

NOTE ON CHARYBDIS ERYTHRODACTYLA (LAM.),  
CHARYBDIS ACUTIFRONS (DE MAN),  
AND CHARYBDIS OBTUSIFRONS NOV. SPEC.

by

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In the collections of the Leiden Museum I found three groups of specimens, which had been classified as *Charybdis erythroductyla* (Lam.).

I also examined *Charybdis acutifrons* (de Man), of which hitherto only one specimen (the type specimen) has been mentioned in literature. It appeared that Dr J. G. de Man did not observe that this specimen has seven antero-lateral teeth, of which the second and fourth are very small. This species belongs to one of the three above-mentioned groups.

The three groups show very distinct differences. Therefore I consider them to be three species, viz., *Ch. erythroductyla* (Lam.), *Ch. acutifrons* (de Man), and *Ch. obtusifrons* nov. spec.

In a subsequent publication I hope to discuss the place of these species in the genus *Charybdis* and the literature on *Ch. erythroductyla* (Lam.). In the following descriptions I only mention the most important literature.

**Charybdis erythroductyla** (Lam.)

(figs. 1—5)

Material: One male and one female (Mus. Godeffroy), Marquesas, coll. Leiden Museum.

These specimens are identical with those mentioned by Randall (*Thalamita pulchra*, Journ. Acad. Nat. Sci. Philad., vol. 8, 1839 (1840), p. 117, pl. 4), Milne-Edwards (*Thalamita Teschoiraei*, 1851, Ann. Sc. Nat., Zool. (3), vol. 16, p. 250, pl. 10, figs. 5, 6, 7), Rathbun (1906, Bull. U. S. Fish Comm. for 1903, pt. 3, p. 872, pl. 4) and Boone (Bull. Vanderbilt Marine Museum, vol. 5, 1934, p. 57, pls. 18 and 19), probably also with the specimens of Nuka-Hiva (coll. Paris Museum) determined by A. M.-Edwards and figured by Nobili (1906, Bull. Scient. Fr. Belg., vol. 40, p. 118, fig. 3).

Description: The carapace is rather convex, bare, with some rather faint granular ridges on the anterior half, viz., (1) one on the frontal region, interrupted in the middle, (2) one on each of the protogastric regions, (3) an unbroken one on the gastric region, (4) one between the last antero-lateral

