

30. *Charybdis (Goniosoma) quadrimaculata*, A. M. Edw.

Goniosoma quadrimaculatum, A. Milne Edwards, Archiv. du Mus. X. 1861, pp. 375, 385, pl. xxxiv. fig. 3 : Ortmann. Zool. Jahrb., Syst., VII. 1893, p. 82.

Goniosoma quadrimaculatum, A. M. Edw. *Portunus lucifer* Fabr., de Man, Journ. Linn. Soc., Zool. XXII. 1887-88, p. 83 footnote.

Goniosoma luciferum, J. R. Henderson, Trans. Linn. Soc. Zool., (2) V. 1893, p. 374.

Differs from *O. cruciferu* in the following particulars:—

(1) the carapace though in sculpture of surface similar, is very much broader, its length being much less than two-thirds its breadth:

(2) the frontal teeth are deeper cut and those of the second pair slope outwards rather more:

(3) the teeth of the antero-lateral borders are regular and are claw-shaped, instead of being broad anteriorly-acuminate lobes; the first is acute and except in its smaller size is similar to the next four, and the last is more spine-like and more prominent:

(4) the orbits are smaller, their diameter being only two-sevenths the width of the inter-orbital space; both the inner angle and the lobule at the outer end of the lower border are acutely dentiform:

(5) the chelipeds in the male are not very much more than twice the length of the carapace; the hand is 6-costate and the costæ are commonly milled in their proximal half, and there are 5 spines on the upper surface of the hand; the fingers of the larger cheliped are shorter than the palm:

(6) in the last pair of legs the merus is nearly twice as long as broad, and the posterior border of the propodite is strongly serrated throughout:

(7) the 6th tergum of the male abdomen has its sides parallel or even slightly divergent in at least two-thirds of its extent:

Colours in spirit yellowish brown with 2 large white spots on either branchial region.

In the Indian Museum are 20 specimens from all parts of the coast of the peninsula: the carapace of the largest specimen is 60 millim. long and 98 millim. in extreme breadth.

31. *Charybdis (Goniosoma) annulata* (Fabr.) A. M. Edw.

Portunus annulatus, Fabricius, Ent. Syst. Suppl. p. 364 (sec. A. Milne Edwards.).

?? *Cancer fasciatus*, Herbst Krabben, III. i. 62, pl. xlix. fig. 5. (sec. A. M. Edw.).

? *Cancer sexdentatus*, Herbst, Krabben, pl. vii. fig. 52.

Portunus annulatus, Latreille, Hist. Nat. Crust. VI. p. 15 (sec. A. Milne Edwards.).

Thalassita annulata, Milne Edwards, Hist. Nat. Crust. I. 463 (sec. A. M. Edw.).

Goniosoma annulatum (Fabr.), A. Milne Edwards, Archiv. du Mus. X. 1861, pp. 374, 385; Miers, Ann. Mag. Nat. Hist. (5) V. 1880, p. 238; de Man, Notes Leyden

Mus. V. 1883, p. 151 and Zool. Jahrb., Syst., VIII. 1894-95, p. 561: Ortmann, Zool. Jahrb., Syst., VII. 1893-94, p. 82: J. R. Henderson, Trans. Linn. Soc. Zool., (2) V. 1893, p. 375.

Goniosoma orientale Heller (nec Dana), "Novara" Crust. p. 29, pl. iii. fig. 3 (sec. de Man).

Differs from *C. crucifera* in the following particulars:—

(1) the carapace is more convex, and the transverse lines are even fainter, especially on the gastric region:

(2) the frontal teeth are deeper-cut and sharper (in adults):

(3) the teeth of the antero-lateral borders are regular; the first is small and acute, the second is not much larger than the first, and the last (in adults) is smaller than any of the three immediately in front of it:

(4) the major diameter of the orbit is only a fourth the width of the inter-orbital space: the inner angle of the lower border of the orbit is dentiform and strongly salient, and the lobule at the outer end of this border is ill-defined:

(5) the chelipeds are not much more than twice the length of the carapace (in the male); the hand has 5 spines on the upper surface, but two of them—those immediately behind the finger-joint—are tubercles rather than spines; the fingers of the larger cheliped are as long as the palm, those of the smaller cheliped are longer than the palm:

(6) in the last pair of legs the merus is nearly twice as long as broad and the posterior border of the propodite is serrated in a large part of its extent:

(7) the 6th abdominal tergum of the male is as long as or nearly as long as broad and has its sides parallel in about three-fourths of their extent.

