

The ambulatory legs are similar to those of *M. quadratus*, and their margins are clothed with some hairs. The meropodites of the legs of the third and fourth pair are armed on their upper margin, a little before the distal end, with an acute spinule, but those of the second and fifth are unarmed. The meropodites are minutely denticulate along the distal half of their under margin, especially those of the legs of the third and fourth pair; this denticulation, however, is so minute that it is only visible by means of a strong magnifying-glass.

Dimensions :—

	♂. millim.	♀. millim.
Distance between the external orbital angles	9½	11
Distance between the second antero-lateral teeth	9½	11½
Length of the cephalothorax	6½	7½
Breadth of the front, between the eye-peduncles.....	2	2½
Length of the hand (fingers included)....	8	4¾

Genus DOTILLA, *Stimps.*

I propose to unite this with the genus *Scopimera*, de Haan, as the two present distinct natural affinities; they not only resemble one another as regards their outer appearance and their essential characters, but both are provided with the singular “tympana” on the meropodites, rarely also on the sternum, which, so far as I am aware, are not found in any other Crustacea. De Haan separated the *Scopimeræ* from the *Dotillæ* on account of the merus-joint of the outer maxillipeds being longitudinally sulcate in the *Dotillæ* and smooth in the *Scopimeræ*. This character, however, is now proved to be only of specific value by a new species in the collection. The form in question agrees closely with the true *Dotillæ*, and more especially resembles *Dotilla sulcata*; but the merus-joint of the external maxillipeds shows only partially the longitudinal grooves characteristic of Forskål’s species.

Three species of *Dotilla* have hitherto been described: the long-known *D. sulcata*, Forsk., from the Red Sea, *D. myctiroides*, M.-Elw., from the coast of Malabar, and *D. fenestrata*, Hilgend., from the eastern coast of Africa.

I am now able to describe two new species of this interesting genus.

78. *DOTILLA BREVITARSIS*, n. sp. (Pl. IX. figs. 1-3.)

Four specimens were collected in the Mergui Archipelago. This new species may be easily distinguished by the following characters:—From Forskål's *D. sulcata*, by the surface of the cephalothorax being differently grooved, by the carpopodite of the chelipedes being armed with a small acute spine at its internal angle, by the meropodites of the ambulatory legs being more enlarged, by comparatively much shorter dactylopodites, which are shorter than the propodites, and by many other characters. It differs also from *Dotilla myctiroides*, M.-Edw., from the coast of Malabar, by the upper surface of the cephalothorax being also sulcate and by the short, not slender chelipedes. *D. fenestrata* may be distinguished from it at first sight by the remarkable "tympana" which occur on the sternum.

I will now compare our new species with *D. sulcata*, two fine specimens of which, collected in the Red Sea, were kindly sent me by the Curators of the Leyden Museum.

In *D. sulcata*, Forsk. (*conf.* Milne-Edwards, Règne Animal de Cuvier, pl. xviii. fig. 3), the frontal groove is continued backward only to the mesogastric region, where a prominence or tubercle is found. Before this prominence it divides into two branches, each of which is immediately again dichotomously divided into two grooves, one of which is directed obliquely forwards towards the external orbital angles, and the other proceeds obliquely backwards towards the bases of the last pair of ambulatory legs. A five-rayed star of grooves is thus formed on the anterior and antero-lateral portions of the cephalothorax, one of the rays of which, the frontal groove, is placed in the middle line of the carapace. The two posterior rays or grooves are longer than the other three, and are accompanied on each side by a supplementary groove; the external one (*a*) proceeds forwards at a little distance from and parallel to the lateral margin of the carapace, dividing into two short grooves at its anterior end; the internal one (*b*) is directed obliquely forwards from the base of the last pair of legs to the urogastric portion of the gastric region. The cardiac and intestinal regions of the cephalothorax, bordered on each side by the oblique groove (*b*),

appear in this species quite smooth and ungrooved. On each side of these smooth regions there are therefore three principal grooves nearly parallel to one another and directed obliquely forwards and inwards. The lateral margins are ciliate, present a small emargination immediately behind the external angles of the orbits, and are directed obliquely backwards to the bases of the fourth pair of legs.

In its general appearance the cephalothorax of *D. brevitarsis* resembles that of *D. sulcata*, but the upper surface is grooved in a different manner. The upper surface is a little broader than long, a little convex longitudinally as well as transversely, and distinctly sulcate. The front resembles that of *D. sulcata*, is strongly deflexed, as in that species, but is less narrowed and more rounded anteriorly. It is broadly grooved, the groove occupying, as in *D. sulcata*, nearly the whole breadth of the front; this groove is prolonged backwards, in the middle line of the cephalothorax, to the posterior cardiac region, where it is a little narrowed, and issues into a transverse groove, which runs parallel to the posterior margin of the carapace at a short distance from it. The five-rayed star of grooves, which occurs in *D. sulcata* anteriorly, is absent in *D. brevitarsis*. The lateral margin is ciliate, and presents a slight emargination immediately behind the external orbital angle, as in *D. sulcata*; about its middle, however, the margin is a little curved inward, so that its course is rather sinuous, and it terminates above the base of the last pair of legs. The lateral margin is bordered, on the upper surface of the carapace, by a groove which corresponds to the groove (a) of *D. sulcata*, described above; another groove, proceeding on the epibranchial region, issues into the lateral groove at about the middle of its length. On each side of the upper surface another transverse groove is found a little behind and parallel to the upper orbital margin, proceeding from the internal angles of the orbits towards the anterior portion of the lateral margin; this groove, into which a small and short groove issues about the middle of its posterior margin, is separated from the upper margin of the orbits by an ovoid prominence. Furthermore, those portions of the upper surface which lie between the broad median furrow and the grooves (a) of the lateral margins are somewhat unequal. The elevated portions of the upper surface, by which the grooves are

separated from one another, are covered with minute tubercles or granules.

As regards the inflected regions of the carapace, *D. brevitarsis* much resembles *D. sulcata*, the pterygostomian and subhepatic regions being sulcate, whereas the posterior or subbranchial portions of the under surface are not grooved, but covered with short cilia; the grooves of the pterygostomian and subhepatic regions are, however, in *D. brevitarsis* a little more numerous and narrower. Furthermore, on the posterior portion of the under surface a row of cilia occurs, proceeding from the anterior part of the lateral margin of the upper surface to the base of the fourth pair of legs.

The outer foot-jaws (fig. 3) also closely resemble those of *D. sulcata*; the merus-joint is larger than the ischium-joint, which is quite smooth; both joints are separated by an almost transverse suture. The merus-joint presents four longitudinal narrow grooves, arranged in such a manner that the elevated parts, which separate the grooves from one another, constitute a W-like figure, the opening of which is directed forward. As on the upper surface of the cephalothorax, the elevated ridges on the merus-joint of the maxillipedes and on the subhepatic and pterygostomian regions are covered with small granules. The sternum is smooth, and does not present the ovoid membranaceous plates which are characteristic of *D. fenestrata*. The abdomen of the male, however, has a characteristic form and differs much from that of *D. sulcata*. The terminal or first joint is triangular, being as long as broad at the base and rounded at the tip; the second is as long as the terminal joint, scarcely broader than long, and with somewhat arcuate lateral margins; the third joint is nearly as long as the second and about as broad as long, presenting a small contraction close to the posterior margin; the fourth joint is only half as long as the second, but is remarkably enlarged on each side and narrowed again posteriorly, thus forming a rounded lobe on each side; the fifth joint is a little shorter than the fourth and is also dilated on each side, though not so much as the fourth joint; the sixth somite is shorter than the fifth, scarcely enlarged, so that it is three times as broad on its anterior margin as it is long; the seventh or basal joint is a little longer than the sixth, and provided with a transverse elevated crest. The lateral margins of the abdomen are fringed with long hairs.

In the female the terminal joint is triangular as in the male, and rounded at the tip; but the other joints are all enlarged laterally, become gradually narrow towards their posterior margins, and gradually decrease in length.

The chelipedes, which are comparatively as long as those of *D. sulcata*, measuring about twice the length of the carapace, are nearly equal, both in the male and in the female. They are slender in *D. myctiroides*, but in *D. brevitarsis* are short and broader, in this respect resembling a little those of *D. sulcata*. The arms are short, smooth, and unarmed; the carpopodite is nearly cuboid, its upper (outer) surface is smooth, convex, and armed at the internal angle with a small acute tooth. The internal plain surface of the wrist is a little hairy. The hands (fig. 2) are short, being only twice as long as broad (the palm and the fingers taken together), whereas in *D. sulcata* they are about three times as long as broad.

The fingers are as long as or scarcely longer than the palm, whereas in *D. sulcata* the fingers are once and a half as long as the palm. In other respects the hands of this species much resemble those of some species of *Ocypoda*, e. g. those of young specimens of *O. ceratophthalma*. They are much compressed and are a little arcuate, so that the outer surface appears convex and the inner concave. The upper margin of the palm is cristate, minutely serrate and hairy, the outer surface smooth, covered with a few small hairs, and marked with a piliferous, longitudinal, elevated line, close to the under margin, to which it runs parallel, proceeding upon the immobile finger. The under margin of the palm itself is carinate, like the upper margin, and also minutely serrate. The compressed fingers are nearly close together, and their somewhat curved, pointed tips cross one another; the inner edges are minutely serrate or denticulate and piliferous. The upper margin is carinate and piliferous, the under margin also carinate and microscopically serrate, being a continuation of the under margin of the palm. The outer surface of the fingers is smooth and almost glabrous, but each is marked with a longitudinal, elevated, piliferous line on the middle of the outer surface, that of the index being the continuation of the elevated line which occurs on the inferior part of the outer surface of the palm. The inner surface of the palm is slightly hairy and also marked with a piliferous line on the under half, which proceeds upon the inner surface of the index, and the

inner surface of the mobile finger is equally marked with a longitudinal, elevated, piliferous line. On the under margin of the index a small tuft of longer hairs is situated close to the tip.

The ambulatory legs are very characteristic and differ much from those of *D. sulcata*. The legs of the first pair are a little longer than the chelipedes, those of the second and third pair are again a little longer than the ambulatory legs of the first pair, and those of the last pair are about as long as those of the first pair. The meropodites of all the legs are enlarged, so that, *e. g.*, those of the ambulatory legs of the second and third pair are little more than twice as long as broad, whereas in *D. sulcata* these joints are slender. The meropodites of all the ambulatory legs are provided with rather large "tympana," which occupy nearly the whole surface of the joints, those of the last pair being only a little smaller*. The meropodites of the legs of the first pair are armed at the distal end of the upper margin with two or three small acute teeth, those of the legs of the second and third pair present a row of small acute teeth along the distal half of the upper margin, which gradually increase in size towards the distal end; the meropodites of the last pair only present one or two small teeth at the distal end of the upper margin. The upper margins of the meropodites bear a few small hairs, but the under margins of the meropodites of the ambulatory legs of the first and second pair are densely clothed with many long hairs. The carpopodites and propodites of the ambulatory legs are very similar to those of *D. sulcata* as regards their relative length; these joints are slightly hairy, but the carpopodites of the legs of the first and second pair present a tuft of hairs on the upper surface close to the articulation with the propodites, and the propodites of these legs a similar tuft on the upper surface close to the articulation with the carpopodites.

The dactylopodites are very characteristic, for they are a

* According to Dr. Hilgendorf (Crustacea von Ost-Afrika in Baron v. d. Decken's Reise, p. 86) the meropodites of the last pair of legs of *D. sulcata* should present no "tympana;" in the two specimens of that species, however, which I have before me the meropodites of the last pair of legs are provided with very small ovoid "tympana," situated in the middle of the joints.

little shorter than the propodites; they are laterally compressed, elongate-triangular, sharply pointed, and fringed with hairs on the lateral margins. The cephalothorax of the largest specimen is nearly 10 millim. broad.

79. *DOTILLA INTERMEDIA*, n. sp. (Pl. IX. figs. 4-6.)