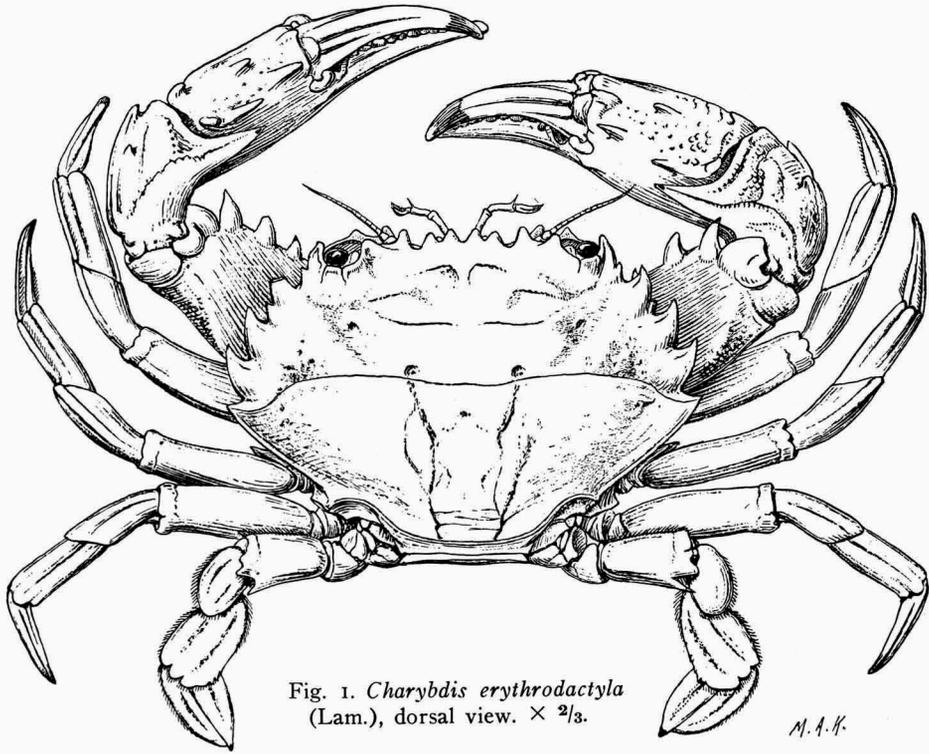


Fig. 1. *Charybdis erythrodactyla* (Lam.), dorsal view.  $\times \frac{2}{3}$ .

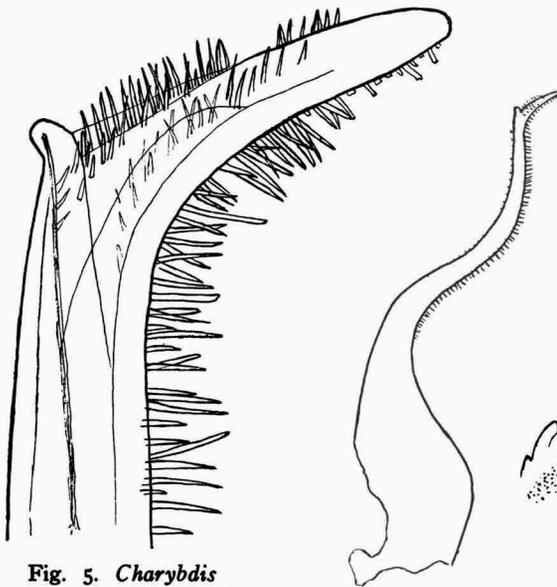


Fig. 5. *Charybdis erythrodactyla* (Lam.), posterior view of the apex of the first male pleopod.  $\times 25$ .

Fig. 4. *Charybdis erythrodactyla* (Lam.), posterior view of the first male pleopod.  $\times 3\frac{1}{2}$ .

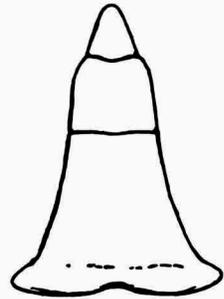


Fig. 3. *Charybdis erythrodactyla* (Lam.), abdomen of the male. Natural size.

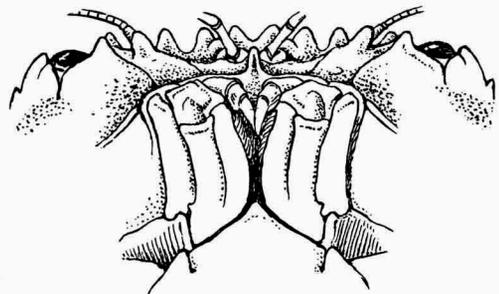


Fig. 2. *Charybdis erythrodactyla* (Lam.), frontal view. Natural size.

teeth, only interrupted by the cervical groove. The regions can be fairly well distinguished (posteriorly the carapace has two divergent sulci, which are not usual in the Portunidae; they resemble shrink-lines). Between the ridges (1) and (3) the carapace has a faintly granular surface; this granulation stretches on to the bases of the first four antero-lateral teeth. There is also a very faint granulation on the bases of the frontal teeth. In the female the granulation on the anterior part of the carapace is somewhat more distinct.

The front is cut into six triangular, blunt teeth. The median and submedian teeth are nearly of the same size and somewhat directed outwards; the medians are only very little prominent beyond the submedian teeth, the incisions between the median teeth and between the median and submedian teeth are very distinct and V-shaped. The submedian teeth are separated from the lateral teeth by a much wider and deeper incision. The latter teeth are somewhat larger than the submedian and median teeth, they are directed forward and separated from the inner supra-orbital angles by a very wide, but not so deep incision; they are a little prominent beyond these orbital angles. On a lower plane there is a little tooth-like knob between the median and submedian teeth, which can be clearly distinguished from the dorsal side.

