

No. 11. — *Reports on the Scientific Results of the Expedition to the Eastern Tropical Pacific, in charge of ALEXANDER AGASSIZ, by the U. S. Fish Commission Steamer "Albatross," from October, 1904, to March, 1905, LIEUT. COMMANDER L. M. GARRETT, U. S. N., Commanding.*

XIX.

Pycnogonida. BY LEON J. COLE.

During the cruise of the "Albatross" in the Eastern Pacific in 1904, pycnogonids were taken at four stations. In all there were only six specimens obtained, three of which, however, belong to a species previously undescribed. When it is recalled that the "Albatross" made explorations in this same region in 1891, it is not surprising that the other two species represented by the remaining three specimens should have been taken in the collections made at that time. A few additional notes on these two species, together with a description of the new form, are presented herewith.

Ascorhynchus agassizii SCHIMKÉWITSCH.

Pl. 1, fig. 1: Pl. 3, figs. 5, 6.

Bull. Mus. Comp. Zoöl., 1893, 25, p. 36, pl. 1, figs. 4-6; pl. 2, figs. 12, 13, 16, 17.

One female; Station 4630; Nov. 3, 1904; lat. $6^{\circ} 52' N.$; long. $81^{\circ} 42.5' W.$ (Gulf of Panama); 556 fathoms; bottom, green sand, large globules.

One female; Station 4631; Nov. 3, 1904; lat. $6^{\circ} 26' N.$; long. $81^{\circ} 49' W.$ (Gulf of Panama); 774 fathoms: bottom, green sand.

These two specimens were taken at stations not far apart, and but a comparatively short distance from the locality where the species was first found, in 1891. They are of about the same size, and agree very closely with the description given by Schimkéwitsch. His description is, however, apparently based entirely, or nearly so, upon the male, and his figures are from a specimen of that sex. The females taken in 1904 are noticeably smaller than his measurements;¹ the dorsal

¹ The specimen from Station 4631, which is slightly the larger, measures 32 mm. from tip of proboscis to tip of caudal segment, when straightened out, while the extent along the third legs is about 135 mm.

tubercles of the trunk segments and of the lateral processes are very much less pronounced, and the animals are rather less spinous throughout. Thus the proximal joints of the palp are practically smooth, and the stiff spines on the fifth joint described and figured by Schimkéwitsch (1893, pl. 2, fig. 12) appear to be lacking entirely. The ovigers are considerably shorter in proportion, while the bristles forming a tuft at the end of joint 6 are only about half as long as joint 7 instead of equalling that joint as they do in the male. Through the kindness of the authorities of the United States National Museum I have had opportunity to examine the specimens described by Schimkéwitsch, and I find that this latter difference holds in the case of the female of that lot. Otherwise the ovigers of the two sexes are nearly alike.

The eye tubercle is lower and less pointed in the specimens collected in 1904.

There are two or three discrepancies in Schimkéwitsch's description, as when he states in speaking of the joints of the leg (*loc. cit.*, p. 38), "le quatrième est une fois et demie plus long que le second." His own figure (pl. 1, fig. 4) as well as both lots of specimens I have examined show it to be fully twice as long. Again, on the same page, he arranges the third joint as intermediate in length between the fifth and sixth, which is obviously a mistake. He gives the arrangement of the joints of the leg, going from longer to shorter, as follows: 4, 5, 3, 6, 2, 7, 8, 1; the series should read, 4, 5, 6, 2, 8, 7, 1, 3. Joints 7, 1 and 3 may be nearly of the same length, but that joint 8 is longer than joint 7 is shown in Schimkéwitsch's own figure (1893, pl. 2, fig. 16).

As will be observed from what has been said above, the two specimens collected by the Eastern Tropical Pacific Expedition, differ from those described by Schimkéwitsch principally in the smaller size, the decidedly less developed dorsal protuberances, and the less pronounced spinosity of the palps. I cannot but believe, nevertheless, that they merely represent probably younger individuals of the same species, though they possess the adult characters of having the chelifori not distinctly chelate (the condition is shown in pl. 3, fig. 6), which is usually a characteristic of the young in this genus, and the genital openings¹ are plainly distinguishable in the usual position on all four pairs of legs. It is to be noted, however, that these specimens came from much shoaler water than those examined by Schimkéwitsch (556 fms. and 774 fms. as compared with 1270 fms. and 1573 fms.), and it is possible that they may represent a shoaler-water type or subspecies. I do not care, however, to name it as such on the insufficient material at hand.

