

PRELIMINARY DIAGNOSES OF NEW CEPHALOPODS FROM THE WESTERN ATLANTIC.

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The cephalopods, wholly pelagic forms, which were obtained by the United States Coast and Geodetic Survey steamer *Bache* during her cruise in the western North Atlantic in the early months of 1914, were submitted to the writer for study and report by the Bureau of Fisheries. The work was begun at once, but was abruptly interrupted by the circumstances attendant upon the entry and participation of the United States in the World War, and its resumption proved impossible until last year. As it appears that the publication of the final report upon the collection as a whole is likely to be yet further delayed, it seems desirable to publish a preliminary account of such new forms, some of them of considerable intrinsic interest, as have thus far come to light in the course of examination of the material. More detailed descriptions and figures of each species will appear in connection with the ultimate complete report above referred to.

The present figures are from drawings by J. Stanley Ferguson.

CHIOTEUTHOIDES, new genus.

Small, loliginiform oegopsids, having the anterior mantle margin free, the funicular locking cartilages elongate and simple. Body elongate, continued between and past the fins as a minute, needle-like process, probably bearing accessory fins or membranes when entire. Ventral arms greatly developed as in *Chiroteuthis* and allied genera, the third pair the reverse. Arm suckers in two rows throughout.

Type.—*Chiroteuthoides hastula*, new species.

CHIOTEUTHOIDES HASTULA, new species.

Plate 16, fig. 3.

Diagnosis.—Body more or less cylindrical, narrow, tapering quite suddenly and rapidly just in front of the fins to a minute, needle-like aciculum, consisting mainly of the very attenuate posterior portion of the gladius, which extends between the fins and some distance past them. Fins nearly circular, about one-third as long as the sac-like part of the mantle, strongly indented posteriorly; anterior margins

less arcuate than the posterior and scarcely notched; traces of a possible "accessory fin" or membrane evident on the margins of the broken needle-like process described above.

Head small, rounded, much compressed dorso-ventrally. Funnel large, thin walled, inflated, reaching about to the center of the head. Funnel cartilages long and narrow, slightly widest posteriorly, thence tapering to a point in front; their grooves simple. Eyes large. Region of head in front of eyes leading to arms stout, four-angled.

Arms well developed; the fourth pair, which are much the largest and longest, about two-thirds as long as the body (exclusive of fins and needle-like process), strongly keeled and bearing two rows of small suckers for their entire length, the distal ones becoming very minute; dorsal and second arms subequal, about half as long as the ventrals; third arms strongly compressed, keeled, and excessively small, being between one-third and one-half as long as the neighboring second pair. Suckers minute, in two rows throughout.

Tentacle stalks about as thick as the second arms; clubs amputated and their structure hence unknown.

No luminous organs evident.

Total length (exclusive of tentacles), 16.5 mm.; length of mantle (dorsal), 10+ mm.

Type.—Cat. No. 338693, U.S.N.M. [S.S.B.637].

Type locality.—200-0 m., station 10187, latitude 28° 59' N., longitude 69° 22' W.; February 23, 1914.

Remarks.—The inconspicuous specimen upon which the new genus and species here proposed are founded has proven so difficult to align with any of the described oegopsids that independent treatment has seemed to be unavoidable. Even its family relationships are not altogether certain. In many ways it has quite the aspect of a *Chiroteuthis*, particularly in the enormously developed ventral arms and the extreme posterior attenuation of the conus of the gladius, but the presence of stalked olfactory tubercles is yet to be established, and the funnel cartilages are far from typically chiroteuthoid.

The absurdly minute arms of the third pair are similar to those of no other cephalopod with which I am acquainted.

ENOPTROTEUTHIS, new genus.

Small loliginiform oegopsids having the anterior mantle margin free, the funicular cartilages being somewhat ovate. Body continued posteriorly between the enormous semicircular fins as a long, extremely slender, needlelike process covering the very attenuate cone of the gladius, without accessory fins. Head prolonged in front of the eyes into a squarish snout. Eyes large, on stout stalks. Arms moderate, not strongly dissimilar. Tentacles with a minute club bearing but few suckers (in two rows in present material).

Type.—*Enoptroteuthis spinicauda*, new species.

ENOPTROTEUTHIS SPINICAUDA, new species.

