

## Subfamily I. CARCININÆ.

## CARCINUS, Leach.

*Carcinus*, Leach, Malac. Podophth. Brit. Text of pl. V.: Desmarest, Consid. Gen. Crust. p. 90: Milne Edwards, Hist. Nat. Crust. I. 433: De Haan, Faun. Japon. Crust. p. 13: Bell, British Stalk-eyed Crust. p. 75: A. Milne Edwards, Ann. Sci. Nat., Zool., (4) XIV. 1860, pp. 228, 265; and Archiv. du Mus. X. 1861, p. 390.

*Carcinides*, M. J. Rathbun, Proc. Biol. Soc. Washington XI. 1897, p. 164 (*new name proposed*).

Carapace approaching the hexagonal, not broad, slightly but distinctly convex, the regions fairly well-defined (well-defined for a Portunoid), no distinct transverse ridges.

Front proper fairly well defined from the inner supra-orbital angles beyond which it projects slightly, three lobed, between a fourth and a fifth the greatest breadth of the carapace in width.

Antero-lateral borders thin, oblique, arched, cut into five teeth including the outer orbital angles, shorter than the postero-lateral borders.

Orbits with one faint notch in the upper and one in the concave lower border, the inner angle of the lower border dentiform but not very prominent. The antennules fold obliquely, but nearer the transverse than the longitudinal.

Basal antenna-joint slightly longer than broad, fixed; the flagellum, which is not very long, stands in the orbital hiatus.

Buccal cavern square, its greatest length a little more than its greatest breadth: the external maxillipeds are rather elongate, especially the merus which projects somewhat beyond the level of the edge of the endostome: epistome lozenge-shaped. The ridges that define the efferent branchial canals do not approach the edge of the endostome.

Chelipeds massive, just shorter than any of the first three pairs of legs, slightly unequal: arm short, without any spines: inner angle of wrist alone spiniform: no spines on the hand, which is deep and not prismatic: fingers stout, a little shorter than the palm, not very strongly toothed.

Legs stoutish: the last pair have the merus elongate and unarmed, the carpus not dilated, the propodite shortened and somewhat broadened, and the dactylus acutely lanceolate.

The abdomen of the male consists of five pieces, the 3rd-5th terga being fused.

*Carcinus* exhibits the relation of the Portunidæ to other Cyclo-metopan families, being related to *Pirimela* among the Cancridæ and to *Hoploxanthus* among the Xanthidæ.

I. *Carcinus mœnas*, (Linn.).

*Cancer marinus sulcatus*, Rumph, Amboinsch. Bariteitk. pl. vi. fig. O.

*Cancer mœnas*, Linnæus, Fauna Suecica p. 492; Mus. Ludov. Ulric. p. 486; and Syst. Nat. (xii) I. p. 1048: ["Pennant Brit. Zool. IV. p. 8, pl. iii. fig. 5" sec. Milne Edwards]: Baster, Naturkundige Uitspanningen Zeeplanten en Zee Insekten, Haarlem, 1765, II. pl. ii. figs. 1-3: Herbst, Krabben, I. ii. 145, pl. vii. fig. 46: Fabricius, Ent. Syst. II. p. 450, and Suppl. p. 334: Bosc, Hist. Nat. Crust. I. p. 173, pl. iii. fig. 1: Latroille, Hist. Nat. Crust. V. p. 368: Risso, Hist. Nat. Crust. Nice, p. 12: Lamarck, Hist. Nat. Anim. sans Vertèbr. V. Crust. p. 270: Dumeril in Dict. Sci. Nat. XI. 1818, p. 299: de Brebisson, Mem. Soc. Linn. Calvados, 1825, p. 233.

*Portunus mœnas* ["Leach, Edinb. Encycl. VII. p. 390" sec. Milne Edwards]: Costa, Faun. Regn. Napoli, Crust. Brach. p. 7.