No fewer than thirty-two specimens, all males, were collected on the coast of Sullivan Island. This pretty small crustacean presents a much more striking resemblance to Forskål's *D. sulcata*, from the Red Sea, than *D. brevitarsis*, for the cephalothorax is grooved almost in the same manner, and the legs also much resemble those of that species. Nevertheless, it may be distinguished at first sight by the merus-joints of the outer maxillipeds being not longitudinally sulcate as in the typical *Dotillæ*, the internal half of these joints at least being quite smooth. Though these joints are still larger than the ischium-joints, they, however, present a remarkable transition towards the true *Scopimeræ*, in which the merus-joints of the external maxillipeds are as little sulcate as in *D. intermedia*.

The cephalothorax nearly resembles that of *D. sulcata*, being a little broader than long; as regards the form of the front and the manner in which the upper surface of the carapace is grooved, both species perfectly agree with one another, *D. intermedia* presenting also a five-rayed star of grooves anteriorly, the frontal groove reaching only to the gastric region. It nevertheless differs from *D. sulcata* in the presence of a transverse groove close and parallel to the posterior margin of the cephalothorax, which occurs also in *D. brevitarsis*. The gastric region bears five small tubercles, one on the mesogastric, one on each hypogastric, and two on the urogastric lobe. The elevated parts of the upper surface are minutely granular, as in the other species. As regards the inflected portions of the cephalothorax, *D. intermedia* agrees with *D. sulcata*, the pterygostomian and subhepatic regions being sulcate.

The merus-joint of the outer foot-jaws of *D. sulcata* is nearly twice as large as the ischium-joint, whereas in *D. intermedia* (Pl. IX. fig. 6) it is but little larger. The suture that separates these joints from one another is transverse. The ischium-joint is nearly quadrangular and smooth. The merus-joint is extremely characteristic, and has a more equilaterally triangular form, the

external and internal margins being arcuate. The outer surface does not present the W-like figure that characterizes this joint in *D. sulcata* and *D. brevitarsis*, but the internal half appears quite smooth, somewhat as in *Scopimera globosa*; a slight angular depression, however, is found on the surface of the merus-joint anteriorly, the corner of the angle being the anterior tip of the joint and the opening being directed backward; moreover a piliferous elevated and curved line proceeds from the external angle of the posterior margin of the joint into the angular depression, which I have described. The sternum is smooth, without "tympana." The abdomen of the male perfectly resembles that of *D. sulcata*, the anterior margin of the fourth joint being emarginate in the middle and also piliferous; the second (penultimate) joint is a little more than twice as broad as long and shorter than the rounded terminal joint, the base of which is a little broader than long.

With respect to the chelipedes and the ambulatory legs, *D. intermedia* nearly agrees with *D. sulcata*; but the following differences may be observed. The fingers of the chelæ in *D. intermedia* (fig. 5) are comparatively a little longer than those of *D. sulcata* (fig. 6), being about $2\frac{1}{2}$ –3 times as long as the palm, in *D. sulcata* only $1\frac{1}{2}$ times. The fingers therefore are very slender and gradually taper into an acute point; they are minutely denticulate at the base, somewhat as in Forskål's species. The ambulatory legs fully resemble those of *D. sulcata*. The meropodites are all provided with "tympana," and those of the last pair have the tympana almost half as long as the joint. The propodites are more distinctly longitudinally grooved on their outer surface than those of *D. sulcata*: the dactylopodites also resemble those of that species; those of the last pair of legs, however, are comparatively a little longer, measuring nearly twice the length of the propodites. The legs are somewhat hairy.

This *Dotilla* is much smaller than the other species, the cephalothorax being only 4– $4\frac{1}{2}$ millim. broad.

DIOXIPPE*, nov. gen.

Cleistostoma, de Haan, partim.

The genus *Cleistostoma* was founded by de Haan upon two Japanese species—*C. dilatata* and *C. pusilla*. An examination of a large number of specimens of the latter species which I found in a small collection of Japanese Crustacea, kindly presented to me by Dr. Anderson, now makes it very probable that the two species of *Cleistostoma* described in the 'Fauna Japonica' are not so closely allied to one another as de Haan supposed, and that they are even generically distinct. De Haan had only young male specimens of *C. pusilla* at his disposal, whereas my specimens are of a larger size, and there are both males and females among them; so that I have been enabled to observe some characters that were overlooked by de Haan. I find that the merus-joint of the external maxillipeds of *C. pusilla* has not the same quadrate form of the ischium-joint, but that the outer foot-jaws of this species resemble much more those of some *Dotillæ*. The external maxillipeds of *Cleistostoma dilatata*, figured by de Haan, on the contrary, have a different form, their merus-joint being as quadrate as the ischium-joint. Moreover, the meropodites of the ambulatory legs of *C. pusilla* present traces of the remarkable "tympana" which are so characteristic of the true *Dotillæ* and *Scopimeræ*; though small, they are quite distinct on the outer surface of the meropodites of the last pair of legs in the male. These "tympana" were overlooked by de Haan, who had only small specimens at his disposal, as I have already observed. Furthermore, the whole outer appearance of *Cleistostoma dilatata* is quite different from that of *C. pusilla*, the lateral margins of the cephalothorax of the former species presenting none of the small emargination immediately behind the external orbital angles which characterizes *C. pusilla*, and is also observed in many species of *Dotilla*, and the front is much broader in *C. dilatata* than in the other species.

The Mergui collection contains an interesting new species, which agrees in many essential characters with *Cleistostoma pusilla*, though specifically distinct. I propose, therefore, for these two species the new genus *Dioxippe*, which may be distinguished from the genera *Dotilla* and *Scopimera* chiefly by

* *Dioxippe*, one of the Heliads.

the shape of the cephalothorax, which is not globose, but rather depressed and distinctly broader than long. In other respects *Dioxippe* appears most closely allied to *Dotilla* and *Scopimera*, especially to the former. The external maxillipeds much resemble those of *Dotilla*, differing from those of *Scopimera*. They meet along their inner margins; the quadrangular ischium-joint is a little broader than long, and presents on its smooth outer surface a transverse arcuate piliferous line proceeding from the middle of the external margin towards the internal half of the anterior margin. The commissure between this joint and the merus-joint is transverse. The merus-joint is a little longer than the ischium-joint, and has the same form as in the genus *Dotilla*; but it presents only a single longitudinal groove quite near the external margin, without any trace of the grooves that characterize most species of *Dotilla*. The anterior margin is very narrow and slightly concave, and bears the palpus near the external angle. The cephalothorax does not present the singular grooves of the genus *Dotilla*. The front is narrow, the orbits more or less oblique and elongate; their inferior margin is very prominent, its external angle even constituting a prominent obtuse triangular lobe in *Dioxippe orientalis*. The meropodites of the ambulatory legs present more or less distinct traces of the singular "tympana" which are so much developed in *Dotilla*, and still more in *Scopimera*.

I thus retain the genus *Cleistostoma* for de Haan's *Cleistostoma dilatata*.

As regards *C. tridentata*, A. Milne-Edw., from Upolu, I do not venture to decide whether this species ought to be referred to *Cleistostoma* as restricted by me or not.

80. DIOXIPPE ORIENTALIS, n. sp. (Pl. IX. figs. 8-10.)

Seventeen specimens were collected in the Mergui Archipelago; all are males, except one single ova-bearing female.

Dioxippe orientalis is probably somewhat allied to *Scopimera inflata*, A. M.-Edw., from the Indian seas ('Journal des Muséum Goddefroy,' Heft iv. 1873, p. 7); but this form is certainly different, because the anterior legs are described as being minutely granular, and the absence of the "tympana" is not mentioned by the learned author. Our *Dioxippe* is of small size, like the species of *Dotilla* and *Scopimera*, and resembles to a certain extent some of the species of *Helæcius*, e. g. *H. inornatus*, Dana.

As in *Dotilla*, the cephalothorax is more enlarged above the bases of the legs than at its upper surface; and it is rather thick, though not globose. The upper surface is broader than long, the proportion of the greatest width, which is found a little behind the middle, being to the length (the front included) as 7 : 5. The upper surface is rather flattened, being only slightly declivous towards the front, towards the postero-lateral angles and behind a straight elevated transverse line which proceeds at a short distance from, and parallel to, the posterior margin between the bases of the last pair of legs. The posterior margin is slightly concave in the middle, and its lateral angles are rounded.

The upper surface is smooth and almost glabrous, presenting only a few scattered short cilia on the postero-lateral regions; the remarkable grooves of the genus *Dotilla* are quite wanting. Besides the broad, though shallow, longitudinal median furrow of the front, some interregional grooves are faintly indicated. Thus an impressed transverse line, interrupted in the middle, lies quite on the middle of the cephalothorax, and this I regard as the ordinary transverse groove which separates the gastric from the cardiac region; behind this groove a second is sometimes observed, situated as far from the transverse line above described as the latter is distant from the posterior margin of the cephalothorax. This second impressed line is apparently that which separates the anterior cardiac region from the posterior. The branchiocardiac grooves are shallow and very faintly marked. Though the upper surface is smooth and flattened, it appears, however, somewhat uneven on the branchial regions, owing to the occurrence of four or five small prominences, the posterior of which is a little more distinct than the others, and assumes the character of a small short transverse tubercle lying close to the base of the legs of the last pair, near the postero-lateral angles of the upper surface. Two slight transverse prominences are also observed on the anterior cardiac region.

The front is a little broader than in the species of the genus *Dotilla*, measuring between the eye-peduncles about a fourth of the distance between the external angles of the orbits. The anterior margin is slightly triangular, being a little prominent and subacute in the middle, whereas the lateral angles are rounded. The front is rather much declivous, and presents a broad, though shallow, longitudinal median furrow. The orbits

are transverse and a little oblique; and the eye-peduncles, which are somewhat thickened at the cornea, are as long as the orbits. The upper margin of the orbits, which is finely ciliated, is smooth, entire, and a little raised upward, and the external angle is obtuse and not prominent. The lateral margins of the upper surface are slightly divergent posteriorly, and terminate nearly between the bases of the fourth and fifth pair of legs, being somewhat deflexed downward; their anterior half appears rather concave and their posterior slightly convex; so that the greatest width of the upper surface is found behind the middle. The lateral margins are slightly raised upwards along their anterior half, and present a small emargination immediately behind the obtuse external orbital angle, without forming, however, an epi-branchial tooth. The lateral margins are shortly ciliated. The external antennæ are short, scarcely reaching to the cornea of the eye-peduncles. The inferior margin of the orbits is smooth and entire, and terminates laterally in a triangular, obtuse, thickened, much prominent lobe, which constitutes the external angle of the infraorbital margin. In those species of the genus *Dotilla* that I have examined, such as de Haan's *Scopimera globosa*, this lobe is quite absent, the external angle of the infraorbital margin being not at all prominent; and this different structure of the orbits changes so much the general outer physiognomy of this species, that I was induced by it to regard this form as the representative of a new genus. The short ciliated external margin of the orbits, which unites the external angles of the supraorbital and infraorbital margins, presents a triangular hiatus close to the external angle of the supraorbital margin. The pterygostomial regions and the other inflected sides of the cephalothorax are smooth, not sulcate, and rather thinly covered with short hairs; as in the genera *Gelasimus* and *Helæcius*, a ciliated line is found on the lateral surface of the cephalothorax, proceeding from the middle of the lateral margins towards the bases of the legs of the penultimate pair. The smooth, short, and narrow epistome is slightly more prominent than the front. The anterior margin of the buccal cavity presents a triangular equilateral prominence in the middle as in *Dotilla*, and a small narrow incision at each lateral angle.

The external maxillipeds closely resemble those of the genus *Dotilla*; but their merus-joints are quite smooth and ungrooved. They meet along their inner margins, which are a little hairy. The ischium-joint is quadrangular, scarcely broader than long;

its outer surface is smooth, and presents an arcuate piliferous line, proceeding from the middle of the external margin towards the internal half of the anterior margin. The latter, which forms the commissure between the merus-joint and the ischium-joint, is transverse (not oblique, as in *Scopimera globosa* and *S. tuberculata*) and straight, though a little concave towards the internal angle, which projects slightly more forward than the acute external angle. The internal and external margins of the ischium-joint are also slightly concave. The merus-joint is a little longer than the ischium-joint, and presents the same form as in the genus *Dotilla* (*sensu stricto*). The external and internal margins are arcuate, convex, and convergent anteriorly, so that the anterior margin of the joint is very short; this anterior margin is slightly concave, and bears the palpus near the external angle. Except a narrow, shallow, longitudinal impression which proceeds close and parallel to the external margin, the outer surface of this joint appears quite smooth, and without any trace of the grooves that characterize the species of *Dotilla*.