Plate 16, fig. 6.

Diagnosis.—Body very short, vasiform, swollen just behind the middle, thence tapering abruptly to continue between and past the fins and as far again as a delicate, needlelike process consisting principally of the excessively produced and attenuated posterior prolongation of the cone of the gladius. Fins almost perfectly semi-circular, but their anterior and posterior margins a little flattened so that together they form an immense, nearly circular, transverse ellipse, half again as long as the body proper. No evident traces present of an accessory membrane of fin.

Head fairly large, oblong, flattened, produced in front as a long, four-sided, snout-like process leading to the arms. Funnel moderate, the funnel cartilages more or less ovate. Eyes enormous, pushed forward on short, heavy, columnar stalks, composed mainly, it would seem, of the immense optic ganglia.

Arms moderate, the lateral pairs somewhat the longest (perhaps two-thirds as long as the body proper), the formula of relative length being 2, 3, 4, 1, or 2, 3, 4 = 1. Suckers in two rows, quite large in proportion to the arms.

Tentacles about twice as long as the arms, the club minute, not expanded, bearing but four suckers arranged in two rows, the three proximal ones much the largest.

No luminous organs evident.

Total length, about 25 mm.; length of mantle (dorsal), about 17 mm.

Type.—Cat. No. 338694, U.S.N.M. [S.S.B.638].

Type locality.—75-0 m., station 10188, latitude 28° 51' N., longitude 70° 08' W.; February 24, 1914.

Remarks.—This extraordinary little squid possesses a combination of very puzzling features. It has a manifest resemblance in its general facies to many of the Chiroteuthidae, and that the relationship is a more than fancied one is indicated by the form of the locking cartilages which does not support its reference to any other family as well. Nevertheless there are discrepancies, as the tentacles show but two rows of suckers on the club, and the ventral arms fail to exhibit the predominance so generally characteristic of these organs in this family. The stalked eyes are also quite peculiar in structure.

Genus *TEUTHOWENIA* Chun, 1910.

ASCOTEUTHIS, new subgenus.

Cranchiids of moderate size, with strongly inflated mantle, showing evident resemblance to *Teuthowenia* s. s., but differing in the much larger, almost semicircular fins, funnel shorter than the strongly

developed eyestalks, and the fact that the first and second arm pairs are distinctly shorter than the third and fourth. The arms and tentacles are well developed, the latter very long, with very minute suckers in four rows on the distal portion. The mouth region is large and strongly protruding.

Type.—*Teuthowenia (Ascoteuthis) corona*, new species.

TEUTHOWENIA (ASCOTEUTHIS) CORONA, new species.

Plate 16, fig. 7.

Diagnosis.—A moderate-sized cranchiid with an inflated, cask-shaped or bag-shaped body, tapering rapidly to a sharp point between and slightly past the small, more or less semicircular fins. Texture of mantle membranous, fairly tough.

Head inconspicuous, pushing out in front as a stout, columnar snout. Eyes large, rounded, their stalks stout and well developed, when entire considerably longer than the funnel; optic ganglia enormous; ocular photophores difficult to distinguish in material at hand. Funnel large, with a wide aperture; when extended reaching barely past the base of the arms.

Arms well developed, keeled, their formula of relative length manifestly 3, 4, 2, 1; third pair distinctly largest and longest, being about one-fifth as long as the mantle. Suckers small, two-rowed. Umbrella wanting.

Tentacles very long; club distinctly keeled, otherwise not expanded, and bearing four rows of very minute suckers, which continue for an uncertain distance down the stalk.

Buccal region strongly raised and protruding between the arms like a continuation of the snout.

Total length, about 57 mm.; length of mantle (dorsal), 27 mm.; length of fins, 4 mm.

Type.—Cat. No. 338695, U.S.N.M. [S.S.B.618].

Type locality.—100-0 m., station 10173, latitude 32° 27' N., longitude 68° 22' W.; February 4, 1914.

Remarks.—This interesting cranchiid is evidently nearer to *Teuthowenia* than it is to any of the other described genera, the differences so far noticed being of such a nature that it is here described as representing a new subgenus of the older group. It has, however, a certain aspect of its own, recalling Chun's remarkable *Crystalloteuthis* in some respects, while the fins are so entirely different from those of the typical *Teuthowenia* both in shape and manner of attachment to the mantle that it is possible that *Ascoteuthis* some day will have to be accorded full generic standing. *Teuthowenia* s. s. is likewise represented in the *Bache* collections, making possible direct comparison of the two.