Ascorhynchus agassizii is certainly very close to *A. glaber* Hoek in general appearance and proportions, and if they came from less widely separated localities I do not think I should hesitate, from the descriptions, in considering them the

¹ It is usual in this genus for the genital openings to occur on all four pairs of the legs in the female, and only on the third and fourth pairs in the male. Upon careful examination, however, of two of the males taken in 1891 and reported on by Schimkéwitsch (1893), I discovered that in one of these there is an additional genital opening situated on the second leg of the right side. No corresponding opening could be detected on the left side.

same. Since they come from such widely separated localities, however, it seems better to let the matter stand as it is, at least until specimens of the two can be compared directly. Furthermore, although Hoek (1881, p. 147) is of the opinion that *A.* (= *Scaeorhynchus*) *armatus* (Wilson)¹ is distinct, I think there can be no doubt that it approaches very closely to the species discussed above. We know far too little about the range of variation during growth and in different individuals to base very positive conclusions upon a few specimens.

Colossendeis gigas HOEK.

Pl. 1, fig. 2; pls. 3, 7.

Colossendeis gigas Hoek, Challenger Reports, 3, pt. 10, Pycnogonida, 1881, p. 61-64, pl. 8, figs. 1, 2; pl. 10, figs. 1-5.

Colossendeis gigas Schimkéwitsch, Bull. Mus. Comp. Zoöl., 25, 1893, p. 29, 30.

One small immature specimen; Station 4672; Nov. 21, 1904; lat. 13° 11.6' S.; long. 78° 18.3' W. (off Callao, Peru); depth 2845 fathoms; bottom, fine green clay, infusorian earth full of Diatoms.

This specimen, though small, agrees very closely with the description of *C. gigas* given by Hoek.

Schimkéwitsch considered *C. gigas* Hoek to be specifically identical with *C. colossea* Wilson (1881, p. 244). That being the case he should have employed the latter name for the species instead of the former, since Wilson's description has priority of publication. Hoek himself (1881, p. 147) noted the resemblance of the two and suggested that they might be identical. Loman (1908, p. 21) discusses the question and is of the opinion that they may be local varieties of a widely distributed deep-sea species. I have compared *C. colossea* from the North Atlantic with the two specimens taken upon the "Albatross" Expedition of 1891 and reported upon by Schimkéwitsch (1893), as well as with the small specimen taken in 1904. The most constant difference appears to be in the proportion of the legs, which are about five times the length of the body (including proboscis and caudal segment) in the Atlantic specimens, and only four times the length of the body in those from the Pacific. Furthermore, the first tibial joint is about equal in length to the femur in the former, whereas it is shorter (by about the length of the third coxal joint) in the latter. There may be other minor differences, but it is difficult to determine their constancy from a small series of specimens. In the characters mentioned the Gulf of Panama specimens agree more closely with the description of *C. gigas* Hoek than do the North Atlantic specimens. For this reason I have retained the name of that species and referred them to it, thus following the course of other recent authors in leaving it distinct from *C. colossea*, though I have little doubt that future collections will reveal intergrading forms, making it necessary to reduce *C. gigas* to subspecific rank.

¹ Wilson (1881, p. 248).

Colossendeis cucurbita, sp. nov.**Pl. 2, figs. 3, 4; pl. 3, fig. 8-12.**

Three specimens (two large and one small) from Station 4647; Nov. 9, 1904; lat. 4° 33' S.; long. 87° 42' 30" W. (approximately midway between Aguja Point, Peru, and the Galapagos Islands); depth 2005 fathoms; bottom light gray and brown Globigerina ooze.

Type. — Collection U. S. National Museum.

