

GINGLYMOSTOMATIDÆ.

37. *Ginglymostoma cirratum*.—*Nurse Shark*.

A large specimen (No. 23651), about nine feet long, in salt, was sent by Dr. Velie.

NOTE.—The following new species are described in this paper:

Diapterus homonymus, Goode & Bean.

Batrachus tau (Linn.), Cuv., subsp. *pardus*, Goode & Bean.

Hemulon fremebuudum, Goode & Bean.

Rhypticus pituitosus, Goode & Bean.

Atherina Velicana, Goode & Bean.

Engraulis hiuleus, Goode & Bean.

Sphagebranchus scuticaris, Goode & Bean.

UNITED STATES NATIONAL MUSEUM,

Washington, December 31, 1879.

NOTICE OF A NEW SPECIES OF THE 'WILLEMOSIA GROUP OF CRUSTACEA' (RECENT ERYONTIDÆ).

By SIDNEY I. SMITH.

Among the very interesting collections of marine invertebrate animals made during the past two years by the fishermen of Gloucester, Mass., and presented to the United States Fish Commission, for the National Museum, there are two species of podophtalmous Crustacea of peculiar interest. One of these is a remarkable Paguroid which I have already described (*Trans. Connecticut Acad.*, v, p. 50, 1879), but of which several additional specimens have been received since the description was published: the other, which is the subject of this notice, belongs to the "Willemoesia group of Crustacea," first brought into prominent notice by the researches in connection with the Challenger Expedition. Of the latter species I have seen only a single specimen, which was taken at a depth of 250 fathoms, off the coast of Nova Scotia, southeast of Sable Island, latitude $43^{\circ} 10'$ north, longitude $61^{\circ} 20'$ west, by Captain Thomas Olsen, of the schooner *Epes Tarr*. This specimen is not in very good condition, having been dried (probably after being taken from the stomach of some fish, though there is very little evidence of digestion having begun), and the internal organs consequently destroyed, but it is still sufficient to throw considerable light upon the structural peculiarities of the group to which it belongs, and on this account particularly I am induced to publish a special notice of it.

Of the three genera into which Bate* has recently separated the forms of the "Willemoesia group," our species should unquestionably be referred to *Pentacheles*, but, on account of the at present uncertain

* On the Willemoesia Group of Crustacea. < *Annals and Magazine Nat. Hist.*, V, ii, pp. 273-283, pl. 13, 1878.

tenure of these genera,* I prefer to refer it provisionally to Heller's genus *Polycheles*.† It is apparently very distinct from any of the Atlantic species described by Heller, Willemoes-Salm,‡ or Bate, but, judging from the very short descriptions given by the last author, it appears to be very closely allied to his *Pentacheles auriculatus* obtained by the Challenger Expedition off the Fiji Islands. In fact I am not able to point out any characters by which the two forms could be distinguished, but, in view of their wide geographical separation, I take it for granted that they are distinct species, and that it would be easy to point out specific characters were Bate's species fully characterized.

Polycheles sculptus, sp. nov.

Male.—The sides of the carapax are nearly parallel posteriorly, but arenately convergent anteriorly, and the greatest breadth is just in front of the cervical suture, and is about three-fourths of the length along the median line. As seen from above, the anterior margin is concave in outline, so that the lateral angles, which are acute and spiniform, are much in advance of the rostrum, which is armed with two spines close together and projecting obliquely upward and forward. About a third of the space between the median line and the lateral angle each side is occupied by a very deep orbital sinus nearly parallel with the lateral margin, considerably deeper than broad, somewhat narrowed and evenly rounded posteriorly, and completely filled by a large ophthalmic lobe (figure 1, *e*). On the inner side of this sinus the frontal margin projects in a small spiniform tooth, but outside, the margin is unarmed and curves regularly to the lateral angle. Just behind the orbital sinus there is a smooth and evenly curved depression in the surface of the carapax exposing a small area on the posterior part of the ophthalmic lobe, more fully described beyond. The cervical suture divides the dorsal surface of the carapax into two pretty nearly equal portions, and is deep and conspicuous, but is indicated in the lateral margin, each side, by a slight emargination only, which is scarcely deeper than the emargination between the anterior and posterior lobes of the hepatic region. The lateral margin is armed, on the anterior lobe of the hepatic region, with (including the anterior angle) six small and slender spiniform teeth directed forward, and on the posterior lobe with three more. The lateral margin, behind the cervical suture, is armed with seven similar teeth

* NORMAN.—“On the Willemoesia Group of Crustacea.” < Annals and Magazine Nat. Hist., V, ii, pp. 382-385, 1878.

