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MATERIALS

FOR A

CARCINOLOGICAL FAUNA OF INDIA.

No. 6.

THE BRACHYURA CATOMETOPA

OR

GRAPSOIDEA.

BY

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XVI.—Materials for a Carcinological Fauna of India. No. 6. *The Brachyura Catometopa, or Grapsoidea.*—By A. ALCOCK, M.B.,
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In treating the Catometopes I have in the main followed the scheme of Milne Edwards (*Annales des Sciences Naturelles* for 1852 and 1853) as modified by Dana, and I may introduce this paper with a statement of the points at which it deviates from the former of those classical works.

In the first place, following Dana and most subsequent authors, I have evicted the *Telphusidæ*. With them must also go *Gecarcinucus*, which is an undoubted Telphusoid, although it is persistently ranked with the *Geocarcinidæ*.

Again I have followed the lead of Dana in his treatment of the *Gonoplacæa* of Milne Edwards, the genera of which are distributed among the *Ocypodidæ* and the Sesarmine *Grapsoidæ*, while *Gonoplax* itself is relegated to the *Carcinoplacidæ*.

This step necessitates a considerable enlargement of Milne Edwards' group of *Carcinoplacinæ*, and a reconstruction of his *Ocypodinæ*, and in carrying this out I have in the main followed Dana's admirable system.

The isolation of *Myctiris* as an independent family, which was first suggested by Dana, is here accented, but at the same time I fully agree with Milne Edwards estimate of this singular form as a "satellite" of the *Ocypodoids*.

In grouping the genera of the *Grapsidæ* I have departed very little from the arrangement of Milne Edwards, who recognized—though his successors have ignored it—the independence of the *Varuna* group.

I have adopted Dana's family of *Geocarcinidæ*, but with some hesitation, for Milne Edwards' estimation of the group as a subfamily of *Grapsidæ* has much to recommend it.

I gladly follow Milne Edwards in recognizing the *Hymenosoma* group as a *tribu principale* not distantly related to the *Ocypodes* and quite distinct from and independent of the *Pinnoteræ* group.

As regards additions to the *Catometopa* as known to and recognized by Milne Edwards, I may mention the *Rhizopinæ* (Stimpson, Miers), the *Hexapodinæ*, the *Palicidæ* (which include *Cymopolia* formerly classed with the *Dorippidæ*), and the new family *Ptenoplacidæ*.

From the system of Dana I would dissent only in separating the *Hymenosoma*-group from the *Pinnoteridæ*; in enlarging the *Scopimerinæ* (= *Dotinæ*) at the expense of the *Ocypodidæ*; in splitting the *Grapsinæ* into two equal groups,—one round *Grapsus*, the other round *Varuna*; and in removing *Gecarcinucus* from the *Geocarcinidæ*.

The scheme of classification proposed by Miers seems to me to, too often, disregard natural relations without facilitating the recognition of species by way of compensation.

The most conspicuous instance is the family *Pinnoteridæ*, in which we find *Pinnoteræ* and its kindred included with such undoubted *Ocypodoids* as *Dotilla* and *Scopimera*, with *Mictyris*, with *Hymenosoma* and its allies, and finally with *Hexapus* whose affinities are quite clearly with the *Rhizopinæ*.

Again by the exclusion of *Scopimera* and *Dotilla* and by the inclusion of the *Gonoplacidæ*, Miers family of *Ocypodidæ* becomes unnatural and incomplete.

I follow Miers in treating the *Rhizopinæ* as a subfamily of *Carcinoplacidæ*.

Ortmann obviates some difficulties by separating *Gonoplax* and *Ommatocarcinus* from the *Carcinoplacidæ* as a distinct family, and by altogether removing the *Hymenosomidæ* from the *Catometopes*. By the latter step his *Pinnoteridæ* gain in natural value, as they further do by the restoration of *Scopimera* and *Dotilla* to their place among the

Ocypodoids; so that both his *Pinnotheridæ* and *Ocypodidæ* are far more natural families than those of Miers. I am doubtful, however, whether Ortmann has assigned its full rank to *Mictyris*, or their proper place to the *Hexapodinæ*.

The Catometope crabs of the Indian fauna number about 140, of which 136 are noticed in the present paper. Of these, 31 are new to science, and include 2 species of *Libystes*, 1 of *Psopheticus*, 2 of *Litochira*, 1 of *Notonyx*, 1 of *Ceratoplax*, 1 of *Typhlocarcinus*, 2 of *Pinnotheres*, 3 of *Dotilla*, 2 of *Scopimera*, 1 of *Glistostoma*, 1 of *Tylodiplax*, 1 of *Elamena*, 2 of *Hymenicus*, 2 of *Ptychognathus*, 1 of *Pyxidognathus*, 3 of *Sesarma*, 2 of *Palicus* (*Cymopolia*), and 1 of each of the following new genera, *Typhlocarcinodes* (Rhizopinæ), *Lambdophallus* (Hexapodinæ), and *Chasmocarcinops* (Asthenognathinæ).

The new species are, for the most part, either little crabs that are liable to be overlooked, or inhabitants of depths which, though moderate, are inaccessible to ordinary collectors.

As heretofore, most of the new species come from the copious collections of the "Investigator" and will be duly figured in the *Illustrations of the Zoology of the R.I.M.S. Investigator*.

Tribe CATOMETOPA.

Quadrilatera, Latreille (pt.), Fam. Nat. du Règne Anim. p. 269.

Catometopes, Milne Edwards (pt.), Hist. Nat. Crust. II. p. 1.

Cancri (pt.), *Ocypodes*, *Grapsi*, *Pinnotheridea*, De Haan, Faun. Japon. Crust.

Ocypodidæ, Milne Edwards (pt.), Ann. Sci. Nat., Zool., (3) XVIII. 1852, pp. 123, 140.

Grapsoidæ, Dana, U. S. Expl. Exp. Crust. pt. I. pp. 67, 306.

Catometopa, Miers, Challenger Brachyura, p. 216.

Catometopa, Ortmann, Zool. Jahrb., Syst. VII. 1893-94, pp. 411, 683, plus

Majoidea Hymenosomidæ, p. 31: and in Bronn's Thier Reich, V. ii. *Arthropoda*, pp. 1165, 1168, 1175.

The carapace is variable, but commonly and typically it is transverse, more or less quadrate, with large branchial and small and indistinct hepatic regions and a broad front. The front also is variable in form, but typically it is much deflexed.

The orbits, typically, occupy the whole or the greater part of the anterior border of the carapace on either side of the front. The typical fold of the antennules is transverse; but it may be oblique, or nearly vertical, and in a few cases there are no distinct fossæ at all into which these appendages can fold.

The epistome, typically, is extremely short, but occasionally it is

of considerable length. The buccal orifice is typically, but by no means always, square cut.

The palp of the external maxillipeds usually articulates either at the summit, or at or near the external angle, of the merus; but often, as in almost the whole family *Gonoplacidae*, it articulates distinctly at the antero-internal angle.

The genital ducts of the male usually perforate the sternum opposite the last pair of legs: if, as happens in the family Gonoplacidae, they perforate the bases of the last pair of legs, they pass forwards to their destination in a groove in the sternum.

The abdomen of the male is very often narrow at its base and so does not cover all the space between the last pair of legs.

The branchiæ are often fewer than 9—from 8 to 6—on either side: their efferent channels open on either side of the palate.

The *Catometopa* may be divided into 9 families. One of these, the *Gonoplacidae*, so closely approaches the Cyclometope family *Xanthidae* that such Xanthoid forms as *Geryon* and *Camptoplax* have by some authors been included in it, while, on the other hand, some of its constituent genera, such as *Gonoplax* and *Carcinoplax*, have been ranged among the Cyclometopes.

Three other families, namely, the *Grapsidae*, the *Geocarcinidae*, and the *Ocypodidae*, include the typical Catometopes, upon which our general conception of the group is founded.

The remaining five families are more or less aberrant, they are the *Pinnoteridae*, the *Mictyridae*, the *Hymenosomidae*, the *Palicidae*, and the *Ptenoplacidae*.

Of these aberrant families, the *Pinnoteridae* are probably most nearly related to the *Gonoplacidae*, the *Mictyridae* to the *Ocypodidae*, and the *Palicidae* to the *Grapsidae*.

The true position of the *Hymenosomidae* appears to me to be still doubtful. Many authors place them near the *Pinnoteridae* and *Mictyridae*, and I think that their most natural place is alongside the *Mictyridae*. Ortmann alone boldly removes them from the Catometope grade altogether and unites them with the Oxyrhynchs, which I think is a decided mistake.

There remains the family *Ptenoplacidae*, which includes the single species *Ptenoplax notopus*. This, though it has a superficial resemblance to *Macrophthalmus*, is remote from that genus in many important characters, and, though it has no look of *Hexapus*, yet shows an attraction to *Hexapus* and *Lambdophallus* that can hardly be accidental.

The 9 families may be characterized as follows, their compass in relation to the schemes of other authors will be noted in the sequel:—

Family GONOPLACIDÆ. Marine Catometopes closely resembling Cyclometopes. The palp of the external maxillipeds articulates at or near the antero-internal angle of the merus, never at the antero-external angle or at the middle of the anterior border: the exognath of the external maxillipeds is of normal size and is not concealed. The interantennular septum is a thin plate. The division of the orbit into two fossæ is not accented.

Family GRAPSIDÆ. Littoral (rock-haunting), or pelagic (drift-weed and timber-haunting), or estuarine and paludine, or fluviatile, or rarely terrene Catometopes. The palp of the external maxillipeds articulates either at the antero-external angle, or at the summit, or at the middle of the anterior border of the merus: the exognath is either abnormally slender or abnormally broad. The interantennular septum is very broad. The division of the orbit into two fossæ is accented. [Front of great breadth: carapace usually quadrilateral, with the lateral borders either straight or very slightly arched, and the orbits at or very near the antero-lateral angles: the buccal cavern is square and there is generally a gap, which is often large and rhomboidal, between the external maxillipeds]. Male openings sternal.

Family GEOCARCINIDÆ. Terrene Catometopes (Land-crabs). The palp of the external maxillipeds articulates either at the antero-external angle or at the middle of the anterior border of the merus (but is sometimes, though never in any Indian species, completely hidden behind the merus): the exognath is slender and inconspicuous (sometimes more or less concealed) and sometimes carries no flagellum. The interantennular septum is very broad and the antennular fossæ are narrow. The front is of moderate breadth and always strongly deflexed: the carapace is more or less transversely oval, *the antero-lateral borders being strongly arched and the fronto-orbital border being very much less than the greatest breadth of the carapace*. In all the Indian forms there is a wide rhomboidal gap between the external maxillipeds. Male openings sternal.

Family OCYPODIDÆ. Amphibious littoral and estuarine crabs, burrowing, and commonly gregarious. The palp of the external maxillipeds is coarse, and articulates at or near the antero-external angle of the merus: the exognath is generally slender and often more or less concealed. The interantennular septum is generally broad, but in one

subfamily (*Macrophthalminæ*) is a thin plate. The front is usually of no great breadth, and is often a narrow lobe more or less deflexed. The orbits occupy the whole anterior border of the carapace outside the front, and their outer wall (between the far ends of the upper and lower borders) is often defective. The buccal cavern is usually large and a little narrower in front than behind, the external maxillipeds are foliaceous and usually completely close it, but if they do not they never leave between them a wide rhomboidal space exposing the mandibles. The abdomen of the male is narrow. Male openings sternal.

Family PINNOTERIDÆ. Small crabs, usually living as commensals in the mantle-cavity of Bivalve Mollusks or Ascidiæ, in the cloaca of Holothurians, in worm-tubes, or in coral-stocks, and hence often exhibiting degeneration of some of the organs of special sense. The external maxillipeds vary: the merus, though often very large, is never quadrilateral, and never carries the palp distinctly at the antero-internal angle: the ischium is often small, and is sometimes absent or indistinguishably fused with the merus, in which case the merus lies with its long axis directed obliquely or almost transversely inwards: the exognath is small and more or less concealed. The interantennular septum, when distinguishable, is a thin plate. [The front is narrow, the eyes and orbits very small, the cornæ sometimes obsolescent: the antennules and antennæ are usually very small and cramped. The buccal cavern is short and of great breadth, being commonly semi-circular in outline. The male abdomen is very narrow]. Male openings sternal.

Family MICTYRIDÆ. Amphibious Catometopes resembling the *Ocypodidæ* in habits. The buccal cavern is of enormous size and is completely closed by the enormous foliaceous convex external maxillipeds, whose coarse palp articulates with the antero-external angle of the merus, and whose short slender exognath is entirely concealed and carries no flagellum. The interantennular septum is narrow. The orbits are represented by a small post-ocular spine, the eyes being quite unconcealed. [Carapace elongate-globose: front a narrow declivous lobe: the rudimentary antennular flagella fold nearly vertically, and are a good deal concealed by the front: the abdomen of the male resembles that of the female and covers the greater part of the sternum. No membranous spaces (*tympana*) on the meropodites of the legs or on the sternum]. Male openings sternal.

Family HYMENOSOMIDÆ. Small marine and estuarine Catometopes having a curious superficial resemblance to some of the Oxyrhynch crabs of the Inachine subfamily, a resemblance heightened by the fact that the epistome is sometimes nearly as long as broad. The palp of the external maxillipeds articulates near the antero-external angle of the merus, but as the antero-internal angle of the merus is sometimes truncated the true relations of the palp are often not quite clear: the exognath is slender and partly or entirely concealed. There are no orbits and the eyes are exposed and little retractile. [Carapace thin, flat, triangular or subcircular, not very well calcified, usually produced to form a horizontal rostrum. Antennular fossæ shallow and ill defined. Antennal peduncle slender. Buccal cavern square, the ischium of the external maxillipeds well developed]. Male openings sternal.

Family PALICIDÆ. Small Catometopes having a sort of *Dorippe* appearance. The Indian members of the family are found among coral- and shell-shingle, at a moderate depth, and have a kind of protective resemblance to an eroded flake of coral rock. The external maxillipeds close the buccal cavern ventrally but not anteriorly: their merus is a very small joint articulating with the retreating antero-external angle of the ischium, and carrying the palp at the middle of the oblique-lying anterior (or inner) border, their exognath is not concealed and is rather broad. The interantennular septum is a thin plate. The orbit has 2 or 3 deep gaps in the upper border. Front of moderate breadth, little or not at all deflexed: antennal flagella of good length: epistome absent: abdomen of male narrow. Compared with the other 3 pairs, the 4th (last) pair of legs, which are dorsally situated, are rudimentary in all the Indian species. Male openings sternal: female openings placed far forward on the sternal segment corresponding with the first pair of ambulatory legs (2nd peræopods).

Family PTENOPLACIDÆ. Represented by an aberrant Catometope found only in Indian Seas at a depth of 100 to 250 fathoms. The external maxillipeds are slender and subpediform, not nearly covering the buccal cavity: their palp articulates with the summit of the slender merus: their exognath is of normal size and form, and is not concealed. The interantennular septum is a thin rudimentary plate. The orbits are very incomplete below. The front is a narrow, little deflexed lobe. No distinct antennular fossæ. Antennal flagella of good length. No epistome. Abdomen of male narrow. Compared with the other 3 pairs, the last (fourth) pair of legs are rudimentary, being also placed close together dorsally: the last segment of the sternum is also rudimentary.

The male openings are in the bases of the last pair of legs but the ducts run forward in a sternal groove.

Most of these families can be further split into subfamilies, as is shown in the following scheme :—

Family GONOPLACIDÆ, Dana.

Gonoplaciens, Milne Edwards (pt.), Hist. Nat. Crust. II. 56.

Gonoplacés Cancéroïdes plus *Carcinoplacinæ*, Milne Edwards, Ann. Sci. Nat. Zool. (3) XVIII. 1852, pp. 162, 164.

Gonoplacidae, Dana, U. S. Expl. Exp. Crust. pt. I. pp. 308, 310.

Carcinoplacinæ plus *Gonoplacinæ* plus *Hæmapodinæ*, Miers, Challenger Brachyura, pp. 222, 237, 275.

Carcinoplacini, Ortmann, Zool. Jahrb., Syst., VII. 1893-94, p. 633.

Carcinoplacidae plus *Gonoplacidae* plus *Hæmapodinæ*, Ortmann in Bronn's Thier Reich, tom. cit. pp. 1175, 1176, 1177.

This family may be divided into the 5 following subfamilies :—

Subfamily I. PSEUDORHOMBILINÆ (*Carcinoplacinæ* Miers, *Carcinoplacidae* Ortmann). Carapace Xanthoid, the regions seldom well defined: front usually of good breadth and square cut, often little deflexed: eyes and orbits of normal size and form, the eyes well pigmented and the eyestalks normally movable except in certain deep-sea genera: the antennules fold transversely: antennal flagella of fair length. Epistome well defined: buccal cavern square-cut and usually completely closed by the external maxillipeds, which have a subquadrate merus. The base of the male abdomen covers the whole space between the last pair of legs. Male openings not sternal.

Subfamily II. GONOPLACINÆ (*Gonoplacinæ* Miers, *Gonoplacidae* Ortmann). The anterior border of the subquadrate carapace is entirely occupied by the square-cut front and orbits, the front being either narrow or of fair breadth, and the orbits being long narrow trenches for the elongate eyestalks. In other respects similar to the *Pseudorhombilinæ*.

Subfamily III. PRIONOPLACINÆ (not represented in India). Differs from *Pseudorhombilinæ* only in the form of the male abdomen, which is not broad enough at base to cover all the space between the last pair of legs.

Subfamily IV. RHIZOPINE (*Rhizopinæ* Miers, Ortmann). With the exception of one species (*Notonyx nitidus*) the eyestalks are fixed, and very often the "cornea" is minute or obsolete: the lower border of the orbit has a tendency to run downwards towards the epistome. The carapace usually has its antero-lateral corners cut away and rounded off: the front may be square-cut and broad, but is more often narrow and more or less distinctly bilobed and deflexed. The antennules may be of fair size and transversely folded, but more often, owing to the narrowness of the front, they are cramped, and fold obliquely: sometimes they cannot be folded in their fossæ at all. Antennal flagella usually short. The epistome may either be well defined and prominent, or ill defined and sunken. The buccal cavern may be squarish, but it often is decreased in breadth anteriorly: the external maxillipeds have a square merus and may completely close the buccal cavern, or there may be a gap between them. The male abdomen does not nearly cover the space between the last pair of ambulatory legs. Male openings sternal.

Subfamily V. HEXAPODINÆ (*Pinnoteridæ-Hexapodinæ* Miers, Ortmann). Only three pairs of legs besides the chelipeds, the last segment of the sternum also aborted. Carapace much broader than long with the antero-lateral corners cut away and rounded off. Front narrow: eyes, orbits and antennæ small: the antennules fold transversely. Epistome well defined: buccal cavern with the sides a little anteriorly-convergent, or not, nearly closed by the external maxillipeds, whose merus is either quadrate or has the antero-external angle rounded off. The male abdomen does not nearly fill the space between the last pair of ambulatory legs. Male openings sternal.

Family PINNOTERIDÆ, Edw.

Pinnoteridæ, De Haan (part), Faun. Japon., Crust., pp. 5, 34.

Pinnothériens, Milne Edwards (part), Hist. Nat. Crust. II. 28.

Pinnotherinæ, Milne Edwards, Ann. Sci. Nat. Zool. (3) XVIII. 1852, p. 138, and XX. 1853, p. 216: Dana, U. S. Expl. Exp., Crust. pt. I. pp. 378, 379: Miers, Challenger Brachyura, p. 274: Ortmann, Zool. Jahrb., Syst., VII. 1893-94, p. 691; and in Bronn's Thier Reich, tom. cit. p. 1177.

I propose, with some diffidence, as I have not examined enough of the forms included, to divide this family into 4 subfamilies:—

Subfamily I. PINNOTERINÆ. Ischium of the external maxillipeds either rudimentary, or indistinguishably fused with the merus to form a single piece which is usually oblique, sometimes transverse. Usually the carapace is not transverse and the palp of the external maxillipeds not so large as the merus-ischium.

Subfamily II. PINNOTHERELINÆ. Ischium of the external maxillipeds distinct and independent, but smaller than the merus, the latter joint little oblique. Usually the carapace is broadly transverse, and often the palp of the external maxillipeds is the largest part of these appendages.

Subfamily III. XENOPHTHALMINÆ. Ischium of the external maxillipeds distinct, as large as or larger than the merus, the latter joint little oblique, the palp of ordinary size. *The orbits are narrow chinks situated dorsally with their long axis at right angles to the anterior border of the carapace.*

Subfamily IV. ASTHENOGNATHINÆ (*Asthenognathidæ* Stimpson). External maxillipeds weak and slender, not nearly meeting across the buccal cavern, the ischium distinct and larger than the merus, the palp of ordinary size. Eyes in the normal position.

Family GRAPSIDÆ, Dana.

Grapsoidiens, Milne Edwards, Hist. Nat. Crust. II. 68.

Grapsinæ, Milne Edwards, Ann. Sci. Nat., Zool., (3) XVIII. p. 136 and XX. p. 163.

Grapsidæ, Dana, U. S. Expl. Exp., Crust. p. 329: Miers, Challenger Brachyura, p. 252: Ortmann, Zool. Jahrb., Syst., VII. 1893-94, p. 699, and in Bronn's Thier Reich, tom. cit. p. 1177.

This family can be divided into four well characterized subfamilies as follows:—

Subfamily I. GRAPSINÆ (*Grapsacea*, Edw., *Grapsinæ* in part, Dana, Kingsley, Miers, Ortmann). Front strongly deflexed: the lower border of the orbit runs downwards towards the buccal cavern: antennal flagellum very short: the external maxillipeds leave a wide rhomboidal gap between them, they are not traversed by any oblique hairy crest, their palp articulates at the antero-external angle of the merus, and their exognath is very slender and is exposed throughout. The male abdomen fills all the space between the last pair of ambulatory legs.

Subfamily II. VARUNINÆ (*Varunacea* and *Cyclograpsacea* part, Milne Edwards; *Grapsinæ* in part, Dana, Kingsley, Miers, Ortmann). Front moderately or little deflexed, sometimes sublaminar: the sub-orbital crest, which supplements the defective lower border of the orbit, is rather distant from the orbit and usually runs nearly in a line with the anterior border of the epistome: antennal flagellum usually of good length: the external maxillipeds do not often gape widely, though usually there is something of a gap, they are not traversed by any oblique hairy crest, their palp articulates with the middle of the

anterior border of the merus, and their exognath is generally broad and is exposed throughout. The male abdomen, though not narrow, rarely covers all the space between the last pair of ambulatory legs.

Subfamily III. SESARMINÆ. (*Sesarmacea* and *Cyclograpsacea* part, Milne Edwards; *Sesarminæ*, Dana, Kingsley, Miers, Ortmann). Front strongly deflexed: the lower border of the orbit commonly runs downwards towards the angle of the buccal cavern: the external maxillipeds leave a wide rhomboidal gap between them, an oblique hairy crest traverses them from a point near the antero-external angle of the ischium to a point near the antero-internal angle of the merus, their palp articulates either at the summit or near the antero-external angle of the merus, and their exognath is slender and either partly or almost entirely concealed. The male abdomen either fills or does not quite fill all the space between the last pair of ambulatory legs. Antennal flagella variable.

Subfamily IV. PLAGUSINÆ. (*Plagusiacea*, Milne Edwards; *Plagusinæ*, Dana, Kingsley, Miers, Ortmann). The front is cut into lobes or teeth by the antennular fossæ, which are visible in a dorsal view as deep clefts: the lower border of the orbit curves down into line with the prominent anterior border of the buccal cavern: the external maxillipeds do not completely close the buccal cavern but they do not leave a wide rhomboidal gap, they are not traversed by any oblique hairy crest, their palp articulates near the antero-external angle of the merus, and their slender exposed exognath has no flagellum. The antennal flagella are short. The male abdomen fills all the space between the last pair of legs.

Family GEOCARCINIDÆ, Dana.

Gecarciniens, Milne Edwards, Hist. Nat. Crust. II. 16.

Gecarcinacea, Milne Edwards (pt.), Ann. Sci. Nat., Zool., (3) XX. 1853, p. 200.

Gecarcinidæ, Dana (pt.), U. S. Expl. Exp. Crust. pt. I. p. 374.

Gecarcinidæ, Miers, Challenger Brachyura, p. 216.

Gecarcinidæ, Ortmann (pt.), Zool. Jahrb. Syst. VII. 1893-94, pp. 699, 732, and in Bronn's Thier Reich, tom. cit. p. 1178.

I think it inadvisable to subdivide this small group, which Milne Edwards, with more justice, regarded as itself only a subfamily of the *Grapsidæ*.

Gecarcinucus is a *Telphusoid* and should not be referred here. *Epigrapsus* and *Grapsodes*, if they are distinct from one another, belong here rather than to the *Grapsidæ*.

Family PALICIDÆ (vel CYMOPOLIDÆ).

This little and aberrant family is probably best treated as an appendage to the *Grapsidæ*.