*Carcinus mœnas*, ["Leach, Edinb. Encycl. VII. p. 429" sec. Milne Edwards]; and Trans. Linn. Soc. XI. 1815, p. 814; and Malac. Pod. Brit. pl. v: Desmarest, in Dict. Sci. Nat. XXVIII. 1823, p. 217; and Consid. Gen. Crust. p. 91: Risso, Hist. Nat. Eur. Mèrid V. Crust. p. 7: Audouin, Explic. p. 84: Savigny Desor. Egypt. Crust. pl. iv. fig. 8: Milne Edwards in Ouvier Règne Anim. pl. x. fig. 3 and Hist. Nat. Crust. I. 434: ["Gould, Report on the Invertebrata of Massachusetts, p. 321" sec. A. Milne Edwards]: De Kay, Zoology of New York, pt. VI. Crust. p. 8, pl. v. figs. 5, 6: Lucas, Hist. Anim. Art. in Expl. Sci. Algeria, Zool. I. i. p. 13; and Hist. Nat. Anim. Art. p. 95: Bell, British Stalk-eyed Crust. p. 76: Salter, Journ. Linn. Soc., Zool., IV. 1860, p. 34 (*process of moulting*): A. Milne Edwards, Archiv. du Mus. X. 1861, p. 391: Van Beneden, Rech. Faun. Litt. Belg. p. 133: Holler, Crust. Sndl. Europ. p. 91, pl. II. figs. 14, 15; and Novara Crust. p. 30: W. C. McIntosh, Trans. Linn. Soc. XXIV. 1864, p. 79, pl. xix., xx. (*on the various kinds of hairs*): Sars, vide Zool. Rec. III. 1863, p. 224: Nardo, Annot. Crust. p. 87: Wood-Mason, Proc. Asiatic Soc. Bengal, 1873, p. 172, and Ann. Mag. Nat. Hist. (4) XII. 1874, p. 406: Brocchi, Ann. Sci. Nat. (6) II. 1875, Art. 2, p. 62, pl. xvi. figs. 89, 90, 100, 101. (*male parts*): Streets, Bull. U. S. Nat. Mus. VII. 1877, p. 109: Meinert, Nat. Tids., Copenhagen, (3) XI. 1877, p. 222, and (3) XII. 1879, p. 507: Kingsley, Proc. Ac. Nat. Sci. Philad. XXX. 1878, p. 321, and XXXI. 1879, p. 398; Nauok, Zeits. Wiss. Zool. XXXIV. 1880, p. 53 (*gastric teeth*): Boas, Stud. Decapod. (Vid. Selsk. Skr. (6) I. 2) p. 141: S. I. Smith, Trans. Conn. Acad. V. p. 34: Carrington and Lovett, Zoologist (3) VI. 1882, p. 12: Carns, Prodr. Faun. Medit. I. p. 518: Cano, Boll. Soc. Nat. Napol. III. 1889, p. 222: Mobius, SB. AK. Berl. 1893, pp. 75, 76: Ortmann, Zool. Jahrb. Syst., etc., VII. 1893-94, p. 423: Birula, Ann. Mus. Zool. Petersb. 1897, p. 448.

Carapace about three-fourths as long as broad, the regions fairly well defined, the gastric being divided into three areolæ, the surface finely granular, especially in the anterior half.

Front cut into three lobes, of which the middle one is acuminate.

Antero-lateral borders rather shorter than the postero-lateral, cut into five anteriorly-acuminate teeth. Posterior border forming a curve with the postero-lateral borders.

Orbits without any particular dorsal inclination, their major diameter about half the width of the inter-orbital space. Antennal flagella about  $1\frac{1}{2}$  times the length of the orbit.

Chelipeds a little unequal, the longer one is less than  $1\frac{1}{2}$  times the length of the carapace: the inner angle of the wrist is spiniform and there are two costæ along the upper surface of the hand, otherwise they are smooth and unsculptured. Palm deep and full, but not inflated, fingers stout, nearly as long as the palm in the shorter cheliped only.

Legs stout, smooth, unarmed: the 2nd and 3rd pairs, which are the longest, are about  $1\frac{1}{2}$  times the length of the carapace: the fourth pair, which are also slightly longer than the larger cheliped, are a little shorter than the first pair.

Sixth abdominal tergum of male about twice as broad as long, with gradually convergent sides.

In the Indian Museum is a single male from Galle (Ceylon), besides numerous specimens from the Mediterranean and the North Sea.