From *Oharybdis quadrimaculata* this species is distinguished by the narrower carapace, by the smaller orbits and the different form of the lower orbital border, and by the greater length of the 6th tergum of the male abdomen.

In the Indian Museum are 7 specimens from Karachi and 1 from Bimlipatam, besides 1 from Penang. The carapace of the largest specimen is 48 millim. long and 70 millim. in extreme breadth.

But for high contrary authority, I should consider this species to be identical with the *Oancer sexdentatus* of Herbst's pl. vii. fig. 52.

32. *Oharybdis* (*Goniosoma*) *merguiensis*, de Man.

Goniosoma merguiense, de Man, Journ. Linn. Soc., Zool., XXII. 1887-88, p. 82, pl. v. fig. 3, 4, and Zool. Jahrb., Syst., 1894-95 p. 560.

Goniosoma Helleri, Henderson, Trans. Linn. Soc., Zool., (2) V. 1893, p. 375.

Very closely resembles *C. quadrimaculata*, but may be distinguished from that species by the following characters:—

- (1) the length of the carapace is two-thirds the breadth:
- (2) the frontal teeth, in the adult are more acute:
- (3) the little lobule at the outer end of the lower border of the orbit is not dentiform:

(4) there is an acute spine on the posterior border of the carpus of the last pair of legs (as well as the usual one on the merus):

(5) the 6th abdominal tergum of the male is, like that of *C. annulata*, as long as broad, or nearly so, with the sides parallel or slightly divergent in about three-fourths of their extent.

For the rest, this species differs from *C. crucifera* in the same particulars as *C. quadrimaculata* does, though the last spine of the antero-lateral border is often more prominent than in *C. quadrimaculata*.

In the Indian Museum are specimens, 22 in number from Mergui, Andamans, Karachi and the Persian Gulf—besides 1 from Singapore 2 from Hongkong. The largest has the carapace 46 millim. long and 69 millim. in extreme breadth.

But for high contrary authority I should have felt inclined to refer this species to the *Cancer fasciatus* of Herbst (Krabben III. i. 62, pl. xlix. fig. 5).

33. *Charybdis (Goniosoma) affinis*, Dana.

Charybdis affinis, Dana, Proc. Ac. Nat. Sci. Philad. 1852, p. 85, and U. S. Expl. Exp. Crust. pt. I. p. 286, pl. xvii. figs. 12 a-c.

Goniosoma affine, A. Milne Edwards, Archiv. du Mus. X. 1861, pp. 384, 385: de Man, Journ. Linn. Soc., Zool. XXII. 1887-88, p. 80, pl. V. fig. 2. and Zool. Jahrb., Syst., VIII. 1894-95, p. 559: J. E. Henderson, Trans. Linn. Soc., Zool. (2) V. 1893, p. 374.

Differs from *C. crucifera* in the following particulars:—

(1) the carapace is flatter, its transverse ridges are much more distinct and there is an additional one across the cardiac region, and the regions are better defined:

(2) the frontal teeth are more acute and are not so parallel:

(3) the first tooth of the antero-lateral border though distinctly emarginate anteriorly has its inner angle acute, and the last tooth is conspicuously larger and more prominent than the last but one, the other teeth are more regularly cut and the antero-lateral border as a whole is less oblique:

(4) the inner angle of the lower border of the orbit is distinctly dentiform:

(5) the chelipeds are only about twice the length of the carapace in the male: the hands are 6 or 7-costate and have 5 spines on the

upper surface, the palms are more swollen (in the adult) and in the smaller cheliped the fingers are decidedly longer than the palm:

(6) the surface of the carapace and chelipeds is much more pubescent, and the size is much smaller.

In the Indian Museum there are 6 specimens, from Mergui, Akyab, and the Orissa coast: the carapace of the largest is 32 millim. long and 48 millim. in extreme breadth.