Genus SANDALOPS Chun, 1906.

SANDALOPS PATHOPSIS, new species.

Plate 16, fig. 1.

Diagnosis.—A minute cranchiid with an elongate, cylindro-conic, almost taoniform body, tapering at first gradually, then more rapidly to a point between the fins. Texture of mantle membranous, the gladius evident as a distinct hyaline streak along the dorsum. Fins minute, each subcircular and about as broad as long; strongly constricted at base, where they are distinctly separated by the hyaline conus.

Head roughly quadrangular, strongly compressed dorso-ventrally; in front passing into a stocky but well-developed columnar snout. Eyes large, strongly constricted just below the oval bulb; their transparent stalks enormously elongate, the entire apparatus perhaps four times as long as the snout and often grotesquely contorted. A subcircular brownish body nearly covering the ventral end of each bulb is possibly the photogenic organ. Funnel large, when extended reaching a trifle past the base of the eyestalks.

Arms practically vestigial throughout, bearing hardly more than a single pair of suckers each; ventral arms and their suckers scarcely distinguishable.

Tentacles long, stout; their clubs minute, hardly expanded and only very weakly keeled. Suckers on club small, in four rows, yet relatively few in number owing to the minute dimensions of the club; passing into a two-rowed condition on the carpus, they continue in rather widely spaced pairs to the base of the stalk.

Total length, about 15.5 mm.; length of mantle (dorsal), 8 mm.

Type.—Cat. No. 338696, U.S.N.M. [S.S.B.624].

Type locality.—1100-0 m., Station 10166, latitude 32° 33' N., longitude 72° 14' W.; January 30, 1914.

Remarks.—There are six specimens of this most absurd appearing little cephalopod in the collection, all very constant in the characters described. From Chun's strange *S. melancholicus*, the type of the genus, they differ in the conspicuously longer eyestalks, more regularly oval eyes, decidedly elongate and tapering body, and the presence of weak keels on the tentacle clubs. Possibly none is mature.

SANDALOPS ECTHAMBUS, new species.

Plate 16, fig. 2.

Diagnosis.—A cranchiid of small size, with an elongate, more or less inflated, cylindro-conic body, tapering at first gradually, then more rapidly, to a point between the fins. Texture of mantle membranous, the gladius evident as a yellowish streak in the mediodorsal line. Fins rather small, each probably subcircular and about as

broad as long; slightly constricted at base; barely separated by the hyaline conus.

Head small, rounded, well elevated dorsally, passing in front into a stocky, slightly tapering snout of only moderate length. Eyes large, distinctly constricted between the large, spherical optic ganglia and the almost spindle-shaped, strongly ventrally produced bulbi; eyestalks quite stout, transparent, larger than and about twice as long as the snout. Ocular photophores not yet certainly identified. Funnel moderately large, reaching just past the base of the eyestalks.

Arms normally developed, but small, the third pair, which are largest, but little longer than the snout; formula of relative length, 3, 4, 2, 1. Suckers small, round, the two rows well separated, but the suckers rather crowded in the row.

Tentacles long and stout, their clubs long, slender, tapering, and not expanded except for a rather wide, delicate, membranous keel on the distal portion. Suckers small, numerous, in four rows on club, whence they pass on the carpus into two zigzag rows which extend perhaps half way down the stalk.

Total length, about 43 mm.; length of mantle (dorsal), 22 mm.

Type.—Cat. No. 338697, U.S.N.M. [S.S.B.627].

Type locality.—100-0 m., Station 10208, North of Little Bahama Bank; March 21, 1914.

Remarks.—This strange cranchiid differs from *S. melancholicus* Chun in the strongly keeled tentacle clubs, more elongate and tapering body, relatively larger fins, and the somewhat different shape of the eyes. From the preceding species it is readily separable by reason of its shorter eyestalks, strong ventral elongation of the bulbi of the eyes, strong keels on the tentacle clubs, and larger fins.

