cuous, naked, and not very distant. The external antennæ have the peduncle about half the length of the moveable plate, which terminates in a small spine; its internal margin dilated and hairy. The internal antennæ are placed very little above the external, and terminate in two short filaments. The external pedipalps are of considerable length, extending forward beyond the peduncles of the external antennæ; the terminal joint much elongated.

The anterior legs are robust and smooth, the hands furnished with a curved moveable finger, which is inflected to meet a small spiniform rudimentary thumb. The remaining legs filiform, elongated; the second the most slender and minutely didactyle; the others monodactyle. A strong spine on the sternum between the anterior pair of legs. Abdomen regularly tapering, rounded, and smooth. The tail with the middle lamina narrow, and pointed at the extremity. Abdominal false feet very long.

Colour greyish-brown, dotted all over with dark brown. Unlike most of its congeners, it does not become red by heat.

Total length from the eyes to the extremity of the tail two inches and a half.

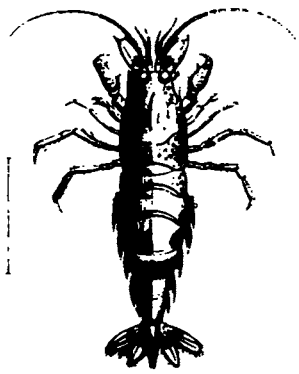
This is one of the most abundant of the coast species of Crustacea. It is taken in multitudes for the table on almost all our sandy shores, ordinarily by means of nets, which are pushed forwards by the "shrimpers," who wade nearly to their middle for hours together, raising the net at intervals, and taking out the shrimps, which are secured in a bag. In some parts of the coast, as at Poole, this species is comparatively rare, and is not used as food. The smaller *Palæmonidæ* are here called "shrimps;" and

when of small size and sold by measure, they are termed "cup-shrimps." The present species is called the Sand Shrimp, and the smaller prawns the Rock Shrimp.

In the breeding-season the shrimps approach the estuaries, and even ascend the rivers to a considerable distance.

"Although," says Mr. Thompson, "this species chiefly frequents sandy shores, I have occasionally seen it brought up in the dredge from deep water, and at a considerable distance from land, in the loughs of Strangford and Belfast. Mr. R. Ball mentions that shrimps, though taken in large quantities at Youghal, are held in little esteem; but that the prawn (*Palæmon serratus*), caught abundantly at spring-tides, is much thought of. This latter is called 'shrimp' there, the former the 'gray shrimp;' this term is also used in Smith's 'History of the County of Cork,' written nearly a century since."

The following observations I have selected from the late Mr. Hailstone's MS. Notes on the Crustacea of Hastings. "Although in general this species is very wholesome, yet instances occasionally occur in which it produces effects similar to those which sometimes follow the eating of mussels. They swim in the water or lie upon the sand in shoals, and are taken by a large net with a semicircular mouth, which the shrimper pushes before him along the bottom of the sea during the ebb-tide. In colour they so closely resemble the sand, that, in the pools left by the tide, they are with difficulty distinguished. They are in spawn throughout the year, and cast the shell in March, April, and May."



BANDED SHRIMP.

Crangon fasciatus. Risso.

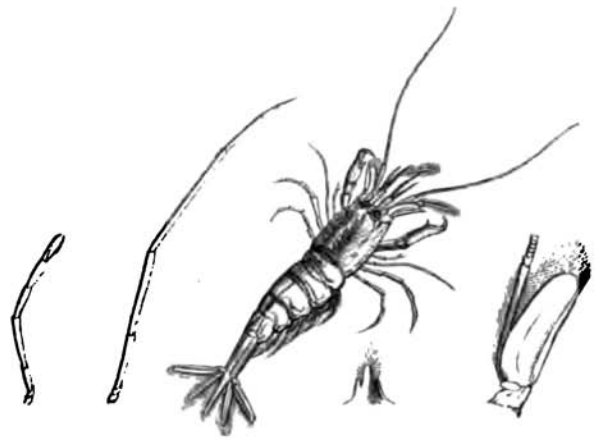
Specific Character.—Second pair of feet shorter than the first and third; abdomen smooth, rather suddenly contracted at the posterior third, with a broad brown band across the fourth abdominal segment: no sternal spine.

Crangon fasciatus, Risso, Crust. de Nice, t. iii. f. 5. p. 82.—Hist. Nat. de l'Eur. Mérid. V. p. 64. — Edw. Hist. des Crust. II. p. 342.

For the first time I am enabled to publish this interesting little species as indigenous to our coasts. I found three specimens amongst some small Crustacea, many of which were very interesting, sent to me by Mr. Alder, by whom they were taken in Salcombe Bay, Devonshire, in the course of his investigations on that coast in search of the nudibranchiate mollusca, the more immediate results of which are well known by the splendid work of that gentleman and Dr. Hancock, published by the Ray Society.

This species considerably resembles the common shrimp in its general aspect; but, besides being very much smaller, it differs from it in many particulars. The peduncle of the internal antennæ is proportionally much shorter; the spines on the branchial region of the carapace obsolete. The first pair of feet are robust, the moveable finger much curved; the second pair of feet shorter than the first and third, extremely small, minutely didactyle; the third pair very slender. The abdomen is as large as the thorax for rather more than half its length, and then contracts somewhat suddenly, by which it may be at once distinguished from young individuals of the other species. There is also a remarkable brown band across the fourth segment of the abdomen, and a spot or two of the same colour on the sides.

