

REPORT  
ON THE  
ANOMURA  
COLLECTED BY MR. JAMES HORNELL  
AT  
OKHAMANDAL IN KATTIAWAR IN 1905-6,  
BY  
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[With One Plate.]

THE present collection of Anomura, though but a small one, is exceedingly interesting for two reasons. First, as showing the considerable degree of variation present in certain species of the family Galatheidæ, and secondly, the large size of many individuals conveys to us some idea under what luxuriant conditions they must have lived.

In all there are thirteen species, representing seven genera, and two of these species are new, viz., *Porcellana gaekwari* and *Polyonyx hendersoni*.

The following is a list of species in the collection :—

- Diogenes investigatoris*, Alcock.
- Clibanarius infraspinatus*, Hilgendorf.
- Clibanarius humulis*, Dana.
- Porcellana serratifrons*, Stimpson.
- Porcellana gaekwari*, n. sp.
- Porcellana tuberculosa*, Milne-Edwards.

<sup>1</sup> The opportunity afforded by this report has been taken advantage of to include reference to several species from the Ceylon Pearl Banks, not previously described from that district.—T.S.

*Polyonyx obesulus* (White).  
*Polyonyx hendersoni*, n. sp.  
*Petrolisthes armatus* (Gibbes).  
*Petrolisthes bosci* (Andouin).  
*Petrolisthes*, sp.  
*Galathea elegans*, White.  
*Munida spinulifera*, Miers.

All these species are shallow-water forms, and in most cases were taken in under four fathoms.

With the exception of *Porcellana tuberculosa*, and the two new species, all the forms herein described have previously been recorded from the Indian Ocean. Both the new species included in this paper, viz., *Polyonyx hendersoni* and *Porcellana gaekwari* were collected by me from the Ceylon Pearl Banks.

A noticeable feature of the collection from the Gulf of Kutch is the preponderance of Galatheidæ over the Paguridæ, both in point of species and numbers. This fact is to be correlated with the peculiar nature of the fauna on the ground where the collection was made. The commensal habits of many genera included in this family are well known. Generally, Galatheids and Munidids are to be found crawling over the surface of dead coral, or under rocks, or upon living coral, but the more brightly coloured representatives of the former genera—such as *Galathea elegans* and *Galathea deflexifrons*—are more commonly to be found commensal with similarly coloured species of Comatulids.

On the other hand, the members of the genera *Polyonyx* find a home in the large exhalant cavities of many species of sponge, and they are but rarely found elsewhere. The species of *Porcellana* proper are likewise more or less commensal. Their commonest habitat is amongst the short stumpy branches of different species of *Spongodes*, many having pink or dark purple tips, and the colour markings of the Porcellanids commensal thereon agree with those of the partner so well that they are often difficult to see.

The Kutch collection was made on ground rich beyond description in corals, sponges, crinoids, and such aleyonarians as *Spongodes*, and it is therefore natural to find a predominance of such forms as usually occur in such a habitat.

The classification of the Galatheidæ adopted in this paper is the one adopted in the Report on the *Challenger* Anomura, and the definitions of the genera here given are also those therein given by Henderson. In the group Paguridea, however, the classification adopted and the characters given are those given by Alcock in his *Indian Decapod Crustacea*. In some instances I have had difficulty in satisfactorily referring some of the Kutch genera to their proper place. Especially was this the case in the family Porcellanidæ, and it would appear that, with our extended knowledge of this group, a more suitable and precise method of classification

might be initiated, even though some of the genera are certainly very nearly related. The descriptions given of many species of Porcellana are much too short to be of any real value, and render the work of identification not only unsatisfactory, but almost impossible. No doubt, however, much of the difficulty referred to above has been due to the difficulty of access to necessary literature.

During the examination of this Kutch collection I have had the inestimable advantage of being so situated that by far the most of the species recorded in this paper have been accessible to me in quantity, and in a living condition, from the Ceylon Pearl Banks.

No fact has struck me so forcibly during the examination of this collection, as the extent of the variation characteristic of many species. Some species within a genus may be distinguished as being more stable than others. Spines are particularly liable to variation; so, in less degree, are colour markings. Many of these variations are noted in the text. This fact serves to indicate how inaccurate may be descriptions of new species made from a very few specimens—and possibly young forms.

I cannot close without expressing my indebtedness to Mr. Hornell for his help in many ways, for placing this collection in my hands, and for providing opportunities for studying fresh material under conditions in which it was a pleasure to work.

## A N O M U R A.

### PAGURIDES.

#### FAMILY : PAGURIDÆ.

PAGURIDÆ : Dana (7), Stimpson (34), Henderson (19), Stebbing (33), Ortmann (29), Bouvier (6), Milne-Edwards and Bouvier (10), Alcock (2).

PAGUROIDÆ : Boas (5).

PARAPAGURIDÆ : Smith (31), Henderson (19), Stebbing (33).