The geographical distribution of *Carcinus mænas* has been referred to by several of the authors above-cited. The species has been found at various places on the Atlantic coast of the Northern United States and off the coast of Pernambuco (Brazil): it is the common shore-crab of the British Islands, and occurs in the North Sea almost up to Arctic limits, in the Baltic, and on the Atlantic coasts of the European continent: it is common in all parts of the Mediterranean, and has been found in the Black Sea and the Red Sea: it is an Indian species, though evidently a very rare one, and has been reported from the Hawaiian Islands, from the Bay of Panama, and—though there is doubt about this locality—from Australia.

Its range in fact corresponds very nearly with that of the Macrurid fish *Macrurus (Malacocephalus) lævis* Lowe, and recalls that of the Perciform fish *Lobotes surinamensis*.

In an *Account of the Investigator Deep Sea Madreporaria*, recently published by the Trustees of the Indian Museum, I have given lists of 43 species of marine animals that are common to the slopes (including both American and European sides) of the Atlantic and of the Oriental Region and Western Pacific, and in a subsequent *Account of the Investigator Deep Sea Brachyura*, also published by the Trustees of the Indian Museum, I have added several species of Crabs that are found both in American-Atlantic and in East-Indian waters: moreover, Captain A. R. S. Anderson, who is engaged in examining the Investigator Echinoids, has discovered some interesting affinities between the West-Indian, the Mediterranean, and the Oriental Echinoid fauna. So that the distribution of *Carcinus mænas* is not so singular as has been supposed.

The significance of this distribution has been discussed in the works just cited: it is emphasized by the fact that *Carcinus mænas* is a shore-crab.

## Sub-family II. PORTUNINÆ.

## BENTHOCHASCON, Alcock.

*Benthochascon Hemingi*, Alcock and Anderson, Ann. Mag. Nat. Hist., Jan. 1899, p. 10.

*Benthochascon*, Alcock, Investigator Deep Sea Brachyura, p. 68.

Carapace sub-quadrate, nearly as broad as long, its anterior portion arched and declivous, its posterior portion flat, the regions hardly defined: no transverse ridges.

Front not very well demarcated from the inner supra-orbital angles, about a fourth the greatest breadth of the carapace in width, cut into 3 (or 4) teeth.

Antero-lateral borders much shorter than the postero-lateral, cut into four teeth including the outer orbital angle. Posterior border broadly excised.

Orbits with indistinct traces of two grooves in the upper border, the lower border concave with the inner angle dentiform and prominent. The antennules fold nearly transversely.

Basal antennal joint short, but longer than broad, freely movable; the flagellum, which is not very long, stands in the orbital hiatus.

Epistome of good length fore-and-aft, not only in the middle but at the sides, well delimited from the palate, not encroached upon by the external maxillipeds. Buccal cavern square, rather broader than long; the external maxillipeds not elongate, their merus as broad as long. The efferent branchial channels defined by ridges.

Chelipeds massive, shorter than any of the first 3 pair of legs, slightly unequal: arm short, without spines: inner angle of wrist alone spiniform: hand deep, smooth or nearly so: fingers stout, as long as or longer than hand, strongly toothed.

Legs stoutish: in the last pair the merus is elongate, the carpus is shortened and somewhat broadened, and the propodite and dactylus are typically foliaceous for swimming.

2. *Benthochascon Hemingi*, Alcock and Anderson.

*Benthochascon Hemingi*, Alcock and Anderson, Ann. Mag. Nat. Hist., January, 1899, p. 10: Alcock, Investigator Deep Sea Brachyura, p. 69, pl. iii. fig. 2.

Carapace almost as broad as long, smooth (though finely frosted) except for slight inequalities of level that scarcely define the regions, strongly declivous in its anterior third.

Front cut into three lobes of which the middle one is bifid at tip: the front is separated from the inner supra-orbital angles by a groove, not by a notch.

Antero-lateral borders considerably less than two-thirds the length of the postero-lateral, cut into four teeth (including the outer orbital angle) of which the last is spiniform and is rather remote from the others.

Posterior border peculiar in being quite flush with the surface of the carapace, and concave or broadly excised.

Orbits large, their major diameter three-fourths the width of the front, without any dorsal inclination: there are two indistinct grooves in the upper border, and the lower border is concave with the inner angle prominent and acutely dentiform. Eyes large, placed mostly on the ventral surface of the eyestalk.

Antennal flagella not much longer than the orbit.

The external maxillipeds fall considerably short of the anterior edge of the palate.