Although the original diagnosis of *Sandalops* has to be considerably modified to permit the reference to it of the two species here described, they appear to show better affinity with this than other cranchiid genera. Indeed one can feel by no means confident that a full ontogenetic series will not show all three of the named forms to be merely developmental stages of a single species. To proceed, however, on such a gratuitous assumption, unsupported by any direct evidence from the specimens themselves, would certainly, in view of the many discrepancies manifested, be very unwise. Separate treatment is obviously the safest plan for the present.

Genus PYRGOPSIS de Rochebrune, 1884.

PYRGOPSIS LEMUR, new species.

Plate 16, fig. 5.

Diagnosis.—A cranchiid of small size, with an elongate, spindle-shaped body, most inflated near the middle, thence tapering to a sharp point between and slightly past the large, nearly semicircular fins. Texture of mantle membranous, the gladius evident as a hya-

line streak in the mid-dorsal line; a longitudinal series of cartilaginous tubercles on each side, ventrally, extending back from the points of attachment of the mantle. Fins with anterior and posterior outlines somewhat flattened, but broadly adherent to the tip of the body so that together they form a robust transverse ellipse.

Head small, conical, prolonged in front as a long, columnar, obscurely quadrangular, ventrally flattened snout. Eyes of moderate size, pyriform, projected into a point forward and ventrally, distinctly constricted between the bulbous and the large rounded optic ganglion; eyestalks long, stout, cylindrical, transparent, not quite as long as the snout; bulbous with an oblique series of four small photophores on the inner ventral aspect, and there are possibly others. Funnel long, reaching well past the base of the eyes.

Arms small and slender, their formula of relative length 3, 4=2, 1; the third pair fully three times as long as the second and fourth, which to an only less degree than the dorsals are small and weakly developed. Suckers small, in two fairly well-separated rows.

Tentacles long, much stouter and more robust than the arms; their clubs but slightly expanded, keeled, and bearing four rows of suckers, the two median of which on the expanded portion of the club are conspicuously the largest; two rows of suckers, greatly reduced in size, continuing down the distal half or two-thirds of the tentacle stalk.

Total length, 55 mm.; length of mantle (dorsal) 32 mm.

Type.—Cat. No. 338698, U.S.N.M. [S.S.B.582].

Type locality.—Surface, Station 10161, latitude 35° 27' N., longitude 73° 14' W., East of Cape Hatteras; January 28, 1914.

Remarks.—This species seems without doubt to be most nearly allied to the Chilean *P. schneehageni* Pfeffer, and may conceivably represent only an Atlantic race of the same stock, but the published descriptions of the latter indicate that certain differences exist. Chief among these are, in the Chilean species, the shorter funnel, not reaching to the base of the eyestalks, the decidedly triangular fins (although their shape as described is no doubt partly due to the conditions of preservation), the alleged distribution of suckers only along the distal third of the distinctly shorter tentacle stalks, and the relatively shorter arms, even the third pair of which is exceeded in length by the snout.

Genus POLYPUS Schneider, 1784.

POLYPUS SCORPIO, new species.

Plate 16, fig. 4.

Diagnosis.—Body small, ovate to pyriform, rounded or rounded-conic behind. Mantle opening ample, extending to a point well back of and just below the level of the pupil.

Head distinctly narrower than the body, but wide and strongly flattened; delimited from the body by a nuchal ridge, and covered by a loose, transparent skin. Eyes large and conspicuous. Funnel large, thick-walled; free only at the tip, which extends barely to the base of the ventral arms.

Arm formula 3, 2, 4, 1; dorsal arms small and slender, about a third shorter than the mantle; ventral arms but little longer; second arm pair about a fourth longer than the mantle and nearly twice as long as the dorsal arms. Third arms more than twice as long as the second pair and much larger and thicker, increasing slightly in diameter from the base to near the middle, thence diminishing gradually until at the tips they taper off quite abruptly; somewhat compressed dorso-ventrally but not keeled. First three or four suckers at base of arms in a single (sometimes weakly zigzag) row; remaining suckers in two rows, large, circular, well elevated. Umbrella thin, delicate; very short, especially between the arms of the dorsal and ventral pairs.

Surface nearly smooth, but dorsal region of body showing a very minute, scattering, granular papillation under sufficient magnification.