### **Diogenes, DANA.**

Dana (7), Stimpson (34), Heller (16), Haswell (14), Henderson (19), Stebbing (33), Ortmann (29).

This genus is confined to shallow water, and is characteristically Indo-Pacific. There are about thirty species, three of which occur along the shores of the Atlantic, one in the Mediterranean (solely), and the rest are purely Indo-Pacific. Many of the species are small and very variable. The outstanding features which characterise the genus are as follows :—

Abdomen soft, coiled, and well developed. Carapace elongate. Eye-stalks slender. Ophthalmic scales large and separated by a movable rostrum. Antennal acicle well developed, with the flagellum usually setose.

Chelipedes dissimilar, the left being much the greater. The fingers move in an oblique direction and have their tips calcareous and acuminate. The palp of the first pair of maxillæ has a recurved flagellum. Fourth pair legs subchelate, fifth pair chelate, both with corneous granules on their distal outer surface. Abdominal segments four in number, and situated on the left side, uniramous in the male and biramous in the female, except in the last one. The gills are phyllobranchs, and are thirteen in number on each side.

### **Diogenes investigatoris, ALCOCK.**

Carapace fairly elongate, with the anterior and lateral edges serrulate.

Rostrum a simple non-serrated rod, tapering towards the free extremity, and equal in length to the ophthalmic scales. These latter have their free edges spinulose. Eye-peduncles shorter than the antero-lateral border of the carapace and reaching to the base of the terminal joints of the antennal and antennular peduncles. The antennal flagellum is slightly shorter than the carapace, and is coarse and setose. The antennal acicle does not overlap the base of the last joint of the peduncle. Left chelipede very much larger than the right, and a little longer than the carapace.

The outer surface of the hand is granulous, and there is a row of spines on the upper part of the outer surface of the palm. The legs are setose along their edges only and smooth elsewhere.

Three apparently young male specimens inhabiting shells of *Nassa glans* and *Sistrum spectrum*.

Length of carapace, 9 mm. ; colour in spirit, dirty white.

*Localities* :—(1) Okha, 5 fms. ; (2) off W. coast of Aramra.

*Previously recorded from* :—(1) Off Vizagapatam Coast, 20 fms. Alcock. (2) Ceylon Pearl Banks, 5 fms. Southwell.

### **Clibanarius, DANA.**

Dana (7), Stimpson (34), Heller (17), Miers (26), Haswell (14), Henderson (19), Milne-Edwards and Bouvier (10), Stebbing (33), Ortmann (29).

Carapace elongate, broadened posteriorly, and calcified in front of the cervical groove, as in many other genera of Paguridæ. Rostrum short and distinct. Abdomen soft and spirally coiled.

Eye-stalks slender. Ophthalmic scales usually closely approximated. Antennal acicle short. Antennal flagellum long and non-setose. Exopodite of the three

maxillipeds have each a well-developed flagellum. The endopodite of the first maxillæ has a recurved flagellum.

Chelipedes usually similar and equal, or one may be slightly larger than the other. The fingers open and close in a horizontal plane, and their tips are corneous and spooned. The fourth and fifth pair of legs have a patch of thickened corneous granules on the outer surface near the tip.

No paired appendages in either sex, except those which form the tail fin. Biramous appendages are found on the left side on segments 2-5 inclusive.

This genus is a large one and comprises about 53 species. For the most part they inhabit tropical seas, but some extend into temperate waters. About half the number of known species are Indo-Pacific forms, five species occur along the Western Pacific Coast, ten species from the West Indies and neighbouring Atlantic Coasts, and six species from the Coast and Islands of North-West Africa. Some are Mediterranean. They are shallow-water and littoral forms (under 100 fathoms).

### ***Clibanarius infraspinatus*, HILGENDORF (20).**

De Man (24), Ortmann (30), Henderson (18), Nobilli (28).

Carapace longer than broad, and bearing tufts of yellowish bristles, which are most numerous near the cervical groove, whilst others occur near the lateral borders, and on the calcified anterior part of the carapace. Rostrum very small and barely reaching to the base of the ophthalmic scales. These latter are small, and have their free edges spinose, setose, and approximated. Eye-stalks long, slender and sparsely setose, slightly longer than the antennal peduncles, and reaching to the middle of the terminal joint of the antennules. Antennal acicle setose and triangular in shape, with spines arranged along the internal edges and overlapping the terminal joint of the peduncle.

Chelipedes equal, similar, and very massive.

Upper and inner border of merus serrulate, and scattered vascular tubercles occur on the outer and under surfaces. A strong tooth occurs near the lower and inner border of the merus of the chelipedes. The extensor surface of the wrist, hand and fingers are covered with short stout conical tubercles, many of which bear a tuft of bristles. There is a hiatus between the base of the fingers when closed. The fingers meet terminally in a flat blackened corneous patch on the extensor surface. They open and close in a horizontal plane.

