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XXXIX.—*On Barnacles of the Genus Megalasma from Deep-sea Telegraph-Cables.* By W. T. CALMAN, D.Sc.

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THE specimens here discussed form part of the collections from telegraph-cables of which particulars were given in my paper "On Barnacles of the Genus *Scalpellum*"*. Some are from localities mentioned in the list of cable-ships given in that paper, but there are also specimens from the vicinity of Zanzibar (C./S. 'Sherard Osborn'), the Java-Australia and the Victoria-Tasmania cables (C./S. 'Recorder'), the Tasman Sea (C./S. 'Patrol'), and the coast of Cuba (probably from a cable).

The species are all referred to the genus *Megalasma* of Hoek †, as re-defined by Pilsbry ‡. It is distinguished from *Pacilasma* by "the shape of the carina, which is enlarged at the sides toward the base, with a concave plate inside." This inner plate, however, does not always terminate above in "two stout teeth," and the peduncle is sometimes far from "very short" as in Pilsbry's definition.

All except one of the species may further be included in

* Ann. & Mag. Nat. Hist. (9) i. p. 96 (1918).

† Rep. 'Challenger' Cirripedia, 1883, p. 50.

‡ Bull. U.S. Nat. Mus. lx. 1907, p. 87.

Pilsbry's subgenus *Glyptelasma*, the characters of which I have already discussed*. It is distinguished from *Megalasma*, s. str., by the fact that the basal margin of the scutum forms a distinct angle with the chord of the occludent margin, whereas in *Megalasma* the two are in line or nearly so. In the species referred to *Megalasma* also the valves are more strongly sculptured than they are in the species of the subgenus *Glyptelasma*.

Annandale's *Pæcilasma* (*Glyptelasma*) *gigas* is in some respects the least typical species of the genus. The expanded sides of the carina are less marked in external view than in the other species, and Annandale was so far justified in regarding it as forming a transition to the genus *Pæcilasma*.

As I have already pointed out, there is great diversity as regards the so-called "filamentary appendages" in the species referred to *Glyptelasma*, and the specific differences to be observed in the disposition of these appendages are in some cases more striking than those exhibited by the valves of the shell. In many species, however, these structures have not yet been examined.

Genus MEGALASMA, Hoek.

Subgenus MEGALASMA, s. str.

Megalasma (*Megalasma*) *minus*, Annandale.

Megalasma striatum, subsp. *minus*, Annandale, Ann. & Mag. Nat. Hist. (7) xvii. 1906, p. 399; id. Illustr. Zool. 'Investigator,' Crust. Entom. pl. i. fig. 8 (1907).

Pæcilasma bellum, Pilsbry, Bull. Bur. Fisheries Washington, xxvi. 1907, p. 183, pl. iv. fig. 6.

Megalasma minus and *M. bellum*, Pilsbry, Proc. Acad. Nat. Sci. Philadelphia, lix. 1907, p. 409, figs.

Megalasma lineatum, Hoek, 'Siboga' Exp., Cirripedia Pedunculata, 1907, p. 31, pl. iv. figs. 1-8.

Megalasma minus, Race I. and Race II. (*M. bellum*), Annandale, Mem. Indian Mus. ii. 1909, p. 96.

Locality.—Lat. 6° 58' S., long. 39° 16' E. (near Zanzibar), 270 fath. C./S. 'Sherard Osborn.' About 20 specimens.

Remarks.—The specimens are of relatively large size (up to 14 mm. capitular length); the scutum is less than twice as long as wide; the lateral border of the peduncular foramen, seen from the side, is straight; the proximal angle of the mandible is very distinctly forked; the middle segments

* Ann. & Mag. Nat. Hist. (9) i. p. 407 (1918).

of the posterior cirri have four large pairs and one small pair of anterior spines. In all these characters the specimens agree with Pilsbry's description of the form which he calls *M. bellum* and which Annandale regards as a local race of his *M. minus*. On the other hand, the base of the carina in our specimens, while varying somewhat in shape, is squarely truncate, with the lateral angles more or less produced and acute, and, although without a median tooth, agrees rather better with Pilsbry's figure of the carina of *M. minus*. Further, a specimen of *M. minus* received from the Indian Museum in 1906, and presumably one of the syntypes, has the scutum distinctly less than twice as long as broad, and therefore disposes of the sole character which Annandale retains as distinctive of the species or race.

Subgenus GLYPTELASMA, Pilsbry.

Key to the Species of the Subgenus Glyptelasma *.

- A. Carina projecting well below scutum, the basal margins of the two valves meeting at an angle as seen from the side.
 - a. Basal margin of carina, seen from the side, as long as that of scutum *M. gracile* (Hoek), with [subsp. *gracilius*, Pilsbry.
 - b. Basal margin of carina, seen from the side, shorter than that of scutum †.
 - a. Carina transversely expanded at the base. [No filamentary appendages.] . *M. gigas* (Annandale).
 - b. Carina not transversely expanded at the base.
 - a. Sides of carina widened in lower third *M. annandalei*, Pilsbry.
 - β. Sides of carina widening evenly throughout its length. [A pair of small filamentary appendages on dorsal surface of prosoma near its hind margin.] *M. pilsbryi*, sp. n.
- B. Carina not projecting far below scutum, the basal margins of the two valves in line or forming an even curve as seen from the side.
 - a. Occludent margin of scutum nearly straight, carina with narrow sides, transversely expanded at base *M. rectum*, Pilsbry.

