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XIX.—*On the Classification of some British Fossil Crustacea, with Notices of new Forms in the University Collection at Cambridge.*
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THE class Crustacea having received less attention from British palæontologists than perhaps any other of similar importance, I have put together in the following pages a few observations I have been able to make on the examples in the collection of the University of Cambridge, as well as on a great number of specimens of the same species, for the most part finely preserved, lent me by various friends to render my observations as perfect as possible. I have given descriptions of some of the best-marked new species, also of some new genera; I have endeavoured to refer some others, hitherto improperly placed in recent genera, to the various fossil genera established by foreign writers for cognate forms, and have ventured a few suggestions on the classification and systematic position of some of the groups.

Class CRUSTACEA.

Ord. PODOPHTHALMA. Tribe DECAPODA.

(*Brachyura*.)

Of this the most highly organized group of Crustacea, I believe the following genera have been quoted from British rocks without sufficient authority: viz. 1. *Zantho* (Leach); this has been quoted with doubt by Desmarest, Bronn, &c. from the London clay; I have ascertained that the crustacea referred to are of an extinct genus, more nearly related to *Pilumnus* than to *Zantho*, which I have named *Zanthopsis*. 2. *Orithya* (Fabr.): M. Deslongchamps referred with doubt a crustacean originally discovered by Sir Henry de la Beche in the greensand of Lyme Regis, to this recent genus of natatory *Brachyura*; I find however that the species referred to (*O. Labechii* of Desl. Mém. de la Soc. Linn.

de Normandie, Morris's Catalogue, &c.), and some similar forms from the gault, form a peculiar genus intermediate between *Homola* and *Corystes*, and belonging not to the *Brachyura* but to the *Anomura*, for which I have proposed the name *Podopilumnus*. 3. *Inachus*: Desmarest (Crust. Foss.), Morris (Catal.), and several other authors have quoted a species of this genus as found fossil in the London clay:—the figures and descriptions which I give below, from the abundance of perfect specimens which I have examined, leave no room for doubt that the fossil in question does not belong to the *Brachyura* but belongs to the *Anomura*, and forms a particular genus allied to *Notopus*, *Dorippe* and the like, to which I have given the name *Notopocorystes*. 4. *Corystes* (Latreille): the gault fossils referred to this genus in Morris's 'Catalogue' belong to the same Anomurous genus as the so-called *Orithya*.

Zanthopsis (M'Coy), n. g.

Gen. Char. Carapace suborbicular or transversely oval, gibbous, strongly arched from before backwards; gastric region very large, tumid, depressed in the middle towards the insertion

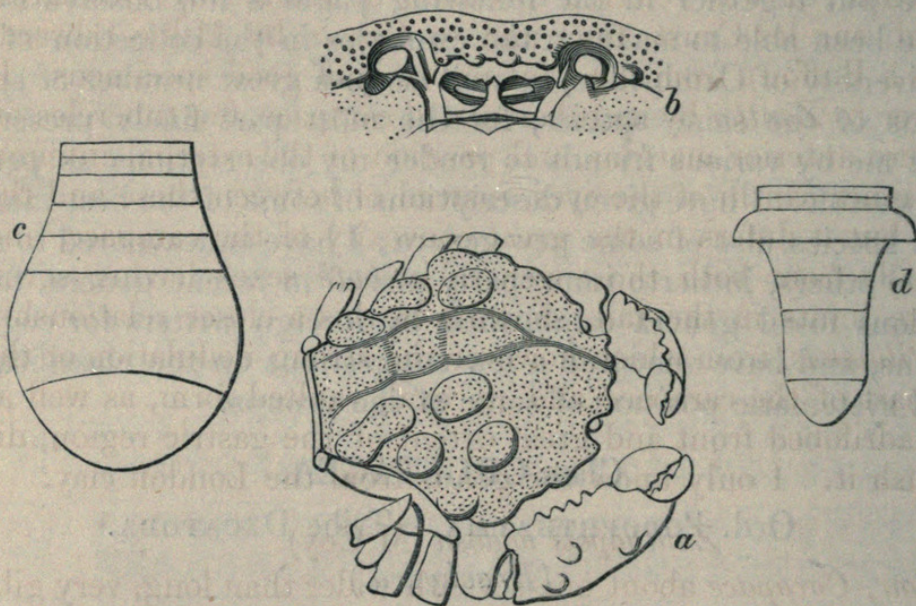


Diagram of the genus *Zanthopsis*.

- a.* Entire animal as far as known; *b*, view of the front from below, showing the internal antennæ lodged in their transverse fossæ, and the position of the outer pair in the inner canthi of the orbits; *c*, abdomen of female, nat. size; *d*, ditto of male, nat. size.

of the *genital region*, which is very small, pentagonal, and not extending more than one-third the length of the carapace towards the front, generally divided by a transverse depression into two portions, the hinder of which is most prominent and equal in width to the *cardiac* and *intestinal regions*, which are longer than broad, and form together a tumid ridge of three

obtuse oblong nodules (defined by a hollow along each side smoother than the rest of the carapace); *branchial regions* with four large tubercles, two before and two behind, the inner posterior one elongate obliquely backwards and outwards; *front* four-lobed (including the prominent inner angle of the orbit); *orbits* large, the two lateral and the inferior angles prominent; *latero-anterior margin* with about three tubercles or spines on each side, the posterior pair largest, placed at the greatest width of the carapace, and in a line with the sulcus separating the genital and cardiac regions; *surface* minutely and closely pitted; *antennæ* as in *Zantho* (outer pair in the inner canthi of the orbits, inner pair in deep transverse fossæ beneath the front); *eyes* on very short peduncles; *tail* of seven distinct pieces in both sexes; *first pair of feet* forming robust, unequal chelæ; *hand* subcompressed, nodulated, with the upper and inner edge tuberculato-dentate; *fingers* short, with few large obtuse teeth; *four hind pair* moderate, subequal, slightly compressed, smooth.