† BATE.—On the Willemoesia Group of Crustacea. < Annals and Magazine Nat. Hist., V, ii, pp. 484-489, 1878.

NORMAN.—Remarks on recent Eryontiæ. < Annals and Magazine Nat. Hist., V, iv, pp. 173-182, 1879.

‡ Beiträge zur näheren Kenntniss der Macrouren. < Sitzungsberichte Akad. der Wissenschaften, Wien, math.-nat. Classe, xlv, Abth. i, pp. 389-393, pl. 1, figs. 1-6, 1862. Die Crustaceen des südlichen Europa, pp. 209-212, pl. 7, figs. 1, 2, 1863.

§ On some Atlantic Crustacea from the Challenger Expedition. < Trans. Linnæan Soc. London, II, i, pp. 50-56, pls. 12, 13, 1875.

which become successively more remote posteriorly. There is a slight median carina extending the whole length of the carapax, and armed, behind the two rostral spines, first with a single small spine directed forward, then with two, side by side and very close together, then with one, then with two on the posterior edge of the cervical suture, then with two more, and finally with two somewhat larger and more widely separated spines projecting forward from the anterior edge of the broad and prominently raised posterior margin. In front of the cervical suture there is an irregular longitudinal dorso-lateral line of five minute spines each side, and back of these a single spine each side on the posterior edge of the cervical suture. Extending from the posterior margin nearly to the cervical suture, there is a sharp sublateral carina parallel to the lateral margin, about a third of the way from it to the median carina, and armed with five small spines on one side and six on the other. The extra spine is on the left side, and next to the last in the series, but is accidentally omitted in figure 5.

The ventral regions of the carapax are inflected each side at a very acute angle with the dorsal surface, and, the sternum being narrow in front, the ventral regions are very broad in the middle, being broadest opposite the bases of the first and second pereopods. The ventral region each side is divided longitudinally into three approximately equal parts by two prominent carinæ; the outer carina (marking the pleurotergal suture?) extends from the anterior margin at the base of the antenna, in a slightly sinuous line, toward the postero-lateral margin of the carapax; the anterior half is very prominent and armed with numerous small spines directed outward, while the posterior half is much less conspicuous, unarmed, and disappears entirely before reaching the posterior angle of the carapax. The inner carina extends along the branchial region from near the base of the first pereopod quite to the postero-lateral angle of the carapax; the extreme anterior portion is not prominent, but from opposite the third pereopod posteriorly it is very prominent, acute, and armed with ten to fifteen sharp spines. The outer of the three longitudinal regions thus marked out is divided transversely by the cervical suture, and the anterior portion (subhepatic region) is divided transversely into an anterior and a posterior lobe by a groove nearly or quite as conspicuous as the cervical. In the frontal margin of this anterior lobe (figure 2), and near its inner side, there is a deep sinus corresponding to the orbital sinus of the dorsal surface, but not quite as wide, and open nearly to the dorsal surface, except where it is crossed by a protuberance from the ventral portion of the ophthalmic lobe (c, figure 2).

On the upper surface of the carapax, the orbital sinus, each side, is completely filled by the dorsal part of the ophthalmic lobe, of which the anterior margin is slightly concave in outline and continuous with the anterior margin of the carapax, but has a small tubercle near the middle. The dorsal surface of the lobe is smooth, calcareous and opaque,

and on a level with the adjacent surface of the carapax except posteriorly, where a small oval area of the extremity of the lobe is exposed by a depression in the carapax. This oval area is thin, semitranslucent, and not calcareous, and has every appearance of being a true corneal area, although I am unable to detect any evidence of facets. The carapax along the margins of the sinus is in close contact with the ophthalmic lobe but is not really connected with it. From the lower portion of each ophthalmic lobe there is an elongated, cylindrical and somewhat conical, but obtuse and pointed, protuberance, of which the base rests in a transverse groove in the base of the antenna, while the terminal portion extends well across the open, ventral side of the orbital sinus. Upon the obtuse extremity of this protuberance there is a nearly circular area similar to the cornea-like area at the posterior extremity of the dorsal part of the lobe.