* Based on the keys given by Pilsbry (Bull. U.S. Nat. Mus. lx. 1907, p. 83, and Proc. Acad. Nat. Sci. Philadelphia, 1907, p. 415).

† On this point Pilsbry's description of *M. annandalei* is at variance with his key and with his figure of that species (Bull. U.S. Nat. Mus. lx. 1907, pp. 83 & 90, pl. vii. fig. 15).

- b. Occludent margin of scutum convex, sides of carina widening below.
- a. Basal width of capitulum little less than one-third of its length.
- a. Basal margin of carina, seen from the side, shorter than that of scutum . . . *M. subcarinatum*, [Pilsbry.
- β. Basal margin of carina, seen from the side, about as long as that of scutum. [A pair of long filamentary appendages placed far forward on dorsal surface of prosoma, and a pair of short ones close to base of first cirri.] *M. orientale*, sp. n.
- b. Basal width of capitulum not more than one-fourth of its length.
- a. Numerous filamentary appendages on dorsal surface of prosoma *M. carinatum* (Hoek).
- β. A pair of uncinat processes on dorsal surface of prosoma *M. hamatum*, sp. n.

Megalasma (*Glyptelasma*) *gigas* (Annandale).

Pæcilasma (*Glyptelasma*) *gigas*, Annandale, Journ. Straits Branch Roy. Asiatic Soc. no. 74, 1916, p. 299, pl. iv. fig. 4, pl. v. figs. 10-14, pl. vi. figs. 7, 8.

Localities.—Lat. 8° 46' S., long. 114° 44' E., 400 fath. 2 specimens.

Lat. 11° 0' S., long. 121° 0' E., 500 fath. About 15 specimens.

Lat. 11° 0' S., long. 121° 30' E., 500 fath. 8 specimens.

Lat. 11° 0' S., long. 122° 0' E., 600 fath. 4 specimens.

All specimens taken by C./S. 'Patrol' from Java-Australia cables.

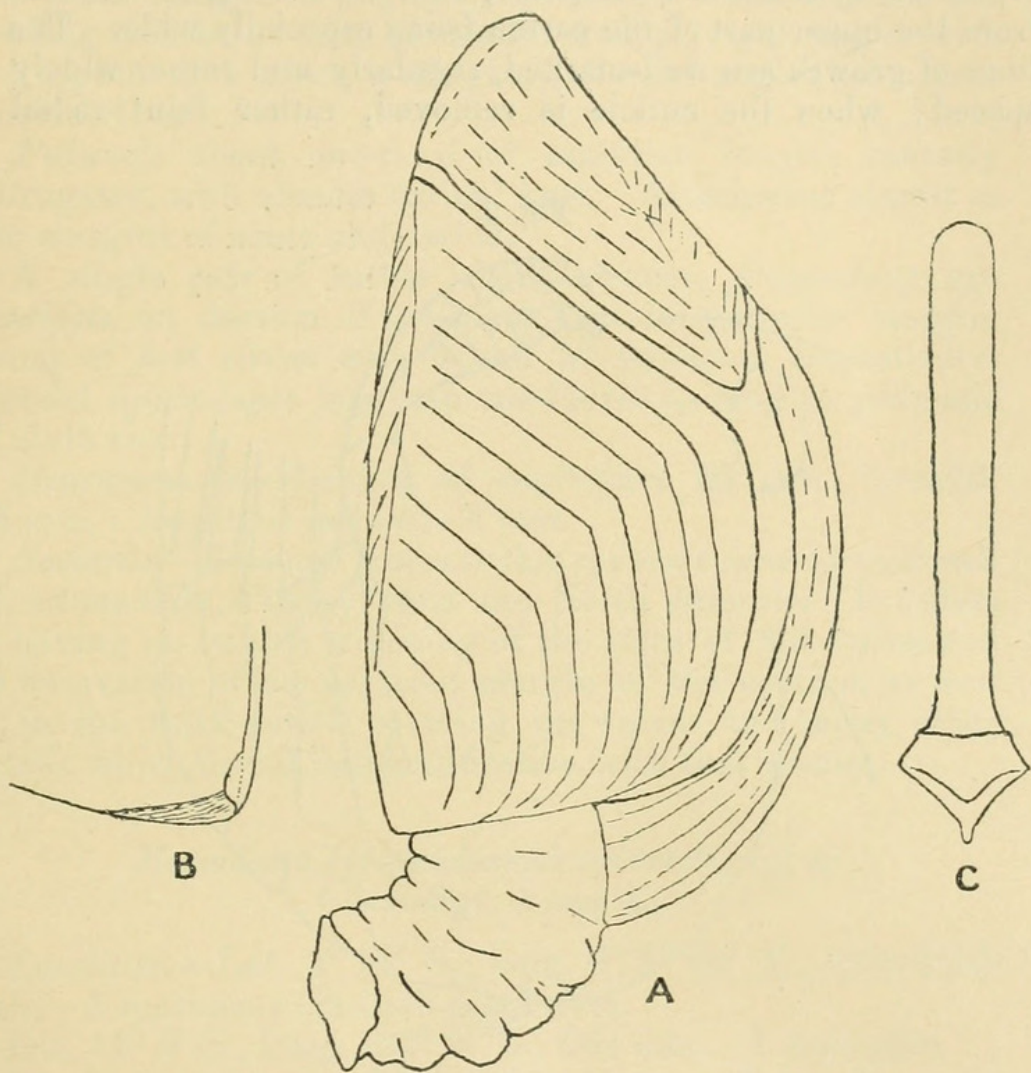
Measurements.—Largest specimen, length of capitulum 30 mm., breadth 15 mm., length of peduncle 36 mm. In another specimen, length of capitulum 25 mm., of peduncle 43 mm.