The *Cancer Leachii* (Desm.) may be looked on as the type of this genus; it was referred to *Cancer* or *Zantho* by Desmarest (Consid. sur les Crust. fos.) and to *Cancer* by Milne-Edwards (Suites à Buffon), from the want probably of good specimens. It is nearer to *Zantho* by its tuberculated carapace, few tubercles on the latero-anterior margins, and position of the external antennæ at the inner canthi of the eyes, instead of between these and the front; but it differs in the great convexity of the carapace, and materially from both those genera in *both* sexes having seven separate joints in the tail, showing in this a closer relationship with *Pilumnus*, from which however the strong nodulation of the hind part of the carapace and its oval, vaulted form, as well as the quadrilobed front and great extent of the gastric region, distinguish it. I only know the genus from the London clay.

Zanthopsis nodosa (M'Coy).

Sp. Char. *Carapace* about one-seventh wider than long, very gibbous in the middle, sloping gradually to the sides, more rapidly towards the posterior margin, falling most rapidly and with an abrupt curve towards the front; anterior half broadly rounded, each antero-lateral margin with three large, obtusely rounded, nodular tubercles gradually diminishing towards the front; tubercles of the branchial regions very prominent as large obtuse nodules; *gastric region* tumid with a shallow depression along the middle; *genital region* small, prominent, strongly divided by a wide transverse depression, posterior half most prominent, obscurely bilobed; hollow space on each side of the mesial regional ridge remarkably smooth; *chelæ* of the male rather larger than of the female, the upper ridge of the right

(large) hand with six or seven conical tubercles, that of the left with about four, outer side of each hand with two very obscure small tubercles near the carpus, and one much larger but less distinct near the origin of the fingers; two blunt teeth on the inner edge of each finger; *tail* of the female broad ovate, of the male narrow hastate, terminal joint triangular, about $\frac{1}{5}$ th wider than long, penultimate joint the same length but a little wider, third joint much wider than the others, but shorter than the fourth or fifth. Length about 1 inch 9 lines, width 2 inches.

Common in the London clay of Sheppey.

(Col. University of Cambridge and Mr. Bowerbank.)

Zanthopsis bispinosa (M'Coy).

Sp. Char. Carapace transversely oval, about one-fifth wider than long, gently convex, two posterior pair of tubercles of the antero-lateral margin forming short, flattened, sharp spines, the anterior one forming a small, very obtusely angular projection; crest of the large hand with four or five tubercles, outer side with two strong elongate tubercles near the carpus, and one large obtuse one near the origin of the fingers; *tail* of the female broad oval, the last and the penultimate joint of equal length, the latter twice as wide as long, fifth joint half the length of the penultimate.

This is considerably wider and flatter than the *Z. nodosa*, and the tubercles on the branchial regions and those formed by the genital, cardiac and intestinal regions are much less prominent; the hollow space along each side of the ridge formed by the medial regions is punctured almost as strongly as the rest of the carapace; the tubercles on the ridge of the hand are fewer, but those on the outer side much more strongly marked; it is moreover easily distinguished by the two hind pair of tubercles of the antero-lateral margins forming depressed sharp spines in the one and large obtusely rounded nodules in the other. Length of carapace 1 inch 9 lines, width 2 inches 3 lines.

Common in the London clay of Sheppey.

(Col. University of Cambridge and Mr. Bowerbank.)

Zanthopsis unispinosa (M'Coy).

Sp. Char. Carapace suborbicular, length and width nearly equal, evenly gibbous, sloping almost equally to the front and to the back; tubercles of the branchial and medial regions nearly obsolete, flattened, obscurely defined; antero-lateral margin with the posterior tubercle on each side forming a strong, short, depressed triangular spine, the two anterior pair almost obsolete, each indicated by a faint wave in the margin. Length of carapace 1 inch 6 lines, width 1 inch 8 lines.

This rare species is distinguished from the common *Z. nodosa* and *Z. bispinosa* by its more uniform convexity and by the orbicular form produced by the length so nearly equaling the width, as well as the single, angular, pointed spine on each side. The different projections on the posterior half of the carapace are much less strongly marked than in the other species, though having the same form and position.

Rare in the London clay of Sheppey.

(Col. University of Cambridge.)

Of this genus (*Zanthopsis*) authors describe from the London clay at Sheppey the *Cancer Leachii* (Desm.), which from the imperfection of the specimen described originally (even the margins of the carapace being absent), I do not think it is possible to recognise with any certainty. Also belonging to it and from the same locality is the *Brachyurites hispidiformis* of Schlotheim (Nachtr. z. Petrefactenk. t. 1. f. 3), which for a wonder has escaped insertion in my friend Mr. Morris's elaborate 'Catalogue'; it has the exact form and strong nodulation of the *Z. nodosa*, but having the two posterior pair of spines even more produced and slender than in the *Z. bispinosa*.

Podopilumnus (M'Coy), n. g.

Gen. Char. Carapace having the front and antero-lateral margins forming a semielliptical curve, antero-lateral margins not compressed, tumid, obtusely rounded, with about three small spinose tubercles; front narrow, slightly projecting, deeply four-lobed (including the inner angles of the orbits), with a shallow furrow extending a short way on the back from the middle notch; orbits large, oval, lower margins denticulated, a small fissure in the under margin at the outer angle (and a doubtful trace of one in the upper margin); posterior lateral margin straight, longer than the anterior, converging towards the truncated base; posterior half of the carapace flat-

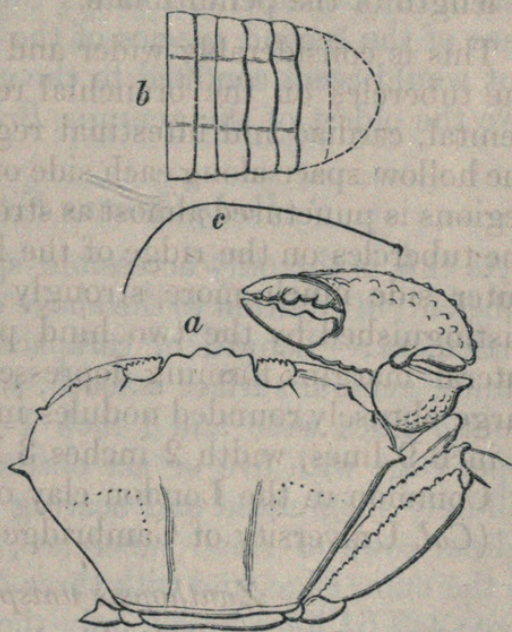


Diagram of the genus *Podopilumnus*.