Unfortunately the specimen is not in sufficiently good condition to enable me to determine positively in regard to the structure of these cornea-like areas, but that they are connected with the optic nerves and are sensitive to light there is, I think, no chance for reasonable doubt. While it seems probable that all four of these areas are really faceted like the eyes of ordinary Podophthalmia, it is possible that they may be large, simple, or nearly simple eyes, like the eyes of some Amphipoda and Cumacea. The division of the ophthalmic lobe each side into two or more "eyes" has not, I think, before been noticed among the Decapoda, and is certainly an interesting fact in morphology, but it is apparently not a character of much systematic or phylogenetic value. Among the Schizopoda, the lamellar expansion of the ophthalmic lobes in *Amblyops*, and their broad expansion and partial union in *Pseudomma*, are quite as remarkable and apparently somewhat similar modifications; and *Ampelisca* and *Biblys*, among the Amphipoda, are cases in which there are two simple eyes each side, while in the closely allied *Haploops* the number apparently varies in the different species.

The peduncles of the antennulae (figures 1, 2) are very stout, being stouter even than the peduncles of the antennae. The basal portion of the proximal segment is longer than the two distal segments, is armed on the distal portion of the outer margin with two spiniform teeth, and the inner side is broadly expanded and prolonged into an acute scale-like appendage upturned and densely ciliated along the inner margin, and extending considerably beyond the distal segment and nearly as far as the tip of the antennal scale (*b*, figure 2). The second and third segments are subcylindrical, and, as seen from above, are each about as broad as long, the second being somewhat larger than the third. The inner or major flagellum is about as long as the carapax. The minor flagellum is about as long as the peduncle of the antenna, about half as thick as the base of the major flagellum, of nearly uniform thickness for two-thirds its length, then tapers rapidly to a very slender tip, and is thickly ciliated along the inner margin distally.

The three first segments of the peduncle of the antenna are very short, the three together being scarcely longer than the fifth segment. The first segment is loosely articulated with the sternum of the antennal segment, so as to be freely movable upon it; it is very short upon the outside, but expands somewhat on the inner side, which terminates distally in a thin tubular process (*a*, figure 2) arising from the oral side of the segment and directed upward to a level with the dorsal side so that, in the ordinary position of the appendages, its orifice is closed by contact with the first segment of the peduncle of the antennula. This tubular process readily admits a large bristle which can be pushed through it round into the cavity of the segment itself. It undoubtedly contains the canal of the green gland. The second segment is small, closely united with the third, and bears upon its outer side a slender scale-like appendage (*a*, figure 1) which reaches nearly to the tip of the peduncle, is about five times as long as broad, and thickly ciliated along both edges. The third segment, as seen from below, is almost wholly internal to the second, and is armed on the distal part of the inner margin with a small spiniform tubercle. The fourth and fifth segments are subcylindrical, the fourth is slightly longer than the fifth, and both are ciliated each side. The flagellum is about as thick at base as the major flagellum of the antennula, but tapers rather more rapidly and is probably considerably shorter.

The buccal opening is nearly square. The branchiostergites extend forward quite over the sternum of the antennary somite, and their anterior extremities are applied to the basal segments of the antennæ, which, however, are freely movable upon the antennary somite. The epistome is short, not extending at all in front of the bases of the antennæ, is nearly on a level with the dorsal wall of the efferent passages from the branchial chambers and on a plane above the bases of the antennæ, so that the efferent passages terminate in the space between the upturned edges of the squamiform processes of the inner sides of the basal segments of the antennulæ and just beneath the short two-spined rostrum. In the middle of the slightly raised and regularly arcuate posterior edge of the epistome there is a slight elevation with a tuft of hairs, as described and figured by Willemoes-Suhm in *Willemoesia leptodactyla*. The anterior part of the endostome is on a plane somewhat above the plane of the epistome, but the space below is filled by the soft and fleshy labrum which projects considerably below the raised posterior edge of the epistome, and does not differ essentially from the labrum in Astacidae or Scyllaridae.