Remarks.—The specimens agree in general with Annandale's description and figures, the most conspicuous difference being that the peduncle is frequently longer—sometimes much longer—than the capitulum. The cuticle may be much paler, sometimes nearly colourless. I can find no trace of a tooth at the basal occludent angle of the tergum on either side. There is some variation in the depth of the sides of the carina. The peduncle shows, more or less distinctly, a longitudinal keel on the carinal side. There are no filamentary appendages.

It seems probable that Annandale's species is related to

M. rectum, Pilsbry, in which the "auriculate" structure of the base of the carina suggests the beginning of such a transverse expansion as is seen in this species.

Fig. 1.



Megalasma (Glyptelasma) pilsbryi, sp. n., holotype.

A. Lateral view, outlines of valves as seen after partial removal of cuticle.
B. Basal angle of scutum, inner surface. C. Carina, inner surface.

Megalasma (Glyptelasma) pilsbryi, sp. n.
(Text-figs. 1 and 2.)

Localities.—Lat. $9^{\circ} 15' S.$, long. $115^{\circ} 10' E.$, 800–1500 fath. 1 specimen.

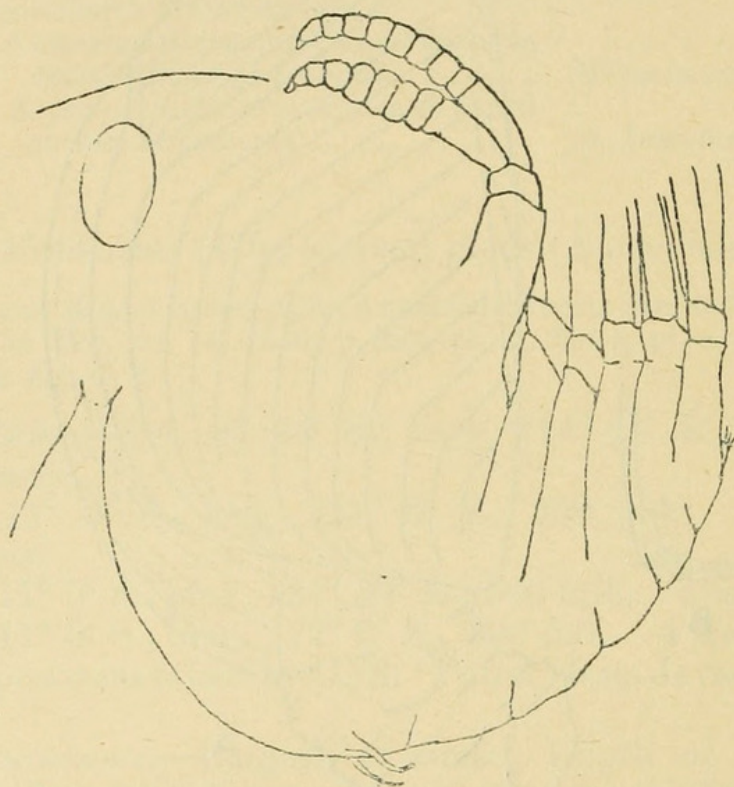
Lat. $10^{\circ} 45' S.$, long. $120^{\circ} 50' E.$, 700 fath. 2 specimens (including holotype).

Lat. $11^{\circ} 0' S.$, long. $121^{\circ} 30' E.$, 500 fath. 1 specimen.

All specimens taken by C./S. 'Patrol' from Java-Australia cables.

Description.—*Capitulum* covered with a thick opaque cuticle, the surface of which has a very fine, short, velvety pile, with stouter but still short setæ interspersed. Valves separated by distinct interspaces, that separating the scutum from the upper part of the carina being especially wide. The lines of growth are well-marked, regularly and rather widely spaced; when the cuticle is removed, rather faint radial

Fig. 2.



Megalasma (Glyptelasma) pilsbryi, sp. n.

Body, from the side, showing dorsal filamentary appendages, first cirrus, and caudal appendages.

striations are visible on the scutum. *Scutum* with occludent margin slightly convex, tergal margin straight, carinal margin convex, passing in an even curve into the straight basal margin, which forms a little less than a right angle with the chord of the occludent margin. A submarginal ridge runs from umbo to apex, but there is no definite ridge from umbo to tergo-carinal angle; the basal margin is slightly everted and thickened. On the inner surface is an umbonal tooth or

tubercle on each valve. *Tergum* with apex slightly recurved; occludent margin convex in its upper half; angle of occludent and scutal margins slightly produced; a well-marked groove from apex to scuto-carinal angle. *Carina* with sides expanding evenly from above downwards, so that the inner margin is regularly concave; basal margin extending well below base of scutum and at right angles with it; septum with concave margin, its lateral angles prominent in side-view.