Specific diagnosis. — Closely related to *Colossendeis gigas*, but proboscis with an upward curve, and fourth joint of palp longer than second.

Description. — Trunk moderate for the genus, possibly a little more slender than in *C. gigas* and *C. colossea*; no trace of external segmentation. Lateral processes short, considerably shorter than width of trunk; well separated, the spaces between them only a little less wide than the processes; broader distally, and separated from the trunk by a distinct furrow. Across the dorsal surface of the trunk, starting even with the anterior edge of the first lateral processes, is a distinct, broadly V-shaped groove, with its convexity directed posteriorly. This groove marks off the anterior part of the first trunk segment from the remainder of the trunk, which is nearly evenly cylindrical, except that its diameter is greater, both laterally and dorso-ventrally, opposite the second and third lateral processes. This anterior part, or "head," is, however, even broader than the trunk behind it, but is narrowed anteriorly so that its sides are convex, thus giving it a rounded outline as viewed from above. Ventro-anteriorly it is produced slightly for the attachment of the palps and ovigers. Viewed laterally this "head" portion is seen to be bent downward slightly, so that the axis of the proboscis, which arises directly from its anterior end, is depressed at a slight angle from the horizontal plane of the body.

Caudel segment directed straight backward in the plane of the body. There is a distinct articulation at its point of juncture with the trunk. Length equal to that of the first two coxal joints of the third legs; as these joints are somewhat shorter in the fourth legs, its tip reaches a little beyond the distal end of the second coxal joint of that pair. Shape slender, slightly clavate, the distal end turned somewhat upward; greatest diameter considerably less than that of the palps.

Eye tubercle a low, rounded, transverse ridge situated just forward of the middle of the "head." Ocelli two, small, round, widely separated; they are marked by a brown pigment which makes them distinctly visible.¹

Proboscis one and one-half times as long as the trunk and caudal segment combined; as stated above, it arises directly from the anterior face of the first trunk segment, but is directed slightly downward from the horizontal axis of the trunk. Proximally it is narrow, the breadth being about equal to that of the trunk between the third lateral processes; this diameter remains nearly constant for about a third of the length, when it expands to nearly double; in its distal third the pro-

¹ They are much less conspicuous in the small specimen.

boscis again narrows, but remains considerably thicker than the proximal portion, and at the tip it again expands to a diameter only a little less than that of the middle third. The distal portion has a distinct upward curve. The proboscis as a whole may then be divided into three parts: the proximal third is narrow and cylindrical; the middle third forms an expanded bulb of greater diameter than any part of the trunk; while the remaining third is narrower again, curves slightly but distinctly upward, and is expanded at the tip, which is composed of three blunt lobes and is terminated by the triangular mouth. The general shape of the proboscis resembles somewhat certain elongated gourds or squashes, and this has suggested the specific name.

Palps but little longer than the proboscis; when extended the distal end of the sixth joint comes even with the end of the proboscis. First and second joints short and knob-like; the first really somewhat triangular as seen from the side, being broader distally; the second short and disc-like. Third joint slender, very slightly less than one-third the length of the proboscis; expanded considerably at the distal end. Fourth joint nearly as broad as this expanded end of the third, and only about as long as broad. Fifth joint somewhat over half again as long as third; of about the same diameter as that joint proximally, but gradually expanding toward the distal end. Joint six about twice as long as four; joint seven one and one-half times six, or in other words, equal to the lengths of joints four and six combined, but of distinctly smaller diameter; eighth joint very small; ninth a little longer; tenth very slender and equal in length to eight and nine taken together. The proximal parts of the palp are smooth, but the distal part of joint six and joints seven to ten are provided with numerous short, stiff hairs.