The antero-lateral borders are cut into seven rather acute teeth, of which the second and fourth are very small. The first tooth (the outer supra-orbital angle) has a nearly straight anterior border, the outer border is convex. The second tooth is very small, it seems to be cut out of the convex outer border of the first tooth. The third tooth has a concave anterior border, a convex outer border and a dark-coloured top. The fourth tooth is an acute very small tooth. The fifth tooth is of the same shape as the third tooth, but it is somewhat larger (in the male at the base of the right fifth tooth there is an indication for another small tooth, which should be separated from the larger tooth). The sixth tooth is like the preceding one, only a little smaller. The seventh tooth is much shorter than the preceding ones, it is directed more laterally.

The postero-lateral borders converge rather strongly posteriorly.

The posterior border is nearly straight, and forms a curve with the postero-lateral borders.

The smooth upper border of the orbit is divided into three parts by two distinct incisions. The inner supra-orbital angle is broad (much broader than the lateral frontal teeth), its top is blunt, and it is on a higher plane than the frontal teeth, the inner angle of the outer part is somewhat turned up. The lower border has laterally one incision; its inner angle is rather prominent, tooth-like, but its top is not acute; the outer part of this border has a faintly distinguishable inner lobe.

The "basal" antenna-joint has a lobe-like tooth, which is directed outwards, and some little granules; it touches the front, excluding the flagellum from the orbit.

The antennulae are folded transversely.

The sub-orbital, sub-hepatic, pterygostomian and sub-branchial regions are nearly bare. Except for the pterygostomian and sub-branchial regions, they are all finely granular.

The sternum is bare.

Of the abdomen of the male the third up to the fifth terga are fused. The second and third terga are transversely keeled, but not so sharp as in *acutifrons*. The sixth tergum has posteriorly convergent lateral sides (the anterior half has nearly parallel sides), the posterior side is curved anteriorly.

The length of the chelipeds in the male is nearly  $2\frac{1}{7}$  the length of the carapace. The surface is smooth. The anterior border of the arm has three spines (the proximal one is the smallest and the distal one the largest); the distal border ends anteriorly in a broad tooth; the posterior border has no armature, it has some granules on the distal part (in the female the right cheliped has four spines on the anterior border of the arm). The wrist has a strong spine at the inner angle and three spinules at the outer angle; the carinae are distinct, smooth, there are only a few granules near and on the carina, which corresponds with the spine at the outer angle. The palm has seven smooth costae, the two costae on the inner surface are ill-developed; only between the two costae on the upper surface there occur a few granules; the upper surface has five spines, of which the two spines on the anterior costae are strongest developed, the other three are much smaller; at the base of the proximal spine on the anterior costa there is a large knob. The movable finger is longer than the palm.

The other legs have no specific characteristics. Of the natatory leg the meropodite is twice as long as broad, the posterior border has the usual spine; the propodite has the posterior border with only a few very minute spinules.

The first male pleopods have a long, sinusoid neck. It has many spines on the outer border, which occur to the top of the apex (in the figure the last spines at the apex are small, they were broken off during the examination). The inner border of the neck has some small spines. On the inner border and on the posterior surface the apex has a great many spines, placed in rows, which are partly under the transparent membrane; the spines do not occur on the distal parts of the inner border and posterior surface of the apex (see figs. 4 and 5).

