapering rapidly to the base of the caudal, much compressed posteriorly. Head heavy, short, about as wide as deep; cheeks swollen. Mouth broad; maxillary reaching vertical from the posterior margin of the eye. Teeth trilobed, in rather narrow bands, arranged in about 13 or 14 oblique rows in the half of each jaw.

Snout short, broad and deep; jaws about equal. Anterior nostril with a thick tube; posterior nostril with a raised rim. Eye moderate, the lower half silvery. Gill-slit wide, extending down in front of 12 pectoral rays. Thumb-tack prickles absent from the type, present on the cotype.

Dorsal unnotched, the rays increasing gradually in length. Caudal rounded, connected for two-fifths its length to the dorsal; no notch between dorsal and caudal. Pectoral with a shallow notch; the lower lobe short, reaching half way between disk and vent. Disk large, as broad as long; center of disk under gill-slit. Vent separated from disk by two-thirds diameter of disk.

Body grayish, mottled on sides with brown; dorsal and anal mottled and barred with brown; caudal barred with light brown; pectoral speckled; peritoneum silvery with scattered black dots.

Specimens examined.

Museum No.	Specimens.	Locality.	Collector.
53791, U.S.N.M.....	1	Station 3519.....	<i>Albatross.</i>
53787, U.S.N.M.....	1	Station 3518.....	Do.
581, U.S.B.F.....	1	Station 3520.....	Do.

CAREPROCTUS GILBERTI Burke, new species.

Careproctus spectrum BEAN, Proc. U. S. Nat. Mus., vol. 13, 1890, p. 40 (in part—confused with the type of *Careproctus spectrum*).

Careproctus colletti EVERMANN and GOLDSBOROUGH, Bull. U. S. Bur. Fish., vol. 26, p. 333; not of Gilbert.

Type.—Cat. No. 64110, U.S.N.M. North of Kodiak Island, Alaska, *Albatross* station 4292; depth, 102 fathoms.

Distribution.—Off British Columbia and southeastern Alaska, *Albatross* stations 2848, 2862, 3480, 4292, 4293, and 4781; depth, 102 to 482 fathoms.

Relationships.—*Careproctus gilberti* closely resembles *Careproctus ostentum*. Specimens of *Careproctus gilberti* were found in the type bottle of *Careproctus spectrum*, indicating that these species also closely resemble each other. We find that *Careproctus gilberti* can be distinguished from *Careproctus ostentum* by the distinctly larger disk and from *Careproctus spectrum* by the smaller disk, wider gill-slit and the darkly colored stomach.

Description of type.—Dorsal, 55; anal, 46; pectoral, 31; pyloric cæca about 10. Depth of body 4 in the length without the caudal; head, 3.6. Eye, 3.5 in the head; disk, 9.

Body short, compressed, tapering rapidly to the caudal fin. Head heavy, deep, compressed; depth of head greater than width of head; interorbital broad and flat; cheeks vertical. Mouth broad; lateral cleft reaching nearly to vertical from front of pupil; maxillary reaching beyond pupil. Teeth slender, elongate, recurved; the lateral

lobes absent from some of the teeth, weakly developed on others, appearing absent under the hand lens; inner teeth appearing prominent; the oblique rows practically indistinguishable. Snout low, broadly rounded, not projecting. Nostril in a short, thick tube. Eye large, prominent, the lower half silvery. Gill-slit large, 2.4 in the head, extending down in front of 14 pectoral rays. Prickles absent. Pyloric cæca 10 to 12 in the cotypes.

Anterior dorsal rays increasing gradually in length, not buried in thick pseudotissue. Caudal truncate, connected for half its length to the anal; the rays coiled at the tip. Upper edge of pectoral on a level with a point midway between angle of mouth and eye; the upper lobe consisting of 14 rays; the space between the two lobes bridged by 10 short, widely spaced rays; lower lobe of 7 rays, 1.4 in the length of the head. Disk small, cupped, a little wider than long, 9 in the length of the head. Vent close to the disk, both hidden between the lower lobes of the pectoral fin.

Skin lax, transparent; flesh pinkish; peritoneum silvery; stomach blackish. In some individuals the body is slightly brownish along the back and the peritoneum is dotted.

Specimens examined.