The male abdomen is narrow, and is similar to that of some other species of this group, the fifth (or antepenultimate) joint being much constricted near its base. The very short first segment occupies a little more than half the width of the sternum between the bases of the last pair of legs; the second segment is a little less broad, but slightly longer; the third segment is the broadest of all, being a little broader than the first, slightly longer than the first two joints taken together, and its lateral margins are arcuate; the fourth is as long as the third, but a little less enlarged; the fifth joint is about once and a third longer than the fourth, and a little narrower, and presents a characteristic constriction near the base; the sixth or penultimate joint is a little longer and broader than the fifth, and almost quadrate; while the terminal joint is as long as the fifth, and rounded at the tip. The lateral margins of the abdomen are fringed with short hairs; its outer surface, like that of the sternum, is quite smooth and glabrous. The female abdomen presents the ordinary form.

The anterior legs of the male are equal or sometimes rather unequal. They are similar to those of *Helæcius*; but the fingers have acute tips. The chelipedes are large and long, measuring about three times the greatest width of the cephalothorax. The basipodites and ischiopodites are smooth and unarmed.

The arms project slightly beyond the upper surface of the cephalothorax, and are trihedrous; their three margins are minutely granular; the inner surface and the anterior surface are smooth, but the outer presents a few scattered granules. The internal surface is slightly concave, the other two are flattened and even. As in *Dotilla myctiroides*, the carpopodite is elongate, being about as long as the length of the cephalothorax; its upper surface has an elongate-rhomboidal form. The carpopodite has wholly smooth upper, inner, and under surfaces, which are separated from one another by minutely granulated margins; it is armed at its internal proximal angle with a strongly compressed, though rather obtuse, tooth. *Scopimera inflata* is also described as being armed with a spine on the carpopodite of its anterior legs. Immediately behind this compressed tooth a small tuft of short hairs is observed, and the slightly convex upper surface of the wrist presents a small impression at the internal proximal angle close to this tooth. The hands (fig. 10) are similar to those of *Helæcius*. They are about once and a half as long as the distance of the external orbital angles, and nearly three times as long as the greatest width (height) of the palm, the fingers being included. The fingers are shorter than the palm; for they are in proportion to the length of the latter as $3\frac{1}{2} : 5\frac{1}{2}$. The slightly convex outer surface of the palm is quite smooth and glabrous; it is marked, however, with a longitudinal minutely granulated line running close and parallel to the flattened under margin, upon the outer surface of the immobile finger, close to its tip. The under margin of the palm is bordered and separated from the smooth, or nearly smooth, convex inner surface by a second longitudinal, minutely granulated line, which is continued along the inferior margin of the immobile finger. These two minutely granulated lines are nearly parallel. The fingers are quite smooth on their outer and inner surfaces. The mobile finger, however, presents a minutely granulated line along its upper margin, and, as I have already remarked, the outer surface of the immobile finger is marked with a similar line proceeding upon it from the outer surface of the palm; and its inner surface presents also a minutely granulated line continued to the tip. The lower finger is nearly in a straight line with the under margin of the palm, being scarcely or not at all deflexed. The sharp inner edges of the fingers are minutely crenulate along their whole

length; the inner edge of the mobile finger is, moreover, a little prominent along its proximal half, presenting a low longitudinal tooth, which is a little more coarsely crenulate at its base. The inner edge of the immobile finger does not present such a tooth or prominence, but a small incision quite at the base. The tips are acute, pointed, and slightly curved, crossing one another when closed.

The ambulatory legs are rather slender, and resemble those of the species of the genus *Helæcius*. Those of the third pair, the antepenultimate legs, are the longest; those of the last pair the shortest of all. The meropodites are strongly compressed and flattened on their upper and under surfaces, and do not present the remarkable "tympana" of *Dotilla* and *Scopimera*; in the latter the tympana constitute oval impressions which are bordered by a wall of the more elevated portion of the surface of the joint. A histological examination of the legs might nevertheless prove their existence also in our *Dioxippe*; for when studying the upper surface of these joints by means of a magnifying-glass I observed oval lines bordering the central flattened part. The meropodites have minutely granulated upper and under margins, but are for the rest unarmed. The other joints are smooth and unarmed; the propodites are also compressed. The dactylopodites are a little shorter than the propodites, are laterally compressed, and acute. The ambulatory legs are also nearly glabrous; the dactylopodites are, however, a little hairy along their margins, and the legs of the second and third pair present a dense hairy down at the articulation of their carpopodites with the propodites, along the upper margins and on the upper and the under surfaces of these joints.

Dimensions of the largest male specimen:—

	millim.
Length of the cephalothorax (without the epistome) ..	$4\frac{5}{6}$
Distance between the upper external orbital angles ..	$6\frac{1}{4}$
Greatest width of the upper surface of the carapace ..	$6\frac{5}{6}$
Length of the anterior legs.....	21
Length of the hands	$8\frac{3}{4}$
Height of the palm	$3\frac{1}{5}$

The greatest width of the upper surface of the cephalothorax of the ova-bearing female is scarcely 5 millim.

Genus METOPOGRAPSUS, *M.-Edw.*

81. METOPOGRAPSUS MESSOR, *Forsk.* (Pl. IX. fig. 11.)

Cancer messor, *Forsk l. Descript. Animal. etc.* p. 88.

Grapsus messor, *Milne-Edwards, Hist. Nat. Crust.* ii. p. 88.

Metopograpsus messor, *Milne-Edwards, Ann. Sci. Nat.* 3 série, t. xx. p. 165.

Grapsus (*Pachygrapsus*) *æthiopicus*, *Hilgendorf, Crustaceen von Ost-Afrika, in Baron v. d. Decken's Reisen*, p. 88, Taf. iv. fig. 2.

Metopograpsus messor, *Hilgendorf, Monatsber. d. K. preuss. Akad. d. Wiss. Berlin*, Nov. 1878, p. 808; *Miers, Crustacea of Rodriguez*, p. 5.

Two specimens were collected at Elphinstone Island.

We are indebted for a very good figure of this species to Dr. Hilgendorf, who erroneously described and figured *Metop. messor* as a new species, under the name of *Grapsus æthiopicus*. The two Mergui specimens fully agree with his figure. The proportion of the distance between the external orbital angles to the length of the carapace (the front included) is as 30:22 in the male of this species, the cephalothorax being more enlarged than in *M. maculatus* and *M. pictus*. The front is comparatively a little less enlarged than in *M. maculatus*, the proportion of the distance between the external orbital angles to the breadth of the front (measured between the eye-peduncles) being in *M. messor* as 30:19, but in *M. maculatus* as 30:20.

The anterior margin of the front is feebly sinuated in the middle, exactly as figured by Hilgendorf, *l. c.* fig. 2 b.

The form of the male abdomen also agrees with that figure, though the penultimate joint in the Mergui specimens appears a little longer in proportion to its breadth.

The hands are somewhat unequal; their outer surface is very convex and appears perfectly smooth, though a little minutely punctate (when seen under a magnifying-glass), except at the upper margin and near the articulation with the wrist. The upper margin of the palm is slightly tubercular and rugose; close to the articulation with the wrist and at the under margin a few oblique, scarcely elevated lines occur on the outer surface of the hand; a similar line, nearly parallel and close to the under margin, proceeds on the outer surface of the palm as far as the middle of the index. The outer surface of the fingers is perfectly smooth and minutely punctate, when seen under a magnifying-glass; and they have somewhat excavated horny tips.

The upper surface of the thumb, which in these specimens appears a little more arcuate than in the figure 2 *c* of Hilgendorf, is minutely tubercular, especially near the inner surface, nearly to the tip. The inner surface of the palm presents on its proximal half some rugose lines, which are parallel to the posterior margin, and the inner surface of the index is a little granular at the base.

Metopograpsus messor has been found in the Red Sea, throughout the whole Indian Ocean (Zanzibar, Persian Gulf, Nossy-Faly, coast of Malabar, Mauritius), in the Malayan Archipelago, and extending from Australia to the Fiji Islands, New Caledonia, and the Sandwich Islands.

82. *METOPOGRAPSUS MACULATUS*, *H. M.-Edw.* (Pl. X. figs. 1-3.)

Metopograpsus maculatus, *H. Milne-Edwards*, *Ann. Sci. Nat.* 3^e série, t. xx. p. 165.

Four specimens were collected in the Mergui Archipelago, one male and three females.

This species is still very imperfectly known, for so far as I am aware no other description has been published since its first diagnosis, given by the late H. Milne-Edwards. Prof. A. Milne-Edwards, to whom I had sent the male individual of this collection, informed me that it was *M. maculatus*, M.-Edw., as I had inferred. I will therefore point out some characters of this *Metopograpsus* and compare it with *M. messor*, Forskâl, and *M. pictus*, A. M.-Edw., the latter of which occurs in the seas of the Moluccas and on the shores of New Caledonia.

With respect to the general shape of the cephalothorax, *M. maculatus* appears quite intermediate between the two above mentioned species of this genus, as regards the proportion between the length and the breadth of the carapace. The cephalothorax of *M. maculatus* is somewhat less enlarged and somewhat more elongate than that of *M. messor*; in the male specimen from Mergui being even more slightly enlarged anteriorly than in the typical specimens from Java, described by the late H. Milne-Edwards. As Prof. A. Milne-Edwards informs me, the proportion of the distance between the external orbital angles to the length of the carapace is as 30 : 23 (in *M. messor* as 30 : 22). The carapace of *M. pictus* is much more elongate than that of *M. maculatus*.

As I have already observed, the front is a little more enlarged

in this species than in *M. messor*, and measures exactly two thirds of the distance between the external orbital angles, both in the male and in the female. Its anterior margin appears nearly straight, and is minutely denticulated along its whole breadth, the minute granules being, however, a little larger towards the angles. Like *M. messor*, the front is much declivous, but the postfrontal lobes are still less prominent, though resembling those of that species. On each side of the middle three lobes may be distinguished, but, as in *M. messor*, the two external ones of each side are scarcely separated from one another, often appearing rather confluent. They are a little granular, but never present the transverse rugose lines which occur on the postfrontal lobes and on the gastric region of *M. messor*. Except the postfrontal lobes, the whole upper surface of the carapace of *M. maculatus* appears everywhere smooth and bright, presenting nearly the same interregional grooves which occur in *M. messor* and *M. pictus*, and they are likewise minutely punctate, especially on the postero-lateral regions, when seen under a lens. In both species the postero-lateral regions are provided with many oblique, elevated lines near the lateral margin. The male abdomen presents a form distinct from that of *M. messor*. The terminal joint is comparatively much smaller, triangular, and nearly as long as broad at its base; the penultimate is nearly twice as broad as the breadth of the base of the terminal joint, has rounded antero-lateral angles, and is even a little broader than the fifth joint. The terminal and penultimate joints have the same length, whereas in *M. messor* the former is a little longer than the latter. In the latter species the abdomen has rather a triangular form, the sides converging towards the tip of the terminal segment; but in *M. maculatus* the sides of the abdomen, except the terminal segment, are nearly parallel to one another.

The chelipedes and ambulatory legs of this species present a remarkable resemblance to those of *M. pictus*, but differ from those of *M. messor* by several characters.

The chelipedes are somewhat unequal, both in the male and in the female. The arms much resemble those of the two other species. Their acute upper margin is transversely rugose; the anterior margin is armed with five or six small obtuse tubercles along its proximal half and is dilated anteriorly into a crest, which is armed with some acute teeth. The under margin of the

arm is also tuberculiferous, and armed at its distal end with a short acute spine (as in *M. messor*). The outer surface of the wrist is transversely rugose and covered with some small, more or less acute tubercles, also at the internal angle. The hands (Pl. X. fig. 2) are a little more elongate (less high) than those of *M. messor*, and differ at first sight by their outer surface being never smooth. The proximal half of the outer surface is covered with many short, oblique, elevated lines, which gradually change towards the fingers into minute granules. As in *M. messor*, an elevated line, nearly parallel to the rounded and rugose under margin of the hand, proceeds towards the base of the immobile finger. The rounded upper margin is covered with numerous small acute tubercles, and the convex inner surface of the hand is granular. The fingers have slightly excavated horny tips, and their somewhat punctate external surface is smooth, but slightly granular at the base; the thumb appears to be somewhat more slender than that of *M. messor*, and its upper surface also is covered with small acute tubercles, which, however, are more numerous and somewhat larger than in that species. The under surface of the index is also somewhat tubercular.