Measurements in mm :	♂	♀
Length of carapace . . . . .	65.0	58.0
Breadth of carapace . . . . .	94.0	84.0
Front . . . . .	28.5	27.0
Interorbital space . . . . .	38.0	34.5
Orbit . . . . .	8.0	8.5
Orbito-frontal border . . . . .	55.0	50.5
Length of cheliped . . . . .	139.0 (right)	106.5 (right)
Length of merus (natatory legs) . . . . .	18.0	16.5
Breadth of merus (natatory legs) . . . . .	9.0	8.5
Length 6th ♂ abdominal segment . . . . .	10.0	—
Breadth 6th ♂ abdominal segment . . . . .	11.5	—
Posterior border . . . . .	27.2	27.0

### **Charybdis acutifrons** (de Man)

(figs. 6—10)

*Gomiosoma acutifrons*, 1879 De Man, Notes from the Leyden Museum, vol. 1, p. 60; 1883, De Man, *ibid.*, vol. 5, p. 152.

*Charybdis (Gomiosoma) erythrodactyla*, 1925, Delsman and De Man, *Treubia*, vol. 6, p. 311, pl. 15a; 1929, de Man, *Bijdragen tot de Dierkunde*, 26ste aflevering, p. 7.

Material: Timor, one young male (type specimen), coll. Leiden Museum; one male and two females, in dried condition, Moluccas, coll. Leiden Museum; one male, Bay of Batavia, coll. De Man (Zoological Museum, Amsterdam); one ova-bearing female, Pulau Berhala, coll. De Man (Zoological Museum, Amsterdam).

Description: The carapace is covered with a dense short tomentum. The regions are hardly distinguishable. There occur several faint granular transverse ridges: (1) a ridge between the last antero-lateral spines, only interrupted by the cervical groove, (2) anterior to it an unbroken one on the gastric region, (3) a short one on each of the protogastric regions, (4) one on the frontal region, interrupted in the middle, (5) a short one on each of the mesobranchial regions, and (6) one on the cardiac regions (in the older specimens (5) and (6) are hardly to be distinguished).

The front is cut into six very acute teeth, which are of nearly the same size and shape. The triangular median teeth have somewhat curved sides and are very sharply pointed. The triangular submedian teeth, somewhat broader at the base than the median ones, have somewhat outward directed tops and they are separated from the lateral teeth by a somewhat deeper incision than the one that separates the submedian teeth from the median teeth. The lateral teeth are somewhat longer than the others, but at the base

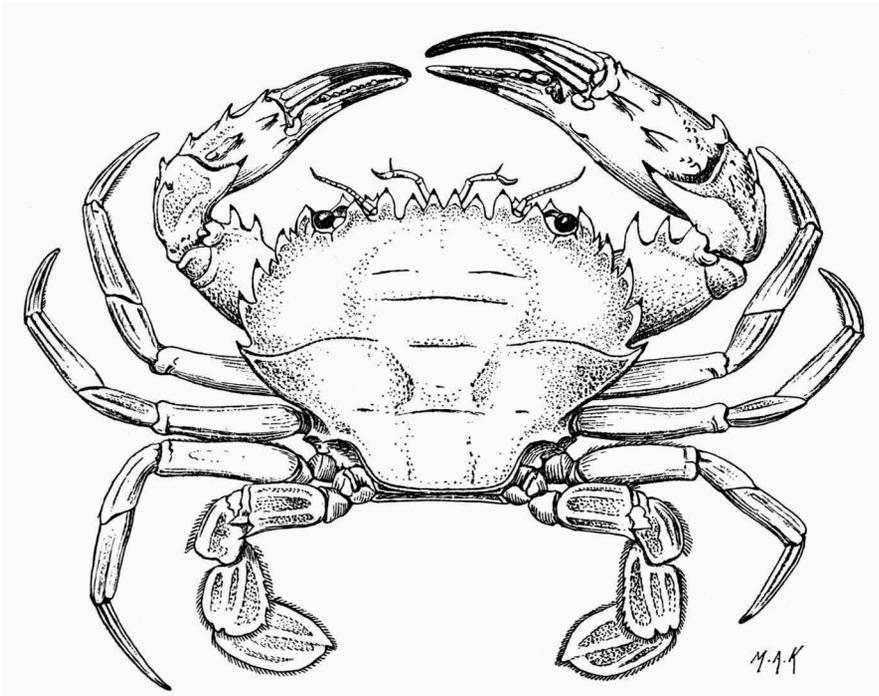


Fig. 6. *Charybdis acutifrons* (de Man), dorsal view.  $\times \frac{2}{3}$ .