34. *Charybdis (Goniosoma) callianassa* (Herbst) A. M. Edw.

† *Cancer callianassa*, Herbst, Krabben. III. ii. 45, pl. liv. fig. 7.

Goniosoma callianassa, A. Milne Edwards, Archiv. du Mus. X. 1861, pp. 382, 385 (part).

Goniosoma variegatum, Miers, Zool. H. M. S. Alert p. 232: Cano, Boll. Soc. Nat. Napoli, III. 1888, p. 219: Thallwitz, Abh. Zool. Mus. Dresden, 1890-91, No. 3, p. 47: Henderson, Trans. Linn. Soc., Zool., (2) V. 1893, p. 376.

A small species, the carapace usually being about 23 millim. long and about 36 millim. in extreme breadth.

Length of carapace about two-thirds the extreme breadth (except in the majority of adult females, in which the last spine of the antero-lateral borders is much prolonged).

Carapace decidedly convex, especially in its posterior half, covered with short pile and crossed transversely by fairly well marked very faintly granular ridges, which are disposed as in *C. crucifera*, except that there is an additional one across the cardiac region.

Front cut into six teeth (not including the inner supra-orbital angles) of which the middle two are slightly the most prominent, the second on either side are broadish with a strong outward slope, and the third on either side are the narrowest and most acute.

Antero-lateral borders cut into six teeth (including the outer orbital angle) of which the first is anteriorly notched with the inner angle acute, and the last is spinelike and from $1\frac{1}{2}$ to twice (in many adult females nearly three times) the length of the last but one: all the teeth have their free edges finally serrulate (except in the case of the posterior edge of the last).

The posterior border of the dorsal surface of the carapace forms a curve with the postero-lateral borders.

Orbits with a perceptible, but not strong, dorsal inclination: the major diameter is a little more than a third the width of the interorbital space: the inner angle of the lower border is dentiform, but the lobule at the outer end of this border is hardly distinguishable.

There is a granular ridge, but no tooth, on the lobule at the outer angle of the basal antenna-joint.

The chelipeds are about $2\frac{1}{2}$ times the length of the carapace (in the adult male), and when denuded are smooth and polished except for costæ on the wrist and hand, and for granules on the far end of the upper surface of the arm. There are only two enlarged spines on the anterior border of the arm, and the posterior border of the arm is spineless. Wrist with granular costæ on the upper and outer surface, with the inner angle strongly spiniform, and with three spinules at the outer angle. Palm inflated, barrel-shaped, 6-costate, the four upper costæ granular; only three spines—and those small—on the upper surface. Fingers of the larger cheliped a good deal shorter than the palm.

Merus of last pair of legs $\frac{3}{8}$ to $\frac{5}{8}$ as broad as long, with a spine, as usual, near the far end of the posterior border: the same border of the propodite is smooth.

The 2nd and 3rd abdominal terga in both sexes—as well as, to a less extent, the 4th in the female—are transversely carinate: the 6th tergum in the male is transversely oblong with the anterior (true posterior) angles rounded.

In the Indian Museum are 66 specimens, chiefly from the Madras and Orissa coasts, but also from Bombay and Karachi.

The carapace of an exceptionally large male is 29 millim. long and 46 millim. in extreme breadth.

This species is easily distinguished from *C. variagata* De Haan, with which it appears to have been confounded, by the following characters:—

(1) the carapace is very decidedly convex in its posterior half, the regions are less clearly defined, and there is only one transverse ridge on the epibranchial regions—namely the usual one that runs in from the last antero-lateral tooth:

(2) the four middle frontal teeth are blunter and more divergent, and the third on either side is larger and more prominent:

(3) the edges of the teeth of the antero-lateral border are serrulate:

(4) the eyes are smaller and the orbits have a much less marked dorsal inclination; the little lobule at the outer end of the lower border of the orbit is obsolete, instead of being a sharp independent denticle.

(5) there is a ridge, but no tooth, on the lobe of the basal antenna-joint.

(6) there are only 2 large spines on the anterior border of the arm, there are no squamiform granules on the under surface of the arm and hand, there are three spinules on the outer surface of the wrist; the palms are more inflated, their costæ less numerous and less salient, and both the spines immediately behind the finger-joint are obsolete:

(7) the sixth abdominal tergum of the male is transverse oblong with the anterior angles rounded off.