a. Carapace, thighs and chelæ; *b*, abdomen of female, the two last dotted joints put in from their impressions on the breast-piece; *c*, profile of carapace showing the abrupt downward curve of the front.

tened, anterior half abruptly sloped downwards towards the front; whole surface even and nearly smooth, the only regions defined are the cardiac and intestinal, which are marked by shallow furrows (*P. Peruvianus*); sides minutely granular; abdomen of the female broad oval (apparently of seven joints); four hinder pair of feet subequal, slightly compressed, very long, the thigh (or third joint) alone equaling the posterior lateral margin of the carapace in length; *chelæ* short and strong.

So far as the imperfection of the specimen allows of examination, the most striking difference between the present genus and the recent *Pilumnus* consists in the great proportional length of the legs, which are rather longer and more slender than those of the *Galene Natalensis* of Krauss (see his Südafrikanischen Crust. t. 1. f. 4), to which it bears some resemblance; the tail of the female is more ample, and the tumid rounding of the antero-lateral margins and their small uncompressed spines contrast strongly with the similar parts in the recent genus. The only two known species are the following, and the so-called *Portunus Peruvianus* figured by D'Orbigny in the geological volume of his great 'Voyage dans l'Amérique méridionale' (t. 6. f. 17), of uncertain origin, but which he suspected to have come from the cretaceous beds of the Cordillera; a view I think confirmed by the geological place of the second species of the genus, which therefore at present would seem confined to the cretaceous system, and is I believe the oldest of the genuine *Brachyura* known.

Podopilumnus Fittoni (M'Coy).

As this is the only accessible species of the genus, it will be sufficient, in addition to the above characters, to add the following particulars:—Length of carapace 1 inch 5 lines, width 1 inch 9 lines, general surface smooth, sides minutely granular; *hands* about 7 lines wide and 1 inch 1 line long, the obtusely keeled upper edge with five or six obtuse tubercles, the outer surface minutely shagreened and bearing three or four irregular longitudinal rows of small tubercles; *fingers* short, curved, rounded on the outer edge, and with three or four blunt teeth on the inner edge; *tail* $6\frac{1}{2}$ lines broad, only the five proximal joints preserved, but the fifth being about the same length as the fourth, it is probable the remaining two were distinct, it being generally at that part of the tail that ankylosis occurs in those genera which have less than the normal number of abdominal or tail segments.

Greensand of Lyme Regis.

(Col. University of Cambridge.)

(Anomura.)

Basinotopus (M'Coy), n. g.*

I propose this genus for the reception of a very common crustacean of the London clay at Sheppey, originally figured and

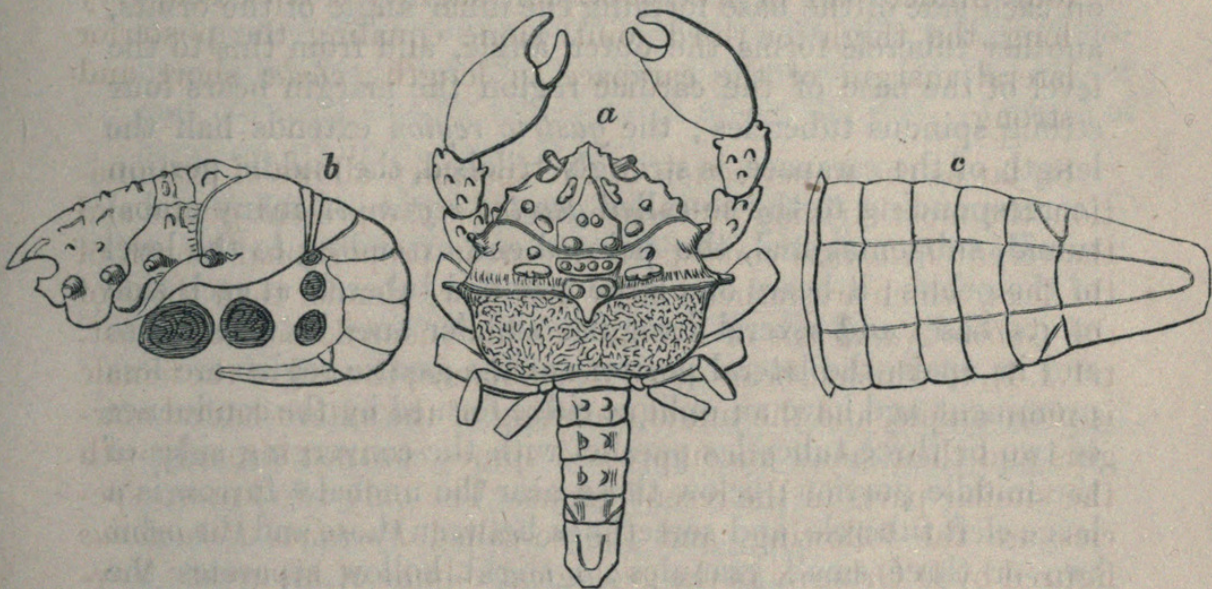


Diagram of the genus *Basinotopus* (nat. size).

- a.* Male specimen seen from above; *b.* profile of female specimen showing the tumid pterygostomian region and the elevation of the two hinder pair of legs over the third pair; *c.* abdomen of female, showing the triangular intercalated pieces between the fifth and sixth joints.

described by Desmarest in his 'Histoire naturelle des Crustacés Fossiles' under the name of *Inachus Lamarckii*, but which I have ascertained, from the examination of numerous finely preserved specimens, not to belong to the genus *Inachus*, nor even to the Brachyurous division, but is truly Anomurous, retaining the little triangular plate between the fifth and sixth joints of the tail, indicating the presence of a caudal fin in the young, and also having the two hind pair of feet disproportionally small and elevated as in *Homola*, *Dorippe* and *Notopus*, &c., from all of which it differs in the large peculiar posterior or basal space behind all the other regions on the carapace (from which the genus derives its name), besides other less striking characters. As there is but one species known, which never has been very fully described, I subjoin a description comprising the generic and specific characters for the present.