Museum No.	Specimens.	Locality.	Collector.
64110, U.S.N.M.....	1	Station 4292.....	<i>Albatross.</i>
64111, U.S.N.M.....	1	Station 4293.....	Do.
64112, U.S.N.M.....	21	Station 2848.....	Do.
53814, U.S.N.M.....	2	Station 2862.....	Do.
53815, U.S.N.M.....	1	Station 3480.....	Do.
45363, U.S.N.M.....	1	Station 2848.....	Do.
48, S.U.Z.M.....	3	Station 2848.....	Do.

PARALIPARIS DEANI Burke, new species.

Paraliparis holomelas EVERMANN and GOLDSBOROUGH, Bull. U. S. Bur. Fish., vol. 26, p. 334 (in part, not of Gilbert).

Type.—Cat. No. 60570, U.S.N.M. Stevens Passage, southeastern Alaska, *Albatross* station 4253; depth, 188 fathoms; length, 68 mm.

Distribution.—Coast of Alaska south of the Alaska Peninsula; *Albatross* stations 4194, 4203, 4251, 4253, 4255, 4292, and 4293; depth, 30 to 274 fathoms.

Relationships.—*Paraliparis deani* does not appear to be closely related to any known species. It is one of the few species of the genus in which the gill-slit extends down in front of the pectoral fin.

Description of type.—Dorsal, 56; anal, 46; caudal, 4; pectoral, 18; pyloric cæca about 9. Depth, 6 in the length of the body without the caudal; head, 4.5. Eye, 2.8 in the head; gill-slit, 3.

Body deepest at the nape, compressed, rather slender and elongate. Head short, broad; interorbital flat; occiput slightly swollen. Mouth horizontal; maxillary reaching vertical from the posterior third of the eye. Teeth arranged in narrow bands, appearing simple under

the hand lens but under the microscope the lateral lobes are seen to be weakly developed. Eye large, prominent; pupil large, round. Snout deep, abrupt. Nostril tube little more than a raised rim. Gill-slit wide, extending down in front of 10 pectoral rays. Thumb-tack prickles present on the lower lobe of the pectoral fin; the epidermis is absent from the remainder of the body and may have contained prickles.

Anterior dorsal rays increasing rapidly in length; the anterior ray short, little greater than the diameter of the pupil. Caudal truncate, of 4 rays, connected for nearly half its length to the anal fin. Pectoral fin notched; the rays opposite the notch widely spaced, not rudimentary; the lower lobe of 4 elongate, nearly equal rays, 1.2 in the head, not reaching the anal fin.

Body pale, with scattered brown dots; mouth pale, dusky in the throat; gill cavity dusky; peritoneum silvery, dotted below, dusky above; stomach black.

Remarks.—The remaining specimens examined vary somewhat from the type. The gill-slit extends down in front of from 10 to 13 pectoral rays. The eye varies from silvery to black. The absence of silvery pigment in the eye may be due to the preserving fluid. In the two cotypes, as in the type, the lower lobe of the pectoral fin retains the epidermis in which are found thumb-tack prickles. None of the specimens have prickles scattered over the body. As the epidermis is absent from the bodies of all the specimens prickles may have been present on the sides of the body in life and lost with the epidermis. The caudal fin is either truncate or slightly concave. Specimens No. 60671 differ from the other specimens and may represent another species. They are larger with shorter, deeper bodies and a paler coloration.

Specimens examined.

Museum No.	Specimens.	Locality.	Collector.
60570, U.S.N.M.	1	Station 4253	<i>Albatross.</i>
64113 (cotypes), U.S.N.M. ...	2	do	Do.
60569, U.S.N.M.	1	Station 4194	Do.
60571, U.S.N.M.	1	Station 4253	Do.
60568, U.S.N.M.	1	Station 4203	Do.
60590, U.S.N.M.	1	Station 4292	Do.
60589, U.S.N.M.	1	Station 4255	Do.
60670, U.S.N.M.	5	Station 4251	Do.
60671, U.S.N.M.	9	Station 4293	Do.

PARALIPARIS GARMANI Burke, new species.

Amira liparina GOODE and BEAN, Oceanic Ichthyology, 1895, p. 278 (in part).

Type.—Cat. No. 64129, U.S.N.M. Off New England, *Albatross* station 2586; depth, 328 fathoms.

Distribution.—Atlantic Ocean off New England, *Albatross* stations 2212, 2561, 2586, 2676; *Fish Hawk* stations 898, 937, 952, 994, 997, and 1093; depth, 300 to 542 fathoms.