Peduncle about one-third of capitular length, coarsely corrugated, with obscure carinal keel. Attachment almost at the margins of scuta and carina.

A single pair of rather short, slender, *filamentary appendages* on dorsum of prosoma near its posterior margin. Rami of *first cirrus* with 9 and 10 segments respectively. *Caudal appendages* less than one-fourth as long as peduncle of sixth cirri.

Measurements.—Length of capitulum 25 mm., breadth 13 mm.; length of peduncle 8 mm.

Remarks.—In some respects this species seems to approach *M. annandalei*, Pilsbry, from the North Atlantic. It differs in having no sudden widening of the sides of the carina and no excavation of the adjacent margin of the scutum, as well as in the thick cuticle covering the valves and many other details which forbid its identification with that species.

Megalasma (Glyptelasma) orientale, sp. n.
(Text-figs. 3 and 4.)

Localities.—Lat. $9^{\circ} 15'$ S., long. $115^{\circ} 10'$ E., 800–1500 fath. 5 specimens (including holotype).

Lat. $11^{\circ} 0'$ S., long. $122^{\circ} 0'$ E., 600 fath. 1 specimen.

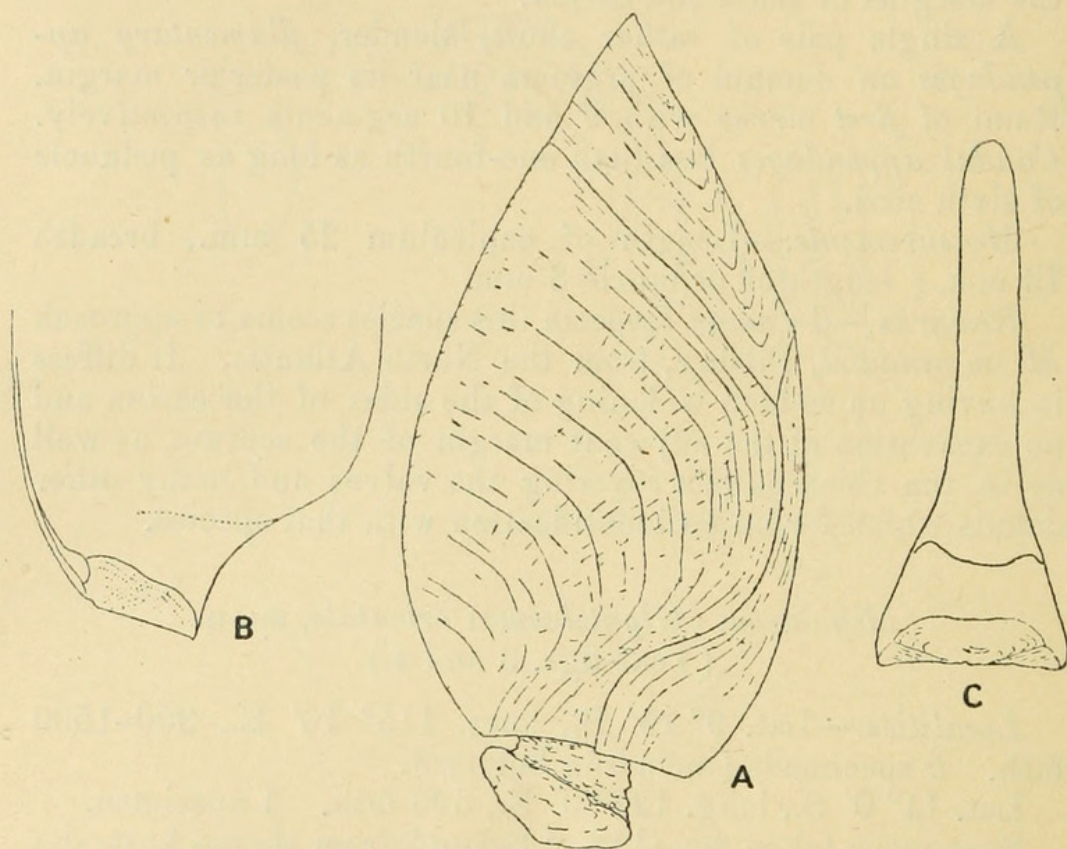
Specimens taken by C./S. 'Patrol' from Java-Australia cables.

Description.—Valves of shell resembling those of *M. subcarinatum*, Pilsbry. *Scutum* with occludent margin convex, carinal margin convex above, deeply excavated below, basal margin everted, forming about a right angle with the chord of the occludent margin. Submarginal ridge from umbo to apex very close to the actual occludent margin, which is concealed when capitulum is viewed from the side. On the inner surface the "smooth basal area" has its upper edge (which marks the line of attachment of the peduncle) much less arched than in *M. subcarinatum*. *Tergum* with carinal margin inclined towards the occludent, apex acute. *Carina*

with sides expanded in the lower part to four to five times their depth in the upper part (as against about three times in the figure of *M. subcarinatum*), transverse width of upper part (in large specimens) about one-third of that of basal margin; basal margin, as seen from the side, equal to or slightly longer or shorter than that of scutum. Inner septum with upper edge concave but not distinctly bilobed, not projecting when the detached carina is seen from the side.