Chelipeds somewhat unequal, the larger one is between  $1\frac{1}{2}$  and  $1\frac{2}{3}$  times the length of the carapace: except for a sharp tooth at the inner angle of the wrist, and for a small sharpish tubercle at the far end of the sharply-defined inner border of the hand, they are smooth and unsculptured. The hands are full and very deep: the fingers are stout but end in acute hooked tips: in the smaller cheliped, but not in the larger cheliped, they are longer than the hand.

Legs stoutish, compressed, a notch and tooth at the far end of the anterior border of the merus of all. The 2nd pair, which are slightly longer than the 1st and 3rd, are from  $1\frac{2}{3}$  times to twice the length of the carapace: all three end in a very acute styliform dactylus. The 4th pair, which are about equal in length to the chelipeds, have the merus four times as long as broad, the carpus not particularly dilated, and the propodite and dactylus typically foliaceous and blade-like, the dactylus however ending in an acutely mucronate tip: the posterior border of the merus is unarmed.

In the Indian Museum are two specimens, both females, from the Andaman Sea 185 and 405 fms. The carapace of the larger one is 48 millim. long and 51 millim. broad.

#### PARATHRANITES, Miers.

*Lupocyclus (Parathranites) orientalis*, Miers, Challenger Brachyura, p. 186.

Carapace hexagonal, convex, moderately transverse, the regions well defined and with some definitely-placed tubercles but no transverse ridges.

The front, which projects beyond the ill-defined inner supra-orbital angles, is less than a fourth the greatest breadth of the carapace in width, and is cut into four teeth.

Antero-lateral borders oblique, not much curved, cut into five teeth including the outer orbital angles.

Orbits with two wide fissures in the upper margin, the lower margin concave with the inner angle dentiform and prominent. The antennules fold transversely.

Basal antennal joint longer than broad, slender, not nearly filling the orbital hiatus, movable; the flagellum, which stands in the orbital hiatus, long.

Epistome short fore and aft, sunk; though well enough delimited from the palate somewhat encroached upon by the external maxillipeds. Buccal cavern square, its greatest length about equals its greatest breadth: external maxillipeds rather elongate, especially the merus.

Chelipeds moderately massive, shorter than any of the first 3 pair of legs; arm wrist and hand with spines; hand prismatic, fingers stout and strongly toothed.

Legs long and slender: in the fourth pair the merus and carpus though shortened are not much broadened, and the propodite and dactylus are foliaceous and typically paddle-like.

The abdomen of the male consists of 5 segments, the 3rd-5th terga being fused.

As Miers says, this genus is allied to *Bathynectes*: in fact it is nearer to *Bathynectes* than to *Lupocyclus*.

### 3. *Parathranites orientalis*, Miers.

*Lupocyclus (Parathranites) orientalis*, Miers, Challenger Brachyura, p. 186, pl. xvii, fig. 1.

Carapace about three-fourths as long as broad (spines included), decidedly convex, the regions well demarcated, the surface granular and somewhat hairy—especially at the antero-lateral margins. There is always a tubercle in the middle line on the posterior part of the gastric region and sometimes three, in a transverse series, in front of it: there are one, or two close side-by-side, in the middle of the cardiac region, and from two to four in a fairly longitudinal series along the inner limit of either epibranchial region.

Front hardly delimited from the almost obsolete inner supra-orbital angles beyond which it projects, cut into four horizontal subacute teeth of nearly equal size.

Antero-lateral borders cut into 5 teeth, of which the first (the outer orbital angle) is remarkably prominent, the next three are very acutely anteriorly-acuminate, and the last—equally acute—stands out nearly at right angles to the others.

Posterior border nearly straight, making a dentiform angle of junction with the postero-lateral borders.

Orbits deep, without any particular dorsal inclination, their major diameter nearly equal to the width of the front; the inner angle of the lower border bilobed, the inner lobe dentiform and projecting beyond the level of the tips of the frontal teeth.

Merus of external maxillipeds produced a good deal beyond the articulation of the flagellum.