Color in alcohol grayish buff, except the eyes, which are dark bluish or slaty, with a golden iridescence around the pupil. Chromatophores few and scattered, the most conspicuous being a single pair near the median line on the head just in front of the nuchal region.

Total length, 22 mm.; length of mantle (dorsal) 4.5 mm.

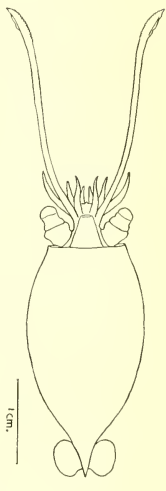
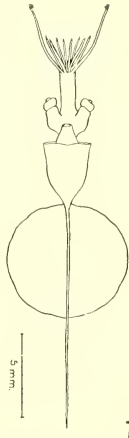
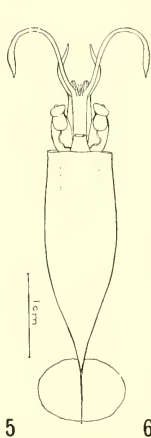
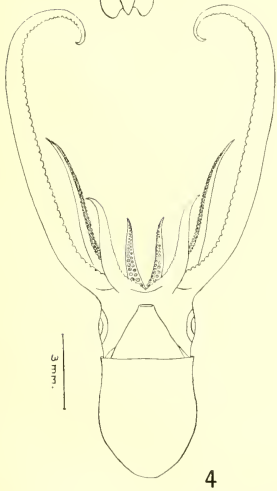
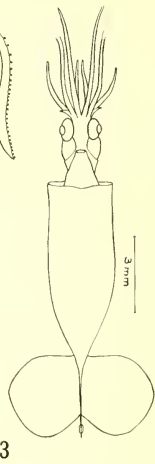
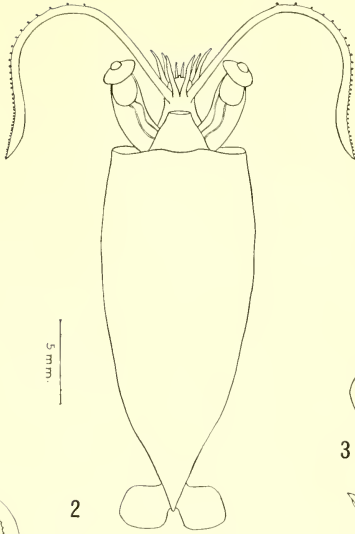
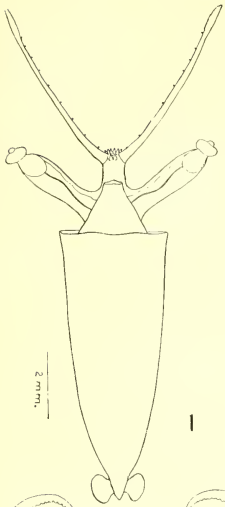
Type.—Cat. No. 338699, U.S.N.M. [S.S.B.682].

Type Locality.—75-0 m., station 10204, off Biscayne Bay, Florida; March 20, 1914.

Remarks.—The only species to which this small but very bizarre little octopus seems at all similar is the *Octopus gracilis* of Verrill (1884). The present specimens differ manifestly from Verrill's description in several particulars, notably the still greater enlargement and lengthening of the third arm pair, the relative shortness of the dorsal arms, and the minute dorsal papillation. Even though they eventually prove to be conspecific, however, it seems safe to apply a new name to the *Bache* species, as that chosen by Verrill was utilized over thirty years previously by Eydoux and Souleyet (1852), although their species is now referred to the genus *Tremoctopus*.

EXPLANATION OF PLATE 16.

- FIG. 1. *Sandalops pathopsis*. Ventral aspect of type.
2. *Sandalops ecthambus*. Ventral aspect of type.
3. *Chiroteuthoides hastula*. Ventral aspect of type.
4. *Polypus scorpio*. Ventral aspect of type.
5. *Pyrgopsis lemur*. Ventral aspect of type.
6. *Enoptroteuthis spinicauda*. Ventral aspect of type.
7. *Teuthowenia (Ascoteuthis) corona*. Ventral aspect of type.



NEW CEPHALOPODS FROM THE WESTERN ATLANTIC.

FOR EXPLANATION OF PLATE SEE PAGE 300.