The second and third legs are smooth and not tuberculated, their joints are beset with setæ, and a few setæ occur on their extensor surfaces. The setæ are more numerous on the dactyli.

Colour in formalin, yellowish-brown.

Eye-stalks and second and third pair of legs bear longitudinal lines of colour.

Length of carapace of largest, 3.7 cm.

Three males, one in shell of *Murex tribulus*.

*Localities*:—(1) Beyt Island E. (Balapur); (2) off Dwarka.

*Previously recorded from*:—Tavoy, Museum collector; Red Sea, Ortmann; Mergui, de Man and Anderson; Singapore, Walker; Sydney, Ortmann.

**Clibanarius humulis**, DANA (7).

Heller (17).

Carapace longer than broad, and well calcified in front of the cervical groove. Rostrum very short and slender. Eye-stalks long and slender, equal in length to the antennal peduncles, and slightly shorter than the antennular peduncles.

Ophthalmic scales short, with their free edges spinose and approximated. The antennal acicle very slightly overlaps the base of the terminal joint of the peduncle, and bears numerous long setæ.

Chelipedes stout, equal, and as long as the carapace. Extensor surface of the wrist and fingers studded with conical tubercles, between which setæ occur. There is a hiatus between the bases of the closed fingers, which latter are blackened and corneous at their tips.

The second and third legs are much longer than the chelipedes, and are smooth and sparsely setose. The propodite of the third left leg is somewhat modified, its outer surface being a little flattened and its upper border crested. Dactyli also slightly flattened and terminating in sharp blackened claws.

Colour in formalin, dirty white; propodites, dactyli, wrist and fingers, light brown.

Two specimens—males.

Length of carapace of largest, 2.2 cm.

One specimen in shell of *Nassa granifera*.

*Localities*:—(1) Off Dwarka; (2) N. coast, Beyt Island.

*Previously recorded from*:—Betra Par, Laccadives, *Investigator*; Raratonga (West Pacific).

GALATHEIDÆ.

FAMILY: PORCELLANIDÆ.

**Porcellana**, LAMARCK.

Lamarck (21), Stimpson (34), Haswell (14), Milne-Edwards (9).

*Characters of the genus*:—

Carapace suborbicular, or subovate. The length usually greater than the breadth. Frontal region prominent and dentate, the teeth usually well developed. Orbits deep.

Eyes usually large. Chelipedes moderately flattened. The carpus short, and usually provided with a single projecting lobe near the proximal end of the internal margin. The digits frequently contorted. Ambulatory limbs with the dactyli short and robust, terminating in a single claw.

**Porcellana serratifrons**, STIMPSON.

Stimpson (34), Southwell (32), Henderson (19).

This species (which the writer has had many opportunities of examining, both from Kutch, and, in particular, from the Ceylon Pearl Banks, where it occurs plentifully) is extremely variable, a fact which, so far as I know, has not hitherto been sufficiently emphasised. So extensive are these variations, that it is impossible to give more than a general description of the species.

The front is composed of three lobes, of which the median one is rounded, and minutely serrate. The two lateral ones are much smaller, and acute, a few teeth, which are coarser than those on the median lobe, being present on their internal edge. The carapace is usually somewhat flattened, and is marked by a discontinuous, parallel transverse series of pubescent striæ. Edges of the carapace with a variable number of teeth. A few spines occur over the insertion of the antennal peduncles. A little posterior to these is a rounded lobe, bearing some small teeth. Some, or all, of the segments of the antennal peduncles bear single teeth on their internal face. Chelipedes equal or unequal, the left or right being the larger. The chelipedes, like the carapace, bear discontinuous rows of pubescent striæ. The inner angle of the merus is prominent and armed with teeth. A few teeth, usually two, occur on the internal edge of the carpus. The external edge may be entire, or bear one or two teeth.

The propodite of each chelipede bears a median dorsal carina, which may, internally, be entire, or toothed; the outer edge always toothed. Fingers curved and short.

Natural colour: dark uneven brownish-grey changing in spirit through brick red to colourless.

Very numerous specimens, males and females.

Average length of carapace, 10 mm.; average breadth of carapace, 9 mm.

*Locality*:—Off S.W. of Beyt Island, Gulf of Kutch.

*Previously recorded from*:—Hongkong, *Challenger* Expedition; Ceylon Pearl Banks, Southwell.

From the examination of some hundreds of specimens, the following facts and conclusions were arrived at:—

- (1) That although the general form and outline of the carapace was consistent throughout, particularly the form of the rostrum, innumerable minor variations occur.

- (2) That these variations are not usually sexual variations, nor merely due to differences of age.
- (3) That the female is generally slightly broader, and of a darker colour—particularly in spirit specimens—than the male.
- (4) That the occurrence of spines is quite irregular, and not to be relied upon for purposes of identification.