C. callianassa has a considerable resemblance to *C. affinis* Dana, from which it may be distinguished by the following characters:—

(1) the carapace is convex instead of nearly flat, the frontal teeth differ, and the teeth of the antero-lateral border are serrulate:

(2) the orbit is more dorsally inclined:

(3) there are only two enlarged spines on the anterior border of the arm: the hands are barrel-shaped and have only 3 spines on their upper surface:

(4) the 6th abdominal tergum of the male has the sides parallel or almost divergent in two-thirds of their extent, whereas in *C. affinis* they form gradually converging curves.

35. *Charybdis (Goniosoma) rostrata*, A. M. Edw.

Goniosoma rostratum, A. Milne Edwards, Archiv. du Mus. X. 1861, pp. 379, 385, pl. xxv. fig 2: J. R. Henderson, Trans. Linn. Soc., Zool., (2) V. 1893, p. 377.

A small species: the length of the carapace in adults being somewhere about 20 millim., and the extreme breadth about 25 millim.

Carapace about four-fifths as long as broad in the male, but not quite so long in the female, moderately convex, crossed transversely by granular ridges which are disposed as in *C. crucifera*, except that there is an additional one across the cardiac region (just as in *C. affinis* and *C. callianassa*), densely though finely pilose.

Front as a whole decidedly prominent, cut into six teeth (not including the inner supra-orbital angles), of which the middle two are bluntly pointed and project far beyond the others, the next on either side are broad and slope outwards, and the third on either side are small narrow and nearly straight.

Antero-lateral borders cut into six serrulate teeth, of which the first is very acute and the last is more spinelike than the others.

The posterior border of the dorsal surface of the carapace forms a curve with the postero-lateral borders.

Orbits without any particular dorsal inclination, the major diameter not much less than half the width of the interorbital space, the inner angle of the lower border dentiform, the lobule at the outer end of the lower border distinct but not dentiform.

A strongish granular ridge on the lobule of the basal antenna-joint.

Chelipeds less than twice as long as the carapace even in the male, nearly smooth when denuded. Arm with 2 spines on the anterior border and none on the posterior border. Wrist with a strong spine at the inner angle and with two—less commonly three—spinules at the outer angle. Hands inflated in the male, but not much so in the female,

6-costate, the four upper costæ granular; only two spines—and those small—on the upper surface of the hand. Fingers longer than the palm in the smaller cheliped, as long as the palm in the larger cheliped.

The merus of the last pair of legs is nearly as broad as long and has the usual spine on its posterior border; the posterior border of the propodite is smooth.

The 6th tergum of the male abdomen is broader than long and has curved and gradually convergent sides.

In the Indian Museum are 98 specimens, chiefly from the northern parts of the Bay of Bengal, Mergui, and the Gulf of Martaban, but also from off the Andamans and off Ceylon.

36. *Charybdis (Goniosoma) variegata* (De Haan).

? *Portunus variegatus*, Fabricius, Ent. Syst. Suppl. p. 364.

??? *Cancer callianassa*, Herbst. III. ii. 45, pl. liv. fig. 7.

? *Thalamita callianassa*, Milne Edwards, Hist. Nat. Crust. I. 464.

Charybdis variegatus, De Haan, Faun. Japon. Crust. pl. i. fig. 2: Stimpson, Proc. Ac. Nat. Sci. Philad. 1858, p. 39.

Goniosoma callianassa, A. Milne Edwards, Archiv. du Mus. X. 1861, pp. 382, 385 (part).

Goniosoma variegatum, var. *callianassa*, J. R. Henderson, Trans. Linn. Soc., Zool., (2) V. 1893, p. 377.

A small species: the carapace in the adult about 20 millim. long and about 35 millim. in extreme breadth.

Carapace about four-sevenths as long as broad (or about two-thirds as long as broad without the enlarged lateral spines), slightly convex, the regions for a *Goniosoma* well defined, crossed transversely by numerous salient granular ridges arranged as in *G. natutor*—the ridges standing out from the copious short pile with which the carapace is covered.