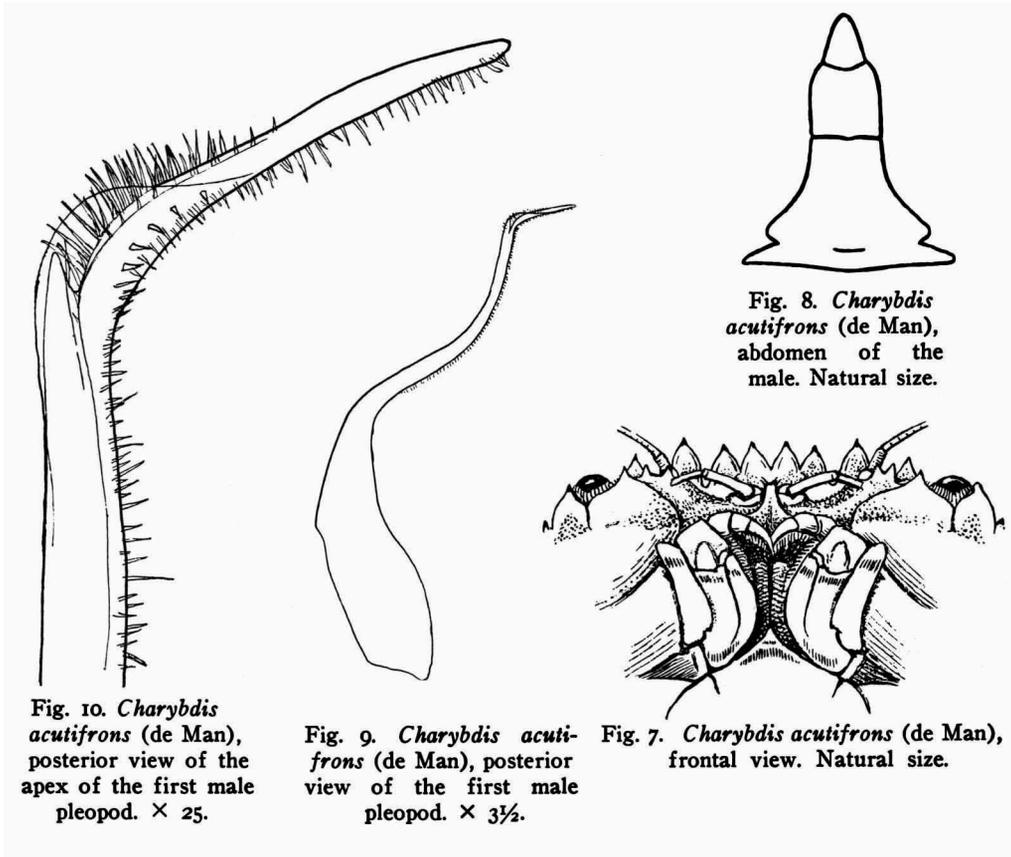


Fig. 8. *Charybdis acutifrons* (de Man), abdomen of the male. Natural size.

Fig. 10. *Charybdis acutifrons* (de Man), posterior view of the apex of the first male pleopod.  $\times 25$ .

Fig. 9. *Charybdis acutifrons* (de Man), posterior view of the first male pleopod.  $\times 3\frac{1}{2}$ .

Fig. 7. *Charybdis acutifrons* (de Man), frontal view. Natural size.

they are as broad as the submedian teeth; by a wide incision they are separated from the inner supra-orbital angles, which are on a somewhat higher plane. On a lower plane there is a little knob between the median and submedian teeth, which is only distinguishable at the ventral side.