The ambulatory legs present a striking resemblance to those of *M. pictus*, figured in the 'Nouvelles Archives.' In *M. messor*, on the contrary, the penultimate joints (or propodites) are comparatively much less elongate.

M. latifrons, White, is probably identical with *M. maculatus*, and in that case has the priority.

Dimensions :—

	♂. millim.	♀. millim.
Distance between the external orbital angles.	29	27
Length of the carapace (the front included) .	$22\frac{1}{2}$	$21\frac{1}{2}$
Breadth of the front (measured between the eye-peduncles)	$19\frac{1}{2}$	$18\frac{1}{4}$
Length of the propodites of the third pair of ambulatory legs, measured in the middle of the joint	$13\frac{1}{2}$	13

Metopograpsus maculatus has hitherto been recorded from Batavia (*Milne-Edwards*); and specimens of this species in the Leyden Museum were collected on the coast of Java.

Genus GRAPSUS, *M.-Edw.*83. GRAPSUS STRIGOSUS, *Herbst.*

Cancer strigosus, *Herbst*, *Krabben und Krebse*, pl. xlvii. fig. 7.

Grapsus strigosus, *Milne-Edwards*, *Hist. Nat. Crust.* t. ii. p. 87, and *Ann. Sci. Nat.* t. xx. p. 169.

Grapsus strigosus, *Alph. Milne-Edwards*, *Nouv. Arch. du Muséum Hist. Nat.* 1873, t. ix. p. 286, with the quoted synonyms.

Six specimens (3 ♂, 3 ♀) were collected, namely, four in Elphinstone Island and two in French Bay, King Island.

Grapsus strigosus occurs in the Red Sea, the Indian Ocean (Mozambique, Ceylon, Nicobar Islands), the Malayan Archipelago (Sumatra, Celebes, Timor, Amboina), Australia, China (Hongkong), the Loo-choo Islands and New Caledonia. It is said to occur on the coast of Chili.

Genus PACHYGRAPSUS, *Stimps.*84. PACHYGRAPSUS MINUTUS, *Alph. M.-Edw.*

Pachygrapsus minutus, *Alph. Milne-Edwards*, *Nouv. Arch. du Muséum Hist. Nat.* 1873, t. ix. p. 292, pl. xiv. fig. 2; *de Man*, *Notes from the Leyden Museum*, vol. v. p. 158.

One male specimen was collected at Owen Island, completely agreeing with the first description and the figure.

The distance between the external orbital angles measures 10 millim.

As this small species has been observed also in the Banda sea and on the coast of New Caledonia, it would appear to be distributed throughout the whole Malayan Archipelago.

Genus PYXIDOGNATHUS, *Alph. M.-Edw.*

85. PYXIDOGNATHUS DEÏANIRA*, n. sp. (Pl. X. figs. 4-6.)

Prof. A. Milne-Edwards some years ago established the genus *Pyxidognathus* for a small crustacean, living in fresh or somewhat brackish water in the island of Ovalau (Bulletin de la Soc. Philom. de Paris, Dec. 1878). I described, three months afterwards, a remarkable species in the Leyden Museum, under the name of *Hypsilograpsus Deldeni*, n. g. et sp., which was found near Manado, in the island of Celebes (Notes from the Leyden Museum, vol. i. p. 72, 1879); and I subsequently recognized the form as being probably identical with Milne-Edwards's *Pyxidognathus granulatus* (Notes from the Leyden Museum, 1883, vol. v. p. 159).

* *Deïanira*, one of the Nereids.

The Mergui Collection, which presents so large a number of interesting species, contains three specimens, namely, a probably adult female and two much younger males, which were collected in mangrove-swamps. These specimens apparently belong to a species hitherto unknown, which I refer to the genus *Pyxidognathus* *.

This species presents the same remarkable and rare structure of the outer foot-jaws as the genera *Ptychognathus*, Stimps. (*Gnathograpsus*, A. M.-Edw.), and *Pyxidognathus*, M.-Edw., and, moreover, agrees in many other characters with the representative of the latter genus. *Pyxidognathus Deïanira* may, however, be distinguished at first sight from *Pyxidognathus granulosus* (and thus also from *Hypsilograpsus Deldeni*) by the upper surface of the cephalothorax being smooth and glabrous, and presenting no other interregional grooves than the median transverse portion of the cervical suture.

The cephalothorax is broader than long, the proportion of the breadth to the length being about as 4:3; *P. granulosus* also presents the same proportions. The cephalothorax is not extraordinarily thick. The carapace is nearly as broad anteriorly as posteriorly, and the lateral margins are scarcely arcuate; the upper surface is much convex anteriorly, declivous towards the lateral margins, and the front is strongly deflexed. The whole upper surface appears smooth to the naked eye; but when examined with a magnifying-glass, it shows everywhere minute punctations, a few larger being seen on the front and near the antero-lateral margins. It is only near the postero-lateral margins that the upper surface is slightly and minutely granular. The median part of the cervical suture and the branchio-cardiac grooves are very faintly indicated; all the other interregional grooves are completely wanting, and the upper surface appears smooth and convex.

The front is considerably deflexed; and is situated between the internal orbital angles, which are as prominent as the front; the distance between the angles measuring about a third of the breadth of the cephalothorax. The front is separated, on each

* *Celochirus crinipes*, Nauck, and *Pachystomum philippinense*, Nauck (1880), are identical, the former with *Ptychognathus pilipes*, A. M.-Edw., the latter with *Pseudograpsus albus*, Stimps. (de Man, in Zoolog. Jahrbücher, herausgeg. von Prof. J. W. Spengel, Jena, Bd. ii. p. 719, 1887).

side, from these triangular internal orbital angles by a small emargination, and is scarcely sinuated in the middle. Only a trace of the usual mesial frontal furrow is visible.

As already observed, the lateral margins are scarcely arcuate. The antero-lateral margins are a little shorter than the postero-lateral and armed with three acute teeth. The first tooth, or external orbital angle, is rather acute and prominent, and about as large as the two following teeth together; the second tooth, only half as large as the first, is acute and directed straight forward, and the third is the smallest of all and also acute. The antero-lateral teeth are separated from one another by rather deep, though narrow, incisions. The external margin of the last antero-lateral tooth is prolonged backward, as a minutely granulated line defining the postero-lateral margin.

The external antennæ are short, scarcely reaching to the external angles of the orbits; their peduncle occupies the internal canthus of the orbits. The first or basal joint scarcely reaches the internal orbital angle, the second is the longest of all, and the third is again a little shorter than the second. The internal suborbital lobe is small and little prominent. The inferior margin of the orbits is minutely crenulate and does not unite with the external orbital angle, so that the orbits are not completely closed externally, as in the genera *Metaplasx*, *Cyclograpsus*, &c. The pterygostomian regions and the inflected sides of the cephalothorax are covered with some small granules and are a little hairy. The epistome is short and enlarged; the minutely granulated anterior margin of the buccal cavity is broader anteriorly than posteriorly, and its lateral margins are arcuate, and being slightly emarginate on each side of the middle, it presents three rounded lobes. The external maxillipeds are a little gaping; the ischium-joint is scarcely twice as long as broad, its internal margin is slightly convex, its external slightly concave. The merus-joint is a little shorter than the ischium-joint and strongly auriculated, the external distal angle being much prolonged transversely outwards. The palpus is inserted on the anterior margin of the merus-joint, its distance from the obtuse internal angle being a little less than its distance from the rounded external angle; between the point where the palpus is inserted and the obtuse internal angle, the anterior margin of the joint is slightly emarginate. The exopodite (exognathe, A. M.-Edw.) is extremely enlarged, being much

broad in the middle than the ischium-joint, and it does not reach to the anterior margin of the merus-joint; it is broadest in the middle and considerably narrower at the anterior extremity. The outer surface of the joints of the external maxillipeds is punctate; both the merus- and ischium-joints are marked with a longitudinal ridge on their outer surface, running close and parallel to the internal margins. The outer surface of the exopodite is convex.

The abdomen of the male is rather narrow, and its lateral margins are nearly parallel, scarcely converging towards the terminal end. The two basal joints do not occupy the whole width of the sternum between the bases of the legs of the last pair. The third and fourth joints are nearly three times as long as broad, and have the same length; the fifth and the sixth are as broad as the two preceding joints, and are successively a little longer; the terminal joint is rounded at the tip and its posterior margin is nearly as broad as its length. The female abdomen is much broader than that of the male and fringed, along the lateral margins, with hairs; the lateral margins of the joints are slightly arcuate. The outer surfaces of the sternum and of the abdomen are slightly punctate.

The chelipedes of the largest specimen (♀) are somewhat unequal, the left leg being slightly the larger. The ischiopodites are armed with two or three minute acute tubercles on their anterior margin. The arms scarcely project beyond the lateral margins of the cephalothorax; their outer surfaces are somewhat transversely rugose, and the margins are covered with some more or less acute granules. The upper surface of the wrist is covered with some minute granules, a few larger ones being found near the internal margin; the internal angle of the wrist is armed with a small acute tooth, and one or two smaller teeth are found immediately below it. The larger hand is scarcely twice as long as high, and the fingers are nearly as long as the palm; the latter has a tolerably convex outer surface and the under margin is also convex. The outer surface, which appears smooth to the naked eye, is marked below with a rather coarsely granulated or minutely denticulated longitudinal line, proceeding close and parallel to the under margin of the palm, to the tip of the immobile finger. One or two minute acute tubercles or granules are found on the outer surface near the middle of the distal margin of the palm, *i. e.* a little below the

articulation of the mobile finger. The upper margin and the slightly convex inner surface of the palm also present some granules. The fingers are spoon-like, excavated at their horny tips, and are scarcely gaping; the mobile finger is nearly straight, and its surface is minutely punctate, but otherwise smooth and ungrooved. The outer surface of the index is also smooth, and both fingers are slightly denticulate, the inner edge of the mobile finger presenting four small teeth, that of the index three, which are a little larger. The smaller hand resembles the larger, but the fingers are comparatively a little longer.

The chelipedes of the two young male specimens are equal to one another, and present the same form and structure as those of the adult female.

The ambulatory legs of the second pair are the longest of all, being twice as long as the length of the carapace, those of the last pair are the shortest, and those of the first and third pairs have an intermediate length. The meropodites are scarcely enlarged, and their outer surfaces are minutely granular; their upper margins are minutely denticulate and armed at the distal end with a short acute spine, which is, however, probably wanting on the upper margins of the meropodites of the last pair. The under margins of the outer (upper) surface of the meropodites are armed with a strong acute spine a little before the distal ends; and the meropodites of the last three pairs, moreover, present two or three smaller spines between the large spine and the distal end of the under margins. The under margins of the internal or under surfaces of the meropodites of the last pair of ambulatory legs are armed with two or three acute spines at the proximal end; these spines are not found on the meropodites of the other ambulatory legs. The propodites, which are a little longer than the carpopodites, are armed with a short acute spine at the distal end of their under margins. The scarcely arcuate dactylopodites are hardly shorter than the propodites: they are depressed, unarmed, terminate in an acute horny tip, and are covered with four rows of minute bristles. The three terminal joints of the ambulatory legs are densely hairy along their upper and under margins.

Dimensions of the largest specimen (♀):—

	millim
Breadth of the cephalothorax (measured at the last	
antero-lateral teeth)	12½

	millim.
Length of the cephalothorax.....	9
Distance between the external orbital angles.....	$10\frac{1}{2}$
Distance between the internal orbital angles	$4\frac{2}{5}$
Length of the larger hand.....	$7\frac{3}{4}$

Genus METAPLAX, *M.-Edw.*(Syn.: *Rhaconotus*, *Gerstaecker*, 1856.)

The genus *Metaplastax* was established in 1852 by the late H. Milne-Edwards for two small Brachyura from the Indian Ocean. This celebrated carcinologist referred it to his section *Gonoplaciens*, and considered it as making a transition between the genera *Macrophthalmus*, *Gonoplax*, and *Helice*. Four years afterwards, Gerstaecker described an interesting new form of *Sesarmacea* under the name of *Rhaconotus crenulatus*. Surprised by the extraordinary length of the legs, he was unable to refer his new species to any one of the genera of *Sesarmacea* enumerated by Milne-Edwards, and not observing its close affinity to the genus *Metaplastax*, he founded a new genus *Rhaconotus*.

In 1858 Stimpson published a new species of *Metaplastax*, discovered at Hongkong.

In 1865, Heller, the author of the Report on the Crustacea collected during the Novara Expedition, described a young female specimen of Brachyura from Ceylon under the name of *Helice dentipes*.

The Mergui Archipelago contains not only representatives of one of the two species of *Metaplastax* described in 1852, but even two new species of this group, and moreover a fine series of specimens of the rare *Rhaconotus crenulatus* and of Heller's *Helice dentipes*.

A careful examination of these five species has led me to the conclusion that they are all closely allied to one another, and ought to be referred to the same genus, and that this genus is most closely allied to *Helice*, de Haan.

When comparing them with one another, and with the typical representative of *Helice*, the Japanese *Helice tridens*, de Haan, it is not difficult to observe that these species are all closely allied, or even agree with one another as regards the structure of the cephalothorax, that the very different appearance of *Rhaconotus crenulatus* and *Helice tridens* must be chiefly ascribed to the thicker cephalothorax of the latter and to the different

form of the chelipedes; and finally that a gradual transition is formed between them by the shape of the anterior legs of the four other species.

I may call attention to a short, horny, longitudinal crest, characteristic of the male, and found on the upper (=inner) surface of the arm of the chelipedes, lying parallel and close to, or even on, the anterior margin of it, which I propose to call the "musical crest." This crest is found in the genera *Metaplex* and *Helice*, and in some species of *Macrophthalmus* (e. g. in *M. tomentosus*, Eyd. & Soul.). I suppose that musical sounds are produced by the crab rubbing this crest along the row of lobules, teeth, or granules situated on the inferior margin of the orbits, which I shall name "the infraorbital ridge."

In all species of *Metaplex* and *Helice* the inferior margin of the orbits is provided with lobules or teeth; these lobules or teeth do not occupy the whole inferior margin of the orbits, but the ridge on which they stand leaves the margin at a small distance from the external angle. In the male this infraorbital ridge is prolonged backwards, parallel to the lateral margin of the cephalothorax, to some distance behind the orbits, so that we may distinguish an "orbital portion" of the infraorbital ridge from a "postorbital portion." In the female, however, at least of those species which I have been able to examine, the infraorbital ridge is never prolonged behind the orbits, and its teeth or lobules are always smaller than in the male.

The genus *Metaplex* belongs to the group of *Sesarmacea* in the close vicinity of *Helice*, and it presents the following characters:—

Cephalothorax broader than long, rather thin and little convex above. Lateral margins toothed. Front little deflexed, rather narrow, measuring about a third or a fourth of the breadth of the cephalothorax, with oblique lateral margins, and less prominent than the epistome. External maxillipeds widely gaping, with an oblique piliferous ridge; merus-joint as long as, or scarcely longer than broad, and about as large as the ischium-joint. As regards the structure of the orbits, of the pterygostomian regions, and of the inflected sides of the cephalothorax, also as regards the shape of the sternum and of the abdomen, the genus *Metaplex* perfectly agrees with *Helice*, de Haan, though the pterygostomian regions and the inflected sides of the carapace are generally less densely reticulate.

The chelipedes of the male are, in most species, more or less elongate, the palm being nearly always longer than broad. Arms of the anterior legs of the male with "musical crest." Ambulatory legs similar to those of *Helice*, those of the penultimate and antepenultimate pair being equal in length, and much longer than the legs of the second and fifth pair.

Though this genus is closely allied to *Helice* I am, however, inclined to retain it, including in the genus of de Haan (the type of which is *Helice tridens*) those species which have the cephalothorax rather thick and more or less convex above, and the chelipedes short, with the palm higher than long. The genus *Metaplax*, on the other hand, may contain those species with a thinner and more depressed cephalothorax, which have the anterior legs more or less elongate, and the palms of the hands longer than high.

The genus *Paragrapsus*, M.-Edw., of which I have been enabled to examine two species through the kindness of Prof. A. Milne-Edwards, is also closely allied to *Metaplax*, but differs by the front being much more prominent than the epistome.

The genus *Metaplax*, as now defined, includes seven species, all of which inhabit the Oriental seas; five are described in this Report, the other two being *Metap. indicus*, M.-Edw., and *Metap. longipes*, Stimps., from Hongkong.

The five species of this collection may be distinguished thus:—

Carpopodites and propodites of the ambula- tory legs	{	not spinulose along the upper or anterior mar- gins. Number of lobules or teeth of the in- fraorbital ridge in the male amounting to	{	25-30.	{	spinulose along the upper or anterior margins.....	<i>crenulatus.</i>
						Lobules of the orbital portion very large, 6 in number in the adult male, and rapidly decreas- ing in size	<i>dentipes.</i>
						Lobules of the orbital portion small, 10-12 in number, and slowly decreas- ing in size	<i>distinctus.</i>
						longer than broad	<i>elegans.</i>
						as long as broad	<i>intermedius.</i>

86. METAPLAX CRENULATUS, *Gerst.*

Rhaconotus crenulatus, *Gerstaecker*, *Carcinologische Beiträge*, *Archiv f. Naturgeschichte*, Jahrg. xxii. 1856, p. 142, Taf. v. fig. 5.

The collection contains a fine series of eleven specimens (8 ♂, 3 ♀) of this rare crustacean*.

The following may be added to Gerstaecker's description.

The granulated anterior margin of the buccal cavity is more prominent than the front, as in *Helice*, so that it is distinctly visible when the carapace is viewed from above. This margin presents a small emargination on each side close to the external angles, and the endostome is longitudinally ridged on each side. The widely-gaping outer foot-jaws are provided with an oblique piliferous ridge, and thus resemble *Helice* and *Paragrapsus*. The infraorbital ridge is continued backwards in the male nearly to the level of the middle of the second antero-lateral tooth; it is entire for a short distance, namely, from the inner angle to a little beyond the middle of the eye-peduncles, but thence appears finely crenulated to the posterior end; these granules, which gradually decrease in size backwards, are about 25 in number. In the female the ridge is not continued behind the orbits, and presents a row of about 25 minute, more or less truncated teeth along its whole length.

The male abdomen measures nearly a third of the breadth of the sternum; the first or terminal joint is triangular, nearly as long as broad at the base, and rounded; the second is much broader and longer, and almost quadrate, being scarcely broader than long; the three following joints gradually increase a little in breadth, decreasing in length; the sixth is extremely short and a little narrower than the fifth, and the seventh, or basal segment, is cristate, and occupies nearly the whole breadth of the sternum between the bases of the last pair of legs. The lateral margins of the abdomen are fringed with short hairs. The first or terminal segment of the female abdomen is partially pushed into the penultimate.

The chelipedes of both males and females are equal to one another; it is probable therefore that Gerstaecker's specimen, the right leg of which was much larger than the left, was an

* *M. crenulatus* was not represented in the extensive collection of the Leyden Museum until 1883.

abnormal individual. In the male the chelipedes gradually appear more elongate, according to the greater age of the individuals: *e. g.*, in a small specimen, the cephalothorax of which is only 20 millim. broad, the chelipedes, being 30 millim. long, are one and a half times as long as the breadth of the carapace; the chelipedes of this specimen only project for a short distance beyond the lateral margins of the cephalothorax, the arms scarcely reaching to the distal end of the first third of the meropodites of the third pair of legs. In the largest specimen, on the contrary, the chelipedes are nearly two and a half times as long as the breadth of the cephalothorax, and they are very elongate, the arms reaching nearly to the distal end of the meropodites of the third pair of legs. The arms are triquetrous in the male, presenting an upper, an anterior, and a posterior surface; they are somewhat thickened near the proximal extremity, and also, although not so much, at the distal end. The "musical crest" is situated near to the proximal extremity of the anterior margin of the upper surface of the arm, and on the margin itself, so that it lies exactly opposite to the infraorbital ridge, against which it is moved and rubbed by the animal. In the female there is no trace of the musical crest.

As already stated, the chelipedes are comparatively much shorter in young male specimens than in the adult. In a young individual, the cephalothorax of which is 20 millim. broad, the musical crest is placed on the middle of the anterior margin of the arm; so that at a still younger age it is probable that the crest is situated near the distal extremity of the arm (as in *Helice*), and that it gradually proceeds towards the proximal extremity, in consequence of the growth of that part of the arm lying between the crest and the distal extremity, the proximal part not increasing in length. In the same specimen the hands are less elongate than in the adult, and the fingers are a little longer than the palm, whereas the immobile finger is scarcely curved downward.

The female specimen, carrying eggs, is scarcely more than 20 millim. broad. Its chelipedes are equal, project but little beyond the lateral margins of the carapace, and are even smaller than those of the male specimen of equal size. The fingers are nearly once and a half as long as the palm.

Dimensions of the largest (male) specimen :—

	millim.
Length of the cephalothorax (distance from its posterior margin to the anterior margin of the buccal cavity)	28½
Breadth of the cephalothorax (distance between the second antero-lateral teeth)	37½
Breadth of the anterior margin of the front.....	8
Length of the chelipedes.....	90
Length of the hands (distance between the proximal extremity of the under margin of the palm and the tips of the fingers).....	42
Length of the upper margin of the palm	27
Length of the ambulatory legs of the penultimate pair	90

The habitat of this rare and interesting species was hitherto unknown.

87. *METAPLAX DISTINCTUS*, *H. M.-Edw.* (Pl. X. figs. 7-9.)

Metaplex distinctus, *H. Milne-Edwards, Observations sur la classification des Crustacés, Ann. Sci. Nat.* 1852, p. 162, pl. iv. fig. 27.

Two fine male specimens were collected at Sullivan Island. The collection of typical specimens of the Paris Museum, kindly sent to me by Prof. A. Milne-Edwards, included two small, little-known forms, viz. *Metaplex indicus* and *M. distinctus*; unfortunately the type specimen of the latter had lost its chelipedes, but this species is very well characterized by the structure of its infraorbital ridge.

M. distinctus and the three following species of the present report differ at first sight from *M. crenulatus* by their smaller size, their more enlarged cephalothoraces, not narrowed anteriorly, by their less elongate legs, and by the ambulatory ones being spinulose only along the upper margin of their meropodites.

For the general appearance of the cephalothorax, I refer to the figure in the 'Annales des Sciences Naturelles,' which is exact. The upper surface is sparsely punctate, and the lateral margins are armed with four teeth (the external orbital angles included); these teeth are formed by three incisions, the anterior of which is rather deep, whereas the posterior two are much smaller. The first two teeth have almost the same size, and are much larger than the posterior two, the last being

still smaller than the third. The lateral margins are fringed with short hairs, and the branchial regions of the upper surface are marked with three minutely granular lines, the anterior one of which is almost transverse, and terminates at the third antero-lateral tooth, whereas the other two proceed obliquely on the postero-lateral regions of the cephalothorax; the latter are slightly pubescent. The upper surface of the carapace is a little convex, and the front is declivous and longitudinally grooved in the middle. The anterior margin of the front, which presents a small triangular incision in the middle, the breadth of which measures somewhat more than a fourth of the distance between the external orbital angles, makes very obtuse angles with the lateral margins of the front.

The front is a little less prominent than the epistome, so that the latter is visible when the carapace is viewed from above.

The infraorbital ridge was described by Milne-Edwards as "finement crénelé;" but these words are only exact when *M. distinctus* is compared with *M. indicus*. In *M. indicus*, M.-Edw., the infraorbital ridge is prolonged backwards to the level of the *first* antero-lateral incision, and only presents nine or ten teeth or lobules of very unequal size. The first four or five teeth are very small, and slightly increase in size; they are followed by two large rounded lobules. Behind the latter, and separated from them by a larger interval, three smaller, rounded, postorbital tubercles occur, constituting the postorbital portion of the ridge, and gradually decrease in size backwards.

In *Metaplex distinctus*, on the contrary, the infraorbital ridge is continued backwards, behind the orbits, to the level of the second incision of the lateral margins of the carapace. In this species the ridge is composed of 25-30 small lobules, which successively, though slowly, decrease in size backwards. The first eight or ten lobules, which constitute the orbital portion of the ridge, are longer than broad, the following as long as broad, and the posterior fourteen or fifteen much smaller postorbital lobules are even a little broader than long. These small lobules are distinctly transversely sulcate on their upper margin.

As in all species of *Metaplex*, the outer foot-jaws are widely gaping and provided with an oblique piliferous ridge; the merus-joint is nearly quadrate, being about as long as broad,

and has been very well figured by Milne-Edwards. The anterior margin of the buccal cavity is nearly straight, and does not present the deep lateral emarginations which occur in *M. crenulatus*. The pterygostomian regions are a little granular, and much resemble those of the latter species.

In the size and the form of the male abdomen this species agrees very well with the rare Crustacean described by Gerstaecker. All the joints are distinctly separated from one another, none of them being coalescent. The first (or terminal) joint is nearly quadrate and rounded anteriorly. The second is almost as long as the first, but much broader, the breadth of its posterior margin being in proportion to the length of the joint as $3\frac{1}{4}:2$. The third joint is scarcely shorter than the second.

The anterior legs are almost equal to one another, and about twice as long as the breadth of the carapace. The arms project the distal half of their length beyond the lateral margins of the cephalothorax, and reach therefore to the middle of the meropodites of the legs of the third and fourth pairs. They are triquetrous, as in the preceding species, the anterior and the posterior surfaces being concave. The upper surface is a little curved, the minutely granular external or distal half making a very obtuse angle with the smooth internal or proximal portion. The latter part bears the musical crest, which is close to the anterior margin; and behind the crest is a longitudinal row of short hairs. The anterior margin of the upper surface of the arms is a little granular, five or six somewhat larger acute granules being found near the distal end. Some small acute granules are also seen along the middle of the posterior margin. The internal angle of the wrist is marked with some small acute granules.

The hands much resemble those of some species of *Macrophthalmus*, the palm being longer than broad, and the fingers deflexed downwards. They are nearly as long as the distance between the external orbital angles. The palm is a little more than once and a half as long as it is broad (high) at its distal end, the proportion of the length of the palm to its breadth at the articulation of the mobile finger being as $10\frac{1}{2}$ to $6\frac{1}{4}$. The fingers are half as long as the palm; the immobile finger is slightly deflexed, but the mobile is strongly curved downward.

The hands appear quite smooth to the naked eye, except at and near the upper margin of the palm and of the mobile finger, where they are minutely granular; when examined, however, under a lens, they seem to be covered everywhere with minute granules. The fingers have horny tips, which are slightly spoon-like excavated; the mobile finger is armed with many small teeth, the basal ones of which are somewhat larger than the others. The immobile finger, which is higher at its proximal than at the distal half on account of a prominent rounded lobe along the former, is armed with many small teeth, of which the basal ones are rather obtuse, those of the distal half being more acute.

The ambulatory legs much resemble those of *Metaplex crenulatus*, but they are less elongate and less spinulose. The legs of the second pair (=the first pair of ambulatory legs) and those of the fifth are nearly of equal length, and much shorter than the legs of the third and fourth pair, which are also equal in length. The meropodites of the legs of the second and of the fifth pair are armed with a single small spine at the distal end of the upper margin, but those of the third and of the fourth pair have a row of five or six acute spines along the distal half of the upper margin. The under margins of the meropodites present no spines, and the other joints of the legs are quite unarmed. The inferior margins of the distal ends of the meropodites of the legs of the third and fourth pair are hairy, and the carpopodites and the propodites of the same legs are also very hirsute, especially at and near their articulations.

Dimensions :—

	millim.
Breadth of the cephalothorax (distance between the second antero-lateral teeth)	16 $\frac{1}{2}$
Length of the cephalothorax	11 $\frac{1}{2}$
„ „ chelipedes	30
„ „ hand (the fingers included)	16
„ „ under margin of the palm	10 $\frac{1}{2}$
„ „ legs of the penultimate pair	33

Metaplex distinctus has hitherto been recorded only from Bombay. It is one of the rare species of Brachyurous Crustacea.

88. METAPLAX DENTIPES, *Heller*. (Pl. XI. figs. 1-3.)

Helice dentipes, *Heller*, *Crustaceen der Novara-Reise*, p. 62, Taf. v. fig. 5.

Helice dentipes, *Kingsley*, *Carcinological Notes*, no. iv. *Synopsis of the Grapsidæ*, *Proc. Acad. Nat. Sci. Philadelphia*, 1880, p. 220.

This species is represented by a fine series of thirteen specimens of various sizes, viz.: one adult male specimen, found at Tavoy, two young individuals from the Rangoon river, two younger individuals from a mangrove-swamp at Zediwon, and eight other specimens from the same locality.

This species has hitherto been very unsatisfactorily known, as only a young female specimen was described by Heller; the interesting characters of the male were unknown. The Mergui specimens, however, undoubtedly belong to Heller's *Helice dentipes*, which may be easily distinguished from the allied species by the less enlarged cephalothorax, by the structure of the infra-orbital ridge, and by some other characters.

This species is closely allied to *Metaplex distinctus*, M.-Edw., the upper surface of the cephalothorax in both species being almost similar, but the cephalothorax of *M. dentipes* is not so enlarged as in *M. distinctus*, the breadth to the length in the former being as 19 : 14, and in the latter as 19 : 13. The lateral margins present three incisions, so that four teeth are formed; the first incision is much deeper than the others. The first tooth or external angle of the orbits is a little shorter than the second, whereas in *M. distinctus* the second is a little shorter than the first. In both species the front is scarcely shorter than the epistome; the median part of the latter, however, is still visible when the carapace is viewed from above. In the form and the size of the front, and in the structure of the upper surface of the cephalothorax, both species are identical.

The infraorbital ridge is characteristic of this species, but it differs in the male and in the female. In the male it is continued backwards nearly to, or a little beyond, a point opposite the second lateral incision, and is composed of 25 lobules, of which only six constitute the orbital portion, the remainder being post-orbital. In younger specimens, the lobules which constitute the orbital portion are more numerous. These structures are comparatively much larger in this species than in *M. distinctus*, and decrease less gradually but more rapidly in size and length. Each lobule presents at its posterior end a much smaller accessory

one, which is united with the chief portion at its base, so that each lobule is transversely sulcate near its posterior end. A similar structure is also found in *M. distinctus*, but in this species the lobules of the orbital portion, 12 or 13 in number, are much smaller, and decrease more gradually in size. The lobules of the postorbital portion decrease more regularly in size, and are rather granuliform. In the female the infraorbital ridge is not prolonged behind the orbits, so that a postorbital portion is wanting; the ridge is composed of 18-20 minute truncate teeth, the first ten or twelve of which are nearly equal, and the posterior ones only decrease slightly in size.

This species, in the pterygostomian regions of its cephalothorax, and in the form and size of the male abdomen and of the outer foot-jaws, agrees with *M. distinctus*. The anterior margin of the buccal cavity also presents the same structure and form in both species.

The chelipedes of the male differ from those of *M. distinctus*. In the adult specimen the left chelipede is much larger than the right, but in the younger specimens (the cephalothorax of which is less than 20 millim. broad) they are equal to one another. The arms do not project so far beyond the lateral margins of the cephalothorax as in *M. distinctus*; when comparing specimens of both species with one another (the cephalothorax of which is 17 millim. broad), the arms scarcely project beyond the lateral margins of the carapace in *M. dentipes*, whereas in *M. distinctus* they reach a little beyond even the middle of the meropodites of the third and fourth legs. In the adult specimen, however, the arms project nearly as far laterally as do those of the smaller *M. distinctus*. The arms have nearly the same form and structure in both species, the upper surface being slightly enlarged towards the distal extremity; the "musical crest" lies on the middle third of the anterior margin, which is minutely denticulated at its distal half, like the posterior margin. In younger individuals the musical crest is found near the distal extremity, as in *Helice tridens*, de Haan.

The wrist is somewhat granular above, especially on its posterior and anterior margins. The larger hand of the adult male is about twice and a half as long as it is broad at the base of the fingers. Though closely resembling *M. distinctus*, the palm is, however, a little less elongate, its length being in proportion to its breadth (height) at the base of the fingers as

13 : 9 $\frac{1}{3}$, whilst in *M. distinctus* it is 13 : 8. In both species the mobile finger does not present the prominent lobe on its inner margin which characterizes *M. elegans* and *M. intermedius*. The fingers are less gaping at their bases than those of *M. distinctus*, and the prominent lobe along the proximal half of the inner margin of the index is less prominent in this species. The inner surface and the upper and under margins of the palm are minutely granular, as also the upper margin of the mobile finger. The smaller hand resembles the larger, but the index presents no prominent lobe, so that the minutely denticulate inner margins of the fingers fit perfectly close together. In younger male specimens the hands are equal and much smaller, and the fingers perfectly close together, leaving no gap between them.

In young female specimens, the cephalothorax of which is 13 or 14 millim. broad, the chelipedes are equal and very small (see Heller, *l. c.*), and their fingers are as long as, or even slightly longer than, the palm. I am unable to describe the chelipedes of the adult female, the collection containing no adult female specimens.

The ambulatory legs of *M. dentipes* wholly agree with those of *M. distinctus*, not only in their length and the relative length of the joints, but also in the armature of their meropodites, which have already been fully described by Heller.

This species therefore differs from *M. distinctus* by its larger size, by its less enlarged and more quadrate carapace, by the structure of its infraorbital ridges, and by the form of its chelipedes.

The largest male specimen is 25 $\frac{1}{4}$ millim. broad, and 18 $\frac{3}{4}$ millim. long, and the ambulatory legs of the penultimate pair measure 55 millim.

Metaplastax dentipes was discovered by Heller at Ceylon.

89. METAPLASTAX ELEGANS, n. sp. (Pl. XI. figs. 4-6.)

The collection contains the large number of twenty-nine specimens, fifteen of which were found at Mergui.

As this new species is closely allied to *M. distinctus*, M.-Edw., only its distinctive characters need be recorded.

Metaplastax elegans scarcely attains the size of *M. distinctus*, the largest specimen in the collection being a little smaller than the two specimens of the latter species described above. As regards the shape of the cephalothorax, both species closely

resemble each other, and have on the lateral margins three or four incisions, which cause them to appear four- or five-toothed. In *M. distinctus* the first two antero-lateral teeth are almost equal to one another, the first tooth (the external orbital angle) being scarcely larger than the second; in *M. elegans*, however, the second tooth is distinctly larger than the first. In both species the front is less prominent than the anterior margin of the buccal cavity; but the median lobe of the anterior margin of the buccal cavity is more prominent in *M. elegans*.

The infraorbital ridge is very finely crenulate in the male, even more delicately than in *M. distinctus*, and, as in that species, the ridge is continued backwards nearly opposite to the second antero-lateral incision. In *M. distinctus* the ridge is composed of 25-30 small lobules, of which the first eight or ten, constituting the orbital portion, are longer than broad, and transversely sulcate above. In *M. elegans*, on the contrary, the ridge consists in the male of 50-60 minute rounded teeth or granules, which gradually and regularly decrease in size backwards; in the female, the ridge, as usual, is not prolonged backwards behind the orbits, and consists of 35 teeth, which are similar to those of the male.

As regards the pterygostomian regions and the shape and structure of the outer foot-jaws, both species completely agree with one another, but the abdomen of the male is a little different. In *M. elegans* the first (or terminal) joint is triangular, rounded, and shorter than broad at the base; the second joint is longer than the first, and broader than long, the proportion of the breadth of its posterior margin to its length being as $3\frac{2}{3} : 2$. The third joint is much shorter than the second.

The chelipedes of the male of *M. elegans* are nearly the same size as those of *M. distinctus*, and their arms project as far beyond the lateral margins of the carapace. The anterior legs are, however, more or less unequal, the right or the left being the larger; the arms are somewhat thickened in the middle, and again narrowed at the distal extremity, that part of the anterior margin of the upper surface which bears the musical crest projecting a little more forward than in *M. distinctus*. The hands of the adult male much resemble those of the latter species, the palm being longer than broad (high); but they are a little less slender, the proportion of the length of the palm (of the larger hand) to its breadth (height) at the distal end being

as $9:6\frac{1}{2}$ (in *M. distinctus* as $9:5\frac{1}{3}$). The outer and the inner surfaces of the hands are rather convex; the outer surface is quite smooth, but the inner is a little granular. The fingers also much resemble those of *M. distinctus*, but the strongly curved mobile finger is armed with a denticulate, prominent, triangular lobe nearly on the middle of its inner margin (as in some *Macrophthalmi*), which is not found in the other species. In younger individuals this lobe is less developed, and in still younger specimens it is quite absent. The mobile finger is granular along its upper margin.

As regards the form of the ambulatory legs, and more especially their relative length and the comparative length of their joints, both species completely resemble one another; but the meropodites of the legs of the last three pairs are armed in *M. elegans* with more spines along their upper margins, those of the last pair being also armed with eight or nine spines*.

Dimensions of the largest male specimen:—

	millim
Length of the cephalothorax	$9\frac{1}{4}$
Breadth of the cephalothorax (distance between the second antero-lateral teeth)	15

90. *METAPLAX INTERMEDIUS*, n. sp. (Pl. XI. figs. 7–9.)

Two male individuals of this new form were collected at Mergui, along with specimens of the preceding species.

In the shape and structure of its cephalothorax, this *Metaplex* perfectly resembles *M. elegans*, except as regards the infraorbital ridge and the abdomen of the male. In *M. intermedius* the lateral margins are four- or five-toothed, just as in *M. elegans*, the second tooth being somewhat larger than the first. The infraorbital ridge is prolonged backwards, almost opposite to the second lateral incision, and consists of 40–50 small teeth or granules, similar to those of *M. elegans*; but the first or innermost four or five are lobuliform, being longer than broad, resembling the infraorbital lobules of *M. distinctus*. These lobuliform teeth gradually pass into the others, which have the form of granules.

The male abdomen is also characteristic, being more enlarged than that of *M. elegans*; the first joint is triangular and rounded,

* I may remark that in the species of *Metaplex* in which the meropodites of the ambulatory legs are spinulose, the spines are often worn off by the animal, and therefore sometimes appear to be absent.

and much shorter than it is broad at the base; the second joint also nearly resembles that of *M. elegans*, being trapezoidal and a little longer than the first; the following joints, however, are all more enlarged than in the preceding species, so that, *e. g.*, the third joint is more than twice as broad at its posterior margin as it is long. The lateral margins of the abdomen and the anterior margins of the segments (except those of the first and the second) are fringed with longer hairs than in the two preceding forms.

The chelipedes of the male are somewhat similar to those of *M. elegans*, but the hands are shorter, and the palm is as long as broad (high); in all other species of the genus *Metapla* which are described in this report, the hands are more or less elongate, the palm being always longer than broad. The chelipedes are a little unequal, the right or the left being the larger one. In the larger specimen, the cephalothorax of which is 12 millim. broad, the arm of the larger chelipede reaches laterally nearly to the middle of the meropodites of the third and fourth legs. The arms are similar to those of *M. elegans*. The muscular crest lies on the middle of the anterior margin of the upper surface. The inner margin of the wrist is granular. The hands much resemble one another. The larger hand is scarcely twice as long as it is broad (or high) at the base of the fingers; the palm is as long as broad at the base of the fingers, being here $5\frac{3}{4}$ millim. broad, and having the same length; the fingers are scarcely shorter than the palm. The hands are rather compressed; the upper and the under margins of the palm are granular, like its inner surface, except near the articulation of the immobile finger, where it is smooth. The outer surface appears smooth to the naked eye, except near the under margin and near the articulation with the wrist, where it is minutely granular. The fingers resemble those of *M. elegans*; the prominent lobe, however, with which the inner margin of the mobile finger is armed, is not found in the middle of it, but nearer to the articulation, and the lobe presents a more quadrangular form, whereas the immobile finger appears comparatively higher at its proximal half.

The ambulatory legs generally resemble those of *M. elegans*. The meropodites, however, are only armed with one single spine near the distal end of their upper margin; the carpopodites and propodites are less slender, and the dactylopodites are compara-

tively longer than those of *M. elegans*, being scarcely shorter than the propodites. For example, the dactylopodites of the legs of the penultimate pair are in proportion to the propodites as $4\frac{1}{4} : 3\frac{3}{4}$, but in *M. elegans* as $4\frac{1}{4} : 3$.

Dimensions of the larger specimen :—

	millim.
Breadth of the cephalothorax (distance between the second antero-lateral teeth)	$11\frac{3}{4}$
Length of the cephalothorax	$7\frac{3}{4}$
Length of the larger hand (fingers included)	$11\frac{1}{4}$

Genus SESARMA, Say.

SECTION A.—*Sesarmæ* without an epibranchial tooth behind the external orbital angle, and in which the upper surface of the palm of the hands of the male presents no oblique, parallel, pectinated ridges.

91. SESARMA AUBRYI, A. M.-Edw.

Sesarma Aubryi, Alph. Milne-Edwards, *Nouv. Arch. du Muséum Hist. Nat.* 1869, t. v. *Bulletin*, p. 29, and 1873, t. ix. p. 307, pl. xvi. fig. 3.

Sesarma (Holometopus) *Aubryi*, Miers, *Proc. Zool. Soc.* 1877, p. 137; *de Man*, *Notes from the Leyden Museum*, vol. ii. p. 30.

Thirteen specimens (9 ♂, 4 ♀) were collected in the Mergui district, twelve of which were captured in fresh water at Sullivan Island.

Sesarma Aubryi has hitherto been found in the seas of New Caledonia, Duke-of-York Island, and at Amboina; it would thus appear to inhabit the seas of the whole Indo-Malayan Archipelago.

SECTION B.—*Sesarmæ* without an epibranchial tooth behind the external orbital angles, and in which the upper margin of the palm of the anterior legs of the male bears two or more oblique, parallel, minutely pectinated ridges.

So far as I am aware, six Oriental species have been described, presenting the characters of this section :—

Sesarma quadrata, Fabr., from the East Indies.

— *affinis*, de Haan, from Japan.

— *picta*, de Haan, also from Japan.

— *ungulata*, M.-Edw., from Celebes and the Philippines.

— *erythrodactyla*, Hess, from Sydney.

— *aspera*, Heller, from Ceylon, Madras, and the Nicobars.

After a careful examination of the typical specimens of these species, I am inclined to regard *S. unguolata*, M.-Edw., as identical with *S. affinis*, de Haan, and both identical with *S. quadrata*, Fabr. *S. picta*, de Haan, is a different form, and also *S. erythro-dactyla*, Hess. *S. aspera* is closely allied to *S. quadrata*, Fabr., and is probably a mere local variety of it.

I am able now to describe two new forms of this section, one of which is closely allied to Heller's *S. aspera*, whereas the other is a most interesting form, leading from the typical *Grapsidæ* to the *Sesarmæ*.

92. SESARMA ASPERA, Heller.

(Compared with the typical specimens of the 'Novara' Expedition.)

Sesarma aspera, Heller, *Crustaceen der Novara-Reise*, p. 63, Taf. vi. fig. 1.

Three young female specimens were collected in Elphinstone Island. Dr. C. Kœlbel, of Vienna, kindly enabled me to study two typical specimens of Heller's *S. aspera*, an adult male from the Nicobar Islands and a somewhat smaller female from Madras.

Dr. F. Meinert, of Copenhagen, kindly gave me an excellent photograph of *Cancer quadratus*, Fabricius (Suppl. Entom. Syst. p. 341), together with the exact dimensions of the typical specimen, which is preserved in the Zoological Museum of the University of Copenhagen. I have, moreover, studied the typical specimens of *S. unguolata*, M.-Edw., and of *S. erythro-dactyla*, Hess.

A careful examination has convinced me that *S. unguolata*, M.-Edw., and *S. quadrata*, Fabr., are identical with *S. affinis*, de Haan. *S. quadrata* of Milne-Edwards is quite another species. Prof. A. Milne-Edwards sent me a young female specimen of his *S. quadrata*; and although I am unable to describe the characters of the adult male, it is evident at first sight that the specimen in question differs from the true *S. quadrata*, Fabr., by its cephalothorax being almost exactly quadrate, whereas in *S. quadrata*, Fabr., the cephalothorax is distinctly broader than long.

Sesarma aspera, Heller, is most closely allied to *Sesarma quadrata*, Fabr. Its distinctive characters are merely the following:—

The cephalothorax is not so ^{wide} large as that of *S. quadrata*, Fabr.; in Heller's type specimens the proportion of the distance

between the external orbital angles to the length of the cephalothorax is as $20:16\frac{1}{2}$, in *S. quadrata*, Fabr., = *ungulata*, M.-Edw., = *affinis*, de Haan, as $20:15\frac{1}{2}$. In the proportion of the distance between the external orbital angles to the breadth of the front, *S. aspera* completely agrees with *S. quadrata*, Fabr. The penultimate joint of the male abdomen has a somewhat different form, being smaller than in *S. quadrata*, Fabr. The legs of both species almost completely agree with one another, the only differences observable being the following:—The oval transverse tubercles, which occur on the upper margin of the mobile finger of the male, number 16 or 17 in *S. aspera*, whereas in the typical specimen of *S. quadrata* there are only 11–13, of which the proximal 7–9 tubercles are more distinct than the others.

The species of this section seem to be comparatively rare, for few specimens exist in museums; but when a more extended series is available for comparison, I am disposed to believe that the differences I have indicated will be found to be individual. The Leyden Museum contains only a single male specimen from an unknown locality; this specimen has 12–13 tubercles on the mobile finger, and certainly belongs to the true *S. quadrata*, Fabr.; it was, however, referred by me to *S. affinis*, de Haan, when I worked out the Leyden collection. *Sesarma aspera* with 17 tubercles on the mobile finger, *S. quadrata* with 11–13, *S. unguata* with 8, and *S. affinis* with 7, are, I think, mere local or perhaps only individual varieties of one and the same species (*S. quadrata*, Fabr.).

Sesarma aspera, Heller, has been recorded from Ceylon, Madras, and the Nicobar Islands.

93. *SESARMA MELISSA* *, n. sp. (Pl. XII. figs. 5–7.)

One male specimen was collected in Kisseraing Island. This species agrees almost completely in all its characters with Heller's *Sesarma aspera*, and differs from it only by the different form of the prominences with which the upper margin of the mobile finger is armed, by its somewhat more slender ambulatory legs, and by the dactylopodites being comparatively a little shorter.

In the structure and dimensions of the cephalothorax, and in the form of the front and of the male abdomen, both species are alike.

* *Melissa*, the daughter of *Oceanus*.

The anterior legs are also nearly alike in both species, but the prominences of the upper margin of the mobile finger have a characteristic form distinctive in each. In the male of *S. aspera*, the upper margin of the mobile finger presents a row of 16 or 17 transverse oval tubercles, each of which is symmetrical with regard to a median, transverse, smooth ridge, the tubercles resembling a *Chiton*, as in *S. bidens*, de Haan. In *S. Melissa* the upper margin of the mobile finger presents a row of 14–15 prominences, which are also transverse, but are not symmetrical and do not resemble a *Chiton*. The anterior (distal) declivity of each tubercle is larger than the posterior (proximal) declivity, and the former is distinctly excavated, the prominences being somewhat horse-shoe-shaped. In other particulars, the hands are perfectly similar in the two species; and in each the anterior margin of the arm presents an acute spine, and its upper margin terminates also in a small acute tooth.

The meropodites have the same form, being equally enlarged in both species. The carpopodites and propodites are, however, a little more slender in *S. Melissa* than in *S. aspera*, and the dactylopodites are a little shorter in proportion to the length of the propodites.

The upper surface of the cephalothorax is ornamented with violet markings, and the propodites of the ambulatory legs with two violet rings, parallel to one another.

Dimensions:—

	millim.
Distance between the external orbital angles	15
Length of the cephalothorax	$12\frac{1}{4}$
Breadth of the front	$8\frac{2}{3}$

Sesarma Melissa stands in the same relation to *Sesarma aspera* as *Sesarma Haswelli* to *Sesarma bidens*.

94. *SESARMA PICTA*, de Haan.

Grapsus (*Pachysoma*) *pictus*, de Haan, *Fauna Japon. Crust.* p. 61, Taf. xvi. fig. 6.

Sesarma picta, Milne-Edwards, *Ann. Sci. Nat.* 3^e série, t. xx. p. 184; de Man, *Notes from the Leyden Museum*, vol. ii. p. 22.

The collection contains one young female specimen, found in fresh water on Sullivan Island.

The distance between the external orbital angles measures $12\frac{2}{3}$ millim., the front between the eyes $6\frac{1}{3}$ millim., and the cephalothorax is 10 millim. long.

Sesarma picta may be easily distinguished from *Sesarma quadrata*, Fabr. (= *affinis*, de Haan = *ungulata*, M.-Edw.), from *S. aspera*, Heller, and from *S. erythrodactyla*, Hess, by its narrow front, which is exactly half as broad as the distance between the external orbital angles. The ambulatory legs of *S. picta*, de Haan, are moreover of a more slender form than those of *S. quadrata*.

Sesarma picta has been found in Japan, and the Leyden Museum possesses a specimen from Macassar, Celebes; it is therefore probable that this species will be found to occur in the Malayan Archipelago.

95. *SESARMA ANDERSONI*, n. sp. (Pl. XII. figs. 1-4.)

Nineteen specimens (8 ♂, 11 ♀) of this most interesting species were "found at low water, in the deep but narrow burrows of dead *Novaculina* sp., on the banks of the Tenasserim river, at Minthantoung."

The numerous species of the genus *Sesarma* nearly all agree with one another, so far as I am aware, in one character, namely, that the posterior margins of the meropodites of the ambulatory legs are entire, and never armed with the acute teeth which are characteristic of the more typical Grapsidæ. In only a single species, viz. the Japanese *Sesarma vestita*, Stimpson, are the meropodites of the ambulatory legs described as being denticulate at the external angle of their posterior margin.

Sesarma Andersoni appears to be allied to *S. vestita*, but may be distinguished from it at first sight by its much more enlarged carapace, which has a glabrous and shining upper surface, and by many other characters. *S. vestita* and this new species are among the smallest representatives of this interesting genus, the cephalothorax being little more than one centimetre broad.

The cephalothorax is enlarged, being much broader than long; the proportion of the distance between the external orbital angles to the length of the carapace is as 13 : 9½. The rather depressed upper surface is marked with the ordinary interregional grooves and is quite glabrous, smooth, and bright, though minutely punctate, when seen under a magnifying-glass. The front is rather broad; measured between the eye-peduncles, its breadth slightly exceeds half the distance between the external orbital angles, the proportion being as 7½ : 13. The front is vertically deflexed, its anterior margin is nearly straight, not at all

emarginate in the middle, and is perfectly smooth. The four subequal postfrontal lobes are little prominent, so that they do not conceal the anterior margin of the front, when the carapace is looked at from above. The upper orbital margin is very oblique. The straight lateral margins of the upper surface of the carapace are nearly parallel, scarcely converging backwards; behind their lateral tooth (the acute external orbital angle) they present a trace of a second tooth. The foremost of the oblique elevated lines with which the sides of the upper surface are provided projects a little externally beyond the lateral margin, and sometimes even the next oblique line projects a little beyond the lateral margin, though not so much as the foremost, and in these specimens a trace even of a third tooth is observed.

As regards the under surface of the cephalothorax, I have little to remark. The male abdomen has about the same form as in *S. quadrata*, Fabr. (= *ungulata*, M.-Edw., = *affinis*, de Haan), the penultimate joint appearing rather short in proportion to its breadth. The last joint of the female abdomen is pushed deeply into the penultimate.

In the adult male the anterior legs are of unequal size. The ischiopodite of the anterior legs is armed anteriorly with a small acute tubercle. The acute upper margin of the arm is entire; its distal end is rounded and does not terminate in an acute spine. The anterior margin is dilated distally into a triangular crest, which appears minutely denticulate anteriorly, but is never armed with a spine. The acute under margin is also almost entire. The outer surface of the arm is transversely rugose, but the anterior and the inner surfaces are almost perfectly smooth, the triangular crest of the anterior margin presenting only some rugose lines on its inner surface, and is separated from the rest of the inner surface of the arm by the ordinary marginal row of hairs.

The upper surface of the carpopodite is covered with many minutely granular, transverse lines, and the inner angle is not armed with a tooth; the inner margin presents a few short hairs near the articulation with the arm. The convex outer surface of the palm is almost smooth, being, however, minutely rugose towards the upper margin and close to the articulation with the wrist, and minutely punctate near the articulation with the mobile finger. The rounded under margin presents some deli-

cate rugose lines, and an elevated line is seen on the outer surface of the palm, not far from the under margin and parallel to it, proceeding from the articulation with the wrist to the acute tooth which is found on the inner margin of the index. On the upper surface of the palm, near the inner margin, many oblique, minutely pectinated ridges run parallel to one another, namely, two longer ridges near the inner margin, and seven or eight shorter ones more outwards. The inner surface of the palm is a little granular. In the larger hand of the adult male the fingers are sometimes widely gaping, the mobile finger being much arcuate; but in other and younger specimens there is no gap between them. The upper surface of the mobile finger is covered with a row of thirteen or fourteen transverse ridges, and is moreover somewhat granular at its base, especially on the inner side. The outer and inner surfaces of the fingers are smooth; the fingers have horny, somewhat excavated tips. The inner margin of the thumb is armed at its base with two strong teeth, the internal one exceeding the other in size when the fingers are gaping; immediately before the horny tip both fingers are armed with a somewhat larger tooth. The index is armed, moreover, with seven or eight teeth, one of which, situated nearly in the middle, is much larger and stronger than the others.

In the adult female the chelipedes and also the hands are much smaller than in the male; they have, however, the same form and structure, but the pectinated ridges on the upper margin of the palm are rudimentary or absent and the upper margin of the thumb presents no transverse ridges, being only somewhat granular at the base.

In their outer appearance the ambulatory legs resemble those of *S. aspera*, but differ from that species, and almost from all other representatives of the genus *Sesarma*, by the structure of the meropodites. The upper or anterior margins of the meropodites do not terminate at their distal ends in a spine, but the posterior margins are denticulate, much as in some typical *Grapsidæ*. Four or five teeth are found at the distal angle, the proximal tooth being the largest, and the others diminish gradually in size towards the articulation with the carpopodite. The outer surface of the meropodites is somewhat transversely rugose and granular. The other joints are unarmed, but a little hairy. The dactylopodites are comparatively much

shorter than in *S. aspera*, Heller, being much shorter than the propodites; they are a little spinulose.

Dimensions of the two largest specimens in the collection, the female being provided with eggs:—

	♂. millim.	♀. millim.
Distance between the extraorbital teeth..	12 $\frac{2}{3}$	10 $\frac{1}{3}$
Length of the cephalothorax	9 $\frac{1}{4}$	7 $\frac{2}{3}$
Breadth of the front between the eyes ..	7 $\frac{1}{5}$	5 $\frac{4}{5}$

In the smallest ova-bearing female, the distance between the extraorbital teeth measures only 8 millim.

SECTION C.—*Sesarmæ* in which the cephalothorax is armed with an epibranchial tooth behind the extraorbital tooth, and in which the upper margin of the palm of the anterior legs of the male presents two or three oblique, parallel, minutely pectinated ridges.

This small section contains only the following Oriental species:—

Sesarma bidens, de Haan.

— *Dussumieri*, M.-Edw.

— *guttata*, A. M.-Edw.

— *livida*, A. M.-Edw.

I am now enabled to add a fifth species, viz. *Sesarma Haswelli*, n. sp. It is extremely difficult to distinguish these species, but a careful examination of the typical specimens, preserved in the Museums of Leyden and Paris, enables me to enumerate their distinctive characters.

Each species seems to be proper to different parts of the Indo-Pacific Region. *Sesarma bidens* inhabits the Japanese and Chinese seas and the Malayan Archipelago (Amboina); *S. Haswelli* and *S. Dussumieri* seem to be proper to the northern and north-eastern part of the Indian Ocean; *S. livida* has been recorded from New Caledonia, and seems to inhabit also the Gulf of Bengal; and, finally, *S. guttata* occurs on the south-eastern coast of Africa.

These closely allied species may be distinguished by the form of the hands, the number of tubercles with which the mobile finger is provided, the form and the structure of these prominences, and by the shape of the joints of the male abdomen.

96. *SESARMA HASWELLI*, n. sp.

(Compared with a typical specimen of *Sesarma bidens*, de H.)

Two young male specimens were collected at Sullivan Island.

Chironomus
= *Perisessa*

I was inclined at first to regard this species as a mere local variety of de Haan's *Sesarma bidens*, but after a more careful examination I consider it to be a distinct species. *Sesarma Haswelli*, however, is most closely allied to *Sesarma bidens*, de Haan. As regards the form and structure of the cephalothorax, both species closely resemble one another, not only with respect to the upper surface and the form of the front, but also with respect to the form of the joints of the male abdomen. The ambulatory legs also completely resemble those of *Sesarma bidens*, as regards the comparative length and breadth of the joints; and their coloration is the same in both species. *S. Haswelli* only differs from *S. bidens* by the number and by the form of the tubercles of the upper margin of the mobile finger.

The mobile finger is a little less arcuate at its base than that of *Sesarma bidens*, being more straight, and it is covered in the right hand, which in our larger specimen is a little larger than the left, with a longitudinal row of 18-19 tubercles, whereas in the left there are only 16 tubercles. In *Sesarma bidens* only 13 tubercles are constantly found on the upper margin of the mobile finger. These tubercles have a different appearance in the two species, extremely difficult to describe.

In *Sesarma guttata* from the shores of Zanzibar, the mobile finger is covered above with 12-13 tubercles; in this species these tubercles are ovoid, rather prominent, and their longer axis is transverse, making a right angle with the longitudinal axis of the finger. These symmetrical tubercles completely resemble some species of *Chiton*, for they present a smooth ridge in the middle, which runs in the longer axis of the tubercle and which is transversely sulcate.

In *Sesarma bidens* the tubercles are similar to those of *S. guttata*, but they are lower and much less prominent. In *Sesarma Haswelli*, however, the tubercles are less distinctly *Chiton*-like; they are more depressed above and are scalariform, each tubercle being nearly vertically deflexed at its distal margin towards the vent; they are transverse, as in all species of this section of the genus, the longer axis being perpendicular to the axis of the finger.

In all other characters the hands are similar to those of *S. bidens*. The outer surface of the immobile finger is somewhat flattened, or slightly concave, presenting a slight longitudinal, ridge-like elevation below, parallel to the under



Man, J G. 1888. "Report on the Podophthalmous Crustacea of the Mergui Archipelago, collected for the Trustees of the Indian Museum, Calcutta, by Dr. John Anderson, F.R.S., Superintendent of the Museum.-Part III." *The Journal of the Linnean Society of London. Zoology* 22, 129–176.
<https://doi.org/10.1111/j.1096-3642.1888.tb01455.x>.

View This Item Online: <https://www.biodiversitylibrary.org/item/98559>

DOI: <https://doi.org/10.1111/j.1096-3642.1888.tb01455.x>

Permalink: <https://www.biodiversitylibrary.org/partpdf/97119>

Holding Institution

Smithsonian Libraries and Archives

Sponsored by

Biodiversity Heritage Library

Copyright & Reuse

Copyright Status: Public domain. The BHL considers that this work is no longer under copyright protection.

This document was created from content at the **Biodiversity Heritage Library**, the world's largest open access digital library for biodiversity literature and archives. Visit BHL at <https://www.biodiversitylibrary.org>.