Peduncle very short, its diameter much less than that of

Fig. 3.



Megalasma (Glyptelasma) orientale, sp. n., holotype.

A. Lateral view. B. Basal angle of scutum, inner surface.
C. Carina, inner surface.

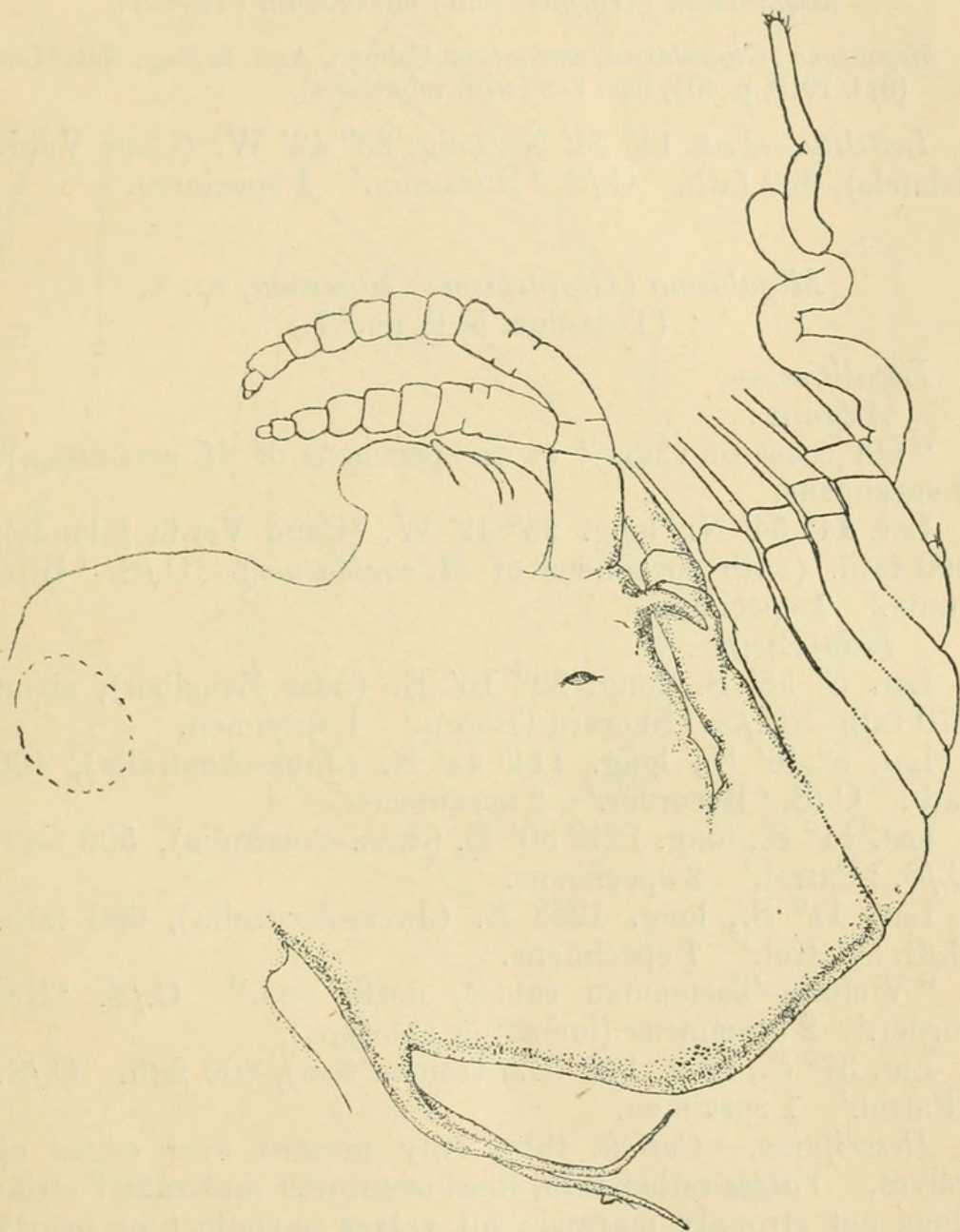
the peduncular orifice, and attached some distance above the basal margins of scuta and carina.

A pair of long tapering *filamentary appendages* are attached side by side on the anterior part of the dorsal surface of the prosoma. A short finger-like appendage is placed close to the base of the first cirrus. Rami of *first cirrus* with 9 and 11 segments respectively. *Caudal appendages* very short stumps, with a few apical setæ.

Measurements.—Length of capitulum 35 mm., breadth 18 mm.

Remarks.—In the characters of the valves this species does

Fig. 4.



Megalasma (Glyptelasma) orientale, sp. n.

Body, from the side, showing filamentary appendages, first cirrus, caudal appendages, and penis.

not differ very widely from *M. subcarinatum*, but since the latter is only known from the North Atlantic ("East of New

Jersey") and its filamentary appendages have not been described, it seems advisable to record the Oriental form under another name. The larger specimens exceed in size any hitherto described in the genus.

Megalasma (Glyptelasma) carinatum (Hoek).

Megalasma (Glyptelasma) carinatum, Calman, Ann. & Mag. Nat. Hist. (9) i. 1918, p. 401, figs. 1-3 (with references).