* On recognizing at first the Anomurous nature of this fossil, I thought it might be the generic type named *Dromilites* by Dr. Milne-Edwards in the number of 'l'Institut' for August 1837 from Sheppey, but having lately had the pleasure of showing him the specimens, I find that though closely allied they are yet distinct.

Basinotopus Lamarckii (Desm. sp.).

Syn. *Inachus Lamarckii* (Desm.).

Carapace broad ovate, very slightly longer than wide, gibbous; *rostrum* short triangular, deeply channeled, bent downwards and with a small tooth on each side, a strong rough tubercle on each side of the base forming the inner angle of the orbits, another tubercle forms the outer angle, and from this to the level of the base of the cardiac region the margin bears four strong spinous tubercles; the *gastric region* extends half the length of the carapace, is strongly trilobed, the middle portion (corresponding to the so-called *genital region* of many crabs) tumid, subpentagonal, the pointed end extending to the level of the orbits; it bears one large rounded tubercle at each side of its base, and several irregular smaller ones between those and its apex; the lateral portions of the gastric region are less prominent and have an oblique ridge formed by the confluence of two or three tubercles parallel with the converging sides of the middle portion; below those near the nuchal* furrow is a large cleft tubercle, and sometimes between those and the orbit two or three small granules; a slight hollow separates the gastric from the small square *hepatic regions*, which correspond on each side to the two anterior marginal spines, each bears one tubercle in its middle; *pterygostomian regions* very tumid, mammillated; *branchial regions* very large, each divided about the middle by a strong, prominent transverse ridge extending from the cardiac region to the fourth (or last) great marginal spine; the anterior edge of this ridge is plicated, and the space between it and the nuchal furrow bears two tubercles, the anterior smallest; the large, peculiar basal space behind these ridges is continuous from side to side behind the intestinal region; it is closely pitted and rough with minute wrinkles; *genital region* forming a narrow transverse tuberculated ridge, its length being only one-fourth of its width, which equals that of the *cardiac region*, which is very gibbous, rotundato-quadrate, and bearing a large hemispherical tubercle on each side; *intestinal region* forming only a small mucro, imperfectly separated from the cardiac, and not extending more than half-way into the rough basal space towards the posterior margin; *abdomen* of six joints, in the male narrow, with nearly parallel sides, obscurely trilobed longitudinally, the first joint very

* I use this term to designate that most important and constant of all the furrows of the carapace—namely that which runs transversely across the back, forming the posterior boundary of the gastric and anterior hepatic regions; it is especially strong, and frequently the only furrow, in the carapace of the *Macrura*, and corresponds on the back to the line of separation between the cephalic and thoracic segments beneath—the *neck* as it were, whence the name.

small and smooth, second, third and fourth each with a pair of tubercles on the elevated middle portion, fifth smooth, with a small triangular piece (remains of the embryonic tail-fin) on each side between it and the sixth or last joint, which is subpentagonal and rather more than twice the length of the fifth; tail of the female broad ovate, smooth, trilobed; *anterior pair of feet* forming short robust chelæ, with scattered spinose tubercles; the others small and smooth, the two hinder pair abruptly smaller and elevated above the rest. Length of carapace 10 lines, width 9 lines.

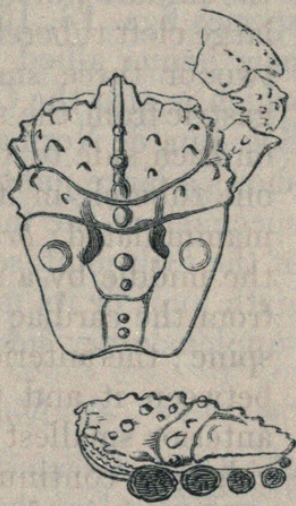
Common in the London clay of Sheppey.

(Col. University of Cambridge and Mr. Bowerbank.)

Notopocorystes (M'Coy), n. g.

Etym. *νωτος*, *dorsum*, *ποὺς*, *pes*, and *Corystes*.

Gen. Char. Carapace longer than broad, ovate, depressed, with scattered tubercles, anterior half broadly rounded and furnished with a few strong marginal teeth; posterior lateral margins acute, straight, rapidly converging towards the base, which is narrow and deeply emarginate; *front* forming a short triangular rostrum, depressed in the middle, and with a small mesial ridge; *orbits* large, transversely oval, complete below and above, with two longitudinal fissures in the upper margin; *gastric region* very large, rhomboidal, defined posteriorly by a strong obtusely angular nuchal furrow pointing backwards, slightly convex, extending nearly the width of the carapace, leaving a very small obscurely defined *hepatic region* on each side; *genital region* very small, about twice as wide as long, not dividing the gastric region; *cardiac region* moderately large, hexagonal, with a small deep lunate fossa on each side at its junction with the genital region; *intestinal region* narrow; *branchial regions* large, each divided by a shallow furrow proceeding from the base of the genital region to the lateral margin on each side, parallel with the nuchal furrow; *pterygostomial regions* very tumid; first pair of feet short, robust, didactyle spinulose; fifth pair of feet disproportionally small and elevated above the level of the others; *abdomen* of the male narrow (? six-jointed).



Back view and profile of *Notopocorystes*.