The mandibles are apparently wholly without molar areas, and expand into very broad and thin lamellæ sharply serrated along the cutting edges. The mandibular palpus is short and apparently composed of only two segments, the distal being shorter than the proximal. There may be an additional short basal segment, which I am unable to discover without injuring the specimen, so that the palpus may prove to be triarticulate.

The lobes of the metastome (labium) are very narrow and widely separated at base.

The two lobes of the first maxilla are very much as described and figured by Willemoes-Suhm in *Willemoesia leptodactyla*, the two lobes being very slender and strongly incurved, the anterior being the larger and having at its base a minute rudimentary appendage.

The second maxilla has two small and very slender endognathal lobes and a very large scaphognath, the anterior, or exognathal, portion of which reaches nearly forward to the base of the antenna.

The inner or endognathal lobes of the maxilliped are small and rudimentary, but there is a very large and terminally bilobed lamella, apparently representing the exognath, which extends forward considerably in front of the epistome, where its terminal lobes are somewhat upturned and serve as the lower wall of a tube from the efferent branchial opening. This lamella is continuous posteriorly with the very large epignath which extends far back into the branchial chamber.

Both pairs of gnathopods are apparently entirely without exognathal or epignathal branches. The first pair (second maxillipeds) reach scarcely beyond the ischia of the second pair, and the three distal segments are very short, the carpus being narrow at base but expanded and somewhat flattened distally, while the propodus and dactylus taken together form a conical tip much shorter than the carpus.

The second pair of gnathopods (external maxillipeds) are very slender, ciliated but unarmed with teeth or spines, and, when extended, reach nearly to the distal ends of the peduncles of the antennule. The ischium is about as long as the three succeeding segments and only a little stouter than the merus, which is a little more than half as long, and the three distal segments are subcylindrical, of about equal length, and taken together are about as long as the merus.

The terminal portion of each of the first pair of pereopods is wanting in the specimen examined, but the one on the left side is perfect to near the distal end of the merus. The coxa is very stout, far stouter than the succeeding segments. The basis is completely ankylosed with the ischium, which reaches to the tip of the second gnathopod, is much expanded distally, but at the same time very much compressed dorso-ventrally, and is smooth and naked. The portion of the merus which is still present is about 20^{mm} long, is smooth and compressed like the ischium, is of equal width with the ischium where it articulates with it, but is slightly expanded for about half its length, then slightly narrowed distally, and is armed near the middle of the outer edge with two small spines.

The second pereopods (figure 3) are slender, densely ciliated along the edges, and reach to the tips of the peduncles of the antennae. The basis is ankylosed with the rather short ischium. The merus is considerably longer than the ischio-basis and reaches to the edge of the carapax. The carpus is a little shorter than the merus. The basal part of the propodus is a very little longer than the carpus, and is flattened

and somewhat expanded distally, where it is fully a third as broad as long; the digital portion is very slender, nearly as long as the basal portion, nearly straight to the slender, acute, and chitinous tip which is strongly curved, and the prehensile edge is thin and very minutely serrate. The dactylus is almost exactly of the same form as the digital portion of the propodus, and its prehensile edge is armed in the same way, but the cilia upon the outer edge are much longer than on the corresponding part of the propodus.

The third and fourth pairs of pereiopods are successively a very little shorter than the second and have very nearly the same form. From the coxal to the meral segment they are very nearly as stout as in the second pair, but the three distal segments are much more slender. The basal part of the propodus is subcylindrical and only very slightly expanded and flattened distally, while the digital part and the dactylus are equal in length, very slender and weak, straight throughout, without incurved or chitinous tips, and densely ciliated along the prehensile edges.

The fifth or last pair of pereiopods (figure 4) are considerably shorter and more slender than the fourth, and all the segments except the propodus and dactylus have very nearly the same relative proportions as in that pair. The basal portion of the propodus is a little longer than the carpus, subcylindrical and slightly tapering distally; the digital portion is about as long as the proximal thickness of the propodus, very slender, and tapers to a rounded tip. The dactylus is fully twice as long as and much stouter than the digital part of the propodus, and straight and subcylindrical.