**Porcellana gaekwari**, n. sp.—Plate, figs. 1–3.

Carapace slightly longer than broad, convex from side to side, and from before backwards, and marked by discontinuous, transverse striæ. Lateral margins armed with a series of spines. There is a spine immediately posterior to the orbit, and one situated over each antennal peduncle. A little further back is a rounded lobe, bearing a few minute teeth, and posterior to this are three more spines.

The rostrum is short and deflexed, with a definite mesial furrow. It is made up of three lobes. The median lobe is much broader, and slightly longer than the two lateral ones. Its free edge is in the form of an exceedingly shallow V, and bears about four to six teeth. The lateral lobes are triangular, with their inner face dentate and their external edge entire.

Antennal peduncle long, cylindrical and three-jointed. First and third joints as broad as long. Middle joint one and a half times longer than broad. Antennal filament nude.

Eye-peduncle short, but extending beyond the edge of the carapace during life. In the living condition the eyes are colourless, but pigment develops after death.

Chelipedes twice as long as the carapace in adult specimens, their dorsal surfaces marked by transverse striæ, equal or unequal, the left or the right being very slightly the larger. Internal face of the merus minutely notched, its distal angle being produced into a lobe. Carpus of female slightly longer than broad, with a few teeth on its internal face, entire in the male, and sinuous.

Propodite long, and broadened distally, the posterior edge being smooth along two-thirds of its length, but denticulate distally. Movable finger curved, with a large tooth near its origin, and serrate along the rest of its inner border. The three following pairs of thoracic feet are approximately two-thirds the length of the chelipedes, and have the merus rather large, the carpus short, and as broad as long. Propodus three and a half times as long as broad and hairy on its anterior surface.

Dactyli short, curved, and multiunguiculate.

Length of carapace, 8 mm.; breadth, 7 mm.; length of chelipede, 17 mm.; length of first thoracic leg, 10 mm.

Natural colour: ground colour milky white. Carapace with a few symmetrical blotches of light brown. Rostrum light purple. Chelipedes similar to carapace, but movable finger light purple. Walking legs light purple.



Seven specimens, one male and six females, five of the latter bearing eggs, and one being a young specimen.

*Locality*:—Challai Paar, Gulf of Mannar, four and a half fathoms; bottom, sand. Found commensal on a species of *Spongodes*, having dark purple tips.

This species bears a general resemblance to *Porcellana serratifrons*, but differs from it very definitely in the following particulars:—

- (1) The median lobe of the rostrum is *slightly* concave instead of rounded.
- (2) The propodite of the chelipede is smooth.
- (3) The dactyli of the thoracic feet are multiunguiculate.

This species appears to be related to *Porcellana nitida*, Haswell, but his description is so short and incomplete that it is inconclusive.

The median rostral lobe of *P. nitida* is said to be "much longer than the other," without any further description. Moreover, *Porcellana gaekwari*, n. sp., has the rostrum spinose. The carpus of the chelipede in *P. nitida* has a sharp entire internal crest. Only the males of *P. gaekwari*, n. sp., have the carpal crest entire.

This species is variable. The young specimen had the chelipedes only one and a half times as long as the carapace, and equal. In others, the chelipedes were sometimes equal, or the left or right was slightly the larger.

The spines on the internal edge of the carpus of the chelipedes of the female were variable in number, as shown in the following table:—

<i>Specimen.</i>	<i>Carpus of R. Chelipede.</i>	<i>Carpus of L. Chelipede.</i>
1	3 spines	2 spines and many minute ones distally.
2	4 "	5 spines.
3	4 "	4 "
4	8 "	5 "
5	7 "	5 "
6	3 "	4 "

This species undoubtedly belongs to the genus *Porcellana*, as defined in the Report on *Challenger* Anomura.

A noticeable feature was, that in the fresh condition the eyes were non-pigmented, the pigment only developing after death, and even then not being very pronounced. Amongst the characteristics of this genus is the fact that the dactyli of the ambulatory limbs terminate in a single claw, and also that the first joint of the antennal peduncle is joined to the margin of the carapace.

*Porcellana gaekwari*, n. sp., differs markedly in both these particulars. However, its general characteristics are more those of a *Porcellana* than of any other genus, and it is accordingly placed here.

This species is named in honour of H.H. the Maharaja Gaekwar of Baroda, to whose liberality is due the carrying through of the investigation of which the present report forms part.

**Porcellana tuberculosa** (MILNE-EDWARDS).—Plate, fig. 4.*Petrolisthes tuberculosa*, Milne-Edwards (9).

A single specimen (female) is doubtfully referred here. The description of this species by Milne-Edwards, in his *Histoire Naturelle* (which is the only one available), is very short, somewhat indecisive, and no figures are given. Milne-Edwards' description is as follows :—

“Carapace slightly convex, and pilose on the sides, covered with short filigerous wrinkles, and presenting on the sides some small tubercles.