This little genus completes the chain of affinities between the recent genera *Homola* and *Corystes*, rendering the transition per-

fect from the *Anomura* to the *Brachyura*. In the general form of the carapace, of the rostrum, in the completeness and form of the orbits with the two fissures in their upper edge, it so exactly resembles *Corystes* as to have even deceived Dr. Leach, the first crustaceologist of his day (see Mantell's Geol. of Sussex, p. 97). I first suspected its anomurous nature from observing the faint sulcus dividing the branchial regions as we so commonly see in the short-tailed *Anomura*, and subsequently was gratified by the Woodwardian Inspectors with the sight of a little specimen of the *N. Mantelli* (M'Coy) in the old cabinet left by Woodward to the University of Cambridge, showing the chelæ and bases of all the feet, proving the posterior pair to be abruptly smaller than the preceding ones and elevated above them, and completely establishing the position of the genus: curiously enough, the entry of this specimen in Woodward's MS. Catalogue indicates the same analogy with the recent form which Dr. Leach pointed out so many years afterwards. This genus includes the "*Corystes*" of Leach and Mantell (Geol. Suss. p. 129. figs. 9 & 10), also the species figs. 13, 15, 16 of the same plate, and the "species of a new genus allied to *Arcania*," figs. 7, 8, 14 of the same plate, which is also the *Orithya Bechei* of Deslongchamps (Mém. de la Soc. Lin. de Normandie). Dr. Mantell in the above plate, fig. 15, shows a large joint in the abdomen below the fifth large one; the specimen of the tail which I have seen is broken before the end of the fifth joint, so that I have no independent authority for the sixth joint or its mode of junction with the fifth, or whether the supplementary side pieces occur between them.

Notopocorystes Mantelli (M'Coy).

Sp. Char. Greatest width of *carapace* (at base of gastric region) one-fifth less than the length; three strong teeth on the antero-lateral margin, the middle one largest, placed at the end of the nuchal sulcus, the lower one between the first and the end of the faint branchial sulcus, at the end of which a fourth small tooth is found; *gastric region* with a narrow mesial ridge from the rostrum bearing three small tubercles on its posterior half; each side of this region has a row of three tubercles running parallel with the gastric or nuchal furrow, the space between them being about equal to their distance from that furrow; behind the inner tubercles of each row is one rather smaller; the *genital region* bears one elongate tubercle in the middle; *cardiac* and *intestinal regions* with a mesial ridge, the former bearing two large and the latter two small tubercles; *branchial regions* with an obtuse boss close to their upper internal angle, and two equidistant tubercles on each side in an oblique line to the second marginal tooth close under the

nuchal sulcus ; *pterygostomian* regions marked with large longitudinal furrows and a few rows of sharp granules ; surface minutely granulated. Length from 9 lines to $1\frac{1}{4}$ inch.

I suspect that the figures in Mantell's 'Geology of Sussex,' t. 29. figs. 15 & 16, and possibly 9 & 10, may belong to this species, though rather more elongate than the specimens I have seen. The *N. Bechei* (Deslong. sp.) is broader, more quadrate, and has vertical rows of tubercles on the branchial regions. I have a sincere pleasure in dedicating this species to the indefatigable geologist, who in one of the earliest of his many valuable geological works, has given the only figures I believe extant of all the species of the genus.

Not uncommon in the greensand of Lyme Regis and in the gault of Folkestone.

(Col. University of Cambridge.)

Pagurus? platycheles (M'Coy).

Sp. Char. *Hands* nearly equal, very much compressed, broad ovate, width nearly three-fourths the length, the moveable finger little smaller than the other ; *carpus* trigonal, not so long as wide ; *surface* closely covered with very obtuse granules of unequal sizes. Length of left hand 10 lines, of right hand 8 lines ; width of left hand 7 lines, of right 5 lines ; length of *carpus* 4 lines, width nearly 5 lines.

One interesting specimen in the collection at Cambridge shows the two strong crustaceous hands *in situ*, while all trace of the body and abdomen have disappeared, which could scarcely have happened unless, as in the recent Hermit Crabs, those parts were almost membranous ; close under the right hand is a clear sparry cavity apparently indicating the place occupied by the soft perishable abdomen. The granulation of the surface resembles that of an *Echinus*. The species is remarkable for the width and brevity of its hands and wrists.

Not uncommon in the great oolite of Minchinhampton.

In connection with the group *Anomura* I may say a few words on a crustacean described and named *Ammonicolax longimanus* by Mr. Pearce (see Annals for September 1842), which he supposed to form a new genus of Hermit Crabs inhabiting the *Ammonites*. It seemed to me very incautious to infer that the *Ammonicolax* lived in the *Ammonites* on no better ground apparently than their co-existence in the Oxford clay at Christian Malford, and on recently examining two authentic specimens presented by Mr. Pratt to the University collection at Cambridge, I found that so far from being *anomurous*, the species had a well-

developed abdomen, caudal fins, remarkably large false feet, and all the characters of the *Macrura*, being in fact clearly referrible to the genus *Mecochirus* of Germar, so abundant in the upper oolitic schists of Bavaria, though not hitherto recognised in Britain. The five internal processes mentioned on each side are merely the indications of the *apodemata* or internal partitions between the gills, and present no peculiarities. As the specific name *longimanus* would be peculiarly inappropriate when this interesting little crustacean is placed in its true genus (nearly all the species of which have longer hands), it might provisionally bear the name of *Mecochirus Pearcei*.

(*Macrura*.)

In this group we find several fossil crustacea referred to recent genera in British works, without, I believe, just reason:—thus in Morris's Catalogue we find *Palinurus Seurii* quoted from Leeds, Yorkshire;—if this muschelkalk fossil is found there, it should be placed in the Triassic genus *Pemphix*, formed many years ago for it by Von Meyer, it having no relation to *Palinurus*. The recent generic name *Astacus* has also been much used for fossils of various ages, but I have not yet seen or heard of the real occurrence of that genus in the fossil state; most of the species will be noticed below under their respective genera.

Eryon Barrovensis (M'Coy).