As seen from above the sides of the pleon are nearly straight, and form, with the telson, a regular acute triangle. The first five segments are carinated dorsally, and the carina projects forward from each segment in an acute tooth, but the carina and tooth are small and low on the first segment, increase rapidly to the fourth, while on the fifth they are scarcely as prominent as on the fourth, and on the sixth the carina is inconspicuous and there is no tooth, but the top of the carina is traversed by a narrow longitudinal sulcus. On the first segment there are, in addition, two slender spines each side projecting forward above the articulations with the carapax. The dorsal surface of the pleon, either side of the median carina, is smooth and scarcely at all sculptured, but along the lateral margin, where the pleura bend abruptly and nearly perpendicularly downward, there is a series of deep longitudinal sulci, except upon the narrow first segment, which is unsculptured, and upon the sixth, where the sulcus is replaced by a simple carina. Of the pleura themselves, the first is nearly obsolete, the second is broader than deep, projecting back over the third with a broadly rounded margin, and forward in a prominent but rounded angle, and has a central circular depressed area; the succeeding pleura decrease regularly in size posteriorly, scarcely overlap when the abdomen is extended, are convex in outline posteriorly but straight or slightly concave anteriorly, and the third, fourth, and fifth are ornamented with a median curved

carina extending two-thirds of the length, but not well marked upon the fifth.

The telson is pretty regularly triangular, about twice as long as broad, is convex and slightly grooved longitudinally above, and terminates in an acutely rounded tip unarmed with spines. The lamellæ of the uropods scarcely reach the tip of the telson; the outer is nearly as broad as long, regularly rounded in outline, and stiffened by two slightly diverging ribs in addition to the thickening of the outer margin; the inner lamella is stiffened by a single median rib, is nearly twice as long as broad, the lateral margins are approximately straight and parallel, and the tip is regularly rounded in outline.

The first pair of pleopods are about 15^{mm} long with an imperfect articulation at about a third of the way from the base to the tip; the basal portion is somewhat triquetral, and the terminal portion expands into a smooth, naked, and thin lanceolate lamella slightly concave posteriorly. The second pair of pleopods are about 24^{mm} long, and the base and lamellæ are of about equal lengths. The lamellæ are narrow, lanceolate, and thickly ciliated along the edges; the inner lamella is slightly broader than the outer, and bears the two styliform processes usually characteristic of males among the *Macrura*. These styliform processes are about 3^{mm} long, and arise together at about a third of the way from the base to the tip of the lamella; the inner, like that upon the three succeeding pairs of pleopods, arises from the slightly thickened inner edge of the lamella, is ridged, of nearly equal width to the rounded tip, and nearly naked except a line of cilia along the posterior margin. The outer process arises just in front of the inner, and its base is at a right angle to that of the outer; it is more slender than the outer, tapers distally, and is ciliated on both edges and on the anterior surface. The three succeeding pairs of pleopods are similar to those of the second pair, but are successively a little shorter, and they want the outer of the two styliform processes on the inner margin of inner lamella.

The single specimen examined affords the following measurements:

	mm.
Length from front of carapax to tip of telson	92
Length of carapax along median line	39
Length of carapax between extremities of lateral margin.....	45
Breadth between lateral spines of anterior margin.....	20
Breadth between postero-lateral angles (about).....	22
Greatest breadth (in front of cervical suture).....	30
Length of first pereopod to near distal end of merus.....	40
Length of second pereopod.....	33
Length of fifth, or last, pereopod.....	20
Length of peduncle of antennula.....	9
Length of major flagellum	45
Length of minor flagellum	13
Length of peduncle of antenna.....	12
Length of antennal scale.....	9
Length of flagellum (at least)	30
Length of pleon.....	53
Length of telson	16

PLATE VII.

POLYCHELES SCULPTUS.

Fig. 1, dorsal view of the anterior portion of the right side of the carapax: *a*, antennal scale; *b*, proximal segment of antennula; *c*, ophthalmic lobe.

Fig. 2, ventral view of the anterior portion of the right side of the carapax: *a*, tubular process containing the canal from the green gland; *b*, process of the ophthalmic lobe; *c*, base of the first pereopod.

Fig. 3, terminal portion of the second pereopod of the right side.

Fig. 4, terminal portion of the fifth pereopod of the left side.

Fig. 5, dorsal view of the entire specimen.

Fig. 6, lateral view of the pleon.