Locality.—Lat. $14^{\circ} 54'$ N., long. $23^{\circ} 42'$ W. (Cape Verde Islands), 990 fath. C./S. 'Britannia.' 1 specimen.

Megalasma (Glyptelasma) hamatum, sp. n.
(Text-figs. 5, 6, and 7.)

Localities.—

Atlantic:

"Off coast of Cuba" (with specimens of *M. carinatum*).
2 specimens.

Lat. $14^{\circ} 54'$ N., long. $23^{\circ} 42'$ W. (Cape Verde Islands), 990 fath. (with specimens of *M. carinatum*). C./S. 'Britannia.' 1 specimen.

Indo-Pacific:

Lat. $6^{\circ} 58'$ S., long. $39^{\circ} 16'$ E. (near Zanzibar), about 270 fath. C./S. 'Sherard Osborn.' 1 specimen.

Lat. $8^{\circ} 46'$ S., long. $114^{\circ} 44'$ E. (Java-Australia), 400 fath. C./S. 'Recorder.' 2 specimens.

Lat. 11° S., long. $121^{\circ} 30'$ E. (Java-Australia), 500 fath. C./S. 'Patrol.' 2 specimens.

Lat. 11° S., long. 122° E. (Java-Australia), 600 fath. C./S. 'Patrol.' 7 specimens.

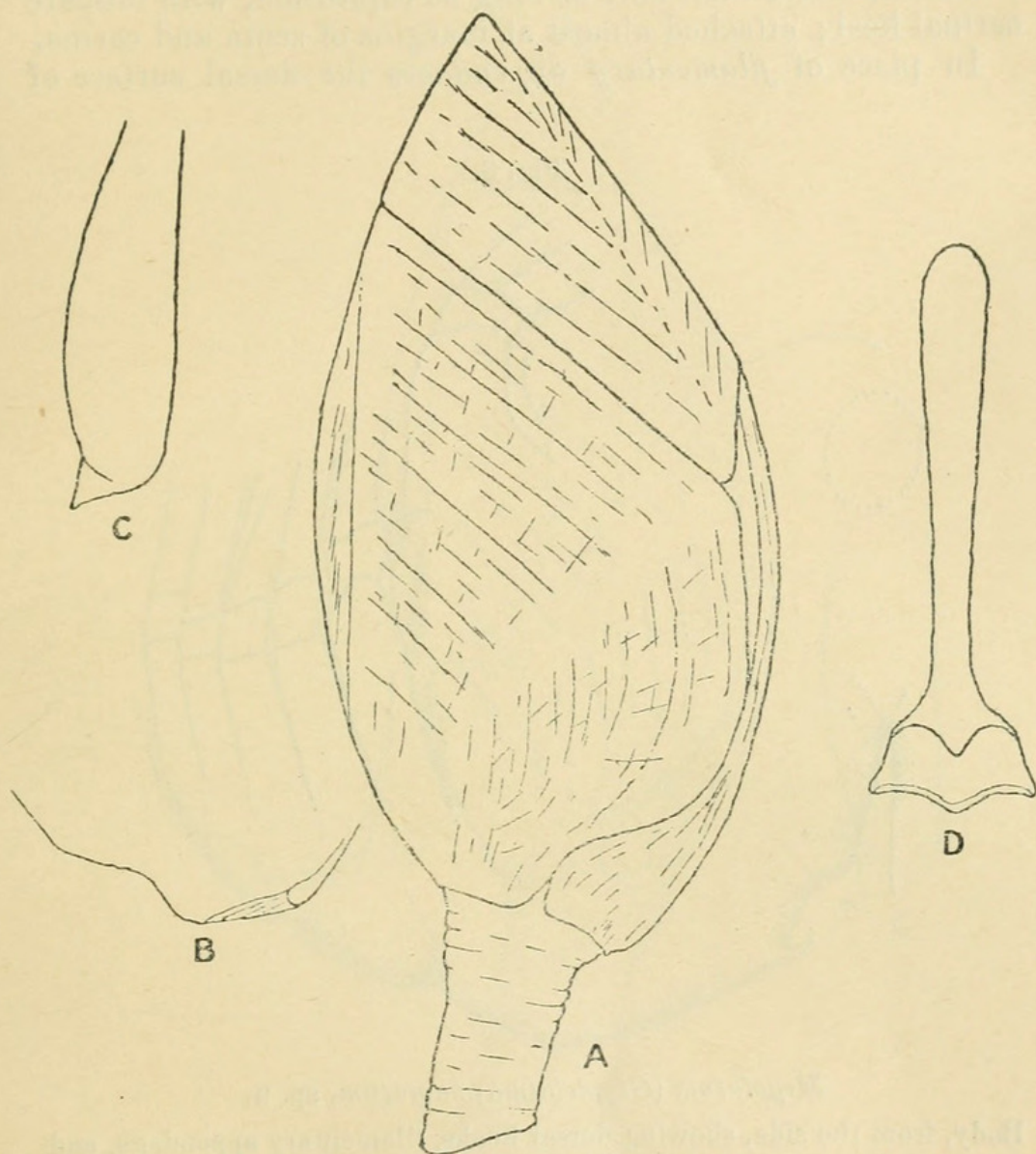
"Victoria-Tasmanian cables, north end." C./S. 'Recorder.' 2 specimens (including holotype).