Sp. Char. *Carapace* subovate, about one-eighth broader than long near the truncated posterior margin; *lateral margins* set with short tooth-like spines, two narrow incisions on each side, the hind pair a little in front of the middle, inclosing between them on each side a short rotundato-quadrate lobe; *front* narrowed, concavo-truncate, with the lateral angles slightly produced outwards; each of the *inner pair of antennæ* having their two setæ deeply divided, the outer one of each slightly longest, scale of the external antennæ large, the setæ scarcely thicker than those of the inner pair; *abdomen* exceeding the length of the carapace by only one-third the length of the outer tail-flaps, which latter are very broad and subquadrate at the end (resembling those of the *Eryon Hartmanni*); each of the segments except the first bears a large, oblong tubercle in the middle; *first pair of legs* robust, short, hand and carpus together nearly one-fourth less than the length of the middle of the carapace; *fingers* very slender, both pointed, of equal length, incurved at the tip, the moveable one most abruptly. Surface minutely granulated, with larger granules on the mesial ridge of the carapace. Length of carapace 2 inches, width 2 inches 2 lines; length of abdomen (to end of outer pair of

tail-flaps) 2 inches 2 lines ; length of hand 1 inch 3 lines, of carpus 4 lines, width of hand at middle $3\frac{1}{2}$ lines.

This is most allied to the only other liassic species which I am aware of, namely the *E. Hartmanni* of Herman von Meyer (see his "Beiträge zu Eryon" in the 18th vol. of the Nova Acta Acad. Cæs. Leop. Carol. &c.), from which it differs in its much shorter abdomen, a character which approximates it to the otherwise dissimilar *E. subpentagonus* (Münst.) and *E. arctiformis* (Schlot.) of the Kelheim and Solenhofen lithographic slates. In all the species described by Von Meyer and Münster the hand and carpus taken together equal or exceed the middle of the carapace in length ; this species is therefore most remarkably distinguished by the comparative shortness of its chelæ as well as their greater robustness.

Rare in the lias of Barrow-on-Soar.

(Col. University of Cambridge.)

Archæocarabus (M'Coy), n. g.

Etym. ἀρχαῖος, *antiquus*, and κάραβος, Aristotle's name for the *Palinurus* or spiny lobster.

Gen. Char. *External antennæ* very thick and long, the setæ of very short fimbriated joints ; *first pair of feet* much thicker than the others, the extremity of the penultimate joint dilated on its inner side to a broad, subtruncate, subcompressed hand as wide as the length of the curved terminal joint which is inflexed on it ; *four posterior pairs of legs* slender, compressed ; *carapace* semicylindrical, obtusely rounded above ; *nuchal furrow* very wide and deep, extending with a gentle backward curve across the carapace in front of the middle ; cephalic por-

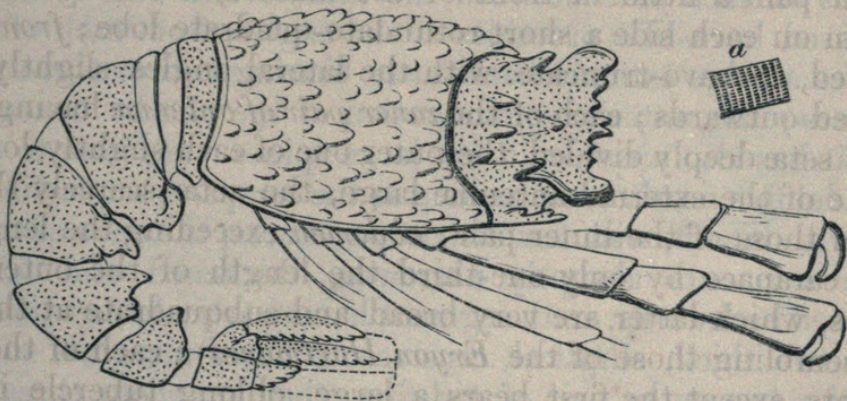


Diagram of *Archæocarabus*.

a. Portion of one of the outer antennæ.

tion depressed, front wide, subtruncate toothed, the lateral angles produced into large, flattened, slightly recurved spines over the eyes, shell below the orbits prolonged forwards into a thick spine ; *crust* excessively thin and fragile, covered with

coarse adpressed tubercles; *abdomen* very thick, rounded, nearly twice the length of the carapace, segments nearly smooth, punctured, their extremities broadly falcate; tail having the crustaceous portion at the outer margin of the base of the two outer pair of fins long, elliptical, strongly serrated on their inner edge.

In all the characters of generic importance which I have seen in these fossils, they approach the recent *Palinuri* or spiny lobsters, with the important exception of the structure of the first pair of feet, which in the recent genus are small, slender, and terminated by a simple point for walking only, forming a strong contrast with the present genus, in which they are powerful prehensile organs, much more robust than the other feet, broadly dilated towards the end, and terminated by a strong subcheliform claw. I only know the genus in the eocene tertiary strata.

Archæocarabus Bowerbanki (M'Coy).

Sp. Char. Carapace about 2 inches 4 lines long and 1 inch 9 lines wide, all behind the nuchal sulcus marked with large semioval flattened tubercles, their blunt apices directed forwards and encircled by a crescent of small pores; the largest tubercles are about the middle of the back, and have a few small ones irregularly placed in the intervals, towards the side-margins they become smaller and more equal; anterior or cephalic portion more nearly smooth, having only small, sharp, widely separated granules, one on each side of the middle near the base and one or two in the median line near the front much larger than the rest; front margin with about three denticles on each side between the middle and the broad compressed horn-like processes at the angles, from each of which latter a ridge extends backwards bearing two or three strong spines; the anterior prolongation of the cheeks beneath the orbit has also a row of a few large spines: *abdomen* to end of caudal fins nearly twice as long as the carapace, semicylindrical, nearly smooth, with few distant punctures, the ends of the first five segments abruptly narrowed, thickened and falcately curved backwards, sixth segment having articulated to each end the two thick, elliptical, crustaceous outer marginal supports of the two outer pair of tail-fins; they are about three times longer than wide, serrated on the inner edge: *first pair of feet* larger than the others, compressed, penultimate joint dilated towards the extremity into a flattened trigonal hand; *terminal joint* forming a strong, subcompressed, curved, moveable finger, as long as the truncated end of the preceding joint, to which it is opposed for prehension, the *arm* about as long as the *leg*

of the second pair; *carpus* about one-third the length of the arm and half the length of the hand, the width of which latter at top exceeds half its length; *three next pair of legs* compressed, gradually diminishing in size; fifth pair not seen. At about 2 inches from their bases the external antennæ are one-fourth of an inch in diameter.