There are seven antero-lateral teeth. The second and fourth teeth are very rudimentary. All the other teeth are claw-like, very acute with dark-coloured tops; the anterior borders are concave and the posterior borders convex. The first, third and sixth teeth are of the same size. The fifth tooth is a little larger and the seventh tooth is the smallest and the narrowest.

The postero-lateral borders converge rather strongly posteriorly.

The posterior border is nearly straight and forms a curve with the postero-lateral borders.

The upper border of the orbit is divided into three parts by two distinct incisions; the border of the middle part is granular. The inner supra-orbital angle is triangular with an acute top, which is directed forward; it is a little broader than the frontal teeth. The granular lower border has a distinct lateral incision. The inner infra-orbital angle is prominent, dentiform, very acute.

The "basal" antenna-joint, that touches the front excluding the flagellum from the orbit, has two spines.

The antennulae are folded transversely.

The sub-orbital, sub-hepatic, pterygostomian and sub-branchial regions are pilose. The pleural groove is not so distinct on account of the rather dense tomentum.

The sternum is bare.

Of the abdomen of the male the lateral sides of the sixth segment are for two thirds parallel and then they converge posteriorly, the posterior side is somewhat curved anteriorly; it is broader than long. The second and third terga are transversely keeled.

The length of the chelipeds is nearly twice the length of the carapace. The under surface is bare, the upper surface is rather pilose. On the anterior border of the arm there are three spines (the proximal one is the smallest), the distal border ends anteriorly in a short spine, the posterior border is unarmed, the posterior surface has some granules, the inferior border ends distally in a spinule. The wrist has a strong spine at the inner angle and three spinules at the outer angle. The hand is seven-costate and has five spines on the upper surface (one at the wrist-articulation, two on the anterior costa and two on the next outer one); at the basis of the proximal spine on the anterior costa there is a little knob, which is much less developed in *erythroductyla*; there are a few granules on the upper surface. The movable finger is much longer than the palm.

The other legs are without specific characteristics.

The length of the meropodites of the natatory legs is about twice the breadth, its posterior border has a strong spine near the distal end, its distal border ends posteriorly in a spinule. The propodite has a row of spinules at its posterior border.

The first male pleopods have a long curved, narrow neck. The apex is long and narrow. The transparent membrane has a strongly curved border. On the inner border of the apex there occur many spines in several rows placed on the inner border. The outer border of the apex has also many spines from the top downwards, and these spines continue on the outer border of the neck (see figs. 9 and 10). The inner border of the neck has only a few very small spinules, hardly to be distinguished even under the microscope.

Measurements of the specimens I examined in mm :

	a	b	c	d	e	f
Length of carapace.	44.5	61.0	56.8	21.0	60.0	53.0
Breadth of carapace	61.5	85.0	76.2	60.0	80.0	71.0
Front . . . . .	20.0	28.0	26.0	10.0	27.0	24.0
Interorbital space .	27.5	36.0	33.4	13.5	36.0	31.3
Orbit . . . . .	7.5	9.0	8.0	4.2	8.5	8.0
Orbito-frontal border	42.5	56.0	51.0	22.0	53.0	47.5
Length of cheliped .	86.5 (r.)	116.2 (l.)	102.0 (l.)	37.0 (r.)	130.0	100.0
Length of merus						
(natatory legs)	12.5	17.0	16.0	6.5	17.0	14.8
Breadth of merus						
(natatory legs)	7.0	8.8	8.2	3.0	9.0	7.8
Length 6th ♂ abdominal segment	6.8	—	—	3.0	8.7	—
Breadth 6th ♂ abdominal segment	7.0	—	—	4.0	9.5	—
Posterior border . .	20.2	29.5	28.0	10.0	27.5	24.0

a, ♂ Molluccas; b, ♀ Molluccas; c, ♀ Molluccas; d, ♂ Timor (immature); e, ♂ Bay of Batavia; f, ♀ Pulau Berhala.