Lat. 37° S., long. 165° E. (Tasman Sea), 800 fath. C./S. 'Patrol.' 1 specimen.

Description.—*Cuticle* thin, only present near edges of valves. *Valves* rather thin, lines of growth and radial striations not strongly marked; all valves in contact or nearly so. *Scutum* with occludent margin convex, tergal margin straight, carinal margin convex above, more or less deeply concave or notched below, basal margin straight, forming a right or an obtuse angle with the chord of the occludent margin; submarginal ridge from umbo to apex straight or gently curved; ridge from umbo to carino-tergal angle very

obscure ; the basal margin is more or less everted, and there is on the inner surface a small umbonal tooth on each valve ; area defined by line of attachment of peduncle very narrow.

Fig. 5.



Megalasma (Glyptelasma) hamatum, sp. n., holotype.

A. Lateral view. B. Basal angle of scutum, inner surface. C. Scutum from occludent aspect, to show eversion of basal margin. D. Carina, inner surface.

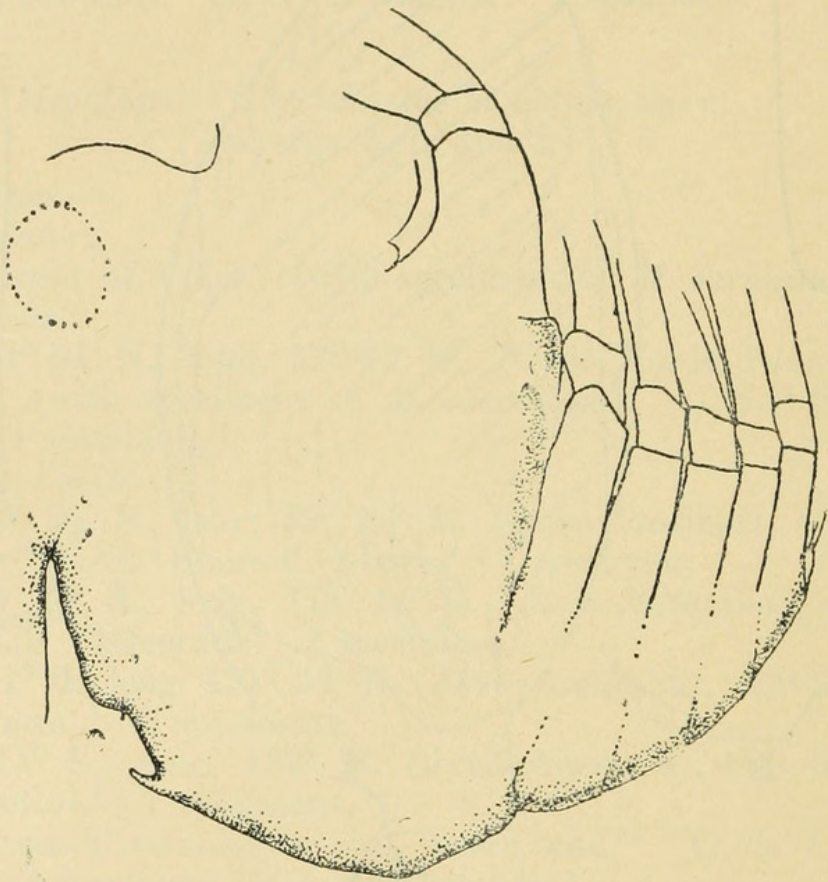
Tergum with straight margins except the occludent, which may be gently curved, carinal margin one-third to one-half as long as the occludent. *Carina* narrow, evenly curved, sides

expanding in lower part, so that the margin is convex or even bluntly angled, basal margin more or less everted, straight or gently concave as seen from the side, in line or forming an even curve with base of scutum; septum notched in the middle, lateral lobes more or less prominent in side-view.

Peduncle less than half as long as capitulum, with obscure carinal keel; attached almost at margins of scuta and carina.

In place of *filamentary appendages* the dorsal surface of

Fig. 6.