Chelipeds moderately massive, their length not  $1\frac{1}{2}$  times that of the carapace: a spinule at the far end of the anterior border of the ischium: a spine near the middle of the anterior border, and a spinule near the far end of the posterior border, of the arm: the inner angle of the wrist is produced to form a spine nearly half as long as the palm, and on the outer surface of the wrist are 3 spinules of which one is almost a spine: hand not inflated, its upper surface with 2 costæ and 3 spines of which the one at the far end of the inner border is the largest; a faint ridge along the outer surface of the hand, and one or two along the inner surface: fingers stout, nearly as long as the hand.

First 3 pair of legs long and slender, the first pair well over twice the length of the carapace. The fourth pair are very little shorter than the chelipeds and have the merus slender and quite unarmed.

2nd and 3rd abdominal terga strongly carinated in both sexes: the 6th tergum of the adult male is nearly as long as broad and has nearly parallel sides.

Colours in life salmon-pink above, tips of spines red.

In the Indian Museum are 54 specimens from off the Malabar coast 56-68 fms., off the Coromandel coast 33 fms., and from the Andamans.

The carapace of the largest specimen is 12 millim. long and 17 millim. broad.

### Sub-family II. CAPHYRINÆ.

#### LISSOCARCINUS. Adams and White.

*Lissocarcinus*, Adams and White, Samarang Crust. p. 45: A. Milne Edwards, Ann. Sci. Nat. Zool., (4) XIV, 1860, p. 228, and Archiv. du Mus. X. 1861, p. 417: Miers, Challenger Brachyura, p. 204.

*Asecla*, Streets, Bull. U. S. Nat. Mus. VII. 1877, p. 110.

Carapace either not, or very little, broader than long, smooth or with a single ridge running obliquely inwards from the last tooth of either antero-lateral border.

Front prominent beyond the inner supra-orbital angles which may be either well or rather ill defined, laminar, subentire or distinctly notched

in the middle line, its breadth (exclusive of the inner supra-orbital angles) is from half to a third the greatest width of the carapace.

Antero-lateral borders little oblique, moderately arched, cut into five lobes or teeth, including the outer orbital angle.

Basal antenna-joint short but not peculiarly broad, its outer angle is produced as a lobule that meets the front and fills the orbital hiatus so as to exclude the flagellum.

The two fissures in the upper edge of the orbit may be distinct, or may be almost indistinguishable. The antennules fold nearly transversely or a little obliquely.

Epistome short, and though well enough demarcated from the palate, somewhat overlapped by the external maxillipeds. Buccal cavern squarish, broader than long, the efferent branchial channels well defined.

Chelipeds short, but a little longer than the legs: arm short, without any distinct spines, only the inner angle of wrist dentiform; palm not prismatic, fingers stout and rather shorter than the palm.

The propodite and dactylus of the last pair of legs are typically foliaceous swimming paddles, but the carpus and merus are not particularly dilated.

The abdomen of the male consists of 5 pieces, the 3rd-5th terga being fused.

*Lissocarcinus* is distinguished from *Thalamonys* chiefly by the sub-circular or obovate carapace and by the stumpy little sculptured chelipeds.

#### *Key to the Indian species of Lissocarcinus.*

- I. Carapace as long as broad, flat, obovate; front broadly triangular, notched at tip ... .. *L. polybioides*.
- II. Carapace broader than long, convex:—
  1. Carapace sub-rotund; front sub-entire, being dorsally grooved but not notched in the middle line, supra-orbital angles obscurely defined ... .. *L. orbicularis*.
  2. Carapace distinctly broader than long; front cut into two broad lobes exclusive of the well defined dentiform supra-orbital angles ... .. *L. levis*.

#### 4. *Lissocarcinus polybioides*, Adams and White.

*Lissocarcinus polybioides*, Adams and White, Samarang Crust. p. 46, pl. xi. fig. 5: A. Milne Edwards, Archiv. du Mus. X. 1861, p. 417: Haswell, Cat. Austral. Crust. p. 83: Miers, Challenger Brachyura, p. 205: J. R. Henderson, Trans. Linn. Soc. Zool., (2) V. 1893, p. 378.



Carapace as long as broad, obovate with the posterior part truncated and much constricted, flat, smooth except for a low transverse ridge passing obliquely inwards from the last tooth of either antero-lateral border.

Front projecting far beyond the well pronounced inner supra-orbital angles, lamellar, horizontal, broadly triangular with the apex rather deeply notched: its breadth (not including the inner supra-orbital angles) is a little less than half the greatest breadth of the carapace.