Relationships.—*Paraliparis garmani* does not closely resemble any known species of the North Atlantic Ocean. It has, however, been confused with *Paraliparis liparina* by various writers. It can readily be distinguished from the latter species by the oblique mouth and the more elongate, slender, and recurved teeth. In these two characters *Paraliparis garmani* bears a close resemblance to *Paraliparis cephalus* of the Pacific Ocean. It differs from the latter species, however, in the larger number of pectoral rays and the rudimentary middle pectoral rays.

Description of the type.—Dorsal, 54; anal, 49; pectoral, 21; caudal, 8; pyloric cæca, 6. Depth, 4.6 in the length of the body without the caudal; head, 4.5. Eye, 5.4 in the head; gill-slit, 4.2.

Body deepest at the nape, tapering rapidly for a short distance, not very attenuate, resembling that of *P. copei*. Head heavy, short, compressed; occiput considerably swollen; cheeks vertical; profile concave over the eyes. Mouth oblique as in *P. cephalus*. Teeth simple, rather slender and elongate, distinctly recurved, arranged in broad bands. Snout deep, abrupt; symphysis of lower jaw sharp, projecting. Nostril without projecting tube. Eye small, black. Gill-slit small, extending up from the upper pectoral ray. Prickles absent.

Anterior dorsal rays buried in tissue. Caudal appearing forked, connected for half its length to the anal. Pectoral divided into two distinct lobes; the space between bridged by 4 rudimentary rays hidden beneath the skin; the upper lobe broadly rounded, 2 in the head; the lower lobe of 3 slender rays, 2.9 in the head.

Remarks.—In the young the occiput is greatly swollen as in *P. cephalus* and the tail appears very slender and attenuate in contrast to the heavy head and trunk. The maxillary may extend from beneath the middle of the eye to the posterior margin.

Specimens examined.

Museum No.	Specimens.	Locality.	Collector.
64129, U.S.N.M.....	1	Station 2586.....	<i>Albatross.</i>
46013, U.S.N.M.....	1	Station 2676.....	Do.
46004, U.S.N.M.....	1	Station 2561.....	Do.
64130, U.S.N.M.....	1	Station 2586.....	Do.
35562, U.S.N.M.....	3	Station 2212.....	Do.
28785, U.S.N.M.....	1	Station 937.....	<i>Fish Hawk.</i>
46005, U.S.N.M.....	1	Station 994.....	Do.
28855, U.S.N.M.....	1	Station 952.....	Do.
31594, U.S.N.M.....	1	Station 1093.....	Do.
28899, U.S.N.M.....	3	Station 997.....	Do.
26739, U.S.N.M.....	1	Station 898.....	Do.

RHINOLIPARIS ATTENUATUS Burke, new species.

Type.—Cat. No. 28377, M.C.Z. Bering Sea, *Albatross* station 3326; depth, 576 fathoms. Only the type-specimen known.

Relationships.—*Rhinoliparis attenuatus* constitutes the second species in the genus. It does not appear to be closely related to

Rhinoliparis barbulifer and can readily be distinguished from the latter by the larger number of barbels on the snout and the more highly modified type of dentition.

Description of type.—Body as in *R. barbulifer*, low, extremely attenuate. Head, 5.7 in the length of the body without the caudal, depressed; width of head greater than depth of head; profile low, nearly straight from snout to occiput; interorbital flattened. Mouth broad; maxillary reaching vertical from posterior margin of eye. Teeth in narrow bands, elongate, slender, slightly recurved, simple or the lateral lobes faintly indicated on some of the teeth. Snout depressed, broad, projecting as in *R. barbulifer*, extending beyond the upper lip for three-fourths the diameter of the eye. The snout is somewhat mutilated, but at least three barbels are present on each side; one of these is situated near the tip of the snout and two near the lateral margin of the lower surface. Nostril with a raised rim. Eye large, 4 in the head. Gill-slit apparently above the base of the pectoral fin. Pyloric cæca about 12.

Caudal fin mutilated but apparently reduced to a single elongate ray, connected for a short distance with the dorsal and anal fins. Pectoral fin with a shallow notch; the middle rays well developed, widely spaced; the lower lobe of 6 elongate mainly free rays.

The dermis absent, probably dusky or blackish; flesh pinkish; mouth dusky; peritoneum black; stomach pale or slightly dusky.