### ***Charybdis obtusifrons* nov. spec.**

(figs. 11 and 12)

*Goniosoma erythrodictylum*, 1883, De Man, Notes from the Leyden Museum, vol. 5, p. 152.

Material: Djeddah, one ovigerous female (J. A. Kruyt 1882), coll. Leiden Museum.

This specimen, which Dr J. G. de Man determined as *Goniosoma erythrodictylum* is probably identical with the specimens mentioned by Nobili (1906, Ann. Sc. Nat.,

Zool. (9), vol. 4, p. 194) and by Klunzinger (1913, Nova Acta, vol. 99, pt. 1, p. 364), because their fronts have truncated teeth (Nobili: "les dents frontales sont plus larges, plus rapprochées et tronquées en avant avec une disposition qui ressemble à celle de *Thalamita danae*" and Klunzinger: „Stirnzähne abgestutzt, ähnlich der *Thalamita crenata*").

Description: The carapace is pilose. The regions are fairly distinct. There

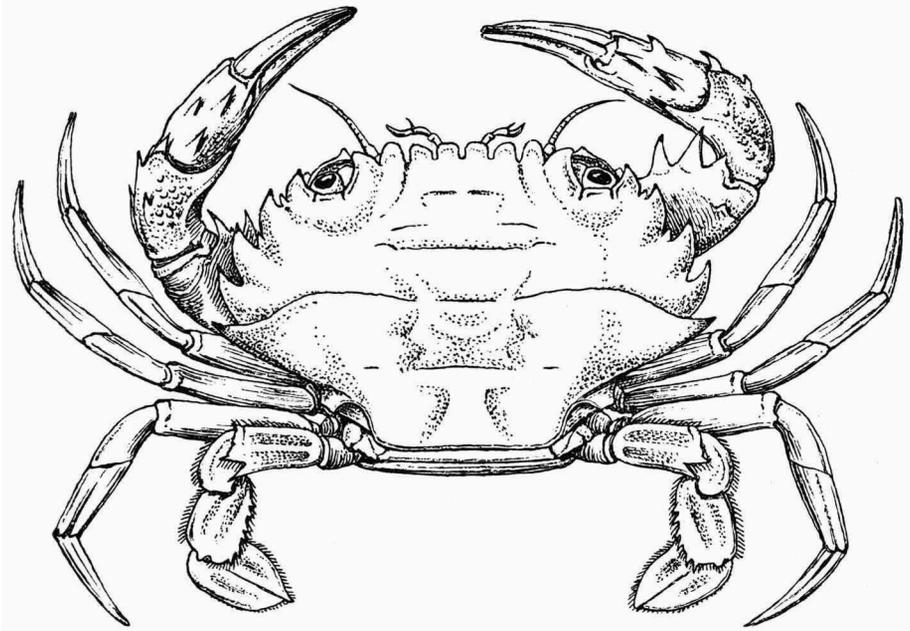


Fig. 11. *Charybdis obtusifrons* nov. spec., dorsal view.  $\times 2$ .

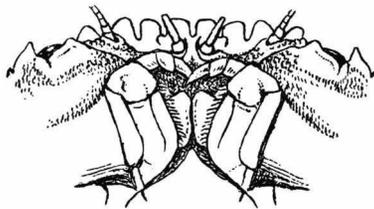


Fig. 12. *Charybdis obtusifrons* nov. spec., frontal view.  $\times 2$ .

are several granular transverse ridges: (1) one on the frontal region, interrupted in the middle, (2) one on the protogastric regions, (3) an unbroken one on the gastric region, (4) one between the last antero-lateral teeth, only interrupted by the cervical groove, (5) one on the mesobranchial region, (6) one on the cardiac region (the ridges (5) and (6) are faintly granular). There is some granulation at the bases of the first three teeth, but this is hardly to be distinguished by the pile.