Antero-lateral borders curved, cut into 5 anteriorly acuminate teeth (including the outer orbital angles) of which the first is the largest and the 5th the smallest.

Posterior border of dorsum of carapace forming a curve with the postero-lateral borders.

Orbits small, their major diameter less than a third the width of the inter-orbital space; two faint grooves in the upper border, the inner angle of the lower border dentiform but not prominent.

Chelipeds moderately stout, longer and stouter than the legs, a little longer than the carapace: inner angle of wrist dentiform, two or three little points—of which one is slightly larger than the others—on the outer angle: hand smooth, except for 2 crests—each of which ends in a tooth—on the upper surface, and for a small tubercle in front of the apex of the wrist-joint: fingers stout, a little shorter than the palm.

Merns of last pair of legs twice as long as broad, its posterior border, like that of the propodite, is smooth and unarmed.

6th abdominal tergum of male longer than broad, with slightly-curved gradually convergent sides.

Sternum elongate-oval particularly so in the male.

In the Indian Museum are 11 specimens, from Madras, from Orissa and Gaujam coasts 13-28 fms., from Malabar coast 28 fms., and from the Andamans.

A small species: the carapace of an egg-laden female is 7 millim. in both diameters.

##### 5. *Lissocarcinus orbicularis*, Dana.

*Lissocarcinus orbicularis*, Dana, Proc. Ac. Nat. Sci. Philad. 1852, p. 86, and U. S. Expl. Exp. Crust. pt. I. p. 288, pl. xviii. fig. 1a-e: A. Milne Edwards, Archiv. du Mus. X. 1861, p. 418: Richters in Mobius Meereaf. Maurit. p. 154: Miers, Zool. H. M. S. Alert, pp. 518, 541, and P. Z. S. 1884, pp. 10, 12, and Challenger Brachyura, p. 205: Ortmann, Zool. Jahrb., Syst., VII. 1893-94, p. 87.

*Lissocarcinus pulchellus*, Muller, Verh. Nat. Ges. Basel, VIII. pp. 475, 482, pl. v. fig. 6.

Carapace slightly broader than long, sub-circular, convex with thin edges, smooth except for a more or less distinct ridge or elevation running obliquely inwards from the last tooth of either antero-lateral border.

Front projecting a little beyond the supra-orbital angles (which are not well pronounced), arched, entire though dorsally concave in the middle line, its breadth is between a half and a third the greatest breadth of the carapace.

Antero-lateral borders curved, divided into five lobes, or, rather, broad flat puckers.

Orbits small, their major diameter is about a fourth the width of the inter-orbital space: two closed fissures near the outer end of the upper margin; inner angle of lower margin dentiform but not prominent.

Antennal flagella short.

Chelipeds a little longer than the carapace: inner angle of wrist dentiform: upper surface of hand with two carinæ, each ending in a blunt tooth, there is also a little tubercle in front of the apex of the wrist joint and an obscure ridge along the outer surface: fingers stout, a little shorter than the palm, the dactylus sharply carinate dorsally.

Legs stout, slightly shorter than the chelipeds, the merus of the last pair is about twice as long as broad and its posterior border, like that of the propodite, is smooth.

Colours very characteristic: carapace dark maroon (chocolate in spirit) with symmetrical yellow markings, chelipeds and legs cross-banded yellow and maroon.

In the Indian Museum is a single egg-laden female from Kiltán I. (Laccadives): its carapace is 10 millim. long and 11.5 millim. broad.

#### 6. *Lissocarcinus laevis*, Miers.

*Lissocarcinus laevis*, Miers, Challenger Brachyura, p. 205, pl. xvii, fig 3: J. E. Henderson, Trans. Linn. Soc. Zool., (2) V. 1893, p. 378.

Carapace distinctly broader than long, convex, perfectly smooth.

Front a little prominent beyond the well pronounced supra-orbital angles, divided into two broad lobes, its breadth (not including the supra-orbital angles) is barely a third the greatest breadth of the carapace.

Antero-lateral borders curved, cut into 5 blunt lobes, of which the first and last are the smallest.

Orbits large, their major diameter nearly half the width of the inter-orbital space, their upper border entire, though traces of the two sutures may be visible.