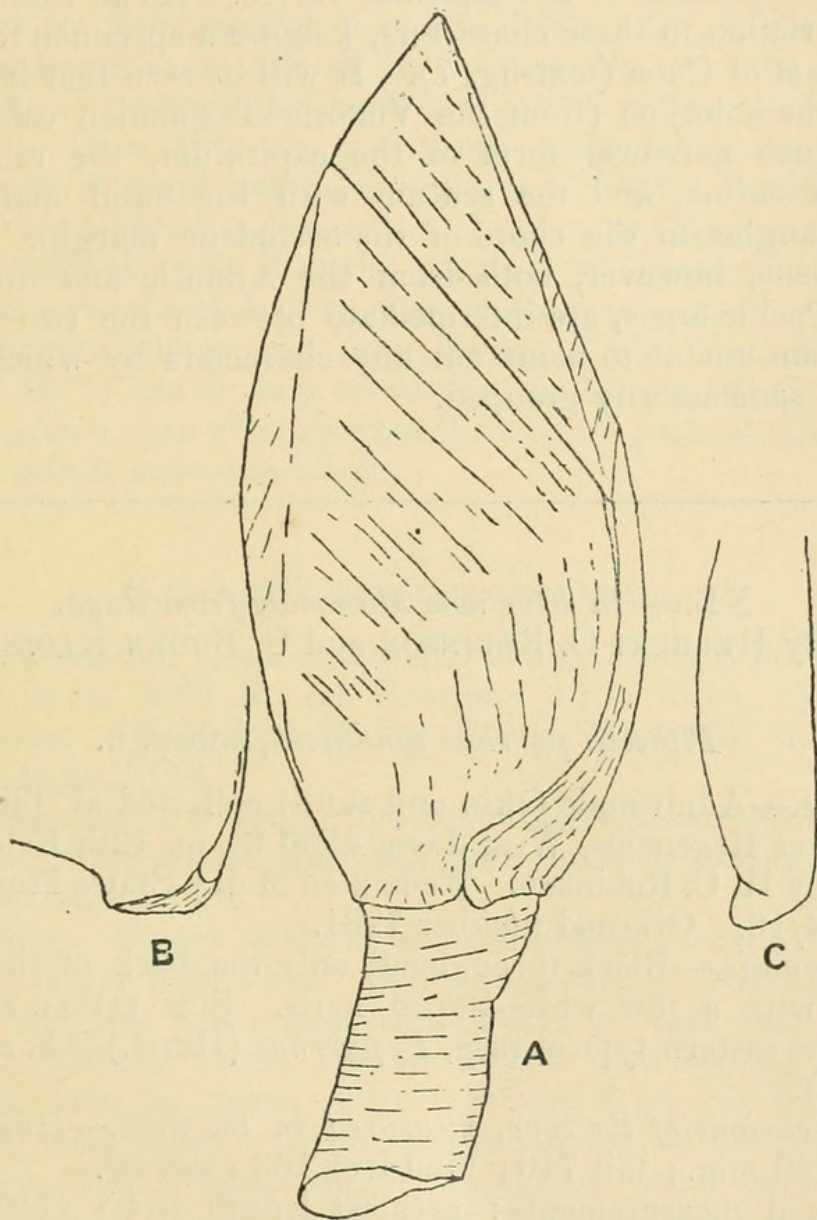
Megalasma (Glyptelasma) hamatum, sp. n.

Body, from the side, showing dorsal hooks, filamentary appendage, and caudal appendages.

the prosoma bears, about the middle of its length, a pair of short hook-like processes, turned forwards, rather more firmly chitinized than the surrounding integument; a short distance in front of these is a pair of low rounded swellings. Close to the base of the first cirrus on each side is a small appendage of varying length, sometimes reduced to a mere papilla, and in one specimen apparently absent. Rami of *first cirrus* with

from 9/11 to 10/12 segments. *Caudal appendages* very short, not more than one-fifth as long as peduncle of sixth cirri.

Fig. 7.



Megalasma (Glyptelasma) hamatum, sp. n. Specimen from coast of Cuba.

A. Lateral view. B. Basal angle of scutum, inner surface. C. Scutum from occludent aspect, to show eversion of basal margin.

Measurements.—Length of capitulum (to middle of basal margin) 24 mm., breadth 12.5 mm.

Remarks.—It is only after considerable hesitation that all

the specimens recorded above have been included under one specific name. They all agree in the possession of the peculiar hook-like organs on the dorsal surface of the prosoma—a character which differentiates them from all the other species I have seen—but they differ greatly among themselves in the characters of the capitular valves. As an example of the variation in these characters, I figure a specimen from off the coast of Cuba (text-fig. 7). It will be seen that it differs from the holotype (from the Victoria-Tasmanian cables) in the much narrower form of the capitulum, the relatively shorter carina, and the scutum with the basal margin at right angles to the chord of the occludent margin. Other specimens, however, both from the Atlantic and from the Indo-Pacific areas, are intermediate between the two forms, and I am unable to point out any characters by which they can be satisfactorily grouped.

XL.—*On Five new Mammals from Java.*

By HERBERT C. ROBINSON and C. BODEN KLOSS.

Pithecus pyrrhus sondaicus, subsp. n.

Type.—Adult male (skin and skull) collected at Tjibodas, Preanger Regencies, West Java, 4500 ft., on 12th February, 1916, by H. C. Robinson. Federated Malay States Museums, no. 164/16. Original number 7181.

Diagnosis.—Black throughout, only the back of the hind limbs with a few white-tipped hairs. Size rather smaller than the eastern typical race, *P. pyrrhus* (Horsf.) = *S. maurus* (auctt.).

Dimensions of the type, measured in the flesh.—Head and body 540 mm.; tail 740; hind foot 163; ear 30.

Cranial measurements: greatest length 104.7 (110.1*); basal length 77.0 (82.0); zygomatic breadth 78.1 (85.8); maxillary tooth-row, excluding incisors, 35.7 (38.4).

Specimens examined.—The type and one other adult male from the same locality compared with eight adults from Eastern Java.

* Measurements in parentheses are those of an adult male *P. p. pyrrhus* from Ongop-Ongop, Idjen Massif, near Banjoewangi, 5700 ft., East Java. F.M.S.M. no. 585/16.



Calman, W. T. 1919. "XXXIX.—On Barnacles of the genus *Megalasma* from deep-sea telegraph-cables." *The Annals and magazine of natural history; zoology, botany, and geology* 4, 361–374.

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