Family OCYPODIDÆ, Ortmann (pt.).

Ocypodians, Milne Edwards, Hist. Nat. Crust. II. p. 39.

Ocypodinæ, Milne Edwards, Ann. Sci. Nat. Zool. (3) XVIII. 1852, p. 140, plus *Gonoplacés Vigils* (pt.), p. 155.

Macrophthalmidæ, Dana, U. S. Expl. Exp. Crust. pt. I. pp. 308, 312.

Ocypodinæ, Miers (pt.), Challenger Brachyura, p. 236, and *Myctirinæ* (pt.), p. 275.

Ocypodidæ, Ortmann (pt.), Zool. Jahrb., Syst., VII. 1893-94, pp. 700, 741; and in Bronn's Thier Reich, tom. cit., p. 1179.

In the treatment of this family nothing can be added to the scheme of Dana, where they are divided into 3 sub-families as follows:—

Subfamily I. OCYPODINÆ (*Ocypodiacés Ordinaires* Edw., *Ocypodinæ* Dana (pt.), Miers (pt.), Ortmann). Carapace deep, subquadrilateral, the regions seldom well defined: front narrow deflexed, commonly a mere lobe between the long eyestalks: antennular flagellum small, folding obliquely or almost vertically, the interantennular septum broad: the external maxillipeds completely close the buccal cavern, their exognath is inconspicuous but is not, or not entirely, concealed, and may either have, or be destitute of, a flagellum: chelipeds remarkably unequal either in both sexes or in the male only. *There is an orifice or recess, the edge of which is thickly fringed with hair, between the bases of the 2nd and 3rd pairs of true legs.*

Subfamily II. SCOPIMERINÆ (*Ocypodiacés Globulaires* Edw., *Dotinæ* Dana, *Myctirinæ* (pt.) Miers, Ortmann). Carapace very deep, cuboidal or globose: front narrow deflexed, commonly a mere lobe: antennular flagellum rudimentary, folding nearly vertically and hidden beneath the front, interantennular septum broad: buccal cavity large, sometimes enormous, completely closed by the external maxillipeds which are commonly very prominent and have small linear concealed exognaths with or without a flagellum: chelipeds equal or subequal in both sexes. *Orbits shallow. Curious membranous spaces known as "tympana" exist on the meropodites of the legs and often of the chelipeds also; and sometimes on some of the segments of the sternum.* No hairy recesses between the bases of the 2nd and 3rd pairs of true legs.

Subfamily III. MACROPHTHALMINÆ. (*Gonoplacés Vigils* pt. Edw., *Macrophthalminæ* Dana, Miers, Ortmann). Carapace usually quadrilateral, broader than long (sometimes more than twice as broad as long),

flattish and not very deep, the regions usually well defined: front variable, but never very broad: antennules with a well developed flagellum that folds transversely, interantennular septum very narrow: eyestalks usually elongate: the external maxillipeds do not always meet across the buccal cavern, though the gap between them is never very wide, their exognath is not, or not entirely, concealed and has a flagellum: chelipeds usually subequal. No special recess between the bases of any of the legs.

Family MICTYRIDÆ, Dana.

Pinnothériens, Milne Edwards (pt.), Hist. Nat. Crust. II. 39.

Myctiroidea, Milne Edwards, Ann. Sci. Nat., Zool., (3) XVIII. 1852, p. 154.

Mictyridæ, Dana, U. S. Expl. Exp., Crust. pt. I, pp. 309, 369.

Pinnotheridæ-Myctirinæ, Miers (pt.), Challenger Brachyura, p. 275; Ortmann (pt.) in Bronn's Thier Reich, tom. cit., p. 1179.

Ocypodidæ-Myctirinæ, Ortmann (pt.), Zool. Jahrb., Syst. VII. 1893-94, pp. 742, 747.

There can be little question that Milne Edwards was right in reckoning *Mictyris* as a "satellite" of the *Ocypodidæ*, or that Dana's plan of separating them as a distinct family is fully justified. The affinities which several authors find between *Mictyris* and the *Pinnotheridæ* are by no means easy to recognize.

Family HYMENOSOMIDÆ, Ortmann.

Pinnothériens, Milne Edwards (pt.), Hist. Nat. Crust. II. 39.

Hymenosominæ, Milne Edwards, Ann. Sci. Nat., Zool. (3) XX. 1853, p. 221.

Pinnotheridæ-Hymenicinæ, Dana, U. S. Expl. Exp., Crust. pt. I. pp. 379, 384.

Pinnotheridæ-Hymenosominæ, Miers, Challenger Brachyura, p. 275.

Majoidea-Hymenosomidæ, Ortmann, in Bronn's Thier Reich, tom. cit., p. 1168.

Three types seem to be distinguishable in this family: in one (e.g. *Hymenosoma*) there is no epistome and the external maxillipeds almost encroach on the bases of the antennules, which appendages are not concealed by the front; in the second (e.g. *Halicarcinus*) there is an epistome of considerable length, but the antennules are still unconcealed by the front; in the third (e.g. *Hymenicus*) there is a long epistome and the antennules are quite concealed by the front.

Family PTENOPLACIDÆ.

This family has no very close connexions with any of the others although it is an undoubted Catometope.

The following is a list of all the Catometope genera known to me arranged according to the foregoing scheme. As in previous papers, the genera known to me by autopsy are marked with an asterisk, and all the Indian genera are printed in roman type.

Family GONOPLACIDÆ, Dana.

Subfamily I. PSEUDORHOMBILINÆ, nov.

? *Brachygrapsus*, J. S. Kingsley, Proc. Ac. Nat. Sci. Philad. 1880, p. 203.

Bathyplox, A. Milne Edwards, Bull. Mus. Comp. Zool., VIII, 1880-81, p. 16: Miers, Challenger Brachyura, p. 230.

? *Camptandrium*, Stimpson, Proc. Ac. Nat. Sci. Philad. 1858, p. 106.

* *Carcinoplax* (= *Curtonotus*).

* *Catoptrus* (= *Goniocaphyra*).

? *Cryptocaeloma*, Miers, Zool. H. M. S. Alert, p. 227.

* *Eucrate*.

Freyvillea, A. Milne Edwards, Bull. Mus. Comp. Zool. VIII, 1880-81, p. 15.

Heteroplax, Stimpson, Proc. Ac. Nat. Sci. Philad. 1858, p. 94.

* *Libystes*.

* *Litochira*.

* *Pilumnoplax*.

* ? *Platypilumnus*.

* *Pseudorhombila*.

* *Psopheticus*.

Subfamily II. PRIONOPLACINÆ, nov.

Eucratoplax, A. Milne Edwards, Bull. Mus. Comp. Zool. VIII, 1880-81, p. 17.

Eucratopsis, Smith, Amer. Journ. Sci. XLVIII, 1869, p. 391, and Trans. Connect. Acad. II. 1871-73, p. 35.

Euryplax, Stimpson, Ann. Lyc. Nat. Hist., New York, VII, 1862, p. 60.

Glyptoplax, Smith, Trans. Connect. Acad. II, 1871-73, p. 164.

Oedioplax, Mary J. Rathbun, P. U. S. Nat. Mus. XVI, 1893, p. 241.

Panoplax, Stimpson, Bull. Mus. Comp. Zool. II, 1870-71, p. 151.

Prionoplax, Milne Edwards, Ann. Sci. Nat., Zool., (3) XVIII, 1852, p. 163.

Speocarcinus, Stimpson, Ann. Lyc. Nat. Hist., York, VII, 1862, p. 58.

Subfamily III. GONOPLACINÆ, Miers.

* *Gonoplax*, Leach, Trans. Linn. Soc. XI, 1815, p. 323; Miers, Challenger Brachyura, p. 245.

Ommatocarcinus, White, in Voy. H. M. S. Rattlesnake, II, p. 393; Miers, Challenger Brachyura, p. 246.

Subfamily IV. RHIZOPINÆ, Stimpson, Miers.

* *Camatopsis*.

* *Ceratoplax*.

? *Chasmocarcinus*, Mary J. Rathbun, Bull. Nat. Hist. Iowa, 1898, p. 284.

* *Hepthopelta*.

* *Notonyx*.

Rhizopa, Stimpson, Proc. Ac. Nat. Sci. Philad. 1858, p. 95.

* *Scolopidia* (= *Hypophthalmus*).

* *Typhlocarcinus*.

* *Typhlocarcinodes*.

* *Xenophthalmodes*.

Subfamily V. HEXAPODINÆ, Miers.

Amorphopus, Bell, Journ. Linn. Soc., Zool., III, 1859, p. 27.

* *Hexapus*, De Haan, Faun. Japon. Crust., p. 35.

* *Lambdophallus*.

Thaumastoplax, Miers, Ann. Mag. Nat. Hist. (5) VIII, 1881, p. 261.

Family PINNOTERIDÆ, Edw.

? Subfamily I. PINNOTERINÆ, nov.

Cryptophrys, Mary J. Rathbun, P. U. S. Nat. Mus. XVI, 1893, p. 250.

Dissodactylus, S. I. Smith, Trans. Connect. Acad. II, 1871-73, p. 172.

Durckheimia, de Man, Zool. Jahrb., Syst., 1889, p. 442.

Fabia, Dana, Proc. Ac. Nat. Sci. Philad. 1851, p. 253, and U. S. Expl. Exp., Crust. pt. I. p. 382.

? *Holothuriophilus*, Nauck, Zeits. Wiss. Zool. XXXIV, 1880, pp. 24, 66.

Ostracoteres, Milne Edwards, Ann. Sci. Nat., Zool., (3) XX, 1853, p. 219.

? *Parapinnixa*, Holmes, Proc. Calif. Acad. IV, 1893-94, pp. 565, 587.

Pinnaxodes, Heller, Novara Crust., p. 67.

* *Pinnoterres*.

? *Scleroplax*, Mary J. Rathbun, P. U. S. Nat. Mus. XVI, 1893, p. 250.

* *Xanthasia*.

? Subfamily II. PINNOTHERELINÆ, nov.

? *Malacosoma*, de Man, Notes Leyden Mus. I, 1879, p. 67.

Opiathopus, Mary J. Rathbun, P. U. S. Nat. Mus. XVI, 1893, p. 251.

Pinnixa, White, Ann. Mag. Nat. Hist. XVIII. 1846, p. 177 (= *Tubicola*, Lockington, Proc. Calif. Acad. VII. 1876, p. 55).

Pinnotherelia, Milne Edwards and Lucas, in Voy. Amér. Mérid., Crust. p. 24 (1843).

Pseudopinnixa, Ortmann (*nec* Holmes), Zool. Jahrb., Syst. VII, 1894, p. 694.

* *Tetrias*.

? *Tritodynamia*, Ortmann, Zool. Jahrb., Syst. VII, 1194, p. 692.

? Subfamily III. XENOPHTHALMINÆ, nov.

* *Xenopthalmus*.

? Subfamily IV. ASTHENOGNATHINÆ, Stimpson.

Asthenognathus, Stimpson, Proc. Acad. Nat. Sci. Philad. 1858, p. 107.

* *Chasmocarcinops*.

Family OCYPODIDÆ, Ortmann, emend.

Subfamily I. OCYPODINÆ, Dana.

Acanthoplax, Milne Edwards, Ann. Sci. Nat. Zool. (3) XVIII, 1852, p. 151.

* *Gelasimus*.

* *Heloeciis*, Dana, Amer. Journ. Sci., (2) XII, 1851, p. 286, and U. S. Expl. Exp., Crust. pt. I. p. 319.

* *Ocyпода*.

Subfamily II. MACROPHTHALMINÆ, Dana.

* *Clistostoma*.

Chænostoma, Stimpson, Proc. Ac. Nat. Sci. Philad. 1858, p. 97.

Euplax, Milne Edwards, Ann. Sci. Nat., Zool., (3) XVIII, 1852, p. 160; Miers, Challenger Brachyura, p. 251.

Hemiplax, Heller, Novara Crust. p. 40: Miers, Challenger Brachyura, p. 250.

**Macrophthalmus*.

Paraclistostoma, de Man, Zool. Jahrb., Syst., VIII, 1895, p. 580.

**Tylodiplax*.

Subfamily III. SCOPIMERINÆ.

**Dotilla* (= *Doto*, De Haan).

Ilyoplax, Stimpson, Proc. Ac. Nat. Sci. Philad. 1858, p. 98.

**Scopimera*.

**Tympanomerus* (= *Dioxippe*, de Man).

Family MICTYRIDÆ, Dana.

**Mictyris*.

Family HYMENOSOMIDÆ, Ortmann.

**Flamene*.

?? *Elamensis*, A. Milne Edwards, Nouv. Archiv. du Mus. IX, 1873, p. 324.

**Halicarcinus*, White, Ann. Mag. Nat. Hist. XVIII, 1846, p. 178: Miers, Challenger Brachyura, p. 280 (= *Liriopea*, Gay, Hist. Fis. Chile, pt. III. Zool. p. 158.

**Hymenicus*.

**Hymenosoma*, Leach, Milne Edwards, Hist. Nat. Crust. II, 35: Miers, Challenger Brachyura, p. 279.

Rhynchoplax, Stimpson, Proc. Ac. Nat. Sci. Philad. 1858, p. 109.

**Trigonoplax*.

Family GRAPSIDÆ, Dana.

Subfamily I. GRAPSINÆ, Dana (pt.).

*??? *Epigrapsus*.

**Geograpsus*.

**Goniopsis*, De Haan, Faun. Japon. Crust., p. 33 (pt.): Miers, Challenger Brachyura, p. 266.

**Grapsus*.

**Leptograpsus*, Milne Edwards, Ann. Sci. Nat., Zool., (3) XX, 1853, p. 171: Miers, Challenger Brachyura, p. 257 (sub-genus of *Grapsus*).

**Metopograpsus*.

Orthograpsus, Kingsley, Proc. Ac. Nat. Sci. Philad. 1880, p. 194 (sub-genus of *Grapsus*).

***Pachygrapsus.**

Perigrapsus, Heller, Verh. zool.-bot. Ges. Wien, XII, 1862, p. 522, and Novara Crust. p. 48.

Subfamily II. VARUNINÆ, nov.

? *Acmæopleura*, Stimpson, Proc. Ac. Nat. Sci. Philad., 1858, p. 105.

**Brachynotus*, De Haan, Faun. Japon., Crust., p. 34, 1835: Miers, Challenger Brachyura, p. 264 (= *Heterograpsus*, Lucas, Expl. Sci. Algerie, Anim. Artic. I, p. 18, 1849: = *Hemigrapsus*, Dana, Amer. Journ. Sci. (2) XII, 1851, p. 288, and U. S. Expl. Exp., Crust., pt. I. p. 348).

**Cyrtograpsus*, Dana, Amer. Journ. Sci. (2) XII, 1851, p. 288, and U. S. Expl. Exp., Crust., pt. I, p. 351.

**Eriochir*, De Haan, Faun. Japon. Crust. p. 32.

Euchirograpsus, A. Milne Edwards, Bull. Mus. Comp. Zool., VIII, 1880-81, p. 18: and Milne Edwards and Bouvier "Hirondelle" (Monaco) Crust., Brachyures et Anomures, p. 46.

Glyptograpsus, S. I. Smith, Trans. Connect. Acad. II, 1871-73, p. 153.

**Planes*, Leach, Malac. Pod. Brit., Expl. of pl. xxvii, figs. 1-3, 1815 (= *Nautilograpsus*, Milne Edwards, Hist. Nat. Crust. II, 89, 1837.)

Platychirograpsus, de Man, Zool. Anz. 1896, p. 292, and Mitteil. Nat. Mus. Hamburg, XIII, 1896, p. 95.

Platygrapsus, Stimpson, Proc. Ac. Nat. Sci. Philad. 1858, p. 104: Miers, Challenger Brachyura, p. 263 (= *Platynotus*, De Haan, Faun. Japon., Crust., p. 34).

**Pseudograpsus*, Milne Edwards, Hist. Nat. Crust. II, 81: Miers, Challenger Brachyura, p. 261 (= *Pachystomum*, Nauck, Zeits. Wiss. Zool. XXXIV, 1880, p. 67).

**Ptychognathus* (= *Gnathograpsus*, A. M. Edw. = *Cœlochirus*, Nauck).

**Pyxidognathus*.

Utica, White, P. Z. S. 1847, p. 85, and Ann. Mag. Nat. Hist., XX, 1847, p. 206.

**Varuna* (= *Trichopus*, De Haan).

Subfamily III. SESARMINÆ, Dana.

**Aratus*, Milne Edwards, Ann. Sci. Nat., Zool., (3) XX, 1853, p. 187.

**Chasmagnathus*, De Haan, Faun. Japon., Crust., p. 27 (= *Paragrapsus*, Milne Edwards, Ann. Sci. Nat., Zool., (3) XX, 1853, p. 195).

**Clistocœloma*.

**Cyclograpsus*, Milne Edwards, *Hist. Nat. Crust.*, II, 77, 1837
(= *Gnathochasmus*, MacLeay, in *Smith's Ill. Ann. S. Afr.* p. 65, 1838).

**Helice*, De Haan, *Faun. Japon.*, *Crust.*, p. 28: Miers, *Challenger Brachyura*, p. 268.

**Metaplax* (= *Rhaconotus*, Gerst.).

**Metasesarma*.

Metopaulias, Mary J. Rathbun, *P. U. S. Nat. Mus.* XIX, 1897,
p. 144.

**Sarmatium* (= *Metagrapsus*, Edw.).

**Sesarma* (= *Holometopus*, Edw.).

Subfamily IV. *PLAGUSIINÆ*, Dana.

**Liolophus* (= *Acanthopus*, De Haan).

**Plagusia*.

Family *GEOCARCINIDÆ*, Dana.

**Cardiosoma* (= *Discoplax*, A. M. Edw.).

**Epigrapsus*.

**Gecarcinus*, Leach, *Trans. Linn. Soc.* XI, 1815, p. 322: Miers,
Challenger Brachyura, p. 217.

**Pelocarcinus* (= *Gecarcoidea*, Edw., = *Hylæocarcinus*, W.-M., =
Limnocarcinus, de Man).

Uca, Latr., *Encycl. Méthod.* X, p. 685: Milne Edwards, *Hist. Nat.*
Crust. II, 21.

Family *PALICIDÆ*, Rathbun (name only).

**Palicus* (= *Cymopolia*).

**Grossotonotus*, A. Milne Edwards, *Nouv. Archiv. du Mus.* IX, 1873,
p. 282, and *Journ. Mus. Godeffroy*, I, 1873, p. 258.

Family *PTENOPLACIDÆ*, Alcock.

**Ptenoplax*.

Family I. *GONOPLACIDÆ*, Dana.

Subfamily i. *PSEUDORHOMBILINÆ*, Alcock.

Key to the Indian Genera.

I. Front with the edge cut straight and square, never curved,
often prominent:—

1. The fronto-orbital border, though extensive, is much
less than the greatest breadth of the carapace, so
that the antero-lateral borders of the carapace have

- a distinctly Cancroid arch: the carapace is usually much broader than long:—
- i. Dactyli of last pair of legs styliform PSEUDORHOMBILA.
 - ii. Dactyli of last pair of legs compressed and ciliated:—
 - a. Antero-external angle of merus of external maxillipeds not particularly produced:—
 - a. Carapace transversely quadrilateral, its antero-lateral borders with few teeth CARCINOPLAX.
 - β. Carapace transversely elliptical, its antero-lateral borders with 5 or 6 teeth CATOPTRUS.
 - b. Antero-external angle of merus of external maxillipeds strongly produced outwards: last pair of legs sometimes paddle-like..... LIBYSTES.
2. The fronto-orbital border is not so very much less than the greatest breadth of the carapace in extent, so that the antero-lateral borders of the carapace are either slightly arched or nearly straight: the carapace is broader than long but is not conspicuously transverse:—
- i. The antennal flagellum stands loosely in orbital hiatus:—
 - a. Carapace deepish, rather markedly transverse: the meri of the legs with a spine or spines on the anterior border ... PSOPHETICUS.
 - b. Carapace shallow, depressed, and flat, little broader than long:—
 - a. Legs spiny PLATYPILUMNUS.
 - β. Legs unarmed..... PILUMNOPLAX.
 - ii. A process of the basal antenna-joint completely fills up and closes the orbital hiatus, entirely excluding the antennal flagellum EUCRATE.
- II. Front with the edge slightly but distinctly curved, never cut straight and square; carapace and appendages in all the Indian species tomentose and hairy LITOCHIRA.

EUCRATE, De Haan.

Eucrate, De Haan, Faun. Japon. Crust. p. 36: de Man, Journ. Linn. Soc., Zool., 1887-88, p. 88: Ortmann, Zool. Jahrb., Syst. VII. 1893-94, p. 685.

Heteroplax, Stimpson, Proc. Ac. Nat. Sci. Philad. 1858 (1859) p. 94.

Carapace deepish, subquadrilateral, a little broader than long, smooth and with little or no distinction of regions, convex fore and aft, very slightly so from side to side.

The extent of the fronto-orbital border is not much less than the greatest breadth of the carapace, the antero-lateral borders therefore, which are toothed, are short and but slightly arched. Front square-cut and straight, well delimited from the well-defined supra-orbital angles, usually notched or grooved in the middle line, about a third the breadth of the carapace.

Upper border of orbit with two distinct sutures. The orbital hiatus is compactly filled and closed by a process of the basal antenna-joint, so that the antennal flagellum, which is of good length, lies entirely outside the hiatus. The antennules fold transversely.

Buccal cavern square, completely closed by the external maxillipeds, the flagellum of which articulates with the inner angle of the merus. Efferent branchial channels of palate well defined.

Chelipeds subequal, much more massive and shorter, or not much longer, than the legs.

Legs slender, unarmed; the propodite and dactylus of the last pair are compressed and are usually, but not always, somewhat broadened.

In both sexes all seven abdominal segments are distinct, and in the male the third segment covers the whole width of the sternum between the bases of the last pair of legs.

Distribution : Indo-Pacific (Indian, Australian and Japanese).

Following de Man and Ortman, I restrict the genus *Eucrate* to those species in which the orbital hiatus is completely stopped-up by a process of the basal antenna-joint.

Key to the Indian species of the genus Eucrate.

- I. Antero-lateral borders of the carapace cut into four teeth (including the outer orbital angle) all of which are distinct: dactylus of last pair of legs distinctly palmulate: front grooved or notched in the middle line:—
 - 1. Carapace nearly smooth..... *E. crenata.*
 - 2. Carapace with some short transverse ridges in its antero-lateral part..... *E. crenata* var. *affinis.*
- II. Antero-lateral borders cut into four teeth (including the orbital angle) of which the 2nd and 4th are hardly distinguishable: front with the median notch almost obsolete: dactylus of last pair of legs palmulate *E. crenata* var. *dentata.*
- III. Antero-lateral borders cut into three teeth (including the orbital angle): dactylus of last pair of legs almost styliform *E. sexdentata.*

1. *Eucrate crenata*, De Haan.

Cancer (Eucrate) crenatus, De Haan, Faun. Japon. Crust. p. 51, pl. xv. fig. 1.

Eucrate crenata, Ortmann, Zool. Jahrb., Syst., VII. 1893-94, p. 663.

? *Pilumnoplax sulcatifrons*, Stimpson, Proc. Ac. Nat. Sci. Philad. 1858 (1859), p. 93: Tozzetti, 'Magenta' Crust. p. 102, pl. vii. fig. 2.

Carapace smooth, its length about five-sixths of its breadth. Front not quite a third the breadth of the carapace, notched and grooved in the middle line. Major diameter of orbit about half the width of the front.

Antero-lateral borders of carapace cut into 4 bluntish teeth, the middle two of which are the largest: a short ridge runs on to the dorsum of the carapace from the last tooth.

Chelipeds less than twice the length of the carapace, not much longer than the legs, especially in the female: one or two teeth at the far end of the upper border of the arm, and one at the inner angle of the wrist: hand rather short and squat, the fingers, which are stout, are a little longer than the palm: there is a characteristic patch of fur at the far end of the upper surface of the wrist.

Legs smooth, the last 3 joints more or less ciliated: in the 4th (last) pair the propodite and dactylus are broader and more compressed than in the other legs.

In the Indian Museum are 3 specimens from the Andamans and 1 from Madras (besides 3 from Hongkong).

The carapace of the largest specimen is 10 millim. long and 12 millim. broad.

2. *Eucrate crenata* var. *affinis*, Haswell.

Eucrate affinis, Haswell, P. L. S., N. S. Wales, VI. 1881-82, p. 547 and Cat. Austral. Crust. p. 86: de Man, Journ. Linn. Soc., Zool. XXII. 1887-88, p. 89, pl. v. fig. 5.

? *Pseudorhombila sulcatifrons*, var. *australiensis*, Miers, Zool. H. M. S. Alert, p. 242, pl. xxiv. fig. c.