“Front deeply divided into three lobes of which the median one is large and round, and is guttered with a profound median furrow, and the lateral ones are straight, obtuse, and directed obliquely outwards. Anterior feet very large. Carpus armed on the anterior edge with several teeth, of which two are pretty large, and present above, three longitudinal series of tubercles, separated by two furrows. Median series most numerous and elevated. Similar tubercles on face of hands. Length 16 mm. Habitat, Chili.”

The Kutch specimen agrees with Milne-Edwards' description in the following particulars :—

- (1) The carapace is pilose on the sides and presents small tubercles laterally.
- (2) The front as in foregoing description.
- (3) The carpus of chelipedes has three longitudinal dorsal series of tubercles, separated by two furrows. Median series most numerous and elevated.
- (4) The presence of tubercles on the hands.

It differs in the following particulars :—

- (1) The transverse filigerous wrinkles on the carapace are absent.
- (2) The carpus of the chelipedes only armed with one tooth proximal and internal, and another distal and external.
- (3) The chelipedes are not covered with a dense down.

Assuming the species to be the same, the Kutch specimen possesses the following characteristic points :—

- (1) The palp of the third maxillipede is enormously long and hairy.
- (2) The right chelipede is slightly larger than the left.
- (3) The merus of each thoracic leg is characterised by being markedly broad.

Milne-Edwards gives the length as eight lines ( $\frac{2}{3}$  in.). I am unable to determine whether this measurement is simply that of the carapace or the whole animal.

The description of the Kutch specimen is as follows:—

Carapace slightly longer than broad, moderately flattened, and markedly tuberculated, with deep intervening sulci, the granular tubercles being largest towards the anterior. Cervical grooves well marked and terminating behind each orbit. Rostrum short, deflexed, and broadly triangular, its extremity being marked by three large tubercles, of which one is median and advanced, and the other pair lateral. Lateral margins of the carapace entire and hairy. Outer orbital angle projecting. Epibranchial spines absent. Eyes large and protruding. Eye-peduncles short; antennules minute. Antennæ projecting laterally, the first joint not extending to the edge of the carapace, and having a crest on the distal anterior edge. Palp of the third maxillipede very long, hairy, and extending beyond the extremity of the antennules. Chelipedes depressed, unequal, the right one being slightly the larger, and twice as long as the carapace.

Merus short, and roughly triangular, with a small tooth on its internal distal angle, and a few scattered granules on its dorsal and external face. Carpus two-thirds as long as the carapace, and half as broad as long. Its dorsal surface is marked by numbers of tubercles of unequal size and roughly arranged in three rows, separated by two shallow furrows. A small spine occurs proximally on its internal edge and another one on its distal external edge. Ventral surface smooth. Propodite narrow proximally, widening distally, and wedge-shaped from side to side, with the narrow end external; its dorsal surface is marked by a number of tubercles of unequal size, and roughly arranged in rows. A few short hairs occur on its external edge. Ventral surface smooth. Fingers short, slightly curved, approximated when closed, and tuberculated. A pad of short matted hairs occurs ventrally on their proximal ends. The three succeeding pairs of thoracic feet equal, short, flattened, hairy along their edges, and tuberculated along their dorsal surface. Merus very large, and almost as long as the three succeeding joints, and three-fifths as broad as long. Carpus, propodus and dactylus of each thoracic leg slender.

Last (fourth) pair of thoracic legs very slender, and folded along the sides of the body, abdomen flexed under the body and slightly hairy, the hairs arising from the edges of the terga and from isolated dorsal areas.

One female with eggs.

Length of carapace, 10 mm.; breadth of carapace, 9 mm.; length of right chelipede, 20 mm.; length of left chelipede, 18 mm.; length of first thoracic leg, 12 mm.; length of merus of first thoracic leg, 5 mm.

Colour in formalin: milky white.

*Locality*:—South-west coast of Beyt Island.

**Polyonyx**, STIMPSON.

Stimpson (34), Henderson (19), Henderson (18), Southwell (32).

Carapace suborbicular, and convex, the breadth slightly greater than the length. Front but little produced, with an almost straight margin. First joint of the antennular peduncle smooth. The corresponding joint of antennal peduncle greatly elongated. Eyes of small size. Chelipedes smooth with the merus broad. Dactyli of the ambulatory limbs short and furnished with two or more well-developed claws.

**Polyonyx obesulus** (WHITE).—Plate, fig. 5.

Southwell (32), Henderson (18), Henderson (19).

Carapace smooth and convex, the breadth slightly greater than the length. Rostrum very slightly developed, obtusely rounded and deflexed in such a way that it is not seen in a dorsal view. First segment of the antennal peduncle long. Chelipedes equal, or the right or left the larger. Outer surface of the hand smooth. Merus of the chelipedes has its internal distal angle produced into an entire lobe. Carpus longer than broad. Propodite as broad as long. Fingers gaping or not, and mostly curved. The ambulatory dactyli are triunguiculate.