I have great pleasure in dedicating this fine species to Mr. Bowerbank, who has done so much to illustrate the fossil botany and zoology of the London clay—his work on the former having almost created the subject; while the extraordinary extent and beauty of the collections which he has made of the other fossils of that formation are, I believe, quite unrivalled, and when fully published will demonstrate a richness in the fauna and flora of the eocene period in Britain for which few geologists are prepared. I have especially to record my obligations to him for sending me a large number of his choicest specimens of London-clay crustacea of those species which I informed him I was about describing from the Cambridge collection, but the specimens of which at my disposal did not fully exhibit all the characters of the species; and having mentioned my anxiety to render my descriptions of those as perfect as possible, without entering further on the extensive subject of the Crustacea of that formation.

The present species is usually found with the abdomen doubled close under the thorax, which latter is almost always crushed, owing to the fragile delicacy of the crust.

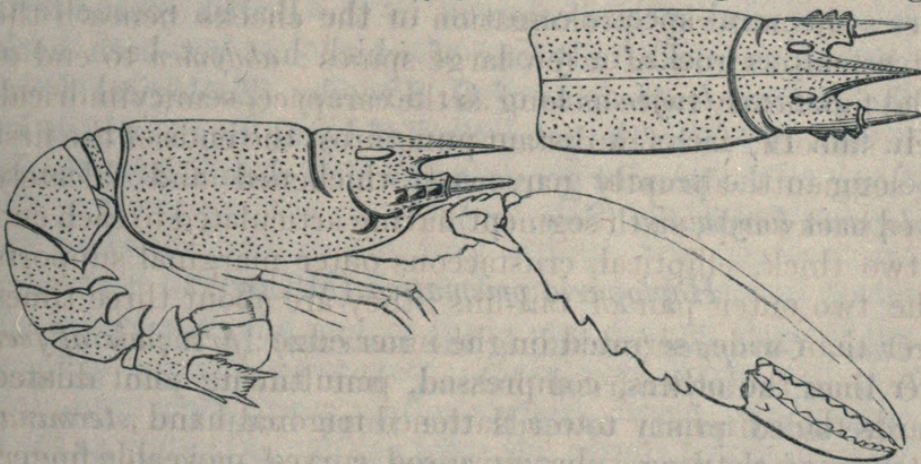
Rare in the London clay of Sheppey.

(Col. University of Cambridge and Mr. Bowerbank.)

Hoploparia (M'Coy), n. g.

Etym. ὄπλα, *arma*, and παρειά, *gena*.

Gen. Char. Carapace minutely granulose, oblong, tumid, slightly



Hoploparia.

compressed, a little deeper than wide, ending in front in a strong sharp rostrum, the sides of which are strongly carinate

and smooth, or with few very minute teeth; beneath the orbits the cheeks are prolonged forwards about half the length of the rostrum, and usually strongly keeled and spinose, forming a semicylindrical sheath over the base of the strong triangular scale of the origin of the outer antennæ, which reaches as far as the rostrum; *nuchal furrow* strongly marked across the middle of the back, but not reaching the marginal third of each side; *cheeks** impressed by a deep λ -shaped sulcus, one portion of which extends upwards nearly parallel with the nuchal furrow, the longer lower branch curves forward under the projecting part of the cheeks, and the shorter branch curves backwards under the end of the nuchal furrow; *abdomen* subcylindrical, smooth or slightly punctured, the second joint having broad, dilated quadrate ends, the third, fourth, and fifth terminating in triangular or broadly falcate extremities, the sixth having articulated to each end the two outer pairs of large trigonal tail-fins, the outer one on each side divided by a transverse suture rather less than one-third from the extremity; seventh joint (or middle flap of the tail) oblong, sides denticulated, extremity narrower than the base, and bearing a small spine at each corner; *first pair of legs* very long and thick, unequal, the larger claw with large blunt teeth, the more slender one with more numerous and equal smaller sharp teeth; the other legs slender.

In the general characters, so far as I have been able to ascertain them, these crustaceans coincide with the living genus *Homarus*, but are constantly distinguished by the sheath-like prolongation of the strongly ridged and spinose cheeks, the nearly smooth-sided rostrum, and the short distance which the nuchal furrow extends down the sides, as well as the separate λ -shaped cheek-furrow on each side, and the size of the antennary scale. There are several species common in the British eocene tertiary and cretaceous rocks, only one of which has yet been noticed, viz. the *Astacus longimanus* of G. Sowerby (Zoological Journal, vol. ii. tab. 17) from the greensand of Lyme Regis, which I find to belong to the present genus, and which should have the name *Hoploparia longimana* (Sow. sp.).

Hoploparia prismatica (M'Coy).

Sp. Char. Carapace (excluding the rostrum) $1\frac{1}{2}$ inch long, width 10 lines, subcylindrical behind, but having the section of a five-sided prism towards the front from the strong projection of the large, acutely angular cheek-ridges, which bear

* Or sides of the carapace immediately in front of each end of the nuchal furrow.

about three large sharp teeth each; *rostrum* large, deeply channeled in the middle, sides rising to very prominent keels minutely serrated towards the end, one elongate tubercle on each side of its base; *nuchal furrow* strong, ends curved forwards, but only extending about halfway from the middle of the back to the side margin; beneath and in front of each of its ends a very deeply marked λ -shaped sulcus; surface very closely and minutely granulated, punctured on the cardiac and intestinal region; ends of the abdominal segments broadly rounded with a small mucronate point directed backwards; the last two joints with rough transverse scale-like sculpturing, the others so finely granulated as to appear nearly smooth.

This species is remarkable for the size and prominence of its sharply angulated cheek-ridges; the surface, particularly of the abdomen, is more nearly smooth than in the other species which I have seen.

Common in the Speeton clay of Speeton, Yorkshire.

(Col. University of Cambridge.)

Hoploparia gammaroides (M'Coy).