Front cut into 6 rather pointed teeth (not including the inner supra-orbital angles) of which the middle two are the most prominent and the outer one on either side is the least prominent and much the slenderest.

Antero-lateral borders cut into six teeth (including the outer orbital angle) which gradually increase in size from before backwards, the last being a salient spine about twice as long as the last but one—*Neptunus* like.

The posterior border of the dorsal surface of the carapace forms a curve with the postero-lateral borders.

Eyes large: the orbit, which has a strong dorsal inclination, is about two-fifths the width of the interorbital space; the inner angle of its

lower border, though not prominently dentiform, is acuminate, and the lobule at the outer end of this border is sharply dentiform.

There is a prominent tooth on the lobule at the outer angle of the basal antennal joint: this is present in no other Indian species.

Chelipeds about $2\frac{1}{2}$ times the length of the carapace (in the male): all three surfaces of the arm and almost all parts of the surface of the hand are covered with granular squamiform markings. Arm with 3 enlarged spines on the anterior border, the posterior unarmed. Wrist costate on the upper and outer surface; the inner angle spiniform; only two spinules at the outer angle. Hands (in adults only) more than usually unequal for a *Goniosoma*: in one cheliped (adult) the palm is swollen and markedly longer than the fingers, in the other it is not swollen and is not much longer than the fingers: the hand is 7-costate and there are 4 spines on its upper surface.

The merus of the last pair of legs is about four-fifths as broad as long and has a spine near the distal end of its posterior border, the propodite has one or two inconspicuous spinules near the far end of its posterior border.

In both sexes the 2nd and 3rd abdominal terga are transversely keeled: in the male the 6th tergum is a good deal broader than long and has strongly curved sides.

In the Indian Museum are 43 specimens from the Madras coast and the Persian Gulf, besides one from Nagasaki and one from Hongkong.

37. *Charybdis* (*Goniosoma*) *natator* (Herbst) A. M. Edw.

Cancer natator, Herbst, Krabben. II. v. 156, pl. xl. fig. 1.

Portunus sanguinolentus, Bosc, Hist. Nat. Crust. I. p. 218.

Thalassita natator, Milne Edwards, Hist. Nat. Crust. I. 463, pl. xvii. figs. 13, 14.

Charybdis natator, De Haan, Faun. Japon. Crust. p. 10.

Charybdis granulatus, De Haan, Faun. Japon. Crust. p. 42, pl. i. fig. 1: Krauss, Sadafr. Crust. p. 24: Stimpson, Proc. Ac. Nat. Sci. Philad. 1853, p. 39.

Goniosoma natator, A. Milne Edwards, Archiv. du Mus. X. 1861, pp. 370, 385: Hilgendorf, MB. Ak. Berl. 1878, p. 801: Miers, Zool. H. M. S. Alert, pp. 513, 539: F. Muller, Verh. Ges. Nat. Basel, VIII. 1886, p. 475: de Man, Archiv. f. Naturges. LIII. 1887, i. p. 334, pl. xiii. fig. 5, and in Weber's Zool. Ergebn. Niederl. Ost.-Ind. II. 1892, p. 285: Walker, Journ. Linn. Soc. Zool. XX. p. 110: J. R. Henderson, Trans. Linn. Soc., Zool., (2) V. 1893, p. 374.

Length of carapace about five-sevenths the breadth.

Carapace slightly convex, with a somewhat mangy pile, crossed transversely by several rather coarse granular more or less broken ridges: the most conspicuous of these ridges runs—broken only by the cervical groove—right across between the last teeth of the antero-lateral borders, and in front of this are two—the anterior one widely divided in the middle—on the gastric region, while behind it are two short ones

on either branchial region and a bow-shaped one on the cardiac region.

Front cut into 6 bluntly-rounded teeth (not including the inner supra-orbital angles) of nearly equal size.

Antero-lateral borders cut into 6 teeth, of which the first (the outer orbital angle) is blunt or truncated, the last is rather smaller than those immediately in front, and the intervening four though anteriorly acute—especially in the young—tend to grow blunt.

The posterior border of the dorsal surface of the carapace forms a curve with the postero-lateral borders.