*Localities*:—(1) Kiu, Okhamandal, low water; (2) South-west coast, Beyt Island. One specimen from each locality.

Breadth of carapace, 8 mm. Natural colour: brownish-grey, turning red in spirit.

*Previously recorded from*:—Amboina, de Man; Singapore, Walker; N. Australia, Miers; Ceylon Pearl Banks, Southwell; Madjicosima Is., White; Flinders Passage, Henderson.

This species is closely related to *P. biunguiculatus*, and De Man suggested their union into one, an idea, however, which was opposed both by Miers and Henderson.

In a former paper on the Anomura of the Ceylon Pearl Banks, I remarked that *P. obesulus* and *P. biunguiculatus* "seem so closely related that it is difficult to believe that they are distinct. Some of our Ceylon specimens seem intermediate in their character."

Since the preceding statement was written I have had many opportunities of examining numbers of fresh specimens from the Ceylon Pearl Banks, where the species occurs plentifully in shallow water, usually inhabiting the large exhalant apertures of a species of *Hippospongia*, or found hidden in the cavities of rock or dead coral.

The two principal points in which *P. obesulus* differs from *P. biunguiculatus* may be summarised thus:—

*P. obesulus*:

- (1) Median frontal projection obtusely rounded and but little projecting.
- (2) Ambulatory dactyli tri-unguiculate.

*P. biunguiculatus*:

- (1) Median frontal projection prominent and acute.
- (2) Ambulatory dactyli bi-unguiculate.

I am now convinced that these differences are sufficiently stable to be specific—a conclusion arrived at after examining some hundreds of specimens of *P. obesulus*. At the same time I would here remark that the aforesaid points of difference are liable to a little variation. In one or two adult specimens of *P. obesulus*, with typically triunguiculate dactyli, the rostrum was scarcely obtuse, whilst in others it was almost straight. Again, one specimen was found with two of the dactyli on the walking legs typically biunguiculate, and in the other specimens the small proximal claw itself was noted to vary in size.

**Polyonyx hendersoni**, n. sp. (18)—Plate, figs. 6–9.

Carapace more convex from front to back than from side to side, broader than long—the greatest breadth being anterior—smooth dorsally, but lineolate along the posterior lateral borders. Rostrum sub-acute, rounded, only slightly projecting, and not visible in a dorsal view. Chelipedes variable, the left or right being the larger. Merus with a small tuberculated lobe on its distal internal face. Carpus as broad as long, strongly tuberculated, its internal edge produced into a rounded lobe bearing a few blunt teeth, and having a ventral entire carina. Propodus small proximally, widening distally, the length slightly greater than the breadth, tuberculated dorsally, smooth ventrally. Fingers curved or not, with a hiatus between them when closed, or not. The ambulatory dactyli are four-clawed, the terminal claw being slightly longer than the penultimate one, and the two proximal ones being minute. Ambulatory legs bear short, matty hairs on their anterior edge.

Length of carapace, 6 mm.; breadth of carapace, 8 mm.

Natural colour: varying shades of brick red.

*Locality*:—South of Adams Bridge, Ceylon, eight and a half fathoms.

Found along with *P. obesulus* inhabiting the cavities of sponges, dead coral and rock. Several specimens, males and females, many of the latter bearing eggs.

This species is the one doubtfully referred to as *Polyonyx tuberculosus* by Henderson in his "Indian Carcinology." After giving a short description of it without naming it, he says, "this species is certainly distinct from *P. obesulus* or *P. biunguiculatus*, and as de Man represents his species with the carpus smooth above, and with very few tubercles present on the hand, our specimens may also

be distinct from *P. tuberculosus*. The ambulatory dactyli of the last species are not described by de Man. I have noticed in one or two specimens of *P. obesulus* a slight tendency towards tuberculation of the hand, chiefly in young individuals, but our species may be distinguished from this variety by the greater tuberculation and the different ambulatory dactyli. De Man had only a single small specimen, and it may have belonged to this variety of *P. obesulus*, in which case a new name will be necessary for the form, which is here briefly characterised."

Unfortunately, I have been unable to obtain de Man's description of *P. tuberculosus*, but the complete tuberculation of the carpus, and propodite, of our specimens, would almost alone be a point of sufficient distinction between the two specimens. Many individuals of *P. hendersoni*, n. sp., were examined, and the tuberculation of the carpus and propodus were found constant in every specimen. In one specimen the dactylus of one of the thoracic legs bore four small proximal spines instead of two. There can be little doubt, however, that *P. hendersoni*, n. sp., is a quite distinct species, and I have pleasure in naming it in honour of Dr. J. R. Henderson, who first described it, and whose careful work on the Anomura in general is so well known.

#### **Petrolisthes**, STIMPSON.

Stimpson (34), Miers (26), Haswell (14), Henderson (19).