The front is cut into six blunt teeth. The median teeth are nearly square-cut, with round angles, there is a narrow incision between them. They are separated from the submedian teeth by a somewhat wider, but less deep incision. Of the submedian teeth the median edges are shorter than the lateral edges, the anterior edges slope somewhat up outwards; the median and lateral edges are nearly parallel to the median axis (on a lower plane between the median and submedian teeth there is a very little knob, which is not visible at the dorsal side). The lateral teeth are separated from the preceding ones by a much wider and deeper incision, of which the edges only slightly diverge anteriorly, the edges of these teeth converge slightly, their tops are round; they are prominent beyond the inner supra-orbital angles, of which they are separated by a V-shaped incision.

There are seven antero-lateral teeth. The first tooth has a straight anterior border, a convex outer border, a sharp dark-coloured top. The second tooth is very small, with serrated anterior and outer borders (observed with a strong lens), without a sharp top. The third tooth is larger than the first, it has a concave anterior border, a convex outer border and a sharp, dark-coloured top. The fourth tooth is very small, a little more acute than the second, its outer border is serrated. The fifth tooth is the largest with a concave anterior border and a convex outer border. The sixth tooth is narrower than the fifth, more spine-like, and the seventh tooth is still more spine-like. The fifth up to the seventh teeth all have sharp, dark-coloured tops.

The postero-lateral borders converge rather strongly posteriorly.

The posterior border is nearly straight, it forms a curve with the postero-lateral borders.

The orbit has two distinct incisions in its upper border. The inner supra-orbital angle is much wider than the lateral frontal teeth, it has a round top, the inner angle of the outer part of this border is somewhat turned up. The lower granular border is cut into two parts by a distinct lateral incision. The inner infra-orbital angle is somewhat prominent and tooth-like. The outer part has a distinct inner lobe.

The "basal" antenna-joint touches the front, excluding the flagellum from the orbit; its surface is granular; it has a little crest with large granules.

The antennulae are folded transversely.

The sub-orbital, sub-hepatic and pterygostomial regions are pilose and granular. The sub-branchial region is bare and only granular near the last antero-lateral teeth. There is a distinct granular, pleural groove.

The sternum is bare.

The female abdomen has its usual segments.

The length of the cheliped is about  $\frac{5}{3}$  times the length of the carapace. The whole surface is pilose. The anterior border of the arm has three spines, of which the proximal one is the smallest; the distal part of the posterior border has a granular surface. The wrist has a strong spine at the inner angle, three spinules at the outer angle, a granular carina and granules on the upper surface, the other carinae are smooth. The hand is seven-costate. The palm bears four spines and one spinule: two spines on the inner costa (at the base of the proximal one there is a granular knob), one spine and the spinule on the next outer costa, a spine at the wrist-articulation; on the proximal part of the upper surface there occur a few large granules. The movable finger is longer than the palm, the costae are very distinct.

The other walking-legs are without specific characteristics.

Of the natatory leg the meropodite has the usual spine near the distal end of the posterior border, its distal border ends posteriorly in a spinule; the propodite has the posterior border with a row of spinules.

Measurements in mm:

Length of carapace . . . . .	21.0
Breadth of carapace . . . . .	32.5
Front . . . . .	10.8
Interorbital space . . . . .	14.2
Orbit . . . . .	4.5
Orbito-frontal border . . . . .	22.0
Length of cheliped (left) . . . . .	35.5
Length of merus (natatory leg) . . . . .	6.2
Breadth of merus (natatory leg) . . . . .	3.4
Posterior border . . . . .	11.5

#### Conclusion.

Antero-lateral border with seven teeth, the second and fourth of which are very small

a. Front with rather obtuse teeth; basal antenna-joint with one obtuse tooth. . . . . *Ch. erythrodactyla*

b. Front with very acute teeth; basal antenna-joint with two spines  
*Ch. acutifrons*

c. Front with truncated teeth; basal antenna-joint only with large granules  
*Ch. obtusifrons*