Differs from typical *E. crenata*, specimens of the same sex and of approximately the same size compared, only in the following characters:—

(1) the carapace is more sculptured, for besides the short transverse ridge on the dorsum of the carapace that runs from the last tooth of either antero-lateral border, there are similar ridges running (a) from the 2nd tooth of either antero-lateral border, parallel with the orbit, and (b) parallel with the front, near the anterior limit of the gastric region; there is also a beaded ridge running parallel with either postero-lateral border:

(2) the patch of fur on the wrist may be smaller :

A single specimen from Mergui (Anderson collection) has the carapace 12 millim. long and 15 millim. broad.

In a large series of specimens these distinctions would probably fail.

3. *Eucrate crenata* var. *dentata*.

? *Heteroplax dentatus*, Stimpson, Proc. Ac. Nat. Sci. Philad. 1858, (1859), p. 94 : A. O. Walker, Journ. Linn. Soc. Zool. XX. 1886-1890, p. 110.

Differs from the typical *E. crenata*, only in the following particulars :—

(1) the front is entire, the median notch being inconspicuous or absent :

(2) the outer orbital angle and the third tooth of the antero-lateral border are large and acute, while the 2nd and 4th teeth are quite inconspicuous.

In the Indian Museum are two small specimens, one from Palk Strait (the other from Hongkong).

4. *Eucrate sexdentata*, Haswell.

Eucrate sexdentata, Haswell, P. L. S., N. S. Wales, VI. 1881-82, p. 548, and Cat. Austral. Crust. p. 86.

? *Pseudorhombila vestita* var. *sexdentata*, Miers, Zool. 'Alert,' p. 240, pl. xxiv. fig. B, and Challenger Brachyura, p. 229.

Differs from *E. crenata* in the following particulars :—

(1) the only ridges on the carapace are two exceeding faint ones running parallel with the postero-lateral borders :

(2) the antero-lateral borders are cut into 3 teeth, of which the last is spine-like :

(3) the median emargination of the front is much less distinct :

(4) the chelipeds are about $1\frac{3}{4}$ times the length of the carapace and are decidedly shorter than the legs: there is only one distinct tooth near the far end of the upper border of the arm: the tooth at the inner angle of the wrist is very large and acute :

(5) the propodite and dactylus of the last pair of legs are not broader than those of the other legs.

In the Indian Museum is a single male from the Gulf of Martaban, 20 fms. The carapace is 11.5 millim. long and 13.5 millim. broad.

CARCINOPLAX, Edw.

Carcinoplax, Milne Edwards, Hist. Nat. Crust. II. 60; and Ann. Sci. Nat., Zool., (3) XVIII. 1852, p. 164: Ortmann, Zool. Jahrb., Syst., &c., VII. 1893-94, p. 685. *Curtonotus*, De Haan, Faun. Japon. Crust., p. 20 (*nom. presc.*).

The chief differences between this genus and *Eucrate* are that (1)

the carapace is very much broader, and its antero-lateral borders are much more arched, the fronto-orbital border being relatively much less extensive; (2) the supra-orbital angles are almost merged in the front, and the median notch of the front is almost obsolete; and (3) the orbital hiatus is not stopped up by any process of the basal antenna-joint.

Carapace deepish, subquadrilateral, usually much broader than long, smooth and with little or no distinction of regions, convex fore and aft, very slightly so from side to side.

The extent of the fronto-orbital border is much less than two-thirds the greatest breadth of the carapace, and the antero-lateral borders, which are toothed, are well arched. Front square-cut and straight, faintly notched or longitudinally grooved in the middle line, not very distinctly demarcated from the supra-orbital angles, from a third to a fourth, or less, the width of the carapace.

The upper border of the orbit is sinuous and may, or may not, be marked by a single faint suture line. The basal antenna joint is short and the antennal flagellum stands loosely in the open orbital hiatus. The antennules fold transversely.

Buccal cavern, palate, and external maxillipeds as in *Eucrate*.

Chelipeds subequal, much more massive and sometimes, in the adult, much longer than the legs.

Legs slender, unarmed; in the last pair the propodite and dactylus are compressed and decidedly broadened for swimming.

In both sexes all seven abdominal segments are distinct, and in the male the third segment covers the whole width of the sternum between the bases of the last pair of legs.

Distribution: Indo-Pacific (Indian, Japanese, Californian).

I exclude from the genus *Carcinoplax* those species, e.g., *setosa* and *integra*, which have the edge of the front turned down and arched: these it seems to me are better associated with *Litochira*.

Key to the Indian species of the genus Carcinoplax.

- I. The long diameter of the orbit is nearly three-fourths the width of the inter-orbital space: a spine or tooth at the outer angle of the wrist. Chelipeds in the adult male very much longer than the legs *C. longimanus*.
- II. The long diameter of the orbit is about half the width of the inter-orbital space: no spine or tooth at the outer angle of the wrist. Chelipeds rather shorter than the legs *C. longipes*.

5. *Carcinoplax longimanus*, De Haan.

Cancer (Curtonotus) longimanus, De Haan, Faun. Japon. Crust. p. 50, pl. vi. fig. 1.

Carcinoplax longimanus, Milne Edwards, Ann. Sci. Nat. Zool. (3) XVIII. 1852, p. 164; Ortmann, Zool. Jahrb., Syst., VII. 1893-94, p. 688.

Carapace, length a little more than two-thirds its breadth, its surface (like that of the chelipeds) finely frosted: in the young the hepatic are obscurely delimited from the branchial and gastric regions and are very slightly tumescent.

Front proper about two-ninths the greatest breadth of the carapace, very faintly notched in the middle line, its free edge longitudinally grooved.

Orbits shallow, their major diameter more than two-thirds the width of the front: borders of orbit finely beaded, the upper border sinuous but entire.

Antero-lateral borders of carapace not much more than half the length of the postero-lateral, well arched, armed with 3 teeth or tubercles (including the outer orbital angle) which become much worn away in adults.

Chelipeds subequal, massive, varying in length with increase in age—from 2 or $2\frac{1}{2}$ times the length of the carapace in females and young males to 4 times and more the length of the carapace in old males, the palm being the principal joint in which the lengthening takes place. There is a spine or tooth in the distal half of the upper surface of the arm, and one at either angle (inner and outer) of the wrist: a blunt crest, ending in a blunt tooth, traverses the inner surface of the palm.

The legs are long: the 3rd pair, which are slightly the longest, are a little more than twice the length of the carapace. The last two joints—as also the anterior border of the carpus—of all the legs are plumose.

In the Indian Museum are 2 specimens from the Gulf of Martaban and the Andaman Sea 53 and 60 fathoms, (besides a large male from Japan).

In spirit the colour is a light reddish ochre, the fingers uncoloured.

6. *Carcinoplax longipes* (Wood-Mason).

Nectopanope longipes, Wood-Mason, Ann. Mag. Nat. Hist., March, 1891, p. 262: Alcock and Anderson, Ill. Zool. Investigator, Crust. pl. xiv. fig. 7.

Carcinoplax longipes, Alcock, Investigator Deep-Sea Brachyura, p. 71.

Carapace, length more than three-quarters its breadth, the regions barely indicated.

Front proper about a third the greatest breadth of the carapace, remarkably prominent, as faintly as possible notched in the middle line.

Orbits shallow, their upper border sinuous but entire, their major diameter about half the width of the front. Eyes small.

Antero-lateral borders of carapace not two-thirds the length of the postero-lateral, moderately arched, armed with two pro-curved spine-like teeth, and with a small blunt denticle just behind the ill-defined orbital angle.

Chelipeds twice the length of the carapace; the arm has a denticle beyond the middle of the upper border, and there is a strong spine—with sometimes a secondary spinule at its base—at the inner angle only of the wrist.

The legs are long and have the dactylus well plumed and the 2 preceding joints more scantily hairy: the third pair, which are slightly the longest, are nearly $2\frac{1}{2}$ times the length of the carapace: though the terminal joints of the fourth (last) pair are compressed they are not so subfoliaceous as those of *C. longimanus*.

In the Indian Museum are 20 specimens from the Andamans 220 to 290 fathoms and off Travancore, 430 fathoms.

In the largest specimen the carapace is 14 millim. long and 17 millim. broad.

In spirit the colour is white with a faint pink tinge, the fingers blackish-brown.

7. PSEUDORHOMBILA, Edw.

Pseudorhombila, Milne Edwards, Hist. Nat. Crust. II. 59, and Ann. Sci. Nat., Zool., (3) XVIII. 1852, p. 164.

The only particulars in which *Pseudorhombila* differs from *Carcinoplax* are that the regions of the carapace are better defined, that the square-cut front is more distinctly bilobed, that the supra-orbital border has two distinct sutures, and that the dactyli of the last pair of legs are styliform.

The only specimen in the Indian Museum that is perhaps referable to this genus is too small and too much damaged for description: it is from the Andamans.

LIBYSTES, A. M. Edw.

Libyestes, A. Milne Edwards, Ann. Soc. Entom. France, (4) VII. 1867, p. 285, and Nouv. Archiv. du Mus. IV. 1863, p. 84.

This genus unites *Carcinoplax* with *Catoptrus*. It chiefly differs

from *Carcinoplax* in having (1) a much shorter and broader carapace, (2) a much shorter and broader buccal cavern, with external maxillipeds that have the antero-external angle of the merus remarkably produced outwards, and (3) the 3rd to 5th abdominal terga of the male fused together. From *Catoptrus* it chiefly differs (1) in having the carapace more subquadrilateral than elliptical, and (2) in the curious *Amphitrite*-like form of the external maxillipeds.

Carapace deepish, subquadrilateral or subelliptical, vastly broader than long, with little or no distinction of regions, convex fore and aft, slightly so from side to side.

The extent of the fronto-orbital border is vastly less than the greatest breadth of the carapace, so that the antero-lateral borders, which may be toothed or entire, have a Cancroid-like curve. Front square-cut and quite straight, not well separated from the supra-orbital angles, slightly notched in the middle line, a third or less the greatest breadth of the carapace.

Orbits shallow, their upper border entire. The basal antenna-joint is short, and the antennal flagellum stands loosely in the orbital hiatus. The antennules fold transversely.

Buccal cavern square-cut, much broader than long; the efferent branchial canals of the palate very well defined. The merus of the external maxillipeds is short and broad and has the external angle much produced, as in many species of *Neptunus*.

Chelipeds subequal, much more massive and longer than the legs; the hands however, which are somewhat tumid, are unequal in the adult.

Legs slender, unarmed: in the Indian species the last pair are almost as paddle-like as those of the typical swimming-crabs of the Portunid family.

In the male the abdomen covers the whole width of the sternum between the last pair of legs, and the 3rd-5th abdominal terga are fused together.

The sternal canals of the male are more perfect than in any other Gonaplacoid known to me.

Key to the Indian species of Libystes.

- 1. Antero-lateral borders of the carapace serrated almost exactly like those of *Catoptrus nitidus* *L. Edwardsi.*
- 2. Antero-lateral borders of the carapace entire *L. Alphonssi.*

Distribution: Indo-Pacific (Madagascar to Sandwich Is.).

8. *Libystes Edwardsi*, n. sp.

Carapace, length about four-sevenths of the breadth, finely pitted under lens, somewhat granular near the antero-lateral borders: an angular eminence near either posterior angle and a slight concavity of the postero-lateral part of the lateral epibranchial regions give the carapace a somewhat quadrilateral cast.

Front a good deal less than a third the breadth of the carapace, perfectly straight, faintly notched in the middle line. Eyes small.

Antero-lateral borders of the carapace with 5 or 6 granular denticles followed by a sharp procurved spine.

The chelipeds have the hands unequal in the adult. They are more than three times the length of the carapace and are smooth and unarmed. The fingers are slender and hooked at tip, especially in the smaller hand: they are a good deal longer than the palm in the smaller hand, and about as long as the palm in the larger hand. On the immobile finger of the smaller hand there are several irregular enlarged teeth. [In the young, as in *Catoptrus*, the hands are nearly equal, and the fingers of both hands are equally long and slender].

The legs are slender and the longest pair are not much more than twice the length of the carapace. The last 3 joints of the last pair form typical swimming paddles.

An apparently adult specimen from the Persian Gulf and 3 young from the Andamans are in the Indian Museum.

The carapace of the large specimen is 8 millim. long and 14 millim. broad.

9. *Libystes Alphonsi*, n. sp.

Differs from *L. Edwardsi* in the following particulars:—

(1) the carapace, though of the same proportions, is more quadrilateral and more convex fore and aft, and the eminences at the posterior angles are wanting:

(2) the antero-lateral borders of the carapace are smooth and entire:

(3) the front is more deflexed and more distinctly divided in the middle line:

(4) the chelipeds (in the young) are about $2\frac{1}{2}$ times the length of the carapace and are nearly equal and similar: the fingers are hardly as long as the palm:

(5) The last 3 joints of the last pair of legs are much broadened and compressed, but are not such unmistakeable paddles as those of *L. Edwardsi*.

In the Indian Museum is a single specimen from the Andamans : its carapace is 4 millim. long and 7 millim. broad.

This species differs but little, except in the sub-quadrilateral shape of the thorax, from the *Libystes nitidus* described and figured by M. A. Milne-Edwards.

CATOPTRUS, A. M. Edw.

Catoptrus, A. Milne Edwards, Ann. Sci. Nat. Zool. (5) XIII. 1870, p. 82 : Ortman, Zool. Jahrb., Syst. VII. 1893-94, p. 685.

Goniocaphyra, de Man, Archiv für Naturges. LIII. 1887, i. p. 339.

Carapace transversely elongate-elliptical, without distinction of regions, moderately convex in both directions.

The extent of the fronto-orbital border is vastly less than the greatest breadth of the carapace, the antero-lateral borders, which are serrated, are therefore well curved. Front straight, slightly notched in the middle line, not distinctly separated from the supra-orbital angles, less than a third the greatest breadth of the carapace.

Orbits shallow, their upper border entire. The antennal flagellum, which is of good length, stands in the orbital hiatus. The antennules fold transversely.

Buccal cavern, palate, and external maxillipeds as in *Eucrate*.

Chelipeds much as in *Libystes*. Legs as in *Libystes*, except that the last pair, though they have the dactylus compressed and ciliated, are never paddle-like.

Abdomen as in *Libystes*.

Distribution : Indo-Pacific (Mauritius to Samoa).

Catoptrus really differs from *Libystes* only in the form of the merus of the external maxillipeds and of the last pair of legs, which are not paddle-like as they are in one species of *Libystes*.

10. *Catoptrus nitidus*, A. M. Edw.

Catoptrus nitidus, A. Milne Edwards, Ann. Sci. Nat., Zool., (5) XIII. 1870, p. 82 : de Man, Notes Leyden Mus. XII. 1890, p. 67 : Ortman, Zool. Jahrb., Syst., VII. 1893-94, p. 687.

Goniocaphyra truncatifrons, de Man, Archiv für Nat. LIII. 1887, p. 339, pl. xiv. fig. 1, and Notes Leyden Mus. XII. 1890, p. 67,

Goniocaphyra sp., Zehntner, Rev. Suisse Zool. II. 1894, p. 163, pl. viii. fig. 12, 12a.

Carapace, length less than two-thirds its breadth, perfectly smooth and shining except for some fine granulation near the antero-lateral borders.

Front about a third the greatest breadth of the carapace, faintly notched and grooved in the middle line.

Antero-lateral borders cut into five teeth followed by a procurved spine.

Merus of external maxillipeds having the external angle very slightly produced.

Chelipeds unequal, much longer and more massive than the legs, the larger one about three times the length of the carapace: they are smooth and unarmed, except that the anterior border of the arm is finely serrulate and that one of the serrations at either the near or far end (rarely at both) is enlarged to form a spine. In the smaller cheliped the fingers are slender hooked and finely toothed, and are rather longer than the slightly swollen palm: in the larger cheliped they are stouter and more coarsely toothed and are shorter than the swollen palm.

Legs slender, the longest pair are hardly more than twice the length of the carapace; the dactylus of all, though compressed, is slender.

In the Indian Museum are 16 specimens from off Ceylon 34 fathoms (besides 3 from Mauritius and 2 from Samoa).

In the largest specimen (from Mauritius) the carapace is 9.5 millim. long and 14.5 millim. broad. The Indian specimens, though they include egg-laden females, are much smaller.

PSOPHETICUS, Wood-Mason.

Psopheticus, Wood-Mason, Admin. Rep. Marine Survey of India, 1890-91, p. 20 (name only): Alcock, Investigator Deep-Sea Brachyura, p. 72.

Psopheticus in several respects connects *Carcinoplax* and *Pseudorhombila* with *Eucrate*, and hence serves to emphasize the opinion of Miers as to the closeness of the ties that connect the three latter genera.

As in *Pseudorhombila* and *Carcinoplax*, the carapace is much broader than long and the orbital hiatus is open. As in *Pseudorhombila*, the dactylus of the last pair of legs is styliform. As in *Eucrate*, the fronto-orbital border occupies almost all the breadth of the carapace.

Carapace deepish, quadrilateral or subquadrilateral, a good deal broader than long, with the regions hardly defined, moderately convex fore and aft, flat from side to side.

Fronto-orbital border little, if at all, less than the greatest breadth of the carapace; the antero-lateral borders of the carapace therefore— which are short—are either very slightly arched or are in the same

straight line with the postero-lateral borders. Front square, entirely straight, prominent, entire, not well delimited from the supra-orbital angles, equal to the third the breadth of the carapace, or a little less.

Upper border of orbit very sinuous and with a single faint shoulder suture line. The antennal flagellum, which is of good length, stands loosely in the orbital hiatus. The antennules fold transversely.

Mouth and external maxillipeds as in *Eucrate*.

Chelipeds much stouter than the legs. The legs end in a slender styliform dactylus, and have one or many spines on the anterior border of the merus.

In both sexes the abdomen consists of seven separate segments, and in the male the third segment covers the whole width of the sternum between the last pair of legs.

Distribution: Andaman Sea.

Key to the (Indian) species of *Psopheticus*.

- I. Carapace quite quadrilateral, the fronto-orbital border being equal to the greatest breadth of the carapace: meropodites of legs with numerous spines ... *P. stridulans*.
- II. Carapace subquadrilateral, the fronto-orbital border being about three-fourths its greatest breadth; meropodites of legs with a single spine ... *P. insignis*.

11. *Psopheticus stridulans*, Wood-Mason.

Psopheticus stridulans, Wood-Mason, Illustrations of the Zoology of the Investigator, Crustacea, pl. v, fig. 1. (1892); Alcock, Ann. Mag. Nat. Hist., May 1894, p. 402; and Investigator Deep-Sea Brachynra, p. 73.

Carapace quite quadrilateral, three-fourths as long as broad, smooth and polished, crossed transversely in its posterior half by a broad groove which is continued obliquely across the pterygostomian regions to the angles of the mouth.

Owing to the large size of the eye and orbit, the extent of the fronto-orbital border is equal to the greatest breadth of the carapace.

A thin sharp prominent tooth at the outer orbital angle, and an obliquely-prominent spine at the junction of the antero-lateral and postero-lateral borders.

The subocular and subhepatic regions are inflated, and together form a granular eminence against which a strong spine on the upper border of the arm can be brought to play, producing a sound. Hence the names *Psopheticus* and *stridulans*.

The major diameter of the reniform eye is between a sixth and a seventh the breadth of the carapace; though the orbit does not conceal the eye its edges are well and cleanly cut.

The chelipeds in the adult male are a little more, in the adult female a little less, than twice the length of the carapace, but are slightly shorter than the legs: they are smooth and polished, as also are the legs. The arm has a strong upstanding claw-like tooth near the middle of its upper border, one or two spinules near the far end of the outer border, and a spinule near the far end of the inner border: the wrist has both the inner and the outer angles spiniform.

The third pair of legs, which are slightly the longest of the four, are rather more than two-and-a-half times the length of the carapace. In all, the anterior edge of the meropodites is armed with spines and the same edge of the carpopodites with spinules—these being least numerous and least distinct in the case of the first pair.

Colours in glycerine: chelipeds and legs rather dusky red; carapace dusky red behind the transverse groove—which forms a very sharply-defined red band—livid red, or almost violet, in front of it; eyestalks almost purple, eyes purplish-black. Eggs in life magenta.

The carapace of the largest male is 15 millim. long and 20 millim. broad.

Only known, so far, from the Andaman Sea: 2 males and a female from 173 fms., 2 males and a female (Types of the species and genus) from 188–220 fms., 7 females (3 with eggs) from 185 fms., a male and 4 females from 370–419 fms.

12. *Psopheticus insignis*, n. sp.

Carapace subquadrilateral, the antero-lateral borders being slightly arched, about three-fourths as long as broad, smooth, crossed transversely by two very low and indistinct ridges—one (convex forwards) between the lateral epibranchial spines, the other at the level of the post-cardiac region. The extent of the fronto-orbital border is about three-fourths the greatest breadth of the carapace.

There is a bluntish tooth at the outer orbital angle, and an obliquely prominent spine at the junction of the antero-lateral and postero-lateral borders, the edge of the carapace between the two being granular.

Eye small, subglobular, its diameter being hardly a tenth the greatest breadth of the carapace.

Chelipeds more than $2\frac{1}{2}$ times as long as the carapace and decidedly longer than the legs: they are unarmed except for a small tooth or spinule at the outer angle of the wrist.

The meropodites of the legs have the anterior border sharply granular, and in the case of the last three pair of legs there is a spine near the far end of this border. The longest pair of legs are hardly $2\frac{1}{3}$ times as long as the carapace.

Two specimens, from the Gulf of Martaban, 60 and 67 fms.

The carapace of the largest is 13 millim. long and 19 millim. broad.

Colours in glycerine, reddish: in the middle of the carapace is a large deep-red shield with a milk-white edge and centre.

This species closely connects *Psopheticus* with *Carcinoplax*.

PILUMNOPLAX, Stimpson restr.

Pilumnoplax, Stimpson, Proc. Ac. Nat. Sci. Philad. 1858 (1859) p. 93: Miers, Challenger Brachyura, p. 225: Alcock, Investigator Deep Sea Brachyura, p. 74.

Carapace depressed, flat, a little broader than long, the regions very faintly indicated. Fronto-orbital border two-thirds, or more, the greatest breadth of the carapace: the antero-lateral borders, which are toothed, are slightly arched or oblique. Front square-cut, straight, rather prominent, more or less confluent with the supra-orbital angles, often notched or grooved in the middle line.

Supra-orbital border often with two fissures. The antennal flagellum, which is of good length, stands in the orbital hiatus. The antennules fold transversely, or nearly so.

Mouth and mouth-parts as in *Eucrate*.

Chelipeds either subequal or unequal, much more massive than the legs. Legs slender, their dactyli compressed.

The abdomen in both sexes is seven-jointed: in the male the 3rd segment covers the whole width of the sternum between the last pair of legs.

Distribution: Tropical and S. Atlantic (deep sea), Arabian Sea (deep), Japan, Fiji.

The species of *Pilumnoplax* are characterized by the flat, depressed carapace, which is also comparatively narrow and, owing to the prominence of the perfectly straight front, is subhexagonal in shape.

13. *Pilumnoplax americana*, Rathbun.

Pilumnoplax americanus, Mary J. Rathbun, Bull. Lab. Nat. Hist. Iowa, 1898, p. 283, pl. vii. figs. 1, 2.

Pilumnoplax Sinclairi, Alcock, Investigator Deep Sea Brachyura, p. 74, pl. iii. fig. 1.

Carapace subquadrilateral, much depressed, a little more than three-quarters as broad as long, very finely frosted, perfectly bare, the regions fairly indicated.

Front horizontal, slightly prominent, square cut, grooved but not distinctly notched in the middle, more than a third the greatest breadth

of the carapace; its free edge is turned vertically downwards and rather deeply grooved from side to side.

The antero-lateral borders are not much more than half the length of the postero-lateral: they are thin and sharp, and are cut into three teeth, of which the first is broad and bicuspid and the other two are acute. On the postero-lateral borders, just behind the junction with the antero-lateral, is a denticle.

The eyes are small but well-formed, and are freely movable. The orbits conceal the retracted eyes to dorsal view: their upper margin is fissured near the middle, and the lower margin is slightly excavated just below the outer angle: the inner angle of the lower margin is not prominent, though dentiform.

The chelipeds in both sexes are very unequal, the larger one being not quite twice as long as the carapace; their surface, under the lens, is finely frosted: the inner angle of the wrist is strongly pronounced and is capped by a pair of acute teeth.

Legs moderately stout, unarmed, smooth, almost hairless: the third pair, which are somewhat the longest, are about two-and-a-half-times the length of the carapace. The dactyli are compressed-styliform.

Colours in spirit french-grey, fingers much darker grey.

A single female specimen, from off the Travancore coast 430 fms., has the carapace 13 millim. long and 16 millim. broad.

This species is closely related to *Pilumnoplax heterochir* (Studer) Miers, but is distinguished from it by the entire and more prominent front, by the absence of transverse markings on the carapace, by the longer legs, and by the smoothness of the chelipeds and legs.

From *Pilumnoplax abyssicola* Miers, which it also closely resembles, it is distinguished by the smooth carapace (to the naked eye), by the turned-down milled edge of the front, by the spinule on the postero-lateral border, by the fissured upper-margin of the orbit, and by the double spine at the inner angle of the wrist.

Distribution: Off Atlantic coasts of North America (Florida and Georgia) 440 and 70 to about 200 fms. Off Travancore coast 430 fms.

A single specimen from the latter locality is in the Indian Museum collection.

[PLATYPILUMNUS, Wood-Mason.]

Platypilumnus, Wood-Mason MS., Alcock, Ann. Mag. Nat. Hist., May, 1894, p. 401: Journ. Asiatic Soc. Bengal, Vol. LXVII. pt. 2, 1898, p. 232: Investigator Deep Sea Brachyura, p. 62.

This genus, like so many of the preceding, has strong affinities with

the *Xanthidae*: it may prove to belong to that family, where I have already, with reserve, placed it.

I may here, however, state that it closely resembles *Pilumnoplax*, having a flat, depressed, slightly transverse carapace. It differs from *Pilumnoplax* in the following particulars:—

(1) the front is more prominent, so that the carapace is more decidedly hexagonal:

(2) the fronto-orbital border is sharply serrated and the chelipeds and legs are profusely spiny:

(3) the external maxillipeds do not completely close the buccal cavern, but leave a wide gap between their anterior margin and the edge of the epistome:

(4) the dactyli of the legs are styliform.

Distribution: Andaman Sea.]

[*Platypilumnus gracilipes*, Wood-Mason.

Platypilumnus gracilipes, Wood-Mason MS., Alcock, Ann. Mag. Nat. Hist., May, 1894, p. 401: Ill. Zool. Investigator, Crust., pl. xiv. fig. 6: J.A.S.B. Vol. LXVII, pt. 2, 1898, p. 232: Investigator Deep Sea Brachyura, p. 63.

A description of the female (which is the only sex known) has been already given in this *Journal* (*loc. cit.*).

LITochira, Kinahan.

Litochira, Kinahan, Journ. Roy. Soc. Dublin, I. 1858, p. 121: Miers, Challenger Brachyura, p. 231.

? *Brachygrapsus*, Kingsley, Proc. Ac. Nat. Sci. Philad. 1880 (1881) p. 203.

Carapace and appendages in all the Indian species thickly tomentose and hairy.

Carapace deepish, either subquadrilateral and a good deal broader than long, or almost square, smooth, with little or no distinction of regions, flat, but declivous anteriorly. Fronto-orbital border not much less than, if not equal to, the greatest breadth of the carapace: antero-lateral borders short and if arched at all, very slightly so, and usually, but not always, with 2 or 3 teeth or spines.

Front not well delimited from the supra-orbital angles, its free edge deflexed and somewhat arched, never square-cut and laminar; more or less distinctly bilobed.

Upper border of orbit entire. The antennal flagellum, which is of good length, stands in the orbital hiatus. The autennules fold transversely, or nearly so.

Mouth and external maxillipeds as in *Eucrate*, &c.

Chelipeds subequal, more massive and usually shorter than the legs. The legs, including the dactyli, are compressed.

The abdomen of the male occupies the whole width of the sternum between the last pair of legs : in both sexes it consists of 7 segments.

I restrict the genus *Litochira* to those species which have the edge of the front turned down and distinctly arched as is shown in Kinahan's figure. These species fall into two groups, in one of which the carapace is a good deal broader than long, as in Kinahan's type, while in the other it is nearly square. Perhaps these two groups should be separated, though I do not recommend this course.

Distribution : S. Atlantic and Indo-Pacific (Cape to Australia).

Key to the Indian species of Litochira.

- I. Length of carapace about two-thirds the greatest breadth of the carapace and equal to the extent of the fronto-orbital border ; the antero-lateral borders distinctly arched :—
 1. Antero-lateral borders of the carapace with three truncated teeth, exclusive of the orbital angle .. *L. angustifrons.*
 2. Antero-lateral borders with two distinct, though blunt, teeth *L. setosa.*
 3. Antero-lateral borders with hardly any trace of lobulation—almost entire *L. integra.*
- II. Carapace more nearly square, the fronto-orbital border almost equal to its greatest breadth, so that the antero-lateral borders are almost in the same straight line with the postero-lateral borders or a very little curved :—
 1. Antero-lateral borders with two spines and one at the orbital angle : legs unarmed *L. Beaumontii.*
 2. Antero-lateral borders with two spines : no spine at the orbital angle : meropodites of the legs with some spines *L. quadrispinosa.*

14. *Litochira integra* (Miers).

Carcinoplax integra, Miers, Zool. H. M. S. Alert, p. 543, pl. xlviii, fig. C : de Man, Journ. Linn. Soc., Zool., XXII, 1887-88, p. 93.

Length of the carapace about two-thirds its breadth and equal to the extent of the fronto-orbital border.

Antero-lateral borders arched, without spines, though when completely denuded they are granular and show faint but quite distinguishable traces of division into two lobules besides the orbital angle.

Chelipeds less than twice the length of the carapace and shorter than the legs, unarmed except for an indistinct blunt tooth near the

far end of the upper border of the arm : inner angle of wrist dentiform.
Legs unarmed.

A single female from Mergui: its carapace is 6 millim. long and 9 millim. broad.

15. *Litochira setosa* (A. M. Edw.).

Carcinoplax setosa, A. Milne Edwards, Nouv. Archiv. du Mus. IX. 1873, p. 267, pl. xii. fig. 2: de Man, Archiv f. Naturges. LIII. 1887, i. p. 349, and Journ. Linn. Soc., Zool., XXII. 1887-88, p. 93.

The only essential difference between this species and the preceding is that the carapace here is a little more depressed and that the antero-lateral borders are cut into 2 blunt teeth besides the blunt orbital angle. The size is about the same.

In the Indian Museum are 16 specimens, from the Andamans and Mergui.

16. *Litochira angustifrons*, n. sp.

Carapace, length a little more than two-thirds the breadth. Fronto-orbital border nearly five-ninths the breadth of the carapace in extent. Antero-lateral borders arched, cut into 4 teeth (including the outer orbital angle) the edges and dorsal surface of which are granular: the first 3 teeth are sharply truncated, the fourth is subacute.

Chelipeds, in the adult male, nearly twice the length of the carapace and hardly shorter than the legs; in the female much less than twice the length of the carapace and markedly shorter than the legs. There is a lobule near the far end of the upper border of the arm, and the inner angle of the wrist is subacute.

Two specimens, from Bombay and Karachi. The carapace of the larger is 13 millim. long and 18 millim. broad.

This species appears to be closely related to *Pilumnoplax ciliatus* Stimpson.

17. *Litochira Beaumontii*, n. sp.

Carapace, length more than two-thirds the greatest breadth, nearly square. The extent of the fronto-orbital border is hardly less than the breadth of the carapace. The antero-lateral borders are hardly arched and are armed with 3 sharp spinules—including one at the outer orbital angle.

The chelipeds are much shorter than the legs and, like them, are unarmed, except that the inner angle of the wrist is dentiform. The longest (penultimate) pair of legs are more than $2\frac{1}{2}$ times as long as the carapace.

In the Indian Museum are 4 specimens, from the Andamans and from off Ceylon 34 fms. The carapace of the type specimen is 5 millim. long and 7 millim. broad.

Colour in spirit, uniform yellow.

18. *Litochira quadrispinosa*, Zehntner.

Litochira quadrispinosa, Zehntner, Rev. Suisse de Zool. II. 1894, p. 171, pl. viii. figs. 11, 11b.

Differs from *L. Beaumontii* in the following particulars only:—

- (1) the carapace is still more nearly square:
- (2) there are 2 spines on the antero-lateral borders but none at the outer orbital angles:
- (3) the inner border of the ischium and arm of the chelipeds is serrated, and the meropodites of the legs are armed with spines.
- (4) the colouration is yellow, with a large purplish-brown horse-shoe behind the front, and with sinuous markings of the same colour on the lateral subfrontal and suborbital regions of the carapace: the greater part of the antennal flagella is of the same purplish-brown colour.

In the Indian Museum is a single specimen from the Andamans: the carapace is 4 millim. long and 5 millim. broad.

Subfamily ii. GONOPLACINÆ.

19. GONOPLAX, Leach.

Gonoplax, Leach, Trans. Linn. Soc. XI. 1815, pp. 309, 323, and Malac. Bod. Brit.: Desmarest, Consid. Gen. Crust. p. 124, and Dict. Sci. Nat. XXVIII. p. 243: De Haan, Faun. Japon. Crust., p. 19: Milne Edwards, Hist. Nat. Crust. II. 60, and Ann. Sci. Nat. Zool. (3) XVIII. 1852, p. 162: Dana, U. S. Expl. Exp. Crust. pt. I. p. 310: Bell, Brit. Stalk-eyed Crust. p. 129: Heller, Crust. Sudl. Europ. p. 102: Miers, Challenger Brachyura, p. 245.

Rhombilia, Lamarck (part), Hist. Nat. Anim. sans Vert. (2) V. p. 466: Latreille, Encyc. Méthod. X. p. 292.

Carapace subquadilateral, with the antero-lateral angles acute and the lateral borders posteriorly convergent, a good deal broader than long, moderately convex, the regions but faintly indicated.

The front and orbits occupy the whole anterior border of the carapace: the front is square cut, laminar, and obliquely deflexed, and takes up between a third and a fourth of the anterior border of the carapace, the rest being taken up by the trench-like orbits.

Eyestalks long and slender: the antennules fold quite transversely beneath the front: the antennæ have a short basal joint and a slender flagellum of good length, standing in the orbital hiatus.

The buccal cavern is square and is well separated from the prominent epistome: the efferent branchial channels are not well defined. The external maxillipeds completely close the buccal cavern: their merus is square and carries the flagellum at the antero-internal angle.

Chelipeds in both sexes much more massive, and in the male very much longer, than the legs, which are long and slender.

The abdomen in both sexes consists of 7 separate segments: in the male the 3rd segment nearly but not quite covers the sternum between the last pair of legs.

Distribution: North-Eastern Atlantic coasts, Mediterranean basin; Persian Gulf; East Indian Archipelago.

In the Indian Museum there is a young female, lately received by myself from the Persian Gulf, of a species of *Gonoplax*. Apart from the shortness of the chelipeds it differs from *G. angulata*, of which we have several good specimens from Europe, only in wanting the terminal spine to the upper border of the meropodites of the legs.

Subfamilies iii. & iv. RHIZOPINÆ & HEXAPODINÆ.

Key to the Indian Genera.

A. Four pairs of legs, besides the chelipeds (*Rhizopinæ*):—

I. The antennular flagella can be completely retracted within the antennular fossæ:—

1. The epistome is of good length fore and aft, it is not in any way confused with the palate but is commonly prominent and almost vertical:—

i. Eyes well formed, rarely deficient in pigment:—

a. Eyes in all respects perfect: front straight, entire, from two-fifths to half the greatest breadth of the carapace: merus of the external maxillipeds nearly square.....

NOTONYX.

b. Eyes either quite perfect or deficient in pigment: front slightly curved and notched in the middle, about a third the greatest breadth of the carapace: antero-external angle of the merus of the external maxillipeds much produced...

CERATOPLAX.

ii. Eyes obsolete or nearly so:—

a. Carapace much broader than long, the postero-lateral borders parallel ...

TYPHLOCARCINUS.

b. Carapace a little broader than long, the postero-lateral borders anteriorly-convergent

XENOPHTHALMODES.

2. The epistome is short, sunken, and not boldly separated from the palate :—
- i. Eyes minute, orbits concealed beneath the anterior border of the carapace : merus of external maxillipeds with a sharp antero-external angle SCALOPIDIA.
 - ii. Eyes obsolete or nearly so, orbits visible from above : antero-external angle of merus of external maxillipeds rounded off TYPHLOCARCINODES.
- II. The basal joint of the antennules completely fills its fossa, into which the flagellum cannot therefore be retracted :—
1. Eyes small, but perfect : outer border of merus of external maxillipeds almost straight HEPHTHOPELTA.
 2. Eyes reduced to a speck of pigment : outer border of merus of external maxillipeds with a strongly convex bulge outwards CAMATOPSIS.
- B. Only three pairs of legs besides the chelipeds, the last pair of other crabs not being represented even by a rudiment. The *vasa efferentia* of the male open on the 4th sternal segment (*Hexapodinae*) LAMBDOPHALLUS.

Subfamily iii. RHIZOPINÆ, Stimps.

NOTONYX, A. M. Edw.

Notonyx, A. Milne Edwards, Nouv. Archiv. du Mus. IX. 1873, p. 268 : Miers, Challenger Brachyura, p. 235.

Carapace deepish, subquadrilateral with the antero-lateral angles rounded off, broader than long, perfectly nude smooth and polished, without any indication of regions, convex fore and aft and anteriorly declivous.

Fronto-orbital border a good deal more than three-fourths the greatest breadth of the carapace : antero-lateral borders short, entire, curved. Front straight, sublaminar, from two-fifths to half the breadth of the carapace.

Eyes small but well developed, the eyestalks movable, obpiriform : orbits in the usual marginal position. The antennules fold transversely in well formed pits. Basal antenna-joint short ; the flagellum, which is of fair length, stands in the orbital hiatus.

Epistome well formed, nearly vertical : buccal cavern a little wider in front than behind. A slight hiatus between the external maxillipeds, the merus of which appendages is square and carries the flagellum at the antero-internal angle.

Chelipeds subequal, or a little unequal, smooth and polished, much

more massive and but little shorter than the legs: palm short and rather deep, with the lower border sharply carinate.

Legs smooth, unarmed, with a very few scattered lank hairs: dactyli styliiform.

The abdomen in both sexes consists of 7 separate segments and does not nearly conceal the sternum between the last pair of legs.

Distribution: Indo-Pacific, from Fiji to the Persian Gulf.

Key to the Indian species of Notonyx.

- I. Carapace, length about three-fourths the breadth: merus of external maxillipeds about as long as the ischium ... *N. nitidus.*
- II. Carapace, length about five-sixths the breadth: merus of external maxillipeds much shorter than the ischium ... *N. vitreus.*

20. *Notonyx nitidus*, A. M. Edw.

Notonyx nitidus, A. Milne Edwards, Nouv. Archiv. du Mus. IX, 1873, p. 209, pl. xii. fig. 3: Miers, Challenger Brachyura, p. 236.

Carapace, length a little more than three-fourths the greatest breadth. Front between a third and two-fifths the breadth of the carapace. Orbits elongate. Merus of the external maxillipeds as long as the ischium.

A small denticle near the far end of the upper border of the arm: inner angle of wrist pronounced, but not acute.

Legs with some scattered hairs along the edges, the 3rd pair, which are slightly the longest, are about $2\frac{1}{2}$ times the length of the carapace and nearly half again as long as the chelipeds.

In the Indian Museum is a single specimen from the Persian Gulf: its carapace is 8.5 millim. long and 11 millim. broad.

21. *Notonyx vitreus*, n. sp.

Carapace, length about five-sixths the greatest breadth, rather tumid. Front nearly half the breadth of the carapace. Merus of the external maxillipeds shorter than the ischium.

No denticle on the arm: inner angle of wrist blunt. Legs with hardly any hairs, otherwise resembling those of *N. nitidus*.

In the Indian Museum is a single specimen from the Andaman Sea, 53 fathoms: its carapace is 5 millim. long and 6 millim. broad.

CERATOPLAX, Stimpson.

Ceratoplax, Stimpson, Proc. Ac. Nat. Sci. Philad. 1858, p. 96: Miers, Challenger Brachyura, p. 233.

Carapace deep, subquadrilateral with the antero-lateral angles rounded off, a good deal broader than long, the regions very indistinctly

and incompletely indicated, strongly convex fore and aft and anteriorly declivous.

Fronto-orbital border about two-thirds the greatest breadth of the carapace: antero-lateral borders sharp, entire, curved: postero-lateral borders parallel.

Front about a third the greatest breadth of the carapace, its free edge slightly arched, notched in the middle line.

The orbits are in the usual position and the eyestalks are immovably fixed in them, but the eyes are fairly well formed, though they may be deficient in pigment. The antennules fold transversely in proper pits. The basal antenna-joint is short: the flagellum, which is of good length, stands in the orbital hiatus.

Epistome well formed and prominent: buccal cavern quadrilateral, slightly increasing in breadth from behind forwards, almost completely closed by the external maxillipeds, the merus of which has the antero-external angle much produced and carries the flagellum at the antero-internal angle.

Chelipeds subequal, more massive but decidedly shorter than the legs; the palm short, deep, and compressed.

Legs slender, unarmed, the 3rd pair the longest: dactyli styliform.

The abdomen in both sexes consists of 7 separate segments and does not nearly occupy the space between the last pair of legs.

Distribution: Indo-Pacific from the Bay of Bengal to Ecuador.

Key to the Indian species of *Ceratoplax*.

- I. Surface of carapace nude, eyes well pigmented: outer surface of palm polished and nearly smooth *C. ciliata*.
- II. Surface of carapace tomentose, eyes deficient in pigment: rows of vesiculous granules on the outer surface of the palm *C. hispida*.

22. *Ceratoplax ciliata*, Stimpson.

Ceratoplax ciliatus, Stimpson, Proc. Ac. Nat. Sci. Philad. 1858, p. 96: A. O. Walker, Journ. Linn. Soc., Zool., XX. 1890, p. 110.

Ceratoplax ciliata, Miers, Challenger Brachyura, p. 234, pl. xix. fig. 3: Cano, Boll. Soc. Nat. Napol. III. 1889, p. 229.

Carapace, chelipeds and legs rather scantily fringed with hairs, but with a nude surface.

Carapace, length a little more than three-fourths the greatest breadth, sparsely punctate, the regions not distinguishable. Front about a third the greatest breadth of the carapace, its free edge slightly arched and notched in the middle line. Eyes well pigmented. Chelipeds decidedly shorter than the legs: inner angle of wrist sharp, but

not produced: outer surface of palm smooth and polished, except for a few depressed granules inferiorly. Third pair of legs not twice the length of the carapace.

In the Indian Museum is a single specimen from the Andaman Sea, 53 fms.

23. *Ceratoplax hispida*, n. sp.

Carapace, chelipeds and legs with a tomentose surface, and fringed with longer silky hairs.

Carapace, length a little less than three-fourths the breadth, when denuded its regions (and three gastric subregions) are just distinguishable, and its surface is pitted and its lateral margins granular. Front a little more than a third the greatest breadth of the carapace, its free edge decidedly arched and notched in the middle line. Eyes very deficient in pigment. Chelipeds (in the female—male unknown) much shorter than the legs: inner angle of wrist sharply dentiform; outer surface of palm with numerous rows of vesiculous granules. Third pair of legs two-and-a-half times the length of the carapace.

In the Indian Museum is a single specimen from Palk Straits: its carapace is 9 millim. long and 13 millim. broad.

TYPHLOCARCINUS, Stimpson.

Typhlocarcinus, Stimpson, Proc. Ac. Nat. Sci. Philad. 1858, p. 95.

Carapace as in *Ceratoplax*. Fronto-orbital border about half the greatest breadth of the carapace. Front less than a fourth the breadth of the carapace, more or less distinctly bilobed. Antero-lateral borders well curved, often emarginate in places: postero-lateral borders parallel.

Orbits in the usual position, completely filled by the immovable eye-stalks: eyes obsolete, or nearly so. The antennules fold nearly transversely, in proper pits. Basal antenna-joint short; the flagellum, which is short, stands in the orbital hiatus.

Epistome well formed and prominent: buccal cavern completely, or almost completely, closed by the external maxillipeds, the flagellum of which articulates with the antero-internal angle of the merus; the outer angle of the merus not produced.

Chelipeds subequal or unequal, much more massive than the legs from which they do not much differ in length: palm short deep and compressed, with sharp upper and lower borders.

Legs slender, unarmed, the 3rd pair slightly the longest: dactyli styliform.

The abdomen in both sexes consists of 7 separate segments and does not nearly occupy all the sternum between the last pair of legs.

Distribution: Indo-Pacific, from the Persian Gulf to Hongkong.

From *Rhizopa*, of which we possess specimens from Hongkong, this genus differs only in having the eyes obsolete and the external maxillipeds more closely opposed to each other. It may well be doubted whether these differences are of generic value.

Key to the Indian species of Typhlocarcinus.

- I. Antero-lateral borders with 2 or 3 emarginations:—
1. Buccal cavern decreasing in size from behind forwards: antero-external angle of merus of external maxillipeds obsolete and rounded off *T. nudus*.
 2. Buccal cavern quite square: antero-external angle of merus of external maxillipeds sharp *T. villosus*.
- II. Antero-lateral borders of carapace entire: buccal cavern quite square *T. rubidus*.

24. *Typhlocarcinus nudus*, Stimpson.

Typhlocarcinus nudus, Stimpson, Proc. Ac. Nat. Sci. Philad. 1858, p. 96.

Carapace much transverse, its length only about five-eighths its greatest breadth, its surface smooth and bare, the regions hardly distinguishable. The posterior part of the antero-lateral border has two or three obscure notches.

The front, which is about a fifth the greatest breadth of the carapace, is grooved in the middle line—almost bilobed. Orbits broadly oval, almost subcircular.

Buccal cavern considerably decreasing in breadth from behind forwards: merus of the external maxillipeds with the antero-external angle obsolete and rounded off; the exognath very narrow.

Chelipeds and legs smooth, with only a few scant hairs on the margin. Chelipeds, in the male about twice the length of the carapace, a little longer than any of the legs: inner angle of wrist sharp, but not produced: palms unequal, smooth and polished, the upper border smooth and crest-like, the lower border with a distinct moulding.

In the Indian Museum are 25 specimens, from Karachi and the Mekran coast, Madras coast and Sandheads, and the Andamans.

In this species a tiny speck of pigment denotes an eye.

25. *Typhlocarcinus villosus*, Stimpson.

Typhlocarcinus villosus, Stimpson, Proc. Ac. Nat. Sci. Philad. 1858, p. 96. Miers, P. Z. S., 1879, pp. 20, 40; Walker, Journ. Linn. Soc. Zool. XX, 1890, p. 110, pl. ix. figs. 6-8; Ortmann, Zool. Jahrb. Syst. VII. 1893-04, p. 689.

Carapace and appendages everywhere covered with velvet. Carapace

about three-fourths as long as broad, its greatest breadth across the middle: when dentated it is granular in places and the regions are hardly distinguishable. Three blunt granular teeth on the lateral borders, two of which are antero-lateral, the third being postero-lateral.

Front between a fourth and a fifth the breadth of the carapace, bilobed: orbits pyriform.

Buccal cavern quite square: antero-external angle of merus of external maxillipeds well marked but not produced, the exognath normal.

Chelipeds about twice as long as the carapace, and nearly the same length as the 3rd (longest) pair of legs, their outer surface, especially that of the palm, is granular: inner angle of the wrist produced, dentiform. The legs are fringed with coarsish hairs.

In the Indian Museum, besides a specimen from Hongkong, are 6 from various parts of the coast of the Bay of Bengal.

The carapace of the best specimens is 6 millim. long and 8 millim. broad.

In this species also there is a tiny speck of pigment for an eye.

26. *Typhlocarcinus rubidus*, n. sp.

Carapace perfectly smooth and nude, except for a few hairs on the anterior and antero-lateral margins, its length a little over three-fifths its breadth, the regions hardly distinguishable, though the epibranchial regions have a decided dorsal bulge.

The antero-lateral borders, which, like the postero-lateral are blunt and granular, are quite entire.

Front about a fifth the breadth of the carapace, bilobed, the median groove very deep. Orbits pyriform. Buccal cavern and external maxillipeds as in *T. villosus*.

Chelipeds and legs rather hairy, but there is always a large smooth bare space on the outer surface of the wrist and palm. Chelipeds about as long as the longest legs, less than twice the length of the carapace: inner angle of wrist produced, dentiform: below and above the bare patch on the wrist and hand the surface, when dentated, is granular.

The colour is a rich ruddy brown.

In the Indian Museum are 18 specimens from the Bay of Bengal, 20 to 65 fms.

The largest specimen has the carapace nearly 7 millim. long and 10 millim. broad, but there are egg-laden females smaller than this.

There is no pigment speck to represent an eye in this species.

XENOPHTHALMODES, Richters.

Xenophtalmodes, Richters, in Müllins Meeresf. Maurit. p. 155, 1880.

Carapace rudely semicircular in outline, the posterior border being

the longest, and the postero-lateral borders being anteriorly-convergent to form a common curve with the well-arched anterior and antero-lateral borders: it is but little broader than long, is convex fore and aft and strongly declivous anteriorly, and shows the regions indistinctly and incompletely.

Fronto-orbital border less than half, front less than a fifth, the greatest breadth of the carapace, the front being prominent and bilobed.

Orbits in the usual position, completely filled by the immovable eye-stalks: eyes obsolete. The antennules are small, and fold obliquely rather than transversely in proper pits. Basal antenna-joint short: the flagellum, which also is short, stands in the orbital hiatus.

Epistome and mouth parts, as also the abdomen, as in *Typhlocarcinus*.

Chelipeds a little unequal, much more massive and rather longer than the legs, of which the 3rd pair is slightly the longest. Palm short deep and compressed, with sharp edges.

Legs slender, unarmed: dactyli styliform.

Distribution: Indian Ocean, from Mauritius and the Red Sea to the Andamans.

This genus differs from *Typhlocarcinus* in having the carapace more elongate and more semicircular in outline, the front more prominent and narrower, and the antennules more cramped in consequence.

27. *Xenophthalmodes moebii*, Richters.

Xenophthalmodes moebii, Richters, in Möbius, Meeresf. Maurit. p. 155, pl. xvi. fig. 29 and pl. xvii. figs. 1-5 1880: Miers, P. Z. S. 1884, pp. 10, 12: de Man, Notes Leyden Mus. XII. 1890, p. 68, pl. iii. fig. 5.

The carapace has rather a lop-sided look and is practically smooth, except for two rather deep semilunar impressions that incompletely separate the gastro-cardiac from the epibranchial regions: its surface is bare, but its free edges, like the edges of the chelipeds and legs, are thickly fringed with longish silky hairs: its length is about five-sixths the greatest breadth, which is quite posterior. Front very decidedly bilobed. Orbits oval. Buccal cavern very slightly decreasing in breadth anteriorly: the merus of the external maxillipeds has the antero-external angle rounded off.

Chelipeds in the male a little longer than the legs, and with the hands decidedly unequal: the inner angle of the wrist is acuminate: the upper edge of the palm is sharp and crest-like, the lower edge has a low granular crest or moulding, the surface of the palm is smooth and polished. The larger cheliped, measured along its convexities, is about twice the length of the carapace.

In the Indian Museum are 13 specimens, from the Persian Gulf, Malabar coast, Coromandel coast, Gulf of Martaban, and the Andamans. The carapace of the largest specimen is 10 millim. long and 12 millim. broad.

In one very young specimen the eye is represented by a tiny speck of pigment, as shown in de Man's figure, but in large specimens there is no trace of this speck.

SCALOPIDIA, Stimpson.

Scalopidia, Stimpson, Proc. Ac. Nat. Sci. Philad. 1858, p. 95: Miers, Challenger *Braehynra* p. 223.

Hypophthalmus, Richters, Abh. Senck. Nat. Ges. Frankfurt, XII. 1861, p. 429.

Carapace of but moderate depth, moderately convex fore and aft and but moderately declivous anteriorly: it is a good deal broader than long and inclines somewhat to a semicircular outline, the greatest breadth being quite posterior, the postero-lateral borders being anteriorly convergent, and the antero-lateral borders being nicely curved: the regions are distinctly mapped out by fine grooves.

Fronto-orbital border about two-fifths, front about a fourth the greatest breadth of the carapace: front rather obscurely bilobed, antero-lateral borders acute.

Eyes minute, eyestalks fixed in small orbits which lie entirely beneath the anterior border of the carapace. The antennules fold transversely in shallow and rather inadequate pits. Basal antenna-joint short; the flagellum, which is of moderate length, stands quite clear of the orbital hiatus.

Epistome sunken, not well demarcated from the edge of the buccal cavern: the latter is squarish and broader in front than behind. There is a considerable gap between the external maxillipeds, the merus of which is square and has a sharp antero-external angle and carries the flagellum at the antero-internal angle.

Chelipeds a little unequal, much shorter and not much more massive (except as regards the larger palm) than the third pair of legs: palm short and compressed, with sharp edges.

The legs have the merus broadened, especially in the case of the 2nd and 3rd pair: the 3rd pair is considerably the longest.

The abdomen consists of 7 separate segments, and does not nearly occupy all the sternum between the last pair of legs.

Distribution: Indo-Pacific, from Madagascar to China.

28. *Scalopidia spinosipes*, Stimpson.

Scalopidia spinosipes, Stimpson, Proc. Ac. Nat. Sci. Philad. 1858, p. 95: J. R. Henderson, Trans. Linn. Soc., Zool., (2) V. 1893, p. 379.

Carapace and appendages downy. Carapace, length about two-

thirds the greatest breadth, its surface closely punctate: all the regions are quite plainly defined by grooves, which also subdivide the gastric into three subregions, and the epibrauchial into two—an anterior and a posterior; and the cardiac region has a distinct bulge. The sharp-ent antero-lateral borders are, like the anterior border, very finely serrated, and are marked off from the blunt postero-lateral borders by a minute spine.

The larger cheliped is barely half again as long as the carapace: both chelipeds have the lower edge of the arm finely serrated, have a spinule near the far end of the upper border of the arm and one at the outer angle of the wrist, and have the inner angle of the wrist strongly dentiform.

The legs have their edges, except in the case of the dactyli, closely and evenly spinulate, but there is a tendency for the spines to fail on the posterior edge of the carpus and propodite. The 3rd pair, which are considerably the longest, are much more than $2\frac{1}{2}$ times the length of the carapace. The legs increase remarkably in length from the 1st to the 3rd, and the 4th are about the same length as the first. The dactyli are sharp, strong, styliform and ciliated: those of the last pair are curved, those of the other pairs are straight.

Henderson records this species from the Gulf of Martaban: the only specimens in the Indian Museum are from Hongkong.

29. TYPHLOCARCINODES, n. gen.

Apparently one of the links between *Typhlocarcinus* and its allies on the one hand and *Scalopidia* on the other.

Carapace moderately deep, shaped much as in *Typhlocarcinus*, but slightly more elongate, the free edges hairy. Fronto-orbital border about three-fifths, front about a third, the greatest breadth of the carapace: front prominent, its free edge convex and entire.

Orbits in the normal position, narrow, button-hole shaped; eye-stalks tapering; immovable; eyes obsolete or nearly so. *Antennules cramped, folding very obliquely—nearly longitudinally*—in proper pits. Antennal peduncle small and cramped, the flagellum standing in the orbital hiatus.

Epistome sunken, linear: buccal cavern square, its anterior angles, like the antero-external angles of the merus of the external maxillipeds, rounded off: the external maxillipeds completely close the buccal cavern and have the flagellum articulated to the antero-internal angle of the merus.

The abdomen does not nearly occupy all the space between the last pair of legs.

The above diagnosis is framed on a broken specimen, without chelipeds or legs, in the Indian Museum. In the form of the front and shape of the carapace this specimen has a strong resemblance to the *Typhlocarcinus integrifrons* described and figured by Miers in Ann. Mag. Nat. Hist. (5) VIII. 1881, p. 260, pl. xiv. fig. 1. Miers himself was doubtful about referring his species to *Typhlocarcinus*.

Our specimen is too much damaged to furnish a useful specific diagnosis.

HEPHTHOPELTA, Alcock.

Hepthopelta, Alcock, Investigator Deep Sea Brachyura, p. 76.

Carapace very deep, inflated, rudely semicircular, about as long as broad, convex fore and aft and vertically deflexed anteriorly, all its borders entire and all, except the posterior, tumid, the cardiac and branchial regions well delimited.

Front considerably less than a third the greatest breadth of the carapace, bilobed, vertically deflexed; the whole extent of the fronto-orbital border is more than half the greatest breadth of the carapace.

Orbits small, shallow, excavated in the vertically-deflexed anterior border of the carapace, not concealing the eyes. Though the eyes are small and their stalks immovably fixed, they are *well formed, well defined and well pigmented*.

The antennulary fossæ are completely filled by the basal antennulary joint, to the exclusion of the flagella.

The basal antenna-joint is small, slender, and does not nearly reach the front; the flagellum, which arises in the orbital hiatus, is hardly longer than the orbit.

The epistome is of considerable width fore and aft and, though sunken, is well defined from the palate. The buccal cavern is square, though very slightly narrower in front than behind; the excurrent branchial canals are well defined. The external maxillipeds, which completely cover the buccal cavern, have the merus shorter and slightly narrower than the ischium and somewhat oval in shape, and the palp jointed to the antero-internal angle of the merus and of good size.

The legs are all long and slender and end in a slender dactylus: the third pair are slightly the longest.

The chelipeds are lost in the single specimen obtained, which is a female.

30. *Hepthopelta lugubris*, Alcock.

Hepthopelta lugubris, Alcock, Investigator Deep Sea Brachyura, p. 77. pl. iv, fig. 2.

Carapace as long as broad, roughly semicircular or semiglobose, of thin texture, its surface very finely frosted and somewhat pubescent.

The fronto-orbital region is vertically deflexed and almost invisible in a dorsal view.

Epibranchial and cardiac regions tumid, circumscribed by deepish grooves.

Legs subcylindrical, with a finely frosted and pubescent surface: the third pair, which are slightly the longest, are about $2\frac{3}{4}$ times the length of the carapace: the posterior (lower) border of the merus of the first two pairs is spinulose.

Colours in spirit, light yellow, eyes black.

A single female, without chelipeds, from the Andaman Sea, 490 fms. The carapace is 8 millim. long, and the same in breadth.

CAMATOPSIS, Alcock.

Camatopsis, Alcock, Investigator Deep Sea Brachyura, p. 75.

Carapace deep, rudely sub-semicircular, hardly broader than long, strongly convex fore and aft and declivous anteriorly: its antero-lateral borders short sharp and entire, its postero-lateral borders long sharpish and slightly convergent anteriorly: its only markings are two longitudinal grooves hardly visible on the undenuded carapace, that mark off the epibranchial regions.

Front considerably less than a fourth the greatest breadth of the carapace, obscurely bilobed; the whole fronto-orbital border is about half the greatest breadth of the carapace.

Orbits large, deep, and normally cut in the anterior border of the carapace: eyestalks large, tumid, conical, almost immovably fixed in the orbits: eyes reduced to a speck of pigment placed on the under surface of the tip of their stalks.

Antennulary fossæ small, and filled entirely by the basal antennulary joint, to the complete exclusion of the large flagellum.

The small basal antenna-joint is wedged in between and beneath the eyestalk and antennule, the second joint hardly reaches to the front, the flagellum is large and considerably longer than the orbit.

The epistome is of considerable width fore and aft, especially at its middle, and though sunken, is well separated from the palate. The buccal cavern is square, though rather broader in front than behind, and is almost entirely covered by the external maxillipeds. These have the merus as long as, and markedly broader than the ischium, owing to the strongly convex bulge of the outer border of the merus: the palp, which is of good size, is jointed to the antero-internal angle of the merus.

The chelipeds are moderately massive and in the male the hands are unequal. The arm is short and trigonal, the wrist rather long narrow and crooked.

Legs sufficiently long and stout, the penultimate pair being the longest; their dactyli are sharply trigonal and elegantly plumose: the last pair have the dactylus slightly curved and compressed.

The abdomen of the male, which is four-jointed, does not nearly fill the space between the last pair of legs.

Between the 4th and 5th segments of the sternum, in the male, is intercalated a long narrow plate that covers the external genital ducts.

31. *Camatopsis rubida*, Alcock and Anderson.

Camatopsis rubida, Alcock and Anderson, Ann. Mag. Nat. Hist. Jan. 1899, p. 13: Alcock, Investigator Deep Sea Brachyura, p. 76, pl. iv. fig. 3.

Carapace very finely granular when denuded of the short velvet that covers it and all parts of the body and appendages. The narrow front and the antero-lateral borders form a semicircular curve: the postero-lateral borders are anteriorly convergent, the greatest breadth of the carapace being between the bases of the penultimate pair of legs. The tumid anterior (true inner) borders of the eyestalks bulge beyond the orbital concavities of the anterior border of the carapace.

The efferent branchial canals cause an angular bulging or carination of the pterygostomian regions.

The chelipeds are unequal in the male (female unknown), the longer one being about $1\frac{3}{4}$ times the length of the carapace. They are unarmed. In the larger hand the fingers meet only at tip and are finely toothed in the distal half only, being rather deeply notched in the basal half, while on the inner surface of the movable finger is a curious truncated spine. In the smaller hand the fingers meet throughout their extent and only the immovable finger is distinctly toothed, one or two of its teeth being enlarged.

The first and last pair of legs are about $1\frac{2}{3}$ times, the second and third pair are about twice, the length of the carapace. In the last pair of legs the terminal joints are more strongly ciliated, and the dactylus is slightly curved and compressed as for swimming.

Colours in spirit rich chocolate brown. Animal entirely covered with velvet.

Three males from the Andaman Sea, 194 fathoms. The carapace of the largest is 9 millim. long and 10 millim. broad.

Subfamily iv. HEXAPODINÆ, Miers.

LAMBDOPHALLUS, nov. gen.

Near *Hexapus*, De Haan, from which it chiefly differs in the form of the anterior pair of male sexual appendages, which are rigidly bent

into the form of an **L**, the horizontal limb of which is lodged in a special trench in the first segment of the sternum.

Carapace much broader than long, broadest behind. Front narrow, nearly vertically deflexed. Orbits small, circular, widely communicating with the antennular fossæ. The antennules fold transversely. Antennæ small, standing in the orbital hiatus.

Epistome well-defined. Buccal cavern with the sides slightly convergent anteriorly. The external maxillipeds have coarse palps, which, when folded, fill the rather broad space that exists between the ischiopodites: the merus is subquadrilateral, with the antero-external angle rounded off, and the palp articulates with its antero-internal angle: the exognath is not concealed.

Chelipeds unequal in the male, shorter but more massive than the legs.

Only three pairs of legs, the fourth pair entirely absent.

Sternum extremely broad. Abdomen of the male very narrow. The efferent ducts of the male sex open on the 4th sternal segment inside the fossa into which the abdomen fits.

32. *Lambdophallus searpes*, n. sp.

Resembles *Hexapus searpus*, De Haan, with a specimen of which I have compared it, but differs in numerous important characters.

Carapace subquadrilateral with the anterior angles broadly rounded off, much broader than long, convex fore and aft and anteriorly deflexed, nearly flat from side to side, the gastric and cardiac regions well defined, the surface uniformly finely granular under a lens.

Front nearly vertically deflexed, its edge square-cut but grooved or notched in the middle line, its breadth about a fifth the greatest breadth of the carapace.

Orbits freely communicating with the antennular fossæ: eyestalks immovable and very short, eyes small but well pigmented.

Antennules large, folding transversely; the inter-antennular septum narrow if complete.

Epistome lozenge-shaped, well defined: the sides of the buccal cavern converge slightly from behind forwards: the ischiopodites of the external maxillipeds are rather narrow and leave between them a widish gap, which, however, is filled by the flagella.

There is a deep crescentic groove across the pterygostomial region, just in front of the bases of the chelipeds, and there are several close-set oblique scorings near the antero-lateral angles of the buccal cavern.

Chelipeds in the male unequal, more massive than the legs, the larger one not $1\frac{1}{2}$ times the length of the carapace: under the lens their

outer surface is very finely and uniformly granular: the fingers are short, especially in the larger hand, and meet only at tip, and at the base of the dactylus of the larger hand is a molariform tooth.

Legs tomentose: only 3 pairs are present, the 4th pair not being represented even by a rudiment. The first pair, which are not much longer than the chelipeds, are the shortest and slenderest: the next two pairs, which are about equal in size, are not quite twice the length of the carapace.

Sternum very broad, finely and uniformly granular: in the male, in the first sternal segment, on either side of the last abdominal tergum, is a long narrow oblique trench, in which the ends of the modified abdominal appendages are lodged.

Male abdomen very narrow, not a fifth the breadth of the sternum at its base. The first tergum is short fore and aft, the second is linear and has a somewhat trilobed form, the 3rd 4th and 5th are fused to form a sort of hexagonal plate with the distal end narrowed, the 6th and 7th are separate.

The anterior of the two pairs of male abdominal appendages are most curiously modified: they are very long and stiff and are L shaped, and the proximal limb of the L lies beneath and parallel with the abdomen, while the distal limb of the L emerges at right angles to the abdominal tergum, and, instead of being free, lies in the special sternal canal before mentioned.

In the Indian Museum are 2 specimens, from the Bay of Bengal, 65 fathoms: The carapace is 4.5 millim. long and 7 millim. broad.

Family II. PINNOTERIDÆ, Edw.

Key to the Indian genera of Pinnoteridæ.

- I. Carapace ill-calcified: the ischium of the external maxillipeds is indistinguishably fused with the much enlarged merus:—
 - 1. Edges of the carapace swollen and ill-defined: dactylus of the external maxillipeds small and often abnormally placed, but present PINNOTERES.
 - 2. The edge of the carapace, in all but its short fronto-orbital portion, forms a thin upturned crest: dactylus of the external maxillipeds wanting, or represented by a tiny pencil of hairs XANTHARIA.
- II. Carapace well calcified: the ischium of the external maxillipeds is distinct and independent:—
 - 1. Ischium of the external maxillipeds much smaller than the merus: dactylus of the external maxillipeds very large, spatulate. Orbits and eyes normal, the orbits circular TETRIAS.

2. Ischium of the external maxillipeds as well developed as the merus, the dactylus not enlarged. The orbits are narrow slits situated dorsally with their long axis almost at right angles with the anterior border of the carapace, and the eyes are minute or obsolescent XENOPHTHALMUS.
3. Ischium of the external maxillipeds very much larger than the merus, the appendages as a whole being slender and not nearly closing the buccal cavern. The orbits are in the usual marginal position..... CHASMOCARCINOPS.

Subfamily XENOPHTHALMINÆ, nov.

XENOPHTHALMUS, White.

Xenopthalmus, White, Ann. Mag. Nat. Hist. XVIII. 1846, p. 177; Milne Edwards, Ann. Sci. Nat., Zool., (3) XX. 1853, p. 220; Burger, Zool. Jahrb., Syst. VIII. 1894-95, p. 386.

Carapace broader than long and broadest behind, arched antero-laterally, the regions faintly indicated. Front narrow, strongly deflexed.

The orbits are small, oblique or nearly longitudinal, button-hole like slits, placed dorsally almost at right angles to the frontal border, and the eyestalks are immovably embedded in them. The eyes are, at most, minute specks of pigment. The antennules and antennæ are extremely small, the antennules folding nearly vertically beneath the front.

Epistome not defined. Buccal cavern almost semicircular, completely closed by the external maxillipeds. The external maxillipeds have the ischium and merus equally well developed (the ischium being nearly square and the merus about a quadrant of a circle) and the palp articulated at the antero-external angle of the merus. Exognath small and concealed.

Chelipeds in the male "with the hands somewhat elongated and thickened," in the female short and very slender.

Legs fairly stout, the third pair the longest.

The abdomen in both sexes consists of seven separate segments.

Key to the Indian species of *Xenopthalmus*.

- I. The legs are ciliated and the third (longest) pair are not twice the length of the carapace *X. pinnoteroides*.
- II. The legs are ciliated towards the tip only, and the third (longest) pair are more than twice the length of the carapace *X. obscurus*.

33. *Xenopthalmus pinnoteroides*, White.

Xenopthalmus pinnoteroides, White, Ann. Mag. Nat. Hist. XVIII. 1846, p. 178, pl. ii. fig. 2, and Samarang Crust. p. 68, pl. xii. fig. 3; Milne Edwards, Ann. Sci.

Nat., Zool., (3) XX. 1853, p. 221: Stimpson, Proc. Ac. Nat. Sci, Philad. 1858, p. 107: Sluiter, Tijds. Nederl. Ind. XL. 1881, p. 162: J. R. Henderson, Trans. Linn. Soc., Zool., (2) V. 1893, p. 394.

This species is included in the Indian Fauna on the authority of Professor J. R. Henderson. It seems to be characterized by having the ischium and merus of the external maxillipeds deeply grooved, longitudinally, near the outer margin; the legs stout and hairy, the third pair barely twice as long as the carapace; and the three terminal joints of the first pair of legs broadened so that their edges are almost carinate: the lateral borders of the carapace are granular or finely denticulate.

34. *Xenophthalmus obscurus*, Henderson.

Xenophthalmus obscurus, J. R. Henderson, Trans. Linn. Soc., Zool., (2) V. 1893, p. 394, pl. xxxvi. figs. 18, 19.

Carapace glabrous and shiny, but its surface is somewhat creased: the median regions are separated from the branchial regions by grooves or depressions, and each branchial region is traversed obliquely in its posterior part by a low ridge.

The rounded-off antero-lateral corners of the carapace are traversed by three low fine ridges, nearly parallel with one another: one of these defines the pterygostomial region, the next appears to be the true antero-lateral border, while the most dorsal one runs from the angle of the orbit to the junction of the antero-lateral and postero-lateral borders.

Front narrow, nearly vertically deflexed, longitudinally grooved in the middle line, its free edge square-cut but faintly sinuous. The eyes are just visible as minute linear specks, placed posteriorly.

No epistome. The ischium and merus of the external maxillipeds are not deeply grooved near the outer border.

Chelipeds in the female shorter and much slenderer than the first and last pair of legs.

The 3rd pair of legs are the longest, being about $2\frac{1}{4}$ times the length of the carapace: the second pair, though a little shorter than the 3rd, are equally stout. The first and last pairs are about equal to one another in size (in the female) being hardly longer than the carapace, and slenderer than the other legs. The terminal joints of all the legs are hairy: the posterior borders of the meropodites of the first three pairs are spiny, the anterior border being very finely serrulate.

In the Indian Museum are two females, one, with eggs, from off the Ganjam coast, 20 fathoms, the other from the Andamans. The carapace in the larger female is 6 millim. long and 8 millim. in greatest breadth.

Subfamily ASTHENOGNATHINÆ, Stimps.

CHASMOCARCINOPS, n. gen.

Carapace deep, convex fore and aft and declivous anteriorly: its greatest breadth is quite posterior, so that the postero-lateral borders, which are blunt, are anteriorly-convergent, though slightly so: the antero-lateral borders are sharp and form an elegant curve with the anterior border: the regions are nearly as well defined as they are in *Scolopidia*: its length is hardly less than its breadth.

The fronto-orbital border is considerably more than a third, but the front (which is bilobed) is only about a sixth, the greatest breadth of the carapace.

The orbits, which are in the usual marginal position, are small, and the *eyestalks*, which are immovable, are *shrunk within them*: the eyes are minute.

The antennular flagella are large and cannot be retracted into the antennular pits, which are filled entirely by the basal joint.

The antennal flagella are long—considerably more than a third the length of the carapace—and stand in the orbital hiatus.

Epistome sunken and not altogether well demarcated from the palate. The buccal cavern has its antero-external angles rounded off, and is not nearly closed by the external maxillipeds: these have the *merus* much shorter and narrower than the *ischium*, oval and somewhat oblique, and the flagellum appears to articulate with the summit of the *merus*.

The chelipeds are about as long as the legs and are very unequal in the male.

The third pair of legs are slightly the longest. As in *Scolopidia* the dactylus of the last pair of legs is recurved.

The abdomen in both sexes is narrow, not nearly occupying all the space between the last pair of legs, and in the male consists of 5 pieces, the 3rd–5th segments being fused. In the male also, as in *Camatopsis*, there is, on either side, a narrow plate intercalated between the 4th and 5th segments of the sternum and covering the external genital ducts.

This genus more clearly than any other connects the *Rhizopinæ* and the *Pinnotheridæ* together.

35. *Chasmocarcinops gelasimoides*, n. sp.

Carapace nearly as long as broad, its surface abundantly sprinkled with vesiculous granules, its free margins rather sparsely ciliated: all the regions are distinguishable, and the cardiac and posterior lobe of the gastric regions are defined by deep impressions: the antero-lateral

borders are sharply defined and granular. Front very distinctly bilobed, prominent.

Chelipeds in the male very unequal, the larger one being twice as long as the carapace, its chief bulk being contributed by the hand, which, with its large swollen polished palm and long crooked fingers meeting only at tip, recalls that of *Gelasimus*. The smaller cheliped (like the female chelipeds) is not much shorter than the larger one and, like it, has the articulation of the wrist confined to a rather prominent postero-inferior lobe of the hand, and the fingers longer than the palm: the chief difference is that the palm is not enlarged and swollen and that the fingers meet throughout almost all their extent. In both chelipeds the surfaces of all the segments are smooth, and there are sharpish granules along the borders of the arm and at the not very pronounced inner angle of the comparatively slender wrist.

The legs, like the fingers of the smaller cheliped, are fringed, but not very thickly, with hair. The 3rd pair are very slightly the longest, being twice the length of the carapace. The edges of the meropodites are furnished with sharp granules and spinules, these being abundant in the case of the first 3 pairs and rather few on the 4th pair. In the first 3 pairs also the carpopodites are of good length and subcylindrical, and the dactyli straight and almost styliform; but in the 4th pair the two terminal joints are compressed, the carpopodite being shortened and the dactylus recurved.

A male and a female from off Madras, 12 fathoms. The carapace of the male is 11 millim. long and 12 millim. broad.

Subfamily PINNOTHERELINÆ.

TETRIAS, Rathbun.

Tetrias, Rathbun, Proc. U. S. Nat. Mus. XXI. 1898, p. 607.

Carapace strongly calcified, broader than long, deep, subquadrangular, dorsally flattish, anteriorly declivous, the regions faintly indicated.

Front between a third and a fourth the greatest breadth of the carapace, its edge only deflexed, not directly united to the epistome. Orbits circular, small: eyestalks short, eyes small. The antennules fold a little obliquely from the transverse. Antennæ small, the flagellum in the orbital hiatus.

Epistome well defined: buccal cavern broadish, quadrilateral. External maxillipeds large, their palp about as large as their merus and ischium combined: ischium distinct, small; merus very large, carpus large and triangular and articulating at the antero-external

angle of the merus, propodite large and articulating with the end of the carpus, dactylus large and spathulate and articulating with the inner angle of the propodite: exognath small and a good deal concealed.

Chelipeds equal, short: the chelipeds in the male equal, and much stouter than the legs.

First 3 pairs of legs coarse, not differing much from each other or from the chelipeds in length, though the second pair are slightly the longest. The fourth (last) pair are very much smaller than the others.

The abdomen of the male is narrow and consists of 7 separate segments.

Tetrias differs very little from *Pinnixa* of which it might, perhaps, be regarded as a subgenus.

Distribution: Indo-Pacific, Andamans to California.

36. *Tetrias Fischeri*, (A. M. E.).

or *Pinnixa (Tetrias) Fischeri* (A. M. E.).

Pinnotheres Fischeri, A. Milne Edwards, Ann. Soc. Entomol. France, VII. 1867, p. 287.

Pinnixa Fischeri, A. Milne Edwards, Nouv. Archiv. du Mus. IX. 1873, p. 319, pl. xviii. fig. 3: de Man, Archiv fur Naturges. LIII. 1887, i. p. 385, pl. xvii. fig. 2.

Carapace and appendages everywhere covered by a close adherent coat of short hair. The regions of the carapace are fairly well indicated and its dorsal surface is closely and finely granular, except in the middle where also the hair is somewhat deficient. Deflexed edge of the front broadly triangular. Eyes well pigmented. The inner edge of the carpus and the inner and distal edges of the large spathulate dactylus of the external maxillipeds are fringed with a close row of hairs of extraordinary length.

Chelipeds in the male much more massive than the legs, and about $1\frac{1}{2}$ times the length of the carapace: their movements are somewhat restricted. There are some spinules at the inner angle of the wrist, and numerous rows of granules—the lowermost row rather acute—on the outer surface of the palm: the fingers, which are shorter than the palm, are stumpy but sharp-pointed.

The first 3 pairs of legs are coarse and are all about $1\frac{1}{2}$ times the length of the carapace, though the second pair are very slightly the longest. The 4th pair are very short—not two thirds the length of the carapace—and are much slenderer than the others. All the legs have a shaggy posterior border, and all end in small hooked dactyli. The posterior border of the meropodite of the last pair is armed with small coarse spines.

The abdomen of the male is narrow and consists of 7 segments: the first two segments are very short, the 3rd 4th and 5th gradually increase in length and slightly decrease in breadth, the 6th is a little shorter than the 5th, and the 7th is long and spatulate and encroaches on the buccal cavern.

In the Indian Museum is a single male specimen, from coral, from the Andamans: its carapace is a little over 5 millim. long and 7 millim. broad.

Subfamily PINNOTERINÆ.

*PINNOTERES, Latreille.

Pinnotheres, Latreille, Hist. Nat. Crust. et Ins. VI. p. 78, and Gen. Crust. et Ins., p. 34: Lamarck, Hist. Nat. An. Sans. Vert. (2nd edit. Vol. V. p. 410): Bosc, Hist. Nat. Crust. I. p. 239: Leach, Malac. Pod. Britt.: Desmarest, Consid. Gen. Crust. p. 116: De Haan, Faun. Japon. Crust., p. 34: Milne Edwards, Hist. Nat. Crust. II. 30, and Ann. Sci. Nat., Zool., (3) XX. 1853, p. 216: Dana, U. S. Expl. Exp. Crust. pt. I. p. 378: Bell, British Stalk-eyed Crust. p. 119: Miers, Challenger Brachyura, p. 275: Ortmann, Zool. Jahrb., Syst., VII. 1894, p. 698: Bürger, Zool. Jahrb. Syst., VIII. 1894-95, p. 362: Adensamer, Ann. Nat. Hofmus., Wien, 1897, p. 105.

Carapace often ill calcified, generally convex with ill-defined edges, in shape transversely oval, or circular, or subquadrangular or subhexagonal with rounded angles, the surface generally smooth, the regions seldom defined.

Front narrow, generally deflexed in the female if not in the male. Orbits small, circular, eyestalks short, eyes small. Antennules folding obliquely in small pits. Antennæ small, the minute flagellum standing in the inner angle of the orbit.

Epistome well defined. The buccal cavern is of a curious crescentic shape, being arched and very broad from side to side, but very narrow fore and aft. The external maxillipeds completely close the buccal cavern: they consist chiefly of the merus, which is fused with the ischium to form a single large obliquely-directed joint carrying the flagellum at its inner end: the flagellum is small though its propodite may be spatulate, and the dactylus is often inserted on the inner or flexor border of the propodite: the exognath is for the most part concealed.

The chelipeds and legs are short, the chelipeds being equal and generally, even in the female, stouter than the legs.

The abdomen in the male is narrow, in the female it is generally larger than the sternum: it consists of 7 separate segments.

* *Pinnotheres*, the correct transliteration of the Greek word, was used by Rumph in 1705, so that no apology is necessary for reverting to it.

The Pinnoteræ live as parasites or messmates, generally within the mantles of Lamellibranch Mollusks.

Key to the Indian species of Pinnoteræ.

- I. The dactylus of the external maxillipeds is articulated far back on the inner or flexor edge of the propodite: the eyes in the female are not entirely visible in an ordinary dorsal view:—
 1. The dactyli of all the legs are about equal:—
 - i. Carapace somewhat octagonal in outline, with deepish tomentose pits separating the branchial from the median regions: first three pairs of legs nearly equal in length: dactyli of all the legs of fair length..... *P. Edwardsi.*
 - ii. Carapace circular, perfectly smooth: second pair of legs decidedly the longest: dactyli of all the legs very short..... *P. mactricola.*
 2. Dactylus of the 3rd pair of legs longer than any of the others *P. purpureus.*
 3. Dactylus of the 4th pair of legs longer than any of the others *P. parvulus.*
- II. The dactylus of the external maxillipeds is articulated to the tip of the propodite: the eyes in the female are entirely dorsal *P. abyssicola.*

37. *Pinnoteræ Edwardsi*, de Man.

Pinnotheres Edwardsi, de Man, Journ. Linn. Soc., Zool., XXII. 1887-88, p. 103, pl. vi. figs. 6-9 (1889).

The description applies to the female.

The length of the carapace is nearly equal to the greatest breadth. Carapace octagonal in shape, with the angles rounded: its dorsal surface little convex, with tomentose depressions of some size and depth separating the median from the branchial regions. The deflexed part of the front is very distinctly triangular. Eyes very small, but deeply pigmented.

Dactylus of external maxillipeds slender and inconspicuous; placed far back on the inner edge of the spatulate propodite.

Chelipeds and legs more or less downy, especially on their under surface. Chelipeds nearly as long as the carapace, a little longer and much stouter than the legs, unarmed: dactylus as long as the upper border of the palm.

Legs rather coarse: the first 3 pairs are about equal in length, the 4th pair is a little shorter.

Carapace 15 millim. long and 16 millim. broad.

From an *Ostræa* from Mergui.

38. *Pinnotheres purpureus*, n. sp.

Closely related to *P. palaensis*, Bürger.

The description applies to the female.

Carapace and appendages smooth, polished, nude. Carapace transversely oval, strongly convex, the regions not well defined. Deflexed part of front broadly and indistinctly triangular. Eyes very small, but well pigmented.

Dactylus of external maxillipeds slender and inconspicuous, placed far back on the inner (flexor) edge of the propodite.

Chelipeds and legs slender, the chelipeds being little stouter than the legs and about the same length as the first pair of legs. The movable finger is not much more than half the length of the upper border of the palm.

The third pair of legs are the largest of all, their meropodites and carpopodites being longer than those of the first two pairs and nearly twice as long as those of the 4th pair. The dactyli of the 3rd and 4th pairs are several times the length of those of the first two pairs, and the dactylus of the 3rd pair exceeds that of the 4th pair. Though the 4th pair have a long dactylus their total length is not greater than that of either of the first two pairs.

Colour either hyaline with numerous minute specks of bluish-black pigment, or the specks may be sufficiently numerous to make the whole animal nearly black.

From an *Ostræa* from the Andaman Islands.

Carapace 7 millim. long and 9 millim. broad.

39. *Pinnotheres parvulus*, Stimpson, de Man.

Pinnotheres parvulus, Stimpson, Proc. Ac. Nat. Sci. Philad. 1853, p. 106; de Man, Joura. Linn. Soc., Zool., XXII. 1887-88, p. 105, and Archiv für Nat. LIII. 1887, i. p. 383; Ortmann, Zool. Jahrb., Syst., VII. 1893-94, p. 699; Bürger, Zool. Jahrb., Syst., VIII. 1894-95, pp. 363, 376, pl. ix. fig. 16 and x. fig. 17.

A single damaged female appears to differ from *P. purpureus* only in the following particulars:—

(1) though the 4th pair of legs are shorter than the 3rd, they are decidedly longer than the 2nd, and still more decidedly longer than the 1st.

(2) the dactylus of the 4th pair of legs is the longest of all.

40. *Pinnotheres mactricola*, n. sp.

Closely related to *P. cardii*, Bürger.

The description applies to the female.

Carapace perfectly circular smooth and polished, convex. Edge of front nearly straight. Eyes minute, well pigmented.

Dactylus of external maxillipeds slender and inconspicuous, arising far back on the inner (flexor) edge of the propodite.

Chelipeds decidedly stouter than the legs and about as long as the first pair of legs: their inner border is scantily fringed with hair: their dactylus is nearly two-thirds the length of the palm.

Legs slender, fringed with hairs: the second pair are decidedly the longest—a little longer than the carapace: the fourth pair are decidedly the shortest: the first and third pairs are about equal in length: in all four pairs the dactyli are equally short.

From *Mactra violacea*, from the mouth of the R. Hooghly.

Diameter of carapace not quite 6 millim.

In the male the front is a little prominent and the chelipeds are very much stouter.

41. *Pinnoteres abyssicola*, Alcock and Anderson.

Pinnoteres abyssicola, Alcock and Anderson, Ann. Mag. Nat. Hist. (7) III. 1899, p. 14: Alcock, Investigator Deep Sea Brachyura, p. 81.

The description applies to the female.

Carapace subcircular, smooth, convex. Front rather prominent, little deflexed, broadly triangular. Eyes of good size but deficient in pigment, entirely dorsal.

The palp of the external maxillipeds is minute and is much concealed by hairs that fringe the prominent internal angle of the merus: the dactylus is borne at the tip of the propodite.

Chelipeds much stouter than the legs, nude except for a fringe of hairs on the lower border of the immobile finger: they are about as long as the carapace, and the dactylus is not much shorter than the upper border of the palm.

Legs slender, nude: the 2nd and 3rd pairs are slightly longer than the 1st and 4th, being nearly $1\frac{1}{2}$ times the length of the carapace: the dactyli also of the 2nd and 3rd pairs are a little longer than those of the 1st and 4th.

From *Lima indica*, from 430 fathoms off the Travancore coast.

Diameter of carapace 8 millim.

XANTHASIA, White.

Xanthasia, White, Ann. Mag. Nat. Hist. XVIII. 1846, p. 176: Dana, U.S. Expl. Exp., Crust., pt. I. p. 383: Milne Edwards, Ann. Sci. Nat., Zool., (3) XVIII. 1853, p. 221: Bürger, Zool. Jahrb., Syst., VIII. 1894-95, p. 386.

Resembles *Pinnoteres* in structure and habit, but differs in the following particulars:—

The edge of the carapace is well defined and, in all but its fronto-

orbital portion, forms an upturned crest, so that the dorsal surface of the carapace is depressed and saucer-like. Other crests are found on the dorsal surface of the carapace and, in the centre, a large mushroom-like tubercle.

Though it is on an inferior plane, the narrow front is prominent and not deflexed.

The buccal cavern and mouth-parts have the same curious form, except that (owing to the encroachment of the epistome in the middle line) the anterior edge of the buccal cavern is bilobed or bow-shaped rather than semicircular, and the dactylus of the external maxillipeds is wanting or is represented by a few hairs.

Distribution : Indo-Pacific, from the east coast of Africa to Fiji.

42. *Xanthasia murigera*, White.

Xanthasia murigera, White, Ann. Mag. Nat. Hist. XVIII. 1846, p. 177, pl. ii. fig. 3: Dana, U. S. Expl. Exp., Crust. pt. I. p. 384, pl. xxiv. figs. 6 a-b: Milne Edwards, Ann. Sc. Nat., Zool., (3) XX. 1853, p. 221: A Milne Edwards, Nouv. Archiv. du Mus. IX. 1873, p. 321: Haswell, Cat. Austral. Crust. p. 113: Miers, Zool. H. M. S. Alert, pp. 518, 546: de Man, Journ. Linn. Soc., Zool., XXII. 1887-88, p. 106: Bürger, Zool. Jahrb., Syst. VIII. 1894-95, p. 386, pl. x. fig. 33: Adensamer, Ann. KK. Nat. Hofmus. Wien, XII. 1897, p. 109: Nobili, Ann. Mus. Genov. (2) XX. 1899, p. 264.

The edge of the carapace is formed, in all but its short fronto-orbital portion, by a thin sharp upturned overhanging crest, which ends in a curl on the anterior part of either branchial region.

A large mushroom tubercle, having a rough or reticulate surface and a more or less reniform outline, occupies the middle of the dorsal surface of the carapace, and between this and the front is a pair of parallel longitudinal crests.

The front is somewhat prominent and is dorsally grooved or obscurely bilobed, and on each side of it, beyond the small orbits, is a small wing-like projection.

Chelipeds not, or hardly, stouter than the legs: the dactylus in the male is about two-thirds, in the female not much more than half the length of the palm.

Legs rather coarse: the first three pairs, which are about equal to one another and to the chelipeds in length, are about as long as the carapace, the fourth pair are a little shorter: the dactyli in all are about equally short.

In the female the broad abdomen is traversed longitudinally by a sort of coarse interrupted carina.

In the Indian Museum are 5 specimens from the Andamans and Mergui. The carapace of the largest female is 11.5 millim. long and 15.5 millim. broad.

The *Xanthasia* sp., or *Xanthasia Whitei*, from Mergui, referred to by de Man in Journ. Linn. Soc., Zool., XXII. 1887-88, p. 106, pl. vii. fig. 1 is represented in the collection by a single small male and is characterized by having the upraised edge of the carapace blunt and rounded, instead of thin and acute, and the median tubercle of the carapace ill defined instead of sharply circumscribed: the posterior margin of the carapace, also, is more prominent and is not quite continuous with the lateral margins. The legs also are somewhat longer.

Family OCYPODIDÆ, Ortmann, emend.

Key to the Indian genera of Ocypodidæ.

- I. A hairy-edged pouch leading into the branchial cavity, between the bases of the 2nd and 3rd pair of true legs [*Ocypodinæ*]:—
 - 1. Antennular flagella rudimentary, completely hidden beneath the front: antennæ small, almost rudimentary: eyes very large, occupying the greater part of the ventral surface of the eyestalks: chelipeds very unequal in both sexes OCYPODA.
 - 2. Antennular flagella small, not hidden beneath the front: antennæ of good size: eyes small, terminal on the long slender eyestalks: in the male only, one cheliped is enormously enlarged the other being very small GELASIMUS.
- II. No pouch or opening between the bases of any of the legs:—
 - 1. The antennules fold obliquely or nearly vertically: curious membranous spaces, or "tympana," are present on the meropodites of the legs (*Scopimarinæ*):—
 - i. Tympana very well defined: external maxillipeds very large and with a strong almost hemispherical bulge forwards:—
 - a. Merus of external maxillipeds larger than the ischium: the distal end of the 4th abdominal segment of the male is fringed with bristles and overlaps the 5th segment DOTILLA.
 - b. Ischium of external maxillipeds larger than the merus: the 4th abdominal segment of the male is normal, but the 5th is constricted in part or all of its extent and gives the abdomen a wasp-like appearance SCOPIMERA.

- ii. Tympana ill defined: external maxillipeds of moderate size, the merus larger than the ischium: the chelipeds of the female, though not so stout as those of the male, are stouter than the legs **TYPANOMERUS.**
- 2. The antennules fold obliquely or quite transversely: no "tympana" are present on any of the joints of the legs (*Macrophthalminae*):—
 - i. Merus of the external maxillipeds smaller than the ischium, the flagellum coarse and articulating at the antero-external angle of the merus: front deflexed: eyestalks often very long **MACROPTHALMUS.**
 - ii. Merus of the external maxillipeds as large as or larger than the ischium, at least the two terminal joints of the flagellum are slender: eyestalks not particularly long:—
 - a. Front declivous: carapace slightly convex: the flagellum of the external maxillipeds articulates at the antero-external angle of the merus: (the chelipeds of the female, as in all *Macrophthalminae*, are shorter and slenderer than the legs) **CLISTOSTOMA.**
 - b. Front square-cut, not in the least deflexed; carapace quite flat dorsally: the flagellum of the external maxillipeds articulates near, but not at, the antero-external angle of the merus: eyes not terminal on the eyestalks **TYLODIPLAX.**

Subfamily OCYPODINÆ, Dana.

OCYPODA, Fabr.

Ocyпода, Fabricius, Ent. Syst. Suppl. p. 347: Desmarest, Consid. Gen. Crust. p. 119, and Dict. Sci. Nat. XXVIII. p. 239: De Haan, Faun. Japon. Crust. p. 29: Milne Edwards, Hist. Nat. Crust. II. 41, and Ann. Sci. Nat., Zool., (3) XVIII. 1852 p. 141: Dana, U. S. Expl. Exp. Crust. pt. I. p. 324: Kingsley, Proc. Ac. Nat. Sci. Philad. 1880, p. 179: Miers, Ann. Mag. Nat. Hist. (5) X. 1882, p. 376, and Challenger *Brachyura*, p. 237: Ortmann, Zool. Jahrb., Syst., X. 1897-98, p. 359 (*Revision der Gattung Ocyпода*).

Carapace deep, square or subquadrilateral, broader (but not much broader) than long, moderately convex, strongly declivous anteriorly, its dorsal surface closely granular with the regions indistinctly and incompletely defined. Front a narrow deflexed lobe, from a seventh to an eighth the greatest breadth of the carapace.

Orbits very capacious, occupying the whole face of the carapace between the front and the antero-lateral angles on either side, usually not very deep: their floor is divided into two fossæ, one for the basal portions of the eyestalk, the other for the eye. The basal joint of the eyestalk is visible throughout: the eye chiefly occupies the ventral surface of the eyestalk, and is often, but not always, tipped by a horn or style formed by a prolongation of the latter.

The basal antennular joint is visible, but the rudimentary antennular flagellum is quite hidden beneath the front. The antennæ, which lie in the orbital hiatus, are, though properly formed in all their parts, little more than rudiments.

The epistome, though short, is quite distinct, and is sculptured. The buccal cavern (in its widest part) is as broad as long, but diminishes in size a little, anteriorly: it is completely closed by the external maxillipeds, which are somewhat narrow and elongate and end in a coarse flagellum that articulates with the antero-external angle of the merus.

Chelipeds shorter than the legs and, in both sexes, remarkably unequal, the larger one being much more massive than the legs. The palm is short and high—especially in the larger cheliped—and is almost always compressed—especially so in the smaller cheliped: the fingers are stout, usually compressed, and strongly toothed. In most cases there is, on the inner surface of the larger palm, near the fingers, a stridulating organ, which can be scraped against the inner surface of the ischium.

Legs stout, the fourth pair much shorter and somewhat less massive than the first three pair, which are of about equal length: between the basal joints of the 2nd and 3rd pair is an orifice, thickly protected by hairs, leading towards the branchial cavity. The branchial cavity is very capacious, and its lining membrane is thick spongy and vascular.

The abdomen of the male is narrow: in both sexes it consists of seven separate segments.

Distribution: Tropical and subtropical coasts, from the American Atlantic, through the Mediterranean and Red Seas, to the American Pacific.

The Ocypodes live together in large companies, and most of them are in the habit of digging long and tortuous burrows in the moist sand near high-water mark, into which they retire with great rapidity when alarmed. As a rule they do not go far from their burrows, but if they do happen to wander and are cut off, they run to sea with marvellous speed. Though the burrows can be but temporary structures, each individual crab, in all the species that I have observed, keeps rigidly to its own. The efficacy of the stridulating-organ as a musical instrument is beyond

dispute, and I have published my own observations on that of *O. macrocera* in the Administration Report of the Marine Survey of India for the year 1891-92 (reprinted in the *Annals and Magazine of Natural History* for 1892). Dr. A. R. Anderson has published a note on the sound produced by *O. ceratophthalma* in this *Journal* for the year 1894.

My own opinion is that these crabs use the stridulating-organ when in their burrows—which undoubtedly are private property—to warn intending intruders of the herd that the burrow is occupied, and thus to prevent the burrow becoming crowded to suffocation-point. This, of course, need not be its exclusive use.

Key to the Indian species of Ocypoda.

- I. No stridulating ridge on the inner surface of [the palm: eyestalks not prolonged beyond the eyes in the form of a style *O. cordimana.*
- II. A stridulating ridge on the inner surface of the palm: eyestalks (except sometimes in the young) prolonged beyond the eyes to form a horn or style:—
 - 1. Length of the stridulating organ much more than half the greatest breadth of the palm: antero-lateral angles of the carapace well pronounced:—
 - i. Fingers of both chelipeds pointed:—
 - a. Stridulating ridge narrow, consisting entirely of small tubercles: no brushes of hairs on the propodites of any of the legs *O. platytarsis.*
 - b. The stridulating ridge consists of tubercles gradually passing into striæ: the anterior surface of the propodites of the first two pairs of legs thickly furnished with hairs ... *O. ceratophthalma.*
 - ii. Fingers of the smaller cheliped expanded at tip: the stridulating ridge consists entirely of striæ... *O. macrocera.*
 - 2. Length of the stridulating organ much less than half the greatest breadth of the palm: antero-lateral angles of the carapace rounded off *O. rotundata.*

The synonymy of the species of *Ocypoda* has been discussed, at length, by Ortmann (*Zool. Jahrb., Syst.*, X. 1897-98, p. 359), who has had access to a great deal more material than I have. It would be inadvisable, therefore, for me, working on a collection made almost entirely in India, to attempt any independent criticism of the older work; so that, in dealing with the Indian species, I shall generally restrict my citations to the papers of Ortmann and the other authors (Kingsley and Miers) who have made a revision of the genus.

43. *Ocypoda ceratophthalma* (Pallas), Ortm.

Cancer ceratophthalmus, Pallas, *Spicilegia Zool.* IX. p. 88, pl. v. figs. 7, 8.

Cancer cursor, Herbst, *Krabben*, I. ii. 74, pl. i. figs. 8, 9.

Ocypoda ceratophthalma, Fabricius, *Ent. Syst. Suppl.* p. 347: Milne Edwards, *Hist. Nat. Crust.* II. 48, and Cuvier *Règne An. Crust.* pl. 17: Kingsley, *Proc. Ac.*

Nat. Sci. Philad. 1880, p. 179: Miers, Ann. Mag. Nat. Hist. (5) X. 1882, pp. 378, 379: C. W. S. Aurivillius, Zur. Biol. Amphib. Decap., p. 17 (Mitg. K. Ges. Wiss. Upsala, 1893).

ORTMANN, ZOOL. JAHRB., SYST. X. 1897-98, pp. 360, 364 (*ubi synonym.*).

Carapace square, its greatest breadth, which is about a tenth more than its greatest length, is at the acuminate antero-lateral angles, which coincide with the outer orbital angles and are right angles, or nearly so.

The borders of the carapace, with the exception of the posterior border, are elegantly beaded or serrulate, and the lateral borders in their anterior third are straight and parallel, or nearly so.

The cardiac region can be distinguished, and the anterior ends of the cervical groove are present on either side of the gastric region.

Upper border of orbit sinuous and a little oblique, so that the outer angle of the orbit is considerably behind the front: the lower border has an obscure notch near its middle, but there is *no gap at its outer angle*. The eyestalk is prolonged beyond the eye into a blunt-pointed style of variable length.

The lateral borders of the buccal cavern, though their general direction is slightly convergent anteriorly, have a distinct outward curve. The merus and ischium of the external maxillipeds have their exposed surface circumscribed by a raised row of granules, which is deficient only at the basal attachment of the ischium.

Chelipeds and legs scabrous, the asperities having in many places a tendency to a rugiform or squamiform arrangement, and almost forming serrations on the borders of some of the joints, and becoming spines or teeth on the lower borders of the arms and hands and at both angles of the wrist—especially at the inner angle where there is always at least one distinct spine.

The stridulating organ of the larger palm is of good length (much more than half the greatest breadth of the palm) and is some little distance from the immobile finger, a thick strip of hair intervening: in its upper half it consists of tubercles gradually passing to striæ, in its lower half it consists of a comb of fine regular and very close-set striæ. It plays against a polished ridge that runs across the upper part of the inner surface of the ischium.

The palms and fingers of both hands—but notably of the smaller hand—are compressed, and the fingers of both hands are *pointed*.

The first three pairs of legs have the merus broadened: they do not differ greatly in length, and the 2nd pair, which are slightly the longest, are about two-and-a-half times the greatest length of the carapace. The fourth (last) pair are a good deal shortened—reaching only a little

more than half-way along the propodite of the 3rd pair—and have a much narrower merus. In all the legs the dactylus is stout and fluted like a bayonet and has more or less of its anterior surface hairy: though somewhat laterally-compressed at base and gradually broadening and becoming dorso-ventrally-compressed towards the tip, it may fairly be called styliform. The propodites of the first two pairs of legs have conspicuous brushes of hairs along their anterior surface.

In the Indian Museum are 84 specimens from all parts of the coasts of the mainland and islands of India. Large specimens have the carapace 40 millim. long and about 45 millim. in greatest breadth.

Distribution: Indo-Pacific, from the east coast of Africa to the Sandwich Islands.

In young specimens the surface of the appendages is smoother and the eyestalks are not prolonged beyond the eyes, which are of large size. In half-grown specimens the terminal style of the eyes is still short.

44. *Ocypoda macrocera*, Edw.

Ocypoda macrocera, Milne Edwards, Hist. Nat. Crust. II. 49: Kingsley, Proc. Ac. Nat. Sci. Philad. 1880, p. 181: Miers, Ann. Mag. Nat. Hist. (5) X. 1882, pp. 378, 381: ORTMANN, ZOOL. JAHRB., SYST., X. 1897-98, pp. 360, 368.

Closely related to *O. ceratophthalma*, from which it is distinguished by the following characters:—

- (1) the carapace is rather broader and the orbits are a little more oblique:
- (2) the raised marginal row of granules on the external maxillipeds is less pronounced:
- (3) the fingers of the smaller cheliped are lamellar up to the tips, which are broad and blunt, not pointed:
- (4) the stridulating ridge is less hairy and consists entirely of striæ.
- (5) it is a smaller species, large specimens having the carapace 31 millim. long and 37 millim. broad.

In the Indian Museum are 78 specimens from the coasts of the Bay of Bengal: there are none from the west coast or from any of the islands, and the species appears to be confined to the Bay.

The colour, in life, is bright red. This species lives in large warrens in the sands of almost all parts of the east coast of the peninsula. One of its most active enemies is the Brahminy kite (*Haliastur indus*). One almost certain use of the stridulating-organ is to give warning to intending trespassers, of its own species, that a burrow is already occupied by its rightful owner.

45. *Ocypoda platytarsis*, Edw.

Ocypoda platytarsis, Milne Edwards, Ann. Sci. Nat. Zool. (3) XVIII. 1882, p. 141; Kingsley, Proc. Ac. Nat. Sci. Philad. 1880, p. 180; Miers, Ann. Mag. Nat. Hist. (5) X. 1882, pp. 378, 383; ORTMANN, Zool. Jahrb., Syst., X. 1897-98, pp. 360, 368 (*sibi synon.*).

This species may be distinguished from *O. ceratophthalma*, which it closely resembles, by the following characters:—

(1) the carapace is very distinctly broader, its length being about four-fifths of its breadth, and the orbits are hardly at all oblique:

(2) the surface of the ischium of the external maxillipeds is often quite smooth:

(3) the stridulating ridge is not, or hardly at all, hairy and consists entirely of granules or small mamillated tubercles; and though the upper edge of the inner surface of the ischium of the larger cheliped is raised and rough, there is no special process against which the stridulating-ridge of the palm can be scraped:

(4) the dactyli of the legs, though fluted as in the other species, are distinctly compressed dorso-ventrally and broadened:

(5) there are no brushes of hairs along the anterior surface of the propodites of any of the legs.

It is a somewhat larger species, the carapace in full-sized adults being 40 millim. long and 54 millim. broad.

In the Indian Museum there are 42 specimens from both coasts of the peninsula and from Ceylon.

46. *Ocypoda rotundata*, Miers.

Ocypoda rotundata, Miers, Ann. Mag. Nat. Hist. (5) X. 1882, pp. 378, 382; Ortmann, Zool. Jahrb., Syst., X. 1897-98, pp. 360, 364.

This species differs from *O. ceratophthalma* in the following important particulars:—

The carapace is less distinctly quadrilateral, owing to the fact that the antero-lateral borders are arched, instead of forming an angle with the upper border of the orbit. These borders sometimes form an unbroken curve with the upper border of the orbit, but sometimes the junction between the two is marked by a notch. The length of the carapace is about five-sixths its greatest breadth, which, owing to the curvature of the antero-lateral borders, is some distance behind the orbits.

There is a notch in the middle of the lower border of the orbit, and a gap at the outer angle, between the upper and lower borders.

The deflexed tip of the front is swollen.

The spines or serrations at the inner angle of the wrist are more numerous, and at the outer angle are better marked.

The length of the stridulating organ is much less than half the greatest height of the palm: the organ consists of about a dozen distant ridges much concealed in hair, and each ridge is sharply serrated.

The scraper on the ischium is placed near the upper angle of the inner face of that joint and consists of an elongate-elliptical longitudinally-grooved cicatrix-like surface, with a patch of hair above it and a much larger patch below it.

The fingers of the smaller cheliped are almost as much dilated at tip as those of *O. macrocera*.

The dactyli of the legs are dorso-ventrally compressed as in *O. platytarsis*.

There is a thick brush of hairs along the anterior surface of the propodite of the first pair of legs only.

The meropodites of the first three pairs of legs are not so broad as in the three preceding species.

In the Indian Museum are 29 specimens from the coasts of Cutch, Sind, and Baluchistan.

This is the largest Indian Ocypode, the carapace of the adult being 52 millim. long and 62 millim. broad.

47. *Ocypoda cordimana*, Desm.

Ocypoda cordimana, Desmarest, Consid. Gen. Crust. p. 121: Milne Edwards, Hist. Nat. Crust. II. 45: Kingsley, Proc. Ac. Nat. Sci. Philad., 1880, p. 185: de Man, Notes Leyden Mus., III. 1881, p. 248: Miers, Ann. Mag. Nat. Hist. (5) X. 1882, pp. 379, 387: ORTMANN, ZOOL. JAHRB., SYST., X. 1897-98, pp. 359, 362 (*ubi synonym.*).

Carapace deep, quadrilateral, strongly convex fore and aft, its length about seven-eighths its greatest breadth, which is some little distance behind the orbits, owing to the gentle curve of the antero-lateral borders: its antero-lateral angles coincide with the outer orbital angles, and point acutely forwards.

Orbits deep; their upper border sinuous, but not in the least oblique; there is usually a notch near the middle of their lower border, and always a deep gap at the outer angle. No terminal style to the eyes.

The lateral borders of the buccal cavern are anteriorly convergent and have no outward curve. The marginal row of granules on the outer surface of the ischium of the external maxillipeds is indistinct or absent.

Though the chelipeds and legs are rough and the roughness is in places squamiform, there is no serration of their edges, except in the case of the lower borders of the arms, the inner edge of the wrists, and the lower border of the hands. The palm of the larger hand, though deep, is not particularly compressed, and it has no stridulating ridge.

The propodites and dactyli of the legs are rather short and stout, the dactyli being fluted and more or less hairy: the edges of the propodites of the first 2 pairs of legs are hairy. The third pair of legs, which are slightly longer than the first 2 pairs, are less than twice the length of the carapace.

In the Indian Museum are 59 specimens, from the Laccadives, the Madras coast, Ceylon, Mergui, Tavoy, the Andamans and Nicobars.

The carapace of the largest specimen is 35 millim. long and 40 millim. broad.

GELASIMUS, Latr.

Gelasimus, Latreille, Dict. des Sciences Nat. XVIII. p. 286 (1820): Desmarest, Consid. Gen. Crust. p. 122, and Dict. Sci. Nat. XXVIII. p. 241: De Haan, Faun. Japon. Crust. p. 25: Milne Edwards, Hist. Nat. Crust. II. 49, and Ann. Sci. Nat., Zool., (3) XVIII. 1852, p. 144: Dana, U. S. Expl. Exp. Crust. pt. I, pp. 312, 315: Hess, Archiv f. Naturges. XXXI. 1865, p. 145: A. Milne Edwards, Nouv. Archiv. du Mus. IX. 1873, p. 271: Kingsley, Proc. Ac. Nat. Sci. Philad. 1880, pp. 135, 136: Miers, Challenger Brachyura, p. 241: de Man, Notes Leyden Mus. XIII. 1891, pp. 20-23: Ortmann, Zool. Jahrb., Syst. VII. 1893-94, pp. 749-753.

"*Uca*," Leach, Trans. Linn. Soc. XI. 1815, pp. 309, 323: M. J. Rathbun, Proc. Biol. Soc. Washington, XI. 1897, p. 154: Ortmann, Zool. Jahrb., Syst., 1897-98, p. 346 (cf. notes by Desmarest and Milne Edwards, *ll. cc. supra*).

In obedience to certain interpretations of the rule of priority, which sacrifice everything to a legal precision that defeats the object of classification, some modern authors propose to apply the name *Uca*, which was originally given to and has for nearly seventy-five years been authoritatively used for a land-crab of the Gecarcinoid family, to the species of the Ocypodoid family which have for the same long period been known to everybody by the name *Gelasimus*.

One of the objects of my poor work being to avoid confusion, I cannot consent to this proposal: and if the rules of nomenclature do not permit me to retain a name that has been deliberately chosen, and used without any ambiguity, by such illustrious predecessors as Latreille, Milne Edwards, and Dana, then I think that the rules should be modified.

The introduction of a rule sanctioning the retention of any name that has been accepted and defined by a monographer of repute, and that has thereafter been in common use for fifty years, would probably satisfy those to whom the written authority of the law is a consideration of first importance.

Carapace deep, subquadrilateral but with the antero-lateral angles produced and acute and the lateral borders more or less convergent posteriorly, occasionally subhexagonal, a good deal broader than long, the regions never very strongly defined. The front is a narrow declivous lobe, the breadth of which, between the eyestalks, is from one-sixteenth to one-sixth the greatest breadth of the carapace.

The orbits are narrowish trenches occupying the whole anterior extent of the carapace between the narrow front and the antero-lateral

angles, and are more or less sinuous and oblique: the eyestalks are very long and are formed as in *Ocypoda*, but are much slenderer: the eyes, though chiefly ventral in aspect, are always terminal.

The small antennular flagella, which are not hidden under the front, fold obliquely. The antennæ, which stand free at the inner angle of the orbits, have well developed flagella.

Epistome, though short, quite distinct. The lateral borders of the buccal cavern are convex outwards, sometimes so much so as to give the cavern a subcircular outline. The external maxillipeds have a long ischium and a short and somewhat oblique merus with the coarse flagellum jointed to its antero-external angle: they close the buccal cavern except for a chink anteriorly.

The chelipeds differ greatly in the sexes. In the female they are equal, are shorter and slenderer than the legs, and have broad-tipped spoon-shaped fingers. In the male one of the chelipeds resembles those of the female, but the other is of relatively gigantic proportions, the hand alone being often as big and heavy as all the rest of the animal.

The legs are stout and end in very sharp dactyli, and the meropodites of at least the 2nd and 3rd pairs are foliaceous: these two pairs are a little longer than the other two, being about twice the length of the carapace.

As in *Ocypoda*, the branchial cavity is capacious, and its lining membrane thickened and vascular, with a fleshy lobe, shaped like a gill-plume, projecting into the space between the tips of the last two gill-plumes: also, between the basal joints of the 2nd and 3rd pairs of legs, there is an orifice, thickly protected by hairs, leading towards the branchial cavity.

The abdomen of the male is narrow: in both sexes of all the Indian species it consists of seven separate segments.

Distribution: all the warmer regions of the globe, from the Atlantic coasts of America eastwards (including the Mediterranean basin) to the Pacific coasts of America again.

The species of *Gelasimus* are, like the *Ocypodes*, gregarious, and live in warrens in the mud-flats of tropical and subtropical estuaries. Their intelligence, like that of the *Ocypodes*, is of a high order.

In one species, at any rate (*Gelasimus annulipes*), the males, which are greatly in excess of the females, use the big and beautifully-coloured cheliped, not only for fighting with each other, but also for "calling" the females. I have described my own observations on these points in the *Administration Report of the Marine Survey of India for 1891-92*—reprinted, as an extract, in the *Annals and Magazines of Natural History* for 1892.

The fact that the males greatly outnumber, and therefore are more

commonly captured than, the females, is sufficient justification for the common practice of using the larger cheliped of the male for the discrimination of the species. It must, however, be remembered that—at least in all the Indian species—this organ changes greatly with advancing age.

I must also confess here that the synonymy of species has defied me.

Key to the Indian species of Gelasimus.

- I. The breadth of the front, measured exactly between the bases of the eyestalks, is between a fifth and a sixth the greatest breadth of the carapace :—
 1. Two oblique granular ridges on the inner surface of the palm of the large cheliped of the male, one continuous with the dentary edge of the immobile finger, the other running to the lower edge of the same finger :—
 - i. Carapace subquadrilateral, the true lateral borders being moderately convergent posteriorly : an enlarged tooth near the tip of the immobile finger of the large cheliped of the male gives the tip of this finger a notched-truncate appearance *G. annulipes.*
 - ii. Carapace subquadrilateral, the true lateral borders nearly parallel : the tip of the immobile finger of the large cheliped of the male is oblique-truncate but not notched *G. lacteus.*
 - iii. Carapace distinctly hexagonal, owing to the great obliquity of the orbits and the strong convergence posteriorly of the true lateral borders : tip of the immobile finger of the large cheliped of the male not truncate or notched *G. triangularis.*
 2. The oblique crest running to the lower edge of the immobile finger of the large cheliped of the male is either absent or is represented by a slight and smooth tumescence *G. inversus.*
- II. The breadth of the front, measured as above, is very much less than a sixth the greatest breadth of the carapace :—
 1. No row of granules running inside of and parallel with the lower border of the orbit :—
 - i. The inner border of the arm of the larger cheliped of the male ends in a sharp tooth or spine, independent of the terminal lobe-like constriction of the arm :—
 - a. Front, measured as above, about a tenth the greatest breadth of the carapace : in the large cheliped of the male the wrist is

smooth, the palm full with the granular ridges on the inner surface indistinct, and the fingers are not specially compressed...

G. tetragonum.

- b. Front, measured as above, not a fifteenth the greatest breadth of the carapace: in the large male cheliped the upper surface of the wrist is granular and the fingers are remarkably compressed and blade-like:—

- a. In the large male cheliped the crests on the inner surface of the palm are moderately prominent, the dactylus is quite blade-like and the cutting-edge of the immobile finger is not much scalloped

G. Marionis.

- β. The crests on the inner surface of the palm are extremely prominent, the cutting edge of the dactylus is not quite straight and that of the immobile finger is scalloped into two large triangular lobes

G. Marionis, var. nitidus.

- ii. The arm of the large male cheliped ends in a constricted lobe, but there is no sharp upstanding tooth inside it on the inner border:—

- a. Front, measured as above, about a twelfth the greatest breadth of the carapace; the fingers of the large male cheliped have tips that suggest tongs, owing to the presence of an enlarged tooth near the tip: the meropodites of the last pair of legs are nearly as foliaceous as those of the preceding pair

G. acutus.

- b. Front, measured as above, not a fifteenth the greatest breadth of the carapace: the fingers of the large male cheliped end in simple hooked tips: the meropodites of the last pair of legs are not much broadened

G. Dussumieri.

- 2. On the lower wall of the orbit, inside of and parallel with the middle third of the lower border of that cavity, is a raised row of granules

G. Urvillei.

48. *Gelasimus annulipes*, Latr., Edw.

? *Cancer vocans minor*, Herbst, Krabben, I. ii. 81, pl. i. fig. 10.

Gelasimus annulipes, Milne Edwards, Hist. Nat. Crust. II. 55, pl. xviii. fig. 10-13; and Ann. Sci. Nat., Zool. (3) XVIII. 1852, p. 149, pl. iv. fig. 15: Dana, U. S. Expl. Exp., Crust., pt. I. p. 317: Heller, Novara Crust. p. 38: Hügendorf, in v. d. Decken's Reis. Ost-Afr. III. i. p. 85, and MB. Ak. Berl. 1878, p. 303: Hoffmann, in Pollen and van Dam, Faun. Madagasc., Crust. p. 18: Kossmann, Reise roth.

Meer., Crust., p. 53 : Miers, Phil. Trans. Roy. Soc. Vol. 168, 1879, p. 488, and Ann. Mag. Nat. Hist. (5) V. 1880, p. 310, and Zool. H. M. S. Alert, pp. 518, 541, and Challenger Brachyura, p. 244 : Richters, in Möbius Meeresf. Maurit., p. 155 : Kingsley, Proc. Ac. Nat. Sci. Philad. 1880, p. 148, pl. x. fig. 22 : de Man, Notes Leyden Mus. II. 1880, p. 69, and Journ. Linn. Soc., Zool., XXII. 1887-88, p. 118 pl. viii. fig. 5-7, and Archiv f. Naturges. LIII. 1887, i. p. 353, and Notes Leyden Mus. XIII. 1891, pp. 23, 39, and in Weber's Zool. Ergebn. Niederl. Ost-Ind. II. 1892, p. 307, and Zool. Jahrb., Syst., VIII. 1894-95, p. 577 : Lenz & Richters, Abh. Senck. Nat. Ges. Frankf., XII. 1881, p. 423 : F. Muller, Verh. Ges. Basel. VIII. 1886, p. 475 : J. R. Henderson, Trans. Linn. Soc., Zool., (2) V. 1893, p. 388 : Ortmann, Zool. Jahrb. Syst. VII. 1893-94, pp. 752, 758, and Jena. Denk. VIII. 1894, p. 57 : Zehntner, Rev. Suisse de Zool. II. 1894, p. 178.

Gelasimus Carionis, Edv. (nec Desm.), Hist. Nat. Crust. II. 53.

Gelasimus porcellanus, White, P. Z. S. 1847, p. 85, and in Adams and White, Samarang Crust., p. 50 : Milne Edwards, Ann. Sci. Nat., Zool., (3) XVIII. 1852, p. 151 : Kingsley, Proc. Ac. Nat. Sci. Philad. 1880, p. 155.

Gelasimus perplexus, Milne Edwards, Ann. Sci. Nat., Zool., (3) XVIII. 1852, p. 150, pl. iv. fig. 18 : A. Milne Edwards, Nouv. Archiv. du Mus. IX. 1873, p. 274.

? *Gelasimus pulchellus*, Stimpson, Proc. Ac. Nat. Sci. Philad. 1858, pp. 99, 100.

Uca annulipes, Ortmann, Zool. Jahrb. Syst. X. 1897-98, pp. 351 and 354 : Nobili, Ann. Mus. Genov. (2) XX. 1899, p. 274 : Doflein, SB. Ak. Münch. XXIX. 1899, p. 193.

Length of the carapace about three-fifths of the greatest breadth at the acute claw-like antero-lateral angles. The posterior border of the dorsum of the carapace—*i.e.*, the border corresponding with the last segment of the sternum—is a good deal over half the greatest breadth of the carapace, so that the lateral borders of the dorsum of the carapace, which are distinctly defined in almost two-thirds of their extent by a fine raised line, are only moderately convergent. The post-gastric and cardiac regions are the only ones that are defined, and they but faintly.

Front, measured between the bases of the eyestalks, from a fifth to a sixth the greatest breadth of the carapace.

Orbits sinuous and considerably oblique ; their upper border defined by a fine raised line which is very distinctly double in a good part of its extent ; their lower border very elegantly and regularly serrated—the teeth increasing in size from within outwards. In the female only there is a short row of granules inside of and parallel with the lower border of the orbit.

In the large cheliped of the adult male the greatest length of the hand (including fingers) is at least three times the length of the carapace : the outer surface of the somewhat rounded arm and of the wrist and hand is smooth to the naked eye, with a few small granules on the inner border of the wrist : the lower border of the palm is obscurely marginate : and on the inner surface of the palm are two salient granular crests, one of these is deeply grooved and nearly vertical and becomes continuous with the dentary edge of the immobile finger, the other,

which is the more prominent, is oblique and runs to the lower border of the same finger. In the adult male the fingers of the large hand are about twice the length of the upper border of the palm: they are not very broad, and owing to the hook-like curve of the dactylus there is a wide space between them when the tips are apposed: the immobile finger is but slightly curved, and is generally shorter than the dactylus, and owing to the presence of an enlarged tooth near the tip, the tip has a characteristic notched-truncate appearance.

The meropodite in the last pair of legs is not at all foliaceous.

The carapace in the adult male is about 11 millim. long and 19 millim. broad.

In the Indian Museum are 300 specimens from all parts of the coast from Karachi on the west to Mergui on the east.

This species is not, as Miers queries, the same as Stimpson's *G. splendidus*, of which we have numerous specimens from Hongkong.

49. *Gelasimus lacteus* (De Haan).

Ocypode (*Gelasimus*) *lactea*, De Haan, Faun. Japon., Crust., p. 54, pl. xv. fig. 5.

Gelasimus lacteus, Milne Edwards, Ann. Sci. Nat., Zool., (3) XVIII. 1852, pl. iv. fig. 16: Stimpson, Proc. Ac. Nat. Sci. Philad. 1858, p. 100: Miers, P. Z. S. 1879, pp. 20, 36: Kingsley, Proc. Ac. Nat. Sci. Philad. 1880, p. 149, pl. x. fig. 28: Cano, Boll. Soc. Nat. Napol. III. 1889, p. 234: de Man, Notes Leydén Mus. XIII. 1891, p. 22: Ortmann, Zool. Jahrb., Syst., VII. 1893-94, pp. 752, 759.

Uca lactea, Ortmann, Zool. Jahrb., Syst., X. 1897-98, pp. 351, 355.

Easily distinguished from *G. annulipes*, which is its nearest relative, by the following characters:—

(1) the carapace is much more nearly quadrangular, the posterior border of its dorsum being between three-fifths and two-thirds of its greatest breadth, and its true lateral borders being parallel, while the lateral borders of its dorsum are nearly so:

(2) in the larger cheliped of the male the outer end of the upper border of the arm, and the inner border of the wrist, are distinctly denticulated; the dactylus is not so strongly hooked, and the end of the immobile finger though obliquely truncate has an acuminate tip—never a notched-truncate tip:

(3) the colour, in spirit specimens, has a sort of livid bloom never seen in *G. annulipes*.

In the Indian Museum are 47 specimens from Karachi and 3 from the Andamans.

[*Gelasimus inversus*, Hoffmann.

Gelasimus inversus, Hoffmann, in Pollen and van Dam, Faun. Madagasc. Crust. p. 19, pl. iv. figs. 23-26 (1874): Kingsley, Proc. Ac. Nat. Sci. Philad. 1880, p. 155

de Man, Notes Leyden Mus. XIII. 1891, pp. 21, 44, pl. iv. fig. 12: Ortmann, Zool. Jahrb., Syst., VII. 1893-94, p. 751, and Jena. Denk. VIII. 1894, p. 59.

Gelasimus chlorophthalmus, Hilgendorf (nec Edw.), MB. Ak. Berl. 1878, p. 803 (apud de Man).

Gelasimus Smithii, Kingsley, Proc. Ac. Nat. Sci. Philad. 1880, p. 144, pl. 9, fig. 14 (apud Ortmann).

Uca inversa, Ortmann, Zool. Jahrb., Syst., X. 1897-98, p. 351.

There are in the Indian Museum specimens of this species from Madagascar and the Red Sea, and some from Karachi which differ from the type in the form of the dactylus of the large male cheliped, and are here separated as a variety.]

50. *Gelasimus inversus*, var. *sindensis*, nov.

This variety differs from typical *G. inversus* from Madagascar only in having the tip of the dactylus of the large male cheliped simple (instead of furnished with a second tooth that gives it a notched appearance) and the palm of the hand smoother externally.

The species resembles *G. annulipes*, from which it differs in the following characters:—

(1) the lateral borders of the dorsum of the carapace are defined by a fine line which is raised and distinct in the anterior third only, and is a little more oblique:

(2) the lower border of the orbit is much more sinuous, and is either entire or is quite imperceptibly denticulated at its outer angle:

(3) in the large cheliped of the male the arm is trigonal with sharp edges, the upper edge rising into a distinct lobe or crest and the distal end of the inner edge forming a crest or blunt tooth; the inner edge of the wrist is distinctly denticulated, and the upper border of the palm has several longitudinal rows of granules; of the granular ridges on the inner surface of the palm the lower one that in *G. annulipes* runs to the lower edge of the immobile finger is absent or, at most, is represented by a smooth and slight swelling; finally the immobile finger, though as in *G. annulipes* nearly straight and shorter than the dactylus, has a simple not a notch-like tip.