*Characters of the genus* :—

Carapace subovate, depressed, the length slightly greater than the breadth. Frontal region triangular, usually depressed, with the antennal peduncle remarkably short. Chelipedes broad and flattened, the carpus of moderate length, and often provided with teeth on the inner margin. Ambulatory limbs with the dactyli short and robust, terminating in a single claw.

#### **Petrolisthes bosci** (AUDOUIN).

*Porcellana bosci*, Heller (15).

*Petrolisthes bosci*, de Man (25).

*Porcellana rugosa*, Milne-Edwards (9).

The front is prominent, triangular and deflexed, presenting a median furrow. The carapace is depressed, and slightly longer than broad. Margins entire and terminating anteriorly in an acute epibranchial spine. The surface is marked by a very noticeable mosaic, and by the strong development of granulate, filigerous, elevated, irregular lines, which are visible to the naked eye. Chelipedes equal, and beautifully sculptured like the carapace. The merus is armed with three spines at its distal extremity, one internal, one external, and one ventral and median. Carpopodite armed internally with a varying number of large spines (usually three or four), and externally with a

serrate crest, arising about the middle of its length, and increasing in size distally. Ventrally and internally the carpus bears an entire carina. Carpus twice as long as broad, and slightly shorter than the carapace. The fingers are straight, and there is no hiatus between them when closed. The ambulatory legs are slightly hairy, the carpus robust and flattened.

Colour in formalin, a lovely and characteristic mosaic of mottled maroon.

It is interesting to note that no mention whatever is made of the natural colour either by Henderson in his *Contribution to Indian Carcinology* (18), or by de Man in the *Crustacea of the Mergui Archipelago* (24). I have been unable to obtain Audouin's original description. However, these colour markings are most characteristic, and quite different in nature from anything I have previously seen. The Kutch specimens were preserved both in formalin and in spirit, and in neither case have the colours suffered any change, even after the lapse of two years.

This species appears to be closely related to *P. dentata* (Milne-Edwards), from which it differs in the peculiar and stronger development of the filigerous lines along the carapace, and also in the inner margins of the fingers being hairy, and the spine on the upper exterior margin of the merus being acute and not obtuse.

Two specimens, one male and one female.

Dimensions:—

	Kutch specimen.	De Man's specimen.
Length of cephalothorax	1.4 cm.	$8\frac{3}{4}$ mm.
Breadth „ „	1.3 „	$8\frac{1}{3}$ „
Length of carpopodite	1.0 „	$5\frac{2}{3}$ „

From these measurements it will be noticed that the Kutch specimens are very large, being approximately two-thirds larger than those examined by de Man.

I have observed this species living in the cavities of certain sponges, and on the branches of *Spongodes*, sp., on the Ceylon Pearl Banks.

*Locality*:—Hanuman Dandi Reef, Beyt.

### **Petrolisthes armatus?** (GIBBES).—Plate, fig. 10.

*Porcellana armata*, Gibbes (12).

*Petrolisthes armatus*, Stimpson (34 and 35).

I doubtfully refer a damaged specimen of this genus to the species *armatus*, not being able to refer to Gibbes' original description, or to Stimpson, and no figure being available. The carapace is slightly flattened, longer than broad, and glabrous. There is no epibranchial spine. The front is broadly triangular and round, deflexed with a mesial furrow. The eyes are large. The chelipedes are equal, and two and a half times as long as the carapace. The merus has a short acute spine at its internal distal angle, and another one ventral and external. The carpus is almost as long as the carapace, and bears three teeth along its internal face, and a ventral internal and

external crest. The palm is broad and round, outer surface of hand not serrate. Fingers acute, curved and shorter than the palm, with a small hiatus between them when closed. Ambulatory legs missing. Colour in spirit: dirty milky white.

*Locality*:—South of Chindi Reef, Gulf of Kutch, 6–10 fathoms.

It is a Floridian and West Indian species, but has also been recorded by the *Challenger*, and from the Ceylon Pearl Banks.

### **Petrolisthes, sp.**

A damaged specimen in the collection is referred to this genus. Carapace slightly longer than broad, a little compressed, surface marked with pubescent striæ, the hairs being short. Lateral margins entire, and slightly hairy. Superior orbital border straight, with a blunt external orbital projection. Rostrum prolonged deflexed, with a shallow median furrow, and the edges crenulate. Eyes large. Eye-peduncles short. Antennules minute. First joint of antennal peduncle reaching beyond margin of carapace. Chelipedes absent. Ambulatory legs short. Merus broad.

Length of carapace, 5 mm.; breadth of carapace, 5 mm.

Colour in formalin: milky white.

*Locality*:—South-west of Beyt Island.