Sp. Char. Carapace averaging from the orbit to the posterior side-margin $2\frac{3}{4}$ inches, depth $1\frac{1}{2}$ inch, minutely punctured on the middle of the back, coarsely squamoso-punctate on the gastric region, granulated on the sides, most strongly near the front lateral margins; *nuchal furrow* strong, but only reaching halfway down the sides, its middle portion equally distant from the edge of the orbit and posterior margin of the carapace, or slightly nearer the former; λ -shaped cheek-furrow deep; *rostrum* strongly bicarinate, with a ridge-like tubercle about two lines long on each side of its base, and one small tubercle at an equal distance below the first pair at the edge of the orbit; from a little behind the level of the orbit the cheek is elevated into a strong keel with about three large spinose tubercles, cheeks prolonged as a semicylindrical sheath to the outer antennæ half the length of the rostrum: *abdominal segments* very flat and smooth, the articular anterior portion scarcely convex, and the sulcus dividing it from the posterior portion not very strong, first segment closely punctured like the middle of the thorax, the dorsal portion of the others with the puncta slight and distant, flaps of the tail coarsely squamoso-punctate; *chelæ* very large, with a rude scale-like sculpturing of the surface, broad one having the hand as wide ($1\frac{1}{2}$ inch) as from the carpus to the base of the moveable finger, four large, short spines on the inner margin, moveable finger longer than from its base to the carpus; *carpus* with several thick short spines; smaller hand as long as

the great one, but about one-third less wide; other legs very slender (third and fourth pair about 3 lines wide), subcompressed, smooth.

This fine species much resembles our common recent lobster at first sight, and has as large or even more robust claws, but similarly armed: in by far the greater number of specimens the characteristic prolongation of the cheeks, with its spinose keel becoming fixed in the matrix, causes the entire front of the carapace from a little behind the rostrum to be broken off, and so leaving no trace of this part of the carapace, heightens the resemblance indicated by the specific name.

Common in the London clay of Sheppey.

(Col. University of Cambridge and Mr. Bowerbank.)

Hoploparia Belli (M'Coy).

Sp. Char. Carapace averaging from the orbit to the posterior side margin $1\frac{1}{2}$ inch, depth of side 9 lines, closely punctured on the middle of the back, and very closely and uniformly granulated over the sides; *nuchal furrow* considerably nearer the posterior margin of the carapace than the edge of the orbit (measured a little one side of the mesial line), its ends reach two-thirds of the way from the mesial line to the lateral margin; λ -like cheek-furrow strong; sheath-like prolongation of the cheeks obtusely rounded, the margins and lateral angles much inflexed, about half the length of the rostrum, two or three obtuse, undefined nodulations on the rounded prominence which extends backwards from its contracted carinate end towards the cheek-furrow; bayonet-shaped antennary scale narrow, extending as far as the tip of the rostrum; one blunt tubercle about twice its diameter from the median line on each side of the base of the rostrum, and another similar one at an equal distance below it on each side: *abdomen* thick, each segment having a gently convex smooth anterior articular portion divided by a strong deep furrow from the rest, which is flattened and very closely and strongly punctured; epimeral extremities of the first joint rudimentary, of the second broad, subquadrate, rounded on the anterior and external edges, subtruncate behind, with the angle forming a short spine, third, fourth, fifth and sixth terminating in broad triangular plates, slightly falcate, the sixth rather longer than the preceding ones, and having the posterior lateral angles produced backwards into a small spine on each side of the base of the seventh joint or middle tail-flap, which latter is subquadrate, its length and the width of the base being equal, narrowing towards the end, which is rounded and terminates at each angle in a small sharp spine; side margins thickened, minutely dentated: *first*

pair of legs closely scabroso-punctate; *chelæ* oval, very slender, about double the length of the carapace, not very unequal, greatest width about half the length from the base of the little finger to the carpus; section subrhomboidal, outer angle obtusely carinated, smooth, sides obtusely rounded in the middle, inner edge with two rows of about four large spiniform tubercles arched forwards; fingers about one-third longer than the base, equal, subcompressed, rounded, straight and of nearly equal width throughout, nearly smooth, with a raised line of very minute teeth on the inner edge; *carpus* small, section oval, scarce half the length from its tip to the base of the moveable finger, finely punctured, and with a few strong spines; *arm* compressed; the other legs slender and nearly smooth (third and fourth pair 1 line in diameter).

This species is much more common in the London clay than the *H. gammaroides* (M'Coy), which it resembles, although only half the length; it may be distinguished therefrom by the finer and more uniform granulation of the sides, the greater length of the *nuchal* furrow, and its being placed farther back towards the posterior margin; the cheeks, instead of being strongly carinated and spined, are only obtusely rounded and nodulated; the *chelæ* are more slender, and the segments of the abdomen differ in the present species, having the anterior smooth portion of each more convex and separated by a much deeper furrow from the posterior part, which in the *H. gammaroides* is closely punctate in the first segment only, the others being polished with comparatively slight distant puncta, while in the *H. Belli* the hinder parts of all the segments are equally rough with a coarse close-set punctuation.

I dedicate this species to Prof. Bell, from whose able pen we may one day expect an illustrated volume on all the crustacea of the London clay, for which I believe the most ample materials exist in metropolitan collections which will be at his disposal. Mr. Morris, in the preface to his Catalogue, mentions in the cabinet of Mr. Bowerbank alone, the perfectly astonishing number of twenty to thirty species from this formation. Upwards of a dozen beautifully perfect specimens of this species were most obligingly sent me by Mr. Wetherell, on our mutual friend Mr. Yates mentioning that I was about describing the species from the Cambridge specimens, but was very anxious to render my specific description complete by the inspection of more perfect specimens. Mr. Bowerbank also lent me charming specimens with the same object.

Common in the London clay of Sheppey, Hampstead, Bayswater, Primrose Hill, &c.

(Col. University of Cambridge, Mr. Bowerbank, Mr. Wetherell, &c.)



McCoy, Frederick. 1849. "XIX.—On the classification of some British Fossil Crustacea, with notices of new forms in the University Collection at Cambridge." *The Annals and magazine of natural history; zoology, botany, and geology* 4, 161–179. <https://doi.org/10.1080/03745486009494810>.

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