In the Indian Museum are 30 specimens from Karachi. The carapace of the largest specimen is 10 millim. long and 18 millim. broad.

51. *Gelasimus triangularis*, A. M. Edw.

Gelasimus triangularis, A. Milne Edwards, Nouv. Archiv. du Mus. IX. 1873, p. 275: Kingsley, Proc. Ac. Nat. Sci. Philad. 1880, p. 150: de Man, Journ. Linn. Soc., Zool., XXII. 1887-88, p. 113, pl. viii. figs. 8-11, and Notes Leyden Mus. XIII. 1891, p. 22, and in Weber's Zool. Ergebn. Niederl. Ost. Ind. II. 1892, p. 307: and Zool. Jahrb., Syst., VIII. 1894-95, p. 577: J. R. Henderson, Trans. Linn. Soc., Zool., (2) V. 1893, p. 388.

Gelasimus perplexus, Heller (nec Edw.), Novara Crust. p. 28, pl. v. fig. 4.

?? *Gelasimus minor*, Owen, Zool. H. M. S. "Blossom," Crust., p. 79, pl. xxiv, figs. 2, 2a (1839): Milne Edwards, Ann. Sci. Nat., Zool., XVIII. 1852, p. 151: Kingsley, Proc. Ac. Nat. Sci. Philad. 1880, p. 150.

Uca triangularis, Nobili, Ann. Mus. Genov. (2) XX. 1899, p. 274.

Length of the carapace about four-sevenths of the greatest breadth, which is at the spine-like antero-lateral angles.

Carapace strongly convex, almost hexagonal, the regions not indicated. The posterior border of the dorsum of the carapace is less than half the greatest breadth, hence not only the lateral borders of the dorsum of the carapace, but also the true lateral borders, are strongly convergent posteriorly, the former being defined by a fine raised line in more than two-thirds of their extent.

Front, as in *G. annulipes*, from a fifth to a sixth the greatest breadth of the carapace.

Orbits sinuous, much oblique: the upper border defined by a fine microscopically-beaded line, which is double in great part; the lower microscopically beaded, serrulate at its outer end.

In the large cheliped of the adult male the hand is about $2\frac{1}{2}$ times as long as the carapace; the outer surface of the arm, wrist, and hand are smooth to the naked eye; all the borders of the arm are sharply defined and finely serrulate, the inner border of the wrist is finely serrulate, and the upper and lower borders of the palm are marginate and granulate, especially the upper border; and the two oblique granular crests on the inner surface of the arm are in strong relief.

In the large hand the dactylus, in the adult, is from $1\frac{1}{2}$ to $1\frac{3}{4}$ times the length of the upper border of the palm; its tip is simply hooked and overhangs the simple upcurved tip of the immobile finger.

The meropodite of the last pair of legs is not nearly so broad as that of the two preceding pairs.

In the Indian Museum are 70 specimens, all but one being from various parts of the Bay of Bengal littoral. The carapace of a large specimen is 10 millim. long and about 18 millim. broad.

The figures of *G. minor*, Owen, agree very well with this species, and if the two names should prove to refer to the same species this name has the precedence.

52. *Gelasimus tetragonum* (Herbst).*

Cancer marinus, minor, vociferans, Seba, Thesaurus, III. p. 48, pl. xix. fig. 15.

Cancer tetragonon, Herbst, Krabben, I. ii. 257, pl. xx. fig. 110, and III. i. 31.

Gelasimus tetragonum, Rüppell, 24 Krab. roth. Meer., p. 25, pl. v. fig. 5; Milne

* I assume that Herbst used *tetragonon* as a noun substantive in apposition to *Cancer*: it may therefore continue in apposition to *Gelasimus* used as a substantive.

Edwards. Hist. Nat. Crust. II. 52, and Ann. Sci. Nat., Zool., (3) XVIII. 1852, p. 147, pl. iii. fig. 9: Guérin, Voy. Coquille, II. Zool., Crust. p. 10, pl. i. figs. 2, 3: A. Milne Edwards, in Maillard's Pile Réunion, Ann. F., p. 6, and Nouv. Archiv. du Mus. IX. 1873, p. 273: Heller, Novara Crust., p. 37: Hilgendorf, in v. d. Decken's Reisen Ost-Afr. Crust. p. 84: Hoffmann, in Pollen and Van Dam, Faun. Madag. Crust. p. 16: Kossmann, Reis. roth. Meer. Crust. p. 52: Kingsley, Proc. Ac. Nat. Sci. Philad. 1880, p. 143, pl. ix. fig. 11: de Man, Archiv f. Naturges. LIII. 1887, i. p. 353, and Notes Leyden Mus. XIII. 1891, pp. 20, 24, pl. ii. fig. 6: Ortmann, Zool. Jahrb. Syst. VII. 1893-94, pp. 750, 754: Whitelegge, Mem. Austral. Mus. III. 1897, p. 138.

Gelasimus Duperreyi, Guérin, Dana U. S. Expl. Exp. Crust. pt. i. p. 317.

Uca tetragona, Ortmann, Zool. Jahrb., Syst. X. 1897-98, p. 348: Doflein SB. Ak. Münch. XXIX. 1899, p. 193.

Length of the carapace about two-thirds of its greatest breadth at the acute antero-lateral angles. Carapace somewhat pentagonal, markedly convex fore and aft, the regions all recognizable but not strongly defined: though the posterior border of its dorsum is only half its greatest breadth, the true lateral borders are but slightly convergent posteriorly. In the adult male the fine raised line that bounds the dorsal plane on each side is distinct as such only in the neighbourhood of the antero-lateral angles, but in the female it runs much further backwards.

The breadth of the front, measured between the bases of the eyestalks, is about a tenth the greatest breadth of the carapace.

Orbits much oblique, both borders sinuous, the lower border elegantly denticulated throughout.

In the large cheliped of the adult male the upper border of the arm is fairly prominent and the inner border ends in a sharp tooth, quite independent of the constricted-off terminal lobule; the wrist is quite smooth to the naked eye, and has the inner angle sharp but not spiniform; and the hand is about $2\frac{1}{2}$ times the greatest length of the carapace.

In the hand of this cheliped the palm is, to the naked eye, frosted with very fine granules, some of which in the neighbourhood of a scar near the base of the immobile finger are visible to the naked eye; its upper border is not, and its lower border is but obscurely, defined; and the two oblique crests on its inner surface are mere swellings, often quite faint, and never strongly salient. The fingers are neither broad nor particularly thin: the dactylus, which is about $1\frac{2}{3}$ times the length of the upper border of the palm, tapers and is somewhat hooked at tip; the immobile finger commonly has two teeth a little enlarged, the second one being near the tip and sometimes giving the tip a somewhat notched (but not truncated) appearance.

The merns of the last pair of legs is not at all foliaceous.

In the Indian Museum are 29 specimens from the Andamans: the carapace of a large one is 17 millim. long and 26 millim. broad.

The "Challenger" specimens referred by Miers to this species have a broad front and are identical with specimens from Hongkong that I take to be *G. splendidus*.

53. *Gelasimus Marionis*, Desm.

Gelasimus Marionis, Desmarest, Consid. Gen. Crust., p. 124, pl. xiii. fig. 1, and Dict. Sci. Nat. XXVIII. 1823, p. 243: Milne Edwards, Ann. Sci. Nat., Zool., (3) XVIII. 1852, p. 145, pl. iii. fig. 5 (nec Hist. Nat. Crust. II. 53): de Man, Notes Leyden Mus. II. 1880, p. 67: Miers, Ann. Mag. Nat. Hist. (5) V. 1880, p. 308: Kingsley, Proc. Ac. Nat. Sci. Philad. XXXII. 1880, p. 141, pl. ix. fig. 8.

Gelasimus cultrimanus, White, P. Z. S. 1847, p. 205, Ann. Mag. Nat. Hist. XX. 1847, p. 205, and Samarang Crust. p. 49 (apud Miers loc. cit. supra).

Gelasimus cultrimanus var. *Marionis*, Ortmann, Zool. Jahrb. Syst. VII. 1893-94, pp. 750, 754.

Length of the carapace about two-thirds of the greatest breadth, which is at the claw-like antero-lateral angles.

Carapace little convex, all its regions very well defined, the posterior border of its dorsum in the adult male is half its greatest breadth and the true lateral borders are moderately convergent posteriorly: the fine raised line that in some other species defines the greater part of the dorsal plane is here, in the adult male, confined to the neighbourhood of the antero-lateral angles.

The breadth of the front between the bases of the eyestalks is not a fifteenth the greatest breadth of the carapace.

Orbits not very oblique nor very sinuous; the lower border, which is nearly straight, is elegantly crenulate throughout.

In the large cheliped of the adult male the upper border of the arm is prominent and the inner border ends in a sharp tooth, independent of the terminal constricted-off lobule; the upper surface of the wrist is granular, and the inner border of the wrist has a denticle or spinule at its angle; and the hand (fingers included) is about three times the length of the carapace.

This large hand has a curious twist: its palm is compressed and has the upper and lower margins well defined, the outer surface covered with large granules, and the two granular crests on its inner surface fairly prominent: its fingers are broad thin and laminar; the dactylus, which may be four times as long as the upper border of the palm, is shaped like a knife-blade; and in the immobile finger, which has a groove or line of pits along its outer surface, the dentary edge has a simple S-shaped curve.

The merus of the last pair of legs is not at all foliaceous.

In the Indian Museum are 9 specimens from the Andamans. The carapace of a large specimen is 18.5 millim. long and 26.5 millim. broad.

54. *Gelasimus Marionis* var. *nitidus*, Dana.

Gelasimus vocans, Milne Edwards, Ann. Sci. Nat., Zool., (3) XVIII. 1852, p. 145, pl. iii. fig. 4 (*nec* Hist. Nat. Crust. II. 54): Stimpson, Proc. Ac. Nat. Sci. Philad. 1858, p. 99: Heller, Novara Crust. p. 37: Hilgendorf, in v. d. Decken's Reis. Ost-Afr., p. 83: A. Milne Edwards, Nouv. Archiv. du Mus. IX. 1873, p. 272: Hoffmann, in Pollen and Van Dam's Faun. Madagasc. Crust. p. 16: Miers, Phil. Trans. Roy. Soc. Vol. 168, 1879, p. 488, and Ann. Mag. Nat. Hist. (5) V. 1880, p. 308, and Challenger Brachyura, p. 242: Richters, in Mobius, Meeresf. Maurit. p. 155: de Man, Notes Leyden Mus. II. 1880, p. 67, and XIII. 1891, p. 23, pl. ii. fig. 5, and Archiv f. Naturges. LIII. 1887, i. p. 352, and in Weber's Zool. Ergebn. Niederl. Ost-Ind. II. 1892, p. 305, and Zool. Jahrb. Syst. VIII. 1894-95, p. 572: Haswell, Cat. Austral. Crust. p. 92.

Gelasimus nitidus, Dana, U. S. Expl. Exp. Crust. pt. I. p. 316, pl. xix. figs. 5a-d: Milne Edwards, Ann. Sci. Nat., Zool., (3) XVIII. 1852, p. 147: Thallwitz, Abh. Mus. Dresden, 1890-91, p. 42.

Gelasimus cultrimanus, Kingsley, Proc. Ac. Nat. Sci. Philad. 1880, p. 140, pl. ix. fig. 7: Ortmann, Zool. Jahrb., Syst., VII. 1893-94, pp. 750-753, and Jena. Denk. VIII. 1894, p. 56.

Uca cultrimana, Ortmann, Zool. Jahrb., Syst. X. 1897-98, p. 343.

Differs from *G. Marionis* only in the form of the large hand of the adult male: this member, in var. *nitidus*,

(1) is not much over $2\frac{1}{2}$ times the length of the carapace, its dactylus being but little more than twice the length of the upper border of the palm:

(2) it has the two oblique granular ridges on the inner surface of the palm remarkably salient:

(3) it has the dentary edge of the immobile finger thrown into a characteristic W-shaped curve owing to the strong projection of two large triangular lobes, and

(4) it has the dactylus somewhat hooked at tip.

In the Indian Museum are 103 specimens, chiefly from the Andamans and Nicobars, but also from the Coromandel and Malabar coasts. The length of the carapace in large specimens is 14 millim., the breadth 21 millim.

55. *Gelasimus acutus*, Stimpson, de Man.

Gelasimus acutus, Stimpson, Proc. Ac. Nat. Sci. Philad. 1858, p. 99: Tozzetti, Magenta Crust. p. 107: Kingsley, Proc. Ac. Nat. Sci. Philad. 1880, p. 144: de Man, Journ. Linn. Soc., Zool. XXII. 1887-88, p. 113, pl. vii. figs. 8-9, pl. viii. figs. 1-4, and Notes Leyden Mus. XIII. 1891, p. 21, and in Weber's Zool. Ergebn. Niederl. Ost-Ind. II. 1892, p. 306, and Zool. Jahrb. Syst. VIII. 1894-95, p. 573: Ortmann, Zool. Jahrb., Syst. 1893-94, p. 750.

Uca acuta, Doflein, SB. Ak. Münch. XXIX. 1899, p. 193.

Length of the carapace about three-fifths the greatest breadth, which is at the acute wing-like antero-lateral angles,

Carapace strongly convex fore and aft, the regions moderately well defined: its lateral borders are strongly convergent, and still more so are the lateral borders of the dorsal plane, which are defined in more than two-thirds of their extent by a fine raised line: the posterior border of the dorsal plane is contained from $2\frac{1}{2}$ to $2\frac{3}{4}$ times in the greatest breadth.

Front, measured between the eye-stalks, about a twelfth the greatest breadth of the carapace, its moulded and bevelled edges do not together take up half its breadth.

Orbits moderately oblique, both upper and lower borders much sinuous; the lower border finely, the upper border still more finely and more distantly crenulate.

In the large cheliped of the adult male all three borders of the arm are well defined, the inner and the lower borders being crenulated, but the inner border having no tooth independent of the terminal constricted-off lobule; the upper surface of the wrist and the outer surface of the palm are closely covered with vesiculous granules; and the hand (fingers included) may be $3\frac{1}{2}$ times the length of the carapace.

In this large hand the upper and lower borders of the palm are well defined, and of the two oblique granular crests on the inner surface of the palm the upper one that runs to the dentary edge of the immobile finger is short and indistinct: the fingers are not particularly broad or thin, and however the teeth may be disposed, there is always one near the end of each finger that is enlarged so as to give the ends of the fingers, when apposed, a sort of tongs-like or forceps-like grip: the dactylus is from 2 to nearly $2\frac{3}{4}$ times the length of the upper border of the palm.

The merus of the last pair of legs is distinctly foliaceous.

In the Indian Museum are 92 specimens chiefly from the Sunderbunds and Mergui, but also from Karachi and the Andamans. In a large specimen the carapace is 14 millim. long and 25 broad.

56. *Gelasimus Dussumieri*, Edw.

Gelasimus Dussumieri, Milne Edwards, Ann. Sci. Nat. Zool. (3) XVIII. 1852, p. 148, pl. iv. fig. 12: A. Milne Edwards, Nouv. Archiv. du Mus. IV. 1868, p. 71, and IX. 1873, p. 274: Hoffmann in Pollen and van Dam's Faun. Madag. Crust. p. 17, pl. iii. figs. 19-22: Kingsley, Proc. Ac. Nat. Sci. Philad. 1880, p. 145, pl. x. fig. 16: de Man, Notes Leyden Mus. II. 1880, p. 68, and XIII. 1891, pp. 20, 26, and Journ. Linn. Soc. Zool. XXII. 1887-88, p. 108, pl. vii. figs. 2-7, and in Weber's Zool. Ergebn. Niederl. Ost-Ind. II. 1892, p. 306, and Zool. Jahrb., Syst., VIII. 1894-95, p. 576: Lenz and Richters, Abh. Senck. Nat. Ges. Frankf. XII. 1881, p. 423: Haswell, Cat. Austral. Crust. p. 93: Miers, Zool. H. M. S. Alert, pp. 518, 541: Ortmann, Zool. Jahrb. Syst. VII. 1893-94, pp. 759, 755.

Gelasimus longidigitum, Kingsley, Proc. Ac. Nat. Sci. Philad. 1880, p. 144, pl. ix. figs. 10, 13 (*vide* Ortmann l. c. *infra*).

Uca Dussumieri, Ortmann, Zool. Jahrb., Syst., X. 1897-98, p. 348: Nobili, Ann. Mus. Genov. (2) XX. 1899, p. 273: Doflein, SB. Ak. Münch. XXIX. 1899, p. 193.

Closely related to *G. acutus*, from which it can be distinguished by the following characters when fully adult males are compared:—

(1) the regions of the carapace are much more strongly defined, and the raised lines that bound the dorsal plane of the carapace on each side are more curved, less rapidly convergent, and less distinct in their posterior part, which gives the carapace a much less posteriorly-contracted look; and the orbits are less oblique:

(2) the front, measured between the bases of the eyestalks, is about a fifteenth the greatest breadth of the carapace, and its moulded and bevelled edges together take up more than two-thirds of its breadth:

(3) in the large cheliped the arm is longer and more slender, both the oblique granular ridges on the inner surface of the palm are very strongly defined, and the fingers may be fully 3 times the length of the upper border of the palm:

(4) these large fingers are broader and thinner, their tips are somewhat hooked and have no enlarged tooth near them, but near the middle of the immobile finger there is a enlarged tooth or triangular lobe:

(5) the merus of the last pair of legs, though it is compressed and somewhat broadened, is not a short foliaceous joint.

In the Indian Museum are 52 specimens, from Mergui, Andamans and Nicobars, and Bimlipatam.

57. *Gelasimus Urvillei*, Edw.

Gelasimus Urvillei, Milne Edwards, Ann. Sci. Nat., Zool., (3) XVIII. 1852, p. 148, pl. iii. fig. 10: Kingsley, Proc. Ac. Nat. Sci. Philad. 1880, p. 145, pl. ix. fig. 15: de Man, Notes Leyden Mus. XIII. 1891, pp. 21, 34: Ortmann, Zool. Jahrb., Syst., VII. 1893-94, p. 750.

Gelasimus Dussumieri, Hilgendorf (*nec* Edw.), in v. d. Decken's Reis. Ost-Afr. Crust. p. 84, pl. iv. fig. 1.

This species closely resembles *G. acutus* and *G. Dussumieri*, but is distinguished from both by the presence of a raised row of granules behind and parallel with the middle third of the lower border of the orbit—*i.e.*, just inside the orbital cavity.

As in *G. acutus*, the fine raised lines that define the dorsal plane of the carapace laterally are distinct throughout and rapidly convergent, which gives the carapace a look of breadth in front and of unusual narrowness behind; and, as in *G. acutus*, the meropodites of the last

pair of legs are, even in the male, decidedly shortened and falcate joints.

On the other hand the front is, as in *G. Dussumieri*, extremely narrow, and its bevelled and moulded edges take up most of its breadth between the eye-stalks. The regions of the carapace, also, are as strongly defined as they are in *G. Dussumieri*.

The large hand of the male resembles that of *G. Dussumieri* in having both the oblique granular ridges on the inner surface of the palm strongly salient, and in having very long fingers with simple hooked tips: the fingers however are not so broad and thin, and the lobe near the middle of the dentary edge of the immobile finger may be present or not.

In the Indian Museum are 10 specimens, from Karachi, Madras, and the Nicobars.

The carapace of the largest specimen is 20 millim. long and 36 millim. broad.

Subfamily SCOPIMERINÆ.

DOTILLA, De Haan, Stimpson.

Dotilla, De Haan, Faun. Japon. Crust. p. 24 (1835) nom. præoc.: Milne Edwards, Hist. Nat. Crust. II. 38, and Ann. Sci. Nat., Zool., (3) XVIII. 1852, p. 152.

Dotilla, Stimpson, Proc. Ac. Nat. Sci. Philad. 1858, p. 98.

Cephalothorax so deep as to be subcubical, as long as broad or a little broader than long. Anteriorly the sidewalls of the carapace have a curious gyrous-sulcate sculpture resembling brain-convolutions: often also a similar kind of sculpture is found on the dorsum of the carapace and on the meropodites of the external maxillipeds.

Front a narrow deflexed lobe much as in *Ocypoda*. The orbits, which occupy all the rest of the anterior border of the carapace, are more or less oblique and shallow—in one species so shallow as to be almost obsolete. Eystalks rather long and slender, with the eyes at the end.

Antennules, like those of *Ocypoda*, having the basal joint of good size, and the flagellum small and hidden by the front. The antennæ stand at the inner angle of the lower orbital border and have a rather short flagellum.

The epistome would be linear but for a large median triangular lobe that projects between the external maxillipeds.

Buccal cavern enormous, suboval or subcircular in outline: the external maxillipeds, which completely cover it and are also very large, have a strong almost hemispherical bulge; their merus is much larger

than the ischium and carries the flagellum at the antero-external angle: the exognath is extremely slender and inconspicuous.

Chelipeds equal, stouter than the legs: fingers usually slender and a little deflexed, usually without conspicuous teeth.

Legs not much differing in length, which is moderate: their meri (as also those of the chelipeds) have on the upper surface a curious membranous area or "tympanum." Similar "tympana" may also be present on some of the segments of the sternum.

The abdomen in the male consists of 7 separate segments, and though narrow is nowhere linear or compressed: the distal end of the fourth segment is thickly fringed with bristles, and overlaps and partly conceals the fifth tergum. In the female, according to De Haan, the abdomen consists of 5 separate segments.

Distribution: Tropical shores and mud-flats, from East Africa and the Red Sea eastwards to Japan. Found in the same situations as *Gelasimus* and *Ocypoda*.

Key to the Indian species of Dotilla.

- I. Carapace broader than long: chelipeds not much longer than the carapace, and not much differing from the legs in point of length: no "tympana" on the sternum:—
 1. Meropodites of legs not dilated: fingers of chelæ slender, without any conspicuous teeth:—
 - i. Whole surface of merus of external maxillipeds gyrous-sulcate: fingers not longer than palm..... *D. affinis.*
 - ii. Only the outer-half of the merus of the external maxillipeds is gyrous-sulcate:—
 - a. Fingers slightly longer than the palm..... *D. Blanfordi.*
 - b. Fingers more than twice as long as the palm..... *D. intermedia.*
 2. Meropodites of the legs dilated:—
 - i. Fingers of chelæ without any conspicuous tooth: dactyli of the legs, even of the last pair, shorter than the propodites..... *D. brevitarsis.*
 - ii. A large tooth on each finger of the chelæ, arranged so that when the tips of the fingers are closed these large teeth meet, and an hour-glass-shaped space is left between the closed fingers: dactyli of the legs longer than the propodites..... *D. clepsydrodactylus.*
- II. Carapace at least as long as broad: chelipeds 3 or 4 times as long as the carapace, and much longer than the legs: "tympana" present on the sternum..... *D. myctiroides.*

58. *Dotilla affinis*, n. sp.

Differs from *D. sulcata*, with specimens of which, from the Red Sea, I have compared it, only in the following characters:—

(1) there is no spine on the under surface of the arm, (2) the fingers are not so long as the palm, (3) there is a small tympanum on the dorsal surface of the merus of the last pair of legs, whereas in *D. sulcata* only the tympanum on the ventral surface is present.

The carapace behind the gastric and inside the branchial regions, forms a smooth semicircular facet, but all its anterior and lateral regions have a curiously convoluted sculpture, the convexities of the convolutions being finely granular.

The grooves that define these convolutions form, when viewed as a whole, a sort of five-rayed star, the anterior ray (which runs up between the eyes on to the front) being the shortest, the antero-lateral rays (which run towards the outer angles of the orbit) being a little longer, and the postero-lateral rays (which really are triple) being the longest of all.

The pterygostomial regions and neighbouring part of the side-walls of the carapace, and the meropodites of the external maxillipeds have the same curious convoluted sculpture. The orbits are shallow but are perfectly defined.

The merus of the external maxillipeds is more than twice the size of the ischium.

Chelipeds (measured round their curve) not twice the length of the carapace: no spine on any of their segments: fingers not so long as the palm.

Legs slightly longer than the chelipeds, their meropodites not at all broadened but all having a "tympanum": except in the case of the last pair of legs—in which the dactylus is remarkably long—the dactyli are rather shorter than the propodites.

No tympana on the sternum.

In the Indian Museum are 4 specimens from Aden and the Baluchistan coast. The carapace of the largest is 5.3 millim. long and 7.3 millim. broad.

59. *Dotilla intermedia*, de Man.

Dotilla intermedia, de Man, Journ. Linn. Soc., Zool., XXII. 1887-88, p. 135, pl. ix, figs. 4-6 (1888).

Carapace sculptured in much the same way as in *D. affinis*, only the grooves are not so deep and distinct, and there is an additional groove running parallel with the posterior margin.