### **Galathea, FABRICIUS.**

**Galathea.**—Leach (23), Desmarest (8), Latreille (22), De Haan (13), Stimpson (34), Haswell (14).

**Galathea.**—Fabricius (11), Milne-Edwards (9), Dana (7), Heller (16).

Rostrum flattened, and of moderate breadth, with the margins usually spinose. Carapace with pubescent transverse striæ, the surface usually unarmed, with the exception of the anterior gastric area. The cardiac area not prominent. Abdominal segments unarmed.

The members of this variable genus are usually confined to shallow water, where they live symbiotic on crinoids, or amongst coral, or on the surface and crevices of rocks. They swim backwards by curious movements of the tail.

The genus is more or less cosmopolitan.

### **Galathea elegans, WHITE.**—Plate, fig. 11.

Adams and White (1), Henderson (19), Miers (27).

Rostrum very long, and acute, two-thirds the length of the carapace and armed with seven small teeth on each side. Carapace and abdomen covered with a continuous series of pubescent striæ, and rather more than half as broad as long (including the rostrum). Lateral margins of the carapace armed with about eight teeth.



Antennæ minute. Antennal peduncle slightly elongated, the joints bearing acute spines on their anterior and posterior faces.

Chelipedes slender, one and two-thirds longer than the carapace and rostrum, and bearing a few spines. Fingers not gaping, and not half the length of the propodus. Colour yellowish, with three longitudinal dark purplish bands on the carapace, and one on either side of the chelipedes and legs.

One female bearing eggs.

Length of carapace and rostrum, 13 mm. ; breadth of carapace, 7 mm. ; length of chelipedes, 22 mm.

This species was found commensal on a species of black and white coloured *Antedon*.

*Locality* :—South-west of Beyt Island.

*Previously recorded from* :—Holborn Island, Haswell ; Ceylon Pearl Banks, Southwell ; Celebes Sea, Henderson ; Borneo, Adams and White ; Singapore, Walker ; N. Australia, Haswell-Miers ; Amboina, de Man.

### **Munida**, LEACH.

Leach (23), Desmarest (8), Dana (7), Bell (4), Stimpson (34), Heller (16), Miers (26).

Rostrum slender and stiliform, with a well-developed supra-orbital spine on either side of the base. Carapace with the surface usually spinulose, and the cardiac area, as a rule, distinctly circumscribed.

Chelipedes and ambulatory limbs elongated and slender. One or more of the abdominal segments usually with a series of spinules on the antero-dorsal margin.

Very many members of this genus are deep-sea forms, extending down to 1,300 fathoms. A few are littoral, and occur in the crevices of rock or coral.

***Munida spinulifera***, MIERS.—Plate, fig. 12.

Henderson (18), Miers (27).

Carapace a little elongated, and covered with a series of more or less continuous pubescent striæ. Edges of carapace armed with seven or eight spines. Rostrum a slender, conical, elongated, entire rod. Behind the rostrum, on each side, are four large spines, slightly less than the rostrum, and decreasing in size posteriorly. Eyes fairly large, and overhung by a few setæ. Peduncles rather short. Chelipedes long (twice as long as the carapace, including the rostrum), slender and hairy. The merus is elongated and bears three spines on its internal edge, and a few smaller ones on its outer edge. Carpus shorter than the merus, with one large spine on its anterior edge, and a row of about four smaller ones on its outer surface. Propodite as long as the fingers, with a number of smaller spines on both its inner and outer edge. Fingers gaping. Abdomen unarmed.

Several specimens, males and females. Natural colour: brick red.

Length of carapace and rostrum, 6 mm.; length of carapace, 3.5 mm.; length of chelipedes, 11 mm.

*Localities*:—(1) S.W. of Beyt Island; (2) S. of Adams Bridge, Ceylon.

*Previously recorded from*:—Amboina (Henderson); Arafura Sea (Miers).

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## EXPLANATION OF PLATE.

## ANOMURA.

- Fig. 1. *Porcellana gaekwari*, n. sp.  $\times 3$ .  
 „ 2. Right chelipede of same.  $\times 5$ .  
 „ 3. Dactylopodite of second right walking leg of same.  $\times 17$ .  
 „ 4. *Porcellana tuberculosa*, M. Edw.  $\times 2\frac{1}{2}$ .  
 „ 5. *Polyonyx obesulus* (White).  $\times 2\frac{1}{4}$ .  
 „ 6. *Polyonyx hendersoni*, n. sp.  $\times 2$ .  
 „ 7. do. outline of rostrum.  
 „ 8. do. right chelipede.  $\times 2\frac{1}{2}$ .  
 „ 9. do. dactylopodite of second walking leg, greatly enlarged.  
 „ 10. *Petrolisthes armatus* (Gibbes), body without legs.  $\times 2$ .  
 „ 10a. Chelipedes of same.  $\times 2\frac{1}{3}$ .  
 „ 11. *Galathea elegans*, White.  $\times 2$ .  
 „ 12. *Munida spinulifera*, Miers.  $\times 3\frac{1}{2}$ .