Orbit without any particular dorsal inclination, its major diameter is about two-sevenths the width of the interorbital space: the inner angle of the lower border is not prominent and hardly dentiform, the lobe at the outer end of this border though well defined is not dentiform.

Chelipeds about $2\frac{1}{2}$ times as long as the carapace (in the adult male), their under surface is covered with transverse squamiform tubercles which are specially regular and distinct on the hand, their other surfaces also are beset with tubercles which are more or less distinctly squamiform: the space between the tubercles is furred. Three enlarged teeth (besides smaller ones) on the anterior border of the arm, the posterior border unarmed. Inner angle of wrist strongly spiniform, outer angle with three small spines. Hand beset with longitudinal series of tubercles, and having 4 or 5 spines on the upper surface: fingers about as long as hand.

The merus of the last pair of legs is about two-thirds as broad as long and has a strong spine on the posterior border, and the same border of the propodite is armed with spinules that become very indistinct with age.

In both sexes the 2nd-4th abdominal terga are transversely keeled: in the male the 6th tergum is as long as broad and has the sides parallel or even slightly divergent in three-fourths of their extent.

Colours in spirit, mottled, with much admixture of red, the ridges of the carapace dark red.

In the Indian Museum are 10 specimens from Ceylon, Madras, and Pondicherry, besides 1 from Singapore. In the largest specimens the carapace is about 70 millim. long and about 100 millim. broad.

38. *Charybdis* (*Goniosoma*) *miles* (De Haan).

Portunus (*Charybdis*) *miles*, de Haan, Faun. Japon. Crust. p. 41, pl. xi. fig. 1: Stimpson Proc. Ac. Nat. Sci. Philad. 1858, p. 39.

Goniosoma miles, A. Milne Edwards, Archiv. du Mus. X. 1861, pp. 378, 385: Ortmann, Zool. Jahrb., Syst., VII. 1893, p. 81.

Size medium: an adult female in the Indian Museum has the carapace 43 millim. long and 59 millim. broad.

Carapace not very broad, its length about three-fourths its breadth, little convex, smooth or granular in places when denuded of copious short pile; its anterior half only is crossed transversely by faint granular lines disposed as in *O. crucifera*.

Front cut into six acute teeth, not including the acutely dentiform inner supra-orbital angles, of which the two middle ones hardly project beyond the others and the outermost on either side are the narrowest and most acute.

Antero-lateral borders very little oblique, cut into 6 acutely acuminate teeth, of which the first (the outer orbital angle) is broad and anteriorly notched with the inner angle acuminate, and the last is not larger or more prominent than the others.

The posterior border of the dorsal surface of the carapace forms a curve with the postero-lateral borders.

Eyes large: the orbit has a considerable dorsal inclination and its major diameter is nearly half the width of the interorbital space; of the two fissures in its roof the inner is a distinct gap; the inner angle of the lower border is acutely dentiform.

The antero-external angle of the merus of the external maxillipeds is somewhat produced laterally.

The chelipeds are long and, for a *Goniosoma*, are slender; their undersurface is finely granular (as also is a large part of the upper surface of the arm) the granules of the hand showing a squamiform arrangement. The arm has four large spines on the anterior border and a spinule at the end of the lower border, but the posterior border is unarmed. The hand is 6-costate, most of the costæ being finely granular, and has 4 acute spines on the upper surface. Fingers slender, very acute, sharply toothed, longer than the palm, which is not swollen.

The last pair of legs have the merus about two-thirds as long as broad and are unarmed except for a spine on the posterior border of the merus and two or three denticles near the far end of the posterior border of the propodite.

The 6th tergum of the male abdomen is much broader than long and has curved and gradually converging sides.

Colours in life red, the tips of spines light, chelipeds mottled red, fingers banded dark and light red.

In the Indian Museum are a male and egg-laden female from the Gulf of Martaban, 53 and 67 fms.

39. *Charybdis (Goniosoma) orientalis* (Dana).

? *Charybdis orientalis*, Dana, Proc. Ac. Nat. Sci. Philad. 1852, p. 65, and U. S. Expl. Exp. Crust. pt. I. p. 285, pl. xvii. fig. 10.

Goniosoma orientale, A. Milne Edwards, Archiv. du Mus. X. 1861, pp. 383, 385: