the outer surface close to the articulation with the wrist. The mobile finger is granular at the base of its upper margin; its inner margin is armed with five or six teeth, the two basal being a little larger than the others. The immobile finger is armed with a large tooth, that occupies the basal half of the inner margin, and with two much smaller teeth. In the smaller (left) hand the outer surface of the palm is a little more granulated than that of the right, the outer surface being also granular towards the base of the immobile finger and even a little towards the under margin; the mobile finger is armed much in the same manner as in the other hand, but the immobile finger presents six teeth, of which the fourth is much larger than the others, though not so large as the large tooth of the index of the right hand; the first, second, and sixth teeth are very small.

In the younger individuals the hands are more granulate than in the adult. In a broad specimen, 39 millim., the whole outer surface of the smaller hand is still granular, and the outer surface of the larger hand is also nearly wholly granular. In the smallest specimen, which is only 22 millim. broad, the hands are everywhere granular on their whole outer surface.

As regards the ambulatory legs, which are hairy, especially on the last two joints, I will only remark that the first two pairs have nearly the same length, that the third pair is somewhat shorter, and that the legs of the last pair are the shortest of all.

Dimensions of the adult specimen and of a younger one:—

	millim.	millim.
Length of the cephalothorax	50	28
Breadth of the cephalothorax (distance between the third or penultimate lateral teeth)	71	39
Distance between the external orbital angles	33	20½
Length of the larger hand	54	28

Myomenippe granulosa, A. M.-Edw., has hitherto been recorded from the coast of Batavia (*Milne-Edwards*) and from the seas of Celebes (*Hilgendorf*); this species therefore inhabits the Malayan archipelago and the neighbouring seas.

As regards *Menippe granulosa*, Strahl (Archiv f. Naturg. xxvii. p. 105, 1861), Prof. v. Martens has shown that this species is identical with *Menippe Panope*, Herbst, after an examination of both the typical specimens.

I am indebted to Dr. Hilgendorf for the following information regarding *Cancer Panope*, Herbst, which really belongs to the genus *Menippe*, the orbits not being closed internally. The typical specimen of Herbst's *Cancer Panope* is $19\frac{1}{2}$ millim. broad and $14\frac{3}{4}$ millim. long. In this species the granules, which are found on the middle of the outer surface of the hands, are larger than those of the upper and under margins of the palm, as they have a diameter of $\frac{1}{2}$ millim., whereas in *Myomenippe granulosa*, A. M.-Edw., the largest granules are found on the upper margin. In *Menippe Panope* the front is *not* divided into six teeth, and the postero-lateral regions of the cephalothorax are nearly quite smooth behind the last antero-lateral tooth, whereas they are distinctly granular in *Myomenippe granulosa*, A. M.-Edw. The lobes on the upper surface of the carapace are less distinct in *Menippe Panope*, being even less developed than in Herbst's figure. The course or direction of the last antero-lateral tooth and the form of the posterior margin of the cephalothorax are also somewhat different in both species.

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

There can be little doubt that the small crustacean described by Alph. Milne-Edwards as a second representative of his genus *Pilumnopeus* must be referred to *Eurycarcinus*. *Pilumnopeus maculatus*, indeed, perfectly agrees, in its outer appearance and in its essential characters, with the true representatives of *Eurycarcinus*, viz. *E. natalensis*, Krauss, *E. Grandidieri*, A. M.-Edw., *E. orientalis*, A. M.-Edw., and *E. integrifrons*, d. M.*, so that there is no reason to refer it to a distinct genus.

The small group of Crustaceans which bears the name of *Eurycarcinus* is, in my opinion, a very natural one. It belongs to those forms the palate of which is more or less distinctly divided by a ridge defining the margin of the efferent canal, such as *Ozius*, *Epixanthus*, *Heteropanope*, and *Pilumnus*; but it is distinguished by its outer physiognomy—the enlarged cephalothorax, which is very convex longitudinally, the transverse orbits,

* I will here remark that *Eurycarcinus integrifrons*, which I described some years ago (Notes from the Leyden Museum, i. p. 55), may perhaps prove to be identical with *Eurycarcinus orientalis*, very shortly described by A. Milne-Edwards from specimens obtained at Bombay (Annal. Soc. Entom. France, 1867, p. 277).

the little prominent antero-lateral teeth, the seven-jointed abdomen of the male, &c.

31. EURYCARCINUS MACULATUS, *A. M.-Edw.* (Pl. II. figs. 4 & 5.)

Pilumnopeus maculatus, *A. Milne-Edwards, Descriptions de quelques espèces nouv. de Crustacés Brachyures, Annal. Soc. Entom. France,* vii. 1867, p. 277; and *Crustacés de Zanzibar et de Madagascar, Nouv. Arch. du Muséum Hist. Nat.* t. iv. p. 82, pl. xix. figs. 17–19.

A single male specimen was collected at Elphinstone Island.

The cephalothorax of this little species is 8 millim. long and $12\frac{1}{3}$ millim. broad, very convex longitudinally and transversely; the upper surface is glabrous, smooth, though minutely punctate on the cardiac region and the surrounding parts of the middle of the carapace, and minutely granular on the frontal and antero-lateral regions. These minute points and granules, however, are only visible with a magnifying-glass, so that the upper surface appears smooth and shining to the unaided eye. Some inter-regional grooves are very faintly indicated, while the others are entirely absent: thus a faint longitudinal median groove is observed on the anterior part of the carapace which separates the two scarcely distinct epigastric lobes; the transverse groove between the gastric and cardiac regions is also feeble, whilst a curved minutely granular line occurs on each side of the carapace, proceeding from the last antero-lateral tooth obliquely forward, as indicated in the figure in the 'Archives.'

The front is not at all prominent but a little deflexed, and its straight anterior margin presents only a small narrow median incision and a very small, scarcely distinct sinus on each side near the lateral angles (internal orbital angles). The upper margin of the orbits is unarmed and presents no fissures; but the under margin presents a triangular hiatus near the external orbital angle, and is armed in the middle with a series of four or five small conical granules, between which some smaller ones occur; the under orbital margin also appears to be a little hairy The antero-lateral margins of the carapace are much shorter than the straight postero-lateral ones; they are armed with four teeth, including the external orbital angles. The first tooth, the outer angle of the orbits, is broadly truncate; the second is a little narrower, but likewise rather obtuse; while the third and the fourth teeth are acute and directed obliquely forward. (In

Eurycarcinus natalensis, Krauss, and *E. Grandidieri*, A. M.-Edw., the second lateral tooth is the largest of all, and in *E. integrifrons*, d. M., the two anterior antero-lateral teeth are of equal size.) The subhepatic region is minutely granular and hairy. The endostome is faintly ridged on each side. The sternum of the male is minutely punctate when seen under a magnifying-glass, and the postabdomen is seven-jointed.

The chelipedes are very unequal in size, and in this specimen the right is the largest. As in the case of the ambulatory legs, they seem to agree in all respects with those of the Zanzibar specimens described by Milne-Edwards. The ambulatory legs are provided along their upper and under margins with some hairs, few in number on the meropodites, but more numerous and dense on the two terminal joints, which moreover bear a close down; and finally the carpopodites of the chelipedes are armed with a small rather acute tubercle at their internal angle. As in specimens from Zanzibar, the outer surface of the hands is marked with numerous small red spots.

This very rare species has hitherto been known only from the shores of Zanzibar.

Genus Ozius, *H. M.-Edw.*

32. Ozius tuberculosus, *H. M.-Edw.*

Ozius tuberculosus, *Milne-Edwards, Hist. Nat. Crustacés*, t. i. p. 405.

Ozius tuberculosus, *Alph. Milne-Edwards, Nouv. Arch. du Muséum Hist. Nat.* t. ix. p. 238, pl. xi. fig. 2; *Heller, Crustaceen der Novara-Reise*, p. 23.

One fine female specimen was collected at Sullivan Island. It has the cephalothorax 57 millim. broad and 41 millim. long.

Ozius tuberculosus had been previously recorded from the Mauritius, the Nicobar Islands, and New Caledonia.

Genus Epixanthus, *Heller.*

Although scarcely generically distinct from *Ozius*, the genus *Epixanthus* may be retained for those species the cephalothorax of which is more enlarged, more depressed and flattened, and in which the fingers of the smaller chelipede are very slender and in contact with one another over their whole length. The genus is represented in the Indo-Pacific region as well as on the shores of West Africa. The former region is inhabited by *Epixanthus frontalis*, M.-Edw., *E. dentatus*, White, and *E. cor-*

rosus, A. M.-Edw.; and the latter by *Epixanthus Hellerii*, a species described also by Prof. A. Milne-Edwards. I may point out that in *E. dentatus* the inferior margin of the orbits presents a distinct hiatus near the external orbital angle, whereas in *E. frontalis* scarcely a trace of it is found.

33. Epixanthus frontalis, *H. M.-Edw.*

Ozius frontalis, *Milne-Edwards, Hist. Nat. des Crustacés*, t. i. p. 406.

Epixanthus frontalis, *Heller, Crustaceen der Novara-Reise*, p. 20; *Alph. Milne-Edwards, l. c.* p. 241.

Nine specimens are in the collection, five (1 ♂, 4 ♀) from King Island, three from Sullivan Island, and one from Elphinstone Bay. In all the right hand is the largest.

Epixanthus frontalis has been observed in the Red Sea (*Kossmann*), in the Persian Gulf, Karak Island (*Heller*), at Zanzibar (*Hilgendorf*), the coast of Tranquebar (*Milne-Edwards*), the Nicobar Islands (*Heller*), the China seas, Japan (*Stimpson*), and New Caledonia (*A. Milne-Edwards*); it would therefore appear to be distributed throughout the whole Indo-Pacific Ocean.

34. Epixanthus dentatus, *White.*

Panopæus dentatus, *White, Proc. Zool. Soc.* 1847, p. 226; *Adams and White, Zoology H.M.S. 'Samarang,' Crustacea*, p. 41, pl. xi. fig. 1.

Epixanthus dilatatus, *de Man, Notes from the Leyden Museum*, vol. i. p. 58.

Panopæus acutidens, *Haswell, A Catalogue of the Australian Stalk- and Sessile-eyed Crustacea*, p. 51, pl. i. fig. 2.

Epixanthus dentatus, *Miers, On Malaysian Crustacea, Ann. and Mag. Nat. Hist.* 1880, 5th ser. vol. v. p. 233.

Four specimens were collected at Elphinstone Island. There can be little doubt that Haswell's *P. acutidens* is identical with the species described by White.

Epixanthus dentatus has been collected on the coast of Java, at the Philippine Islands, and on the coast of Australia (Port Darwin).

Genus Actumnus, *Dana.*

This genus is described as having the fingers of the chelipedes spoon-shaped. In the species represented in this Collection the fingers have pointed tips—a fact already pointed out by Prof. A. Milne-Edwards in the case of one of them (Nouv. Arch. t. ix. p. 194).

35. ACTUMNUS SETIFER, *de Haan*.

Cancer (Pilumnus) setifer, *de Haan, Fauna Japonica, Crustacea*, p. 50, pl. iii. fig. 3.

Actumnus tomentosus, *Dana, l. c.* t. i. p. 243, pl. xiv. fig. 2.

Actumnus setifer, *Alph. Milne-Edwards, Nouv. Arch. du Muséum Hist. Nat.* t. i. p. 287, pl. xviii. fig. 5.

Actumnus tomentosus, *Alph. Milne-Edwards, l. c.* p. 285, and *Nouv. Arch. Mus. Hist. Nat.* t. ix. p. 194.

Actumnus setifer, *Miers, Report on the Zoological Collections made during the Voyage of H.M.S. 'Alert,' Crustacea*, pp. 225 & 226.

A small male specimen, which I refer to this species, was collected in the Mergui Archipelago.

The antero-lateral margins are armed with three small spiniform teeth behind the scarcely prominent, though acute external orbital angle, and some small acute granules occur between these spiniform teeth. The lobes of the upper surface of the cephalothorax are very distinct and covered with small acute granules anteriorly and on the antero-lateral regions, those of the hepatic region being the largest and most prominent. The specimen has lost one chelipede. In the preserved chelipede, the outer and upper surface of the hand is covered with many acute granules, which even occur at the base of the index; the mobile finger is covered with some acute granules at its base. The fingers appear to be smooth and their tips are pointed; the index is provided with a small tuft of hair on its outer and on its inner surfaces, near the dentiferous margin. The outer surface of the hand is rather convex, whilst the inner surface is nearly plain and almost perfectly smooth, which is also characteristic of the inner surface of the fingers.

Actumnus setifer has been recorded from Japan, Tahiti, and New Caledonia.

36. ACTUMNUS ELEGANS, n. sp.

Of this new species, seven specimens (5 ♂, 2 ♀) were collected at Sullivan Island. It is most closely allied to *Actumnus obesus*, Dana, from the Sandwich Islands, which evidently represents this form in the Mergui Archipelago.

It may be distinguished at first sight from *A. obesus* by the antero-lateral margins being armed with six acute spinuliform granules, behind the acute granuliform external angle of the orbits, arranged in three groups, two together.

The cephalothorax has precisely the same form as that of *Actumnus obesus*, and is uniformly covered on its upper surface with short yellow hairs. The regions are quite indistinct, no trace of divisional lines being found; the upper surface is *not* uniformly covered with granules as in *A. obesus*, but only a few acute granules (15–20) are found on the antero-lateral regions, which resemble the six granules with which the antero-lateral margins are armed, but are much smaller. The front, the gastric, cardiac, and intestinal regions are not covered with granules. The frontal margin is divided by a small median incision in two almost straight lobes, and passes laterally continuously into the upper orbital margin, not being separated by a cleft from the internal orbital angles. The frontal or inner part of the upper margin of the orbits makes nearly right angles both with the frontal and the external, somewhat granular portion of the upper orbital margin. The external angle of the orbits is formed by a small, acute, spinuliform granule. The antero-lateral margins are about as long as the postero-lateral, which are smooth and concave; they are armed with six small, acute, spinuliform granules, which are arranged in three groups, two in each. The inferior margin of the orbits is minutely granular, and presents a small triangular hiatus close to the external orbital angle. The pterygostomian regions are glabrous and nearly quite smooth, presenting only some minute granules near the inferior margin of the orbits. The outer surface of the maxillipeds, the sternum, and the lateral margins of the abdomen are clothed with yellow hairs.

The chelipedes are of unequal size, the right chelipede being the larger in all our specimens. The anterior margin of the arm, which is very short, the antero-internal margin of the wrist, and the upper margin of the hand and of the mobile finger are clothed with a row of long yellow hairs. The upper surface of the wrist and the outer surface of the larger hand are covered with similar yellow hairs, disposed between the granules with which they are provided. The larger hand wholly resembles that of *A. obesus*, its outer surface being covered everywhere with acute granules, disposed irregularly, those of the middle of the outer surface being a little larger than those of the upper; the under margin presents a longitudinal line of granules on the inner side, and is clothed with a row of long yellow hairs. The

mobile finger is somewhat hairy and granular at the base, though much less than in *A. obesus*, the granules not extending beyond the proximal half of the finger. The outer surface of the fingers, the tips of which are pointed, is smooth. The inner surface of the hand is smooth, being only a little punctate at the base of the mobile finger. The smaller chelipede presents the same characters as the other.

The ambulatory legs are precisely similar to those of *A. obesus*, being clothed with rather long yellow hairs, but they are somewhat granular; the upper margin of the meropodites is minutely granular, and somewhat larger acute granules are observed on the upper surface of the carpopodites and propodites.

The cephalothorax of the largest specimen, a female, is $5\frac{3}{4}$ millim. broad; and the species probably attains a larger size.

37. Actumnus nudus, *A. M.-Edw.* (Pl. II. figs. 2 & 3.)

Actumnus nudus, *Alph. Milne-Edwards, Descript. de quelques espèces nouvelles de Crustacés Brachyures, Annal. Soc. Entom. de France*, 4e sér. t. vii. 1867, p. 265.

A single female specimen was collected in the Mergui seas. Prof. Milne-Edwards kindly identified it for me, and as his determination is doubtless correct, I now add a full description of the species.

The specimen is nearly twice as large as that described by Milne-Edwards. The cephalothorax is rather narrow, the proportion of the breadth to the length being as 4 to 3. The upper surface is very convex longitudinally, and also somewhat declivous towards the lateral margins. Interregional grooves are almost wholly wanting: I only observe a faintly indicated, shallow, cervical suture, separating the gastric region from the hepatic and branchial regions, and the usual shallow, median, frontal furrow, bifurcated behind, which separates the slightly prominent epigastric lobes from one another. The front, the epigastric lobes, the gastric region, and especially the antero-lateral regions are covered with pearl-shaped granules; on each side of the gastric region, ten or twelve of these granules are arranged in an arcuate line, with the convexity directed forward, which separates the antero-lateral region from the postero-lateral. Each antero-lateral region (hepatic and epibranchial) is

covered with 30–35 perliform granules; the granules of the gastric region are not so numerous and a little less prominent, and a few small granules are observed immediately behind and close to the arcuate line of granules which I have described above. When the upper surface is examined with a sufficiently strong magnifying-glass it appears covered everywhere, anteriorly as well as posteriorly, with innumerable microscopic granules. A few short hairs are also sparsely distributed over the anterior half of the cephalothorax. The front, which is strongly deflected, measures about a third of the breadth of the cephalothorax. It is much advanced and divided by a small median, triangular incision into two rounded oblique lobes, the anterior margins of which are somewhat crenulate or uneven, and nearly continuous with the upper orbital margins, being separated from the internal angles of the orbits by a small and scarcely distinct cleft. The upper margin of the orbits is entire and covered with minute pearl-shaped granules, and the external angle of the orbits is very little prominent. The entire inferior margin of the orbits presents, close to the external angle, and separated from it by a narrow fissure or hiatus, a dentiform lobe which projects a little more forward than the external angle of the orbit itself. The internal lobe of the inferior orbital margin is dentiform and obtuse. The internal orbital hiatus is occupied by the peduncle of the external antennæ, the penultimate joint of which nearly reaches the front. The antero-lateral margins of the upper surface of the cephalothorax are scarcely longer than the postero-lateral, and are divided into five, little prominent, broad (=long) dentiform lobes, including the scarcely prominent external orbital angle. The third or middle lobe is the broadest (or longest) of all, the second and the fourth are a little broader (or longer) than the first (external angle of the orbits), the fourth being rather acute, and the last antero-lateral tooth is dentiform and also rather acute. The two last antero-lateral teeth are slightly carinate above, the carinæ being minutely granular; the granular carina of the fifth tooth is directed backward and slightly inward, and terminates at the postero-external end of the curved line of granules, which defines the antero-lateral from the postero-lateral regions, as is described above.

The inflected sides of the carapace, as the pterygostomian, subhepatic, and subbranchial regions, are nearly quite smooth; the

under surface of the internal lobe of the inferior orbital margin is, however, somewhat granular, and the posterior end of the subhepatic region, which is situated below the two last antero-lateral teeth, is also slightly granular. The anterior part of the subhepatic regions and the pterygostomian regions are glabrous, but the posterior half of the inflected sides of the cephalothorax are a little hairy. The endostome is distinctly longitudinally ridged on each side.

The specimen has unfortunately lost its larger chelipede, so that I can only describe the smaller one, the left. The arm is almost wholly covered by the cephalothorax, and its outer surface is smooth, the upper margin being a little hairy. The convex upper surface of the wrist is covered with some pearl-shaped granules, which are similar to those of the anterior part of the upper surface of the carapace. The distal end of the internal margin of the wrist is somewhat dentiform, and the internal surface of this joint is smooth.

The outer surface of the palm, as well as its upper and under margin, is covered with numerous, small, scarcely acute granules which are arranged irregularly, but the convex inner surface of the palm is smooth. The brownish-coloured fingers are a little shorter than the palm. They have pointed, crossing tips. The inner edges meet along their whole length; the inner edge of the immobile finger is distinctly crenulate, but the same edge of the mobile finger appears entire and is only very minutely crenulate. The outer surface of the immobile finger is longitudinally grooved and slightly granular; the mobile finger is also longitudinally sulcate on its upper margin and outer surface, and covered with granules between the grooves, the granules decreasing gradually in size towards the pointed tip.

The ambulatory legs are short, and, when compared with those of other species of this genus, tolerably slender. Their outer surface is smooth, but the upper margin of the joints, especially of the carpopodites and propodites, is minutely granular, and all the joints are slightly hairy along their upper and under margins. The dactylopodites are scarcely longer than the propodites, and terminate in rather long, acute, scarcely arcuate, corneous tips.

Dimensions of the specimen under notice:—

	millim.
Breadth of the cephalothorax (distance between the fourth or penultimate antero-lateral teeth)	11¾
Length of the cephalothorax	8¾
Breadth of the front	4

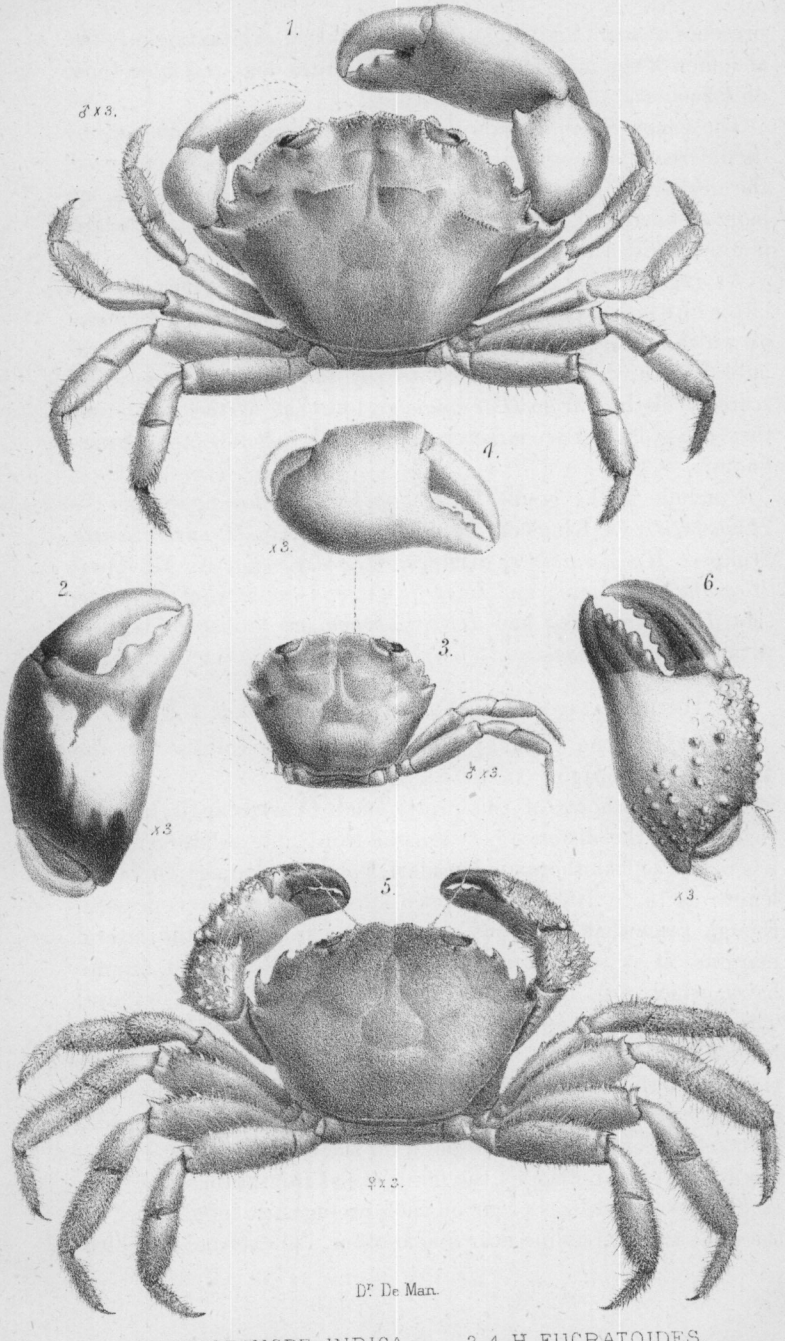
Actumnus nudus was discovered in 1867 at Pondicherry, but has not been recorded since, so far as I am aware.

Milne-Edwards's specimen had evidently lost the hairs with which the legs had been sparsely clothed.

Genus Heteropanope, *Stimpson*.

The name *Heteropanope*, established by Stimpson in 1858, being of older date than the name *Pilumnopeus* of A. Milne-Edwards, I propose to include under the former a small number of Crustaceans from the Indo-Pacific region, which were described by Stimpson as representatives of *Heteropanope*, together with a few species described by A. Milne-Edwards, Miers, and Haswell under the name of *Pilumnopeus*. I may, however, remark that Stimpson also referred to his genus *Heteropanope* those species which are regarded as representatives of the genus *Epixanthus*. As regards the genus *Pilumnopeus*, two species have been described by the French carcinologist under that name, one of which, *Pilumnopeus maculatus*, is a true *Eurycarcinus*; whereas the second, named *Pilumnopeus crassimanus*, is probably identical with *Ozius serratifrons*, Kinahan, and also perhaps with Stimpson's *Heteropanope australiensis* (Miers, Zoology of the Voyage of H.M.S. 'Alert,' Crustacea, p. 228). I am the more inclined to retain the genus *Heteropanope*, because, when the genus *Pilumnus* is submitted to a thorough revision, it may be useful to refer to the former some species which still bear the name of *Pilumnus*.

The glabrous or scarcely hairy cephalothorax of most species of *Heteropanope* is little convex (except that of *H. serratifrons*) and but little enlarged; the lateral margins are armed with four or five more or less prominent teeth, which are never spiniform, and the front is more or less prominent. The external antennæ resemble those of *Pilumnus*, the basal joint being small and not nearly reaching the front. The endostome is longitudinally ridged. The inferior margin of the orbits, which are transverse,



1, 2. HETEROPANOPE INDICA. 3, 4. H. EUCRATOIDES.
5, 6. PILUMNUS ANDERSONI.

Crowther lith. Mintern imp.

presents a small hiatus close to the external orbital angle. The abdomen of the male is seven-jointed, and the legs resemble those of *Pilumnus*.

The genus *Epixanthus* is distinguished from *Heteropanope* by its different physiognomy—the cephalothorax is more enlarged, the orbits are circular, the hands, and especially the fingers, are more slender, and the basal joint of the external antennæ, which is united with the front, is large.

As regards the genera *Eurycarcinus* and *Pilumnus*, in the latter of which I propose to include those species the carapace of which is more or less hairy and armed with spiniform antero-lateral teeth, it is unnecessary to say that they are generically scarcely distinct from *Heteropanope*, but that at the same time they are sufficiently characterized by their whole outer physiognomy.

I include in the genus *Heteropanope* the following species:—*H. serratifrons*, Kinahan; *H. glabra*, Stimps.; *H. australiensis*, Stimps.; *H. eucratoides*, Stimps.; *H. crassimana*, A. M.-Edw.; *H. granulosa*, Miers; and *H. indica*, n. sp.,—observing, however, that *H. australiensis* and *H. crassimana* are probably identical with *H. serratifrons*.

38. HETEROPANOPE INDICA, n. sp. (Pl. III. figs. 1 & 2.)

Two specimens, a male and a female, were collected in the Mergui Archipelago.

The cephalothorax of this pretty small Crustacean is broader than long; the distance between the third antero-lateral teeth, where the cephalothorax is broadest, being in proportion to the length as 15 to $10\frac{1}{2}$. The upper surface is rather depressed, though somewhat declivous towards the front and the lateral margins; it is covered with a few, sparsely distributed, minute hairs, which are, however, scarcely visible to the naked eye. The regions of the upper surface are faintly marked by shallow inter-regional grooves. The upper surface is smooth posteriorly; on the anterior half it is marked with some transverse, minutely granulated, pubescent, elevated lines, five on each side. Two small elevated lines are found on the epigastric lobes, separated from one another by the faint mesial frontal furrow. Two other transverse ridges occur on each protogastric lobe, placed in the same transverse line near one another, the external of which

is only half as broad as the internal ridge. Lastly, two parallel, slightly oblique, elevated lines are seen near the third and the fourth antero-lateral teeth, the posterior of which is twice as broad as the anterior. Although I have described the upper surface as being smooth, I may, however, remark that it is minutely granular near the postero-lateral margins, which are but little longer than the antero-lateral. The distance between the third antero-lateral teeth is three times as great as the distance between the internal orbital angles. The front is somewhat declivous, and consists of two slightly oblique lobes, which are separated from one another by a small triangular incision; these lobes are rather prominent in the middle, and their minutely granular anterior margin is broadly emarginate towards the external angle, so as to constitute a small tooth at the external angle of each lobe. Each frontal lobe is marked above with a slightly arcuate, transverse, granular line, and is covered with some granules between this line and the anterior margin. The frontal lobes, which therefore somewhat resemble those of some species of *Leptodius*, are separated by a small notch from the little prominent, internal orbital angles. The orbits are transverse, being a little broader than long. The granular upper margin of the orbits is marked with two fissures on the external half; the granulated or minutely denticulated under margin presents a strong, rather obtuse, tooth at the internal angle, which is a little more prominent than the internal angle of the upper margin, projecting nearly as much forward as the small external teeth of the frontal lobes. The infraorbital margin is marked with a small triangular hiatus close to the little prominent external angle of the orbits.

The antero-lateral margins are armed with four prominent teeth, including the external orbital angle. The first tooth is rather broad, and its external margin is slightly emarginate; the second tooth much resembles the first, but it is a little narrower and more triangular; the third tooth is the most prominent of all, being triangular, rather acute, and directed obliquely forward; the fourth tooth resembles the third, but is much smaller and much less prominent. The last two teeth are somewhat carinate and granular above, and the external margins of all the antero-lateral teeth are granular.

The inflected sides of the cephalothorax are somewhat granular and hairy, but the pterygostomian regions do not present a

tubercular eminence, as in *H. serratifrons*, or a small tooth, as in *H. australiensis*. The basal joint of the external antennæ is short and small, and does not nearly reach the front; the other joints occupy the internal orbital hiatus, and the flagellum is rather short, measuring only a fourth of the distance between the third antero-lateral teeth. The endostome is distinctly longitudinally ridged on each side. The epistome is nearly smooth. The male abdomen is seven-jointed, the joints being all distinctly separated from one another; it closely resembles that of some *Pilumni*, and the penultimate joint is nearly quadrate, being scarcely broader than long. The sternum and the abdomen are smooth, though somewhat pubescent, and the lateral margins of the female abdomen are fringed with rather long hairs.

The chelipedes are very unequal, the right being the largest in both specimens; although the larger chelipede of the female specimen is wanting, I suppose that the anterior legs present the same size both in the male and in the female. The arms are short, scarcely projecting laterally beyond the lateral margins of the cephalothorax; they are armed near the distal end of the upper margin with a strong, acute, somewhat curved tooth. The under margin is entire, but the anterior margin is somewhat granular and hairy. The external (or posterior) surface of the arm is minutely granular near the upper margin, but otherwise the arms appear smooth. The wrist is armed with a small, scarcely acute tooth at the distal and internal angle; its upper surface appears smooth to the naked eye, but, when seen under a lens, some small granules are observed near the internal and external margins, especially on the wrist of the smaller chelipede. The larger hand is very large, its length (the fingers included) being but little shorter than the breadth of the cephalothorax, *i. e.* the distance between the third antero-lateral teeth. The fingers are nearly half as long as the palm, which is but little longer than broad (high). The outer surface of the palm is rather convex and quite smooth, and the obtuse upper and under margins, like the inner surface, are also perfectly smooth. The fingers have pointed tips, which cross one another; they are nearly smooth, the immobile finger presenting only a trace of a longitudinal impressed line on its outer and inner surfaces, and the mobile finger being slightly granular above at the articulation. The latter presents a somewhat larger tooth at its base, and the other finger is armed with

two or three teeth along its inner margin. Whereas the larger hand is quite smooth and glabrous, the upper and under margins and the outer surface of the palm of the much smaller left hand are covered with distinct granules and with sparsely distributed hairs. In the smaller hand the fingers also are comparatively longer than in the larger hand, being but little shorter than the palm; they are distinctly longitudinally sulcate, but are only indistinctly denticulate. The mobile finger is somewhat granular and hairy above near the articulation with the palm.

Regarding the ambulatory legs, I may remark that the three anterior pairs have nearly the same length, but that the last pair are distinctly shorter. They are somewhat hairy, especially the last three joints. The dactylopodites are almost as long as the propodites, and terminate in small horny tips.

Dimensions of the male specimen :—

	millim.
Length of the cephalothorax	$10\frac{1}{2}$
Breadth of the cephalothorax (distance between the third antero-lateral teeth)	15
Distance between the internal orbital angles	5
Length of the larger hand (fingers included)	14
Length of the palm	9
Height of the palm near the articulation with the fingers	7

39. Heteropanope eucratoides, *Stimps.* (Pl. III. figs. 3 & 4.)

Heteropanope eucratoides, *Stimpson, Proceed. Acad. Nat. Sciences Philadelphia,* 1858, p. 33.

A single male specimen of this rare species was found at Elphinstone Island.

This species is closely allied to the preceding, but it presents a different external appearance, on account of the antero-lateral margins being comparatively much shorter in proportion to the postero-lateral, and because the third antero-lateral tooth is not the largest but the smallest of all, so that the cephalothorax is broadest at the fourth antero-lateral teeth.

As in *Heteropanope indica*, the upper surface of the cephalothorax is rather depressed and scarcely convex, being only somewhat declivous towards the anterior and lateral margins. The cephalothorax, however, is a little less enlarged, the proportion

of its breadth (*i. e.* the distance between the fourth antero-lateral teeth) to the length being as $12\frac{1}{5}$ to 9. As regards the structure of the upper surface of the cephalothorax, this species nearly completely agrees with *H. indica*, the anterior half presenting the same minutely granulated transverse elevated lines, in the same number, and arranged in the same manner; the inter-regional grooves, however, are a little more distinct, and the metabranchial regions, which are situated on each side of the cardiac region, are minutely granular. In the form of the front and in their orbits, both species closely resemble each other, so that one description suffices for both; but the anterior margin of the frontal lobes in this species is widely and more faintly emarginate, so that the external angles are much less prominent and not dentiform as in *H. indica*. The antero-lateral margins are comparatively much shorter than those of *H. indica*, so that a transverse line, uniting the fourth antero-lateral teeth divides the upper surface into two portions of very different length, the length of the anterior portion being in proportion to that of the posterior as 1 to 2. The antero-lateral margins are divided into four prominent teeth, including the external orbital angles. The first or anterior tooth is rather small, and much resembles the first antero-lateral tooth of *H. indica*, the external margin being slightly emarginate. The second tooth is a little broader than the first, more prominent and rather obtuse; the third is the smallest of all, triangular, and much less prominent than the second and the fourth. The last tooth is conical and prominent, granulated above and moderately acute. The margins of the teeth are almost smooth. The inflected sides of the cephalothorax are nearly smooth, and only a little granular near the antero-lateral teeth; they do not present the tubercular eminence or tooth which is so characteristic of *H. serratifrons* and *H. australiensis*.

The outer antennæ, the smooth epistome, and the anterior margin of the buccal cavity fully agree with *H. indica*. As in the latter, the endostome is distinctly ridged on each side. The external maxillipeds closely resemble those of *H. indica*; Stimpson's words, "Hectognathopoda sat hiantia," are therefore inexplicable to me, seeing that the external maxillipeds of the species of *Heteropanope* perfectly resemble those of *Pilumnus*. The male abdomen is similar to that of *H. indica*, but the terminal joint is comparatively a little longer. The sternum and abdomen

are minutely pubescent posteriorly. Unfortunately the specimen has lost its smaller chelipede. The chelipede which is present perfectly resembles the larger chelipede of *H. indica*, so that I again refer to my description of that species. I will only add that the chelipede is quite smooth everywhere on all the joints, and that the denticulate upper margin of the arm is furnished near its distal end with a strong tooth, which is, however, a little less acute than in the preceding species.

The ambulatory legs are also wanting, except those of the two anterior pairs of the right side; these agree with those of *H. indica*, but the dactylopodites are a little more elongate, being distinctly longer than the propodites.

Dimensions.

	millim.
Length of the cephalothorax	9
Breadth of the cephalothorax (distance between the fourth antero-lateral teeth)	$12\frac{1}{5}$
Distance between the internal orbital angles	$4\frac{2}{3}$
Length of the hand (the fingers included)	10
Height of the hand at the base of the fingers	$5\frac{3}{5}$

The specimen under description, as in fact the whole collection, is preserved in alcohol. This species is, like *H. indica*, of a dark olive-green colour. The diagnosis given by Stimpson very well agrees with my description, except that the three posterior antero-lateral teeth are described as being acute, whereas in this specimen the second is rather obtuse.

Stimpson discovered this species at Hongkong.

Genus Pilumnus, *Leach*.

40. Pilumnus vespertilio, *Fabr.*

Cancer vespertilio, *Fabricius, Suppl. Entom.* 1798, p. 338.

Pilumnus vespertilio, *Milne-Edwards, Hist. Nat. Crustacés*, t. i. p. 418, and *Règne Animal de Cuvier*, pl. xiv. fig. 3.

Pilumnus vespertilio, *Alph. Milne-Edwards, Nouv. Arch. du Muséum Hist. Nat.* t. ix. p. 242; *Hilgendorf, Monatsber. k. Akad. Wiss. Berlin*, Nov. 1878, p. 793; *Miers, Ann. & Mag. Nat. Hist.* 1880, 5th ser. vol. v. p. 234; *Haswell, Catalogue &c.* p. 65.

Eight specimens were collected at Elphinstone Island, five males and three females.

These specimens agree very well with the description and figure given by Milne-Edwards, but I may add the following details.

In all the eight specimens the upper margin of the orbits is more or less granular, and presents *two* fissures, so that this species belongs to the subgenus *Eupilumnus*, established by Kossman (Mr. Miers, *l. c.*, erroneously mentioned the subgenus *sensu stricto Pilumnus*). In all the under margin of the larger hand is covered with rounded granules, except in the two largest males, in which the granulation of the under surface of the larger hand gradually begins to disappear. According to Dr. Hilgendorf (*l. c.*), in the true *P. vespertilio* the under surface of the larger hand is somewhat granular in the male but everywhere granular in the female, so that there can be no doubt that these specimens are really representatives of this species.

Pilumnus ursulus, Ad. & White, and *Pilumnus mus*, Dana, are identical with this species, according to Mr. Miers.

Pilumnus vespertilio is a very common species, distributed throughout the whole Indo-Pacific region, having been observed in the Red Sea (*Kossmann*), at Mozambique (*Hilgendorf*), Java (*Miers*), Sydney (*Hess*), and on the coral-reefs of Australia (*Haswell*), at New Caledonia, the Loo-Choo Islands, and Japan (*Stimpson*).

41. Pilumnus Andersoni, n. sp. (Pl. III. figs. 5 & 6.)

Four specimens (1 ♂, 3 ♀) of this new species were collected by Prof. Anderson in the Mergui Archipelago, two of which were found at Elphinstone Island and two at King Island. One of the female specimens is provided with eggs and another is infested in its cephalothorax with a *Bopyrus*. Courage, indeed, is necessary to describe a new species of this genus, for the very numerous species of *Pilumnus*, which often closely resemble one another, are rather insufficiently known. I therefore sent a specimen to Prof. Milne-Edwards, who informed me that this species was unknown to him, although closely allied to *Pilumnus Peronii*, M.-Edw., as I also supposed. As regards the species which have been described by Stimpson, Hilgendorf, Miers, and Haswell, I may remark that *P. Andersoni* is allied to *P. hirsutus*, Stimps., *P. longicornis*, Hilg., *P. Bleekeri*, Miers, *P. terræreginæ*, Hasw., and *P. vestitus*, Hasw., but is nevertheless a distinct species in my opinion.

The following is the description of the largest specimen, a female, found at Elphinstone Island.

In its outer appearance *P. Andersoni* somewhat resembles the common Indian *P. vespertilio*, Fabr., but it is of smaller size and much less hairy. The cephalothorax is about once and a half as broad as long, the proportion of the breadth to the length being as 25 to 18. The upper surface is tolerably convex longitudinally, and much less convex transversely; it is much declivous anteriorly towards the front, and also somewhat towards the lateral margins. The regions are faintly and only partly indicated, the inter-regional grooves, so far as they are present, being rather shallow. The two small, rounded, epigastric lobes, which are separated as usual from one another by the median frontal furrow, are a little prominent; the frontal furrow is bifurcated immediately behind them, and the two parallel grooves into which it is divided, which border the mesogastric area, diverge backwards and terminate in the gastrobranchial grooves. The latter are very shallow though yet distinct; their external transverse portions, separating the hepatic and epibranchial regions from one another, are a little deeper than the median portion, and the upper orbital margins are surrounded by a shallow groove which separates these margins from the hepatic and protogastric regions. Behind the cervical suture no other divisional lines are visible. The upper surface of the cephalothorax is covered with some very small granules anteriorly and on the postero-lateral margins: the front, the epigastric lobes, the protogastric regions, and the mesogastric area are covered with minute granules, whereas the granules of the slightly prominent hepatic region and of the anterior margin of the epibranchial region are a little larger. The granules are nevertheless scarcely visible to the naked eye. As I have already observed, some small granules are also found on the postero-lateral margins, but the rest of the upper surface is not granular behind the cervical suture. The upper surface is everywhere minutely punctate and covered with a short down, which conceals the minute granulation of the anterior half.

The front measures a third of the breadth of the cephalothorax, and is considerably deflexed and slightly prominent; as in *P. vespertilio*, it is divided by a triangular median incision into two broad, rather truncate, and slightly oblique lobes, with minutely granulated anterior margins, external to which a small

acute tooth is present on each side, which is separated from the median lobes and from the obtuse, slightly granular, internal orbital angles on each side by a small cleft. The orbits have the usual size and form; the upper orbital margin presents two fissures by which it is divided into three portions, the two external of which are covered with a few granules, whereas the much larger internal portion is almost smooth.

The external orbital angle is little prominent, and not spiniform; it is separated by a small hiatus from the inferior orbital angle, which is denticulate, being armed with six or seven acute teeth besides the also denticulate internal lobe, which projects as much forward as the external frontal teeth. The antero-lateral margins are shorter than the postero-lateral; they are armed, behind the little prominent external orbital angle, with three acute, dark-pointed, spiniform teeth. The external margin of the first antero-lateral tooth, *i. e.* the outer orbital angle, is minutely denticulate, and the external margin of the second antero-lateral tooth, which is spiniform, is also somewhat granular at its base. The external margins of the two posterior antero-lateral teeth are quite smooth. A subhepatic spine which occurs in so many species of this genus is wanting in *P. Andersoni*, its place being occupied by a small, somewhat prominent, acute granule. The postero-lateral margins are straight and very slightly concave. The posterior margin of the carapace is bordered by an impressed line, running close to and parallel with it. The external antennæ are long, measuring twice the distance of the internal and external angles of the orbits, and they reach almost to the penultimate antero-lateral spine. When the cephalothorax is viewed from above, the antennal peduncle is visible in the cleft or hiatus that separates the internal orbital angles from the external frontal teeth; its basal joint, which scarcely reaches a process of the external frontal tooth, is twice as long and nearly twice as broad as the next or penultimate joint. The terminal joint projects beyond the front, and is scarcely shorter than the second joint.

The subhepatic and pterygostomian regions of the carapace are covered with a short down and with numerous minute granules; those which are found on the anterior portion of the subhepatic region are a little larger than the others. The endostome is distinctly longitudinally ridged. The anterior margin of the epistome is granular, the posterior margin, *i. e.* the anterior margin of the buccal cavity, is sharp, and similar to that of

P. vespertilio. The outer foot-jaws also resemble those of that species; they are covered with a short pubescence and fringed with yellow hairs along their inner margins. The sternum and the abdomen are covered with a short down, the abdomen, both in the male and in the female, being similar to that of *P. vespertilio*. The abdomen of the female is fringed with long hairs on the lateral margins.

The chelipedes are very unequal: in three specimens the right hand is the largest, in the fourth it is the left. The anterior margin of the basipodites is armed with three or four acute granules. The arms scarcely project beyond the lateral margins of the cephalothorax; the upper margin is armed with two somewhat arcuate, dark-pointed, acute spines at the distal end, the larger of which is situated a little behind the distal spine, which is itself accompanied by a somewhat smaller spine at its base. Behind these large spines the upper margin is further armed with four or five acute granules, which gradually decrease in size towards the proximal end. The anterior margin of the arm presents three or four acute teeth along its proximal half, and the under margin is also granulo-spinulous. The under surface of the basipodites and of the arms is a little granular; the concave inner and the scarcely convex outer surfaces are a little punctate but nearly smooth, the outer surface being only slightly granular near its margins. The wrist is armed, at its internal angle, with an acute spine, and the upper surface is granulo-spinulous, being covered with many small acute tubercles or granules, especially along the inner margin and anteriorly (distally). In its outer appearance the larger hand is similar to that of *P. vespertilio*. The larger hand is nearly twice as long as high (at the base of the fingers), the fingers being included, and quite as long as the length of the cephalothorax. The convex outer surface of the palm is more or less granulo-spinulous on the upper margin and on a proximal area; around the articulation of the wrist, the distal portion of the palm, and the rounded under margin are quite smooth and glabrous. As already remarked, the size of the granulo-spinulous area of the outer surface of the palm is a little variable, the smooth portion of the outer surface being in some specimens larger than in others. In one of the specimens from King Island, the whole under margin of the palm is smooth, and the granules are even wanting at the distal end of the upper margin, so that the granulo-spinulous area only

occupies the proximal third of the outer surface. In the largest specimen, on the contrary, the larger proximal half of the outer surface is granulo-spinulous, and some granules are also found at the proximal end of the under margin. The granules of the granulo-spinulous area are of unequal size and are acute; some larger granules are often observed in two rows on the upper margin, and irregularly spread over the outer surface, whereas others of smaller size are distributed between the large granules. In other specimens the granules which are found on the upper margin are smaller than those of the outer surface. The somewhat convex inner surface of the palm is quite smooth in the three smaller specimens, but a little granular on the middle in the largest. The dark-coloured fingers are shorter than the palm, and are nearly similar to those of *P. vespertilio*; they meet along their inner margins, and have pointed, crossed tips. The mobile finger is covered above at its base with a few granules, but otherwise it is quite smooth and glabrous, presenting, however, some longitudinal lines of punctulations. The inner edge is feebly denticulate, a somewhat larger (longer) tooth being found at the base, and the inner surface bears a few small tufts of short hairs along the inner edge. The immobile finger presents an impressed, punctate, longitudinal line on the outer and on the inner surface; its inner margin is provided with six teeth, which are stronger than those of the mobile finger, and the third of which is the largest; on the inner surface this finger also bears a few tufts of short hairs.

The hand of the smaller chelipede is much smaller and comparatively more slender than the larger hand. The smaller hand is a little shorter than the other, but much lower, its height measuring scarcely more than a third of the length, the fingers included. The whole upper surface of the palm, including its upper and under margins, is covered with some large acute granules, which are comparatively a little larger than those of the larger hand, and are mostly arranged in six or seven longitudinal rows, two of which are found on the upper margin. The inner surface of the palm presents some acute granules. The fingers of the smaller hand, which are shorter than the palm, meet along their inner margins, and have also pointed crossed tips. The lower finger is slightly deflexed, and rather profoundly sulcate both on its outer and its inner surface; the inner margin is armed with five or six teeth. The mobile finger, which is

a little granular and hairy above at the base, is also profoundly sulcate, and, as in the larger hand, its inner edge is more feebly denticulate than the lower finger. Both fingers present a few small tufts of short hairs internally along the inner edges.

The ambulatory legs resemble those of the European *P. hirtellus*, and are tolerably slender. The upper margins of the meropodites are armed with some acute spinules along their distal half, one of which is constantly found at the distal end; the other joints are unarmed. The dactylopodites are straight, a little shorter than the propodites, and terminate in an acute, slightly arcuate, horny tip.

The anterior legs are everywhere covered with a short pubescence, except the smooth distal portion of the outer surface of the larger hand, which is quite glabrous; the inner surface of the palms and the fingers are also glabrous and naked. The ambulatory legs present everywhere the same pubescence, and are fringed moreover along their upper and under margins with rather long hairs, especially along those of the last three joints.

Dimensions of the largest specimen:—

	millim.
Length of the cephalothorax	$13\frac{1}{2}$
Breadth of the cephalothorax, the lateral spines included	$18\frac{3}{4}$
Distance between the internal orbital angles	$6\frac{3}{5}$
Length of the larger hand	$13\frac{1}{2}$
Height of the larger hand at the base of the fingers	$6\frac{1}{2}$
Length of the smaller hand	$10\frac{3}{4}$
Height of the smaller hand	$4\frac{1}{5}$
Length of the ambulatory legs of the penultimate pair	32

The female bearing eggs is 15 millim. broad.

According to Prof. Milne-Edwards, this new species differs from *Pilumnus Peronii*, M.-Edw., by a less globular cephalothorax, the upper surface of which is more granular, by a less advanced front, and by more pointed and more delicate anterolateral spines.

P. cursor, A. M.-Edw., from New Caledonia and Upolu, is also closely allied to our species. In *P. cursor*, however, a typical specimen of which I have before me, the inter-regional grooves are more distinctly indicated, the whole outer surface of the larger hand is covered with granules, and the fingers of the larger hand are profoundly sulcate, at least in the typical specimen, which

TREASURER'S Account for the year from May 1, 1886, to April 30, 1887. (Presented at the Anniversary Meeting, Tuesday, May 24, 1887.)

Receipts and Payments.

Receipts.	£	s.	d.
Balance at Bankers' on 1st May, 1886	381	12	9
Interest on Investments	190	14	0
Admission Fees	288	0	0
Annual Contributions	1260	3	0
Compositions	180	0	0
Sales of Publications:—			
Transactions £145 16 7			
Journals 116 10 10			
Proceedings and Catalogues 3 1 6			
	265	8	11
Donation	113	10	2
	£2679	8	10

Payments.	£	s.	d.
Taxes and Insurance	22	13	9
Repairs and Furniture	38	0	10
Coals and Gas	69	5	0
Salaries and Commission	431	13	4
Library:—			
Books £140 6 5			
Binding 82 8 2			
	222	14	7
Expenses of Publications:—			
Printing £583 15 6			
Illustrations 631 5 5			
Distribution 68 7 4			
	1283	8	3
Miscellaneous Printing and Stationery	65	14	0
Petty expenses (including Tea and Postage)	74	10	4
Investment	150	0	0
Balance at Bankers' on 30th April, 1887	321	8	9
	£2679	8	10

Investments on 30th April, 1887.

	£	s.	d.
Consols	3511	19	0
Metropolitan Board of Works 3½ per cent. Stock	1184	15	11
Great Indian Peninsula Railway 5 per cent. Guaranteed Stock	938	14	0
Do. Do. Do. 4 per cent. Debenture Stock	108	0	0
Forth Bridge Railway Co. 4 per cent. Stock	495	0	0
	£6238	8	11

FRANK CRISP, *Treasurer.*

The foregoing accounts have been examined and found correct. { FRED. V. DICKINS. WILLIAM CARRUTHERS, ALBERT D. MICHAEL, B. DAYDON JACKSON, } *Auditors.*

May 12, 1887.

NOTICE.

THE irregularity in the issue of Numbers of the Journals in sequence is due to separate Volumes being issued concurrently.

Journal of Zoology.

Vol. XX., when completed, will contain **Nos. 116 to 125** inclusive.

Of this Volume there has been published Nos. 116, 117, and 118.

Vol. XXI.—Devoted to the Fauna of the Mergui Archipelago, when completed, will contain **Nos. 126 to 135** inclusive.

Of this Volume there has been published Nos. 126, 127–128, and 129.

Vol. XXII. will consist only of Dr. De Man's Crustacea of the Mergui Archipelago, commencing **No. 136**, and this Volume may run to six Parts.

Fellows are requested to compare the Numbers given above with their series, before inquiring as to supposed missing Parts.

For issues of Botany, see notice on back of the wrapper of the Botanical Journals.