(Figs. 1 to 4 from drawings by S. I. Smith; Figs. 5 and 6 from drawings by J. H. Emerton.)

Fig. 5.

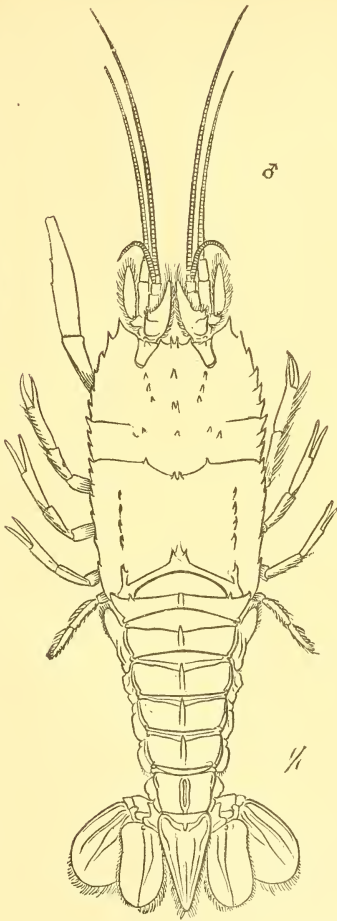


Fig. 1.

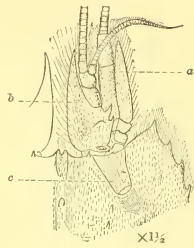


Fig. 2.

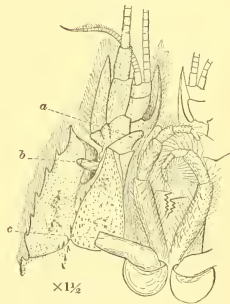


Fig. 3.



Fig. 4.

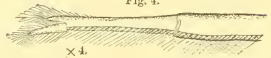
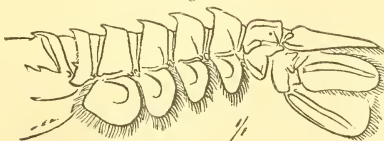


Fig. 6.



POLYCHELES SCULPTUS.



Owing to the imperfections of the descriptions of the species of the "Willemoesia group," already known, it is useless to attempt to point out which of the characters above alluded to are common to all the species or only specifically or generically (if there be more than one genus among the species now known) characteristic.

In regard to the openings of the green glands it may be well to notice that Willemoes-Suhm was unable to discover them in *Willemoesia leptodaetyla*. He might easily have overlooked them, however, if they were, as is probable, situated as in our species. One of Bate's figures of *Pentacheles anthrax* (Annals and Mag. Nat. Hist., V, ii, pl. 13, fig. 2, 1878) apparently shows the tubular process just as it exists in our species, although I find no reference to it in the accompanying text. Bate subsequently, however, appears to allude to this same process as "the olfactory tubercle of the second or outer antenna," though I cannot find that he anywhere alludes to Willemoes-Suhm's inability to discover the openings of the green glands.

NEW HAVEN, CONN., December 30, 1879.

DESCRIPTIONS OF SOME GENERA AND SPECIES OF ALASKAN FISHES.

By TARLETON H. BEAN.

The collections of the United States National Museum contain many Alaskan fishes, two of which are here described as new to science.

Cottus polyacanthocephalus Pallas.

This species has some points in common with *Boreocottus axillaris* Gill. I cannot find, in the description of the genus *Boreocottus*, anything to separate it from *Cottus*. The specimens here described are numbered 23499 in the Museum register. They were collected at Unalaska, by Mr. William H. Dall, and were catalogued in his notebook at No. 900.

LIST OF SPECIMENS.

- 23499 a. Length 185 millimeters without caudal.
D. X, i, 14; A. 13; V. I, 3; P. 18.
- 23499 b. Length 138 millimeters without caudal.
D. X, i, 13; A. 11; V. I, 3; P. 18.
- 23499 c. Length 142 millimeters without caudal.
D. X, i, 14; A. 12; V. I, 3; P. (right) 18, (left) 16.

DIAGNOSIS.

B. VI. D. X. I, 13 to 14. A. 11-13. V. I, 3. P. 18.

Two small spines above the snout; one above each orbit, with four obscure ones behind it. A pair of small spines on the occiput. Three