Oviger somewhat longer than the entire body (tip of proboscis to tip of caudal segment). First three joints short, rounded, and arising directly behind the origin of the palps from a process of the trunk which is almost as large as one of the coxal joints of the appendage. The fourth joint is long and slender, but gradually increases in diameter toward its distal end. The length of these four joints, together with that of the process from which the appendage arises, is almost exactly equal to the length of the proboscis. The fifth joint is short, its length being equal to that of joints $1 + 2 + 3$. The sixth joint resembles the fourth in shape, but is slightly longer, being equal in length to joints $2 + 3 + 4$. The remaining joints are short and coil closely around in a little spiral, the terminal joint thus overlapping joint seven on its mesial side, as shown in Fig. 9. Joint seven is about three-fourths the length of joint five; the succeeding joints decrease gradually in length and diameter to the small terminal claw which constitutes the eleventh joint of the appendage. The oviger is armed only by a series of three or four rows of rather simply "denticulate" spines on the outer curvature of joints seven to ten, and a few minute stiff spines on the outer side of these same joints and extending along the opposite side of joint six.

Legs about three times the length of the entire body from tip of proboscis to tip of caudal segment; they vary somewhat, the second pair being the longest, the third pair a little shorter, followed by the fourth pair, the first pair being the

shortest of all. The three coxal joints short, each being about as long as broad, and somewhat longer than the lateral process; the three together equal half the length of the trunk proper, from the base of the proboscis to the base of the caudal segment. Femur slender, slightly curved, somewhat longer (in the second legs) than the length of the body; first tibial joint equals the femur in length, more slender, but not tapering; second tibial joint a trifle over two-thirds the length of the first, and tapering evenly toward its distal end. The tarsal joints are short, the first being about equal to the length of the coxal region, and the second slightly more than half the length of the first; both are practically straight, and are armed only with a slight projection ventrally at their distal ends. The claw is small, scarcely over a fourth the length of the second tarsal joint, and stout for its length. Auxiliary claws wanting.

On the ventral side of the second coxal joint, is a low transverse prominence. This is somewhat more pronounced on the third and fourth legs, where the small genital apertures are situated, not at the very top, but upon its proximal face. The genital apertures were plainly distinguished in the two larger specimens, which dissection showed to be females, but could not be made out in the small individual, the sex of which was not determined.

The body and appendages, except as noted in the above description, are entirely smooth. The two larger specimens are a light straw-color (in alcohol); the smaller one is lighter. Under the microscope the integument has a granular appearance, due to its being marked everywhere by minute irregular whitish dots.

Measurements in Millimeters.

Specimen	Sex	Proboscis	Trunk	Caudal segment	Total length	Palp	Oviger	First leg	Second leg	Third leg	Fourth leg
<i>a</i> (type)	♀	27	15	5	47	34	62	131	145	140	135
<i>b</i>	♀	25	13	4	42	32	58	128	138	134	130
<i>c</i>	?	16	10	3	28	23	38	87	97	91	88

Attached to the legs of one of the larger specimens (specimen *b*) were a half-dozen curious capsules, which I judge are similar to those found by Hoek (1881, p. 65 and 143) on three specimens (two females and a male) of *Colossendeis leptorhynchus*. These bodies are 2 to 2.5 mm. in diameter, and more or less hemispherical in shape (pl. 3, fig. 12). There arises excentrically from the flatter side a short stalk by which they are fastened to the legs of the pycnogonid. The interior contains a quantity of whitish flocculent material, among which are small bodies 0.07–0.1 mm. in diameter, which appear to be eggs. Sections of this poorly

preserved material gave an appearance similar to that described by Hoek. Whereas Hoek describes his specimens as being "sprinkled over" with these bodies, they have in the present instance a peculiarly regular arrangement, a pair being attached close together near the proximal end of the femur of three different legs, viz., the second and third legs of the right side and the third left leg (pl. 3, fig. 11). This arrangement would appear to suggest either that it is difficult for the animal to reach this particular part of the leg in order to clean it, in case the capsules are not to be considered as pertaining to the species, or else that this is the regular position for the attachment of the egg capsules of the pycnogonid itself. It is a singular fact that the external egg masses appear to be unknown in this genus, and Hoek discusses the possibility that these capsules may be the form they take in these animals. He considers this view as improbable, however, and calls attention to the fact that they occur on both sexes, whereas it is the almost universal rule among the Pycnogonida (a single known exceptional instance) that the eggs are carried by the male upon his ovigers.

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