Total length six-tenths of an inch.



SPINOUS SHRIMP.

Crangon spinosus. Leach.

Specific Character.—Carapace armed with five longitudinal series of teeth; abdomen nearly smooth; the third and fourth segments slightly carinated; the fifth, sixth, and seventh, channelled.

Crangon spinosus,	Leach, Trans. Lin. Soc. XI. p. 346.—Lam. Hist. Nat. des Anim. sans Verteb. V. p. 202.
Pontophilus „	Leach, Mol. Brit. t. xxxvii. A.
Crangon cataphractus (in part),	Edw. Hist. des Crust. II. p. 243.

The carapace of this species is armed with five longitudinal series of teeth directed forwards. The laminar appendage of the external antennæ about the length of the peduncle of the same antennæ. Internal antennæ very short. First pair of feet strong, the moveable finger moderately curved; the second pair extremely small, but distinctly didactyle; the third pair very slender and fili-

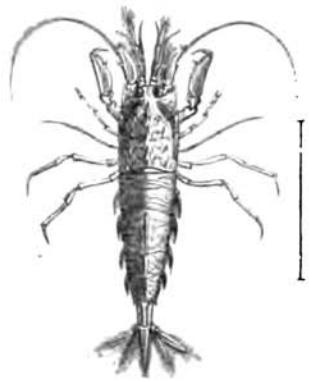
form; the fourth and fifth stronger. The abdomen is nearly smooth; the third and fourth segments obtusely carinated in the centre; the fifth with a triangular depression; the sixth and seventh distinctly channelled.

Length one inch and a half.

A careful examination of several British specimens of this species, and of a well marked one of the Mediterranean form, with which, I believe, it has been erroneously confounded, has led me to reject the alleged synonyms of Risso and Roux, which appear to me to belong to a very distinct species. I am not aware of the grounds upon which Dr. Milne-Edwards has considered the *Egeon loricatus* of Risso as the male of the *Pontophilus spinosus* of Leach; but I feel very confident that they belong to different species.

Although the spinous shrimp is to be ranked amongst the rarer of the small *Macroura* of this country, it is very extensive in its range. Leach speaks but of two specimens known to him; one obtained by Mr. Prideaux in Plymouth Sound, and the other taken off Falmouth by the ill-fated Cranch. Mr. Couch states, in his "Cornish Fauna," that he has obtained it only once, when he found it in the stomach of a fish taken at a depth of from twelve to fifteen fathoms. I have a specimen taken by my friends Professor Forbes and Mr. M°Andrew, off Shetland.

By the following extract from Mr. William Thompson's observations on the Crustacea of Ireland, it would appear that it has been found on the Irish coast. "In Mr. V. Thompson's collection there is a specimen bearing the name of *Pontophilus spinosus*, and marked as Irish."



SCULPTURED SHRIMP.

Crangon sculptus. Mihi.

Specific Character.—Carapace with several raised lines, each armed with two or three small teeth; two spines on the median line, one considerably posterior to the other: second pair of legs much shorter than the first, didactyle: abdomen distinctly sculptured; third, fourth, and fifth segments sharply carinated; sixth and seventh, channelled.

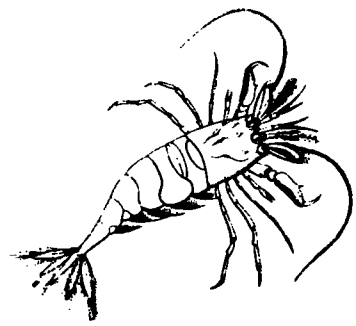
Of this new species I possess two specimens, which I found amongst some small Crustacea dredged by Mr. Bowerbank at Weymouth. Like *Egeon loricatus* of Risso, *Pontophilus spinosus* of Leach, and *Crangon septemcarinatus* of Sabine, it has several denticulated carinæ on the carapace, and might at first sight be supposed the young of some one of them. It is, however, a very distinctly marked species.

The carapace is rough, with about five irregular raised lines, each armed with two or three small teeth, and two small spines on the median line, one behind the other. The

laminar appendage of the external antennæ, a little longer than their peduncle. The first pair of feet, with the hand, smooth and rounded, the finger moderately curved; the second pair of feet minute. The segments of the abdomen very distinctly sculptured; the raised portions polished, the depressions slightly pubescent: the third, fourth, and fifth segments with a distinct central carina; the sixth and seventh channelled.

Length seven-tenths of an inch.

It differs for *C. spinosus* in the less regularly longitudinal direction of the lateral raised lines on the carapace, the less pointed and fewer teeth of this part, the longer proportion of the antennæ-scale with relation to the peduncle, and, strikingly, in the sculpture of the abdominal segments, and the extent and sharpness of the carina on this part. Of the two specimens which I possess, one has several ova attached to the abdominal false feet.



THREE-SPINED SHRIMP.

Crangon trispinosus.

Pontophilus trispinosus, HAILSTONE, Mag. of Nat. Hist. VIII. p. 261, fig. 25.

OF this species I have never seen a specimen; I therefore content myself with copying Mr. Hailstone's description, and Mr. Westwood's observations on the species; premising that the characters, as Mr. Westwood very properly remarks, entirely confirm the correctness of Milne-Edwards, and other continental carcinologists, in rejecting the generic separation of *Pontophilus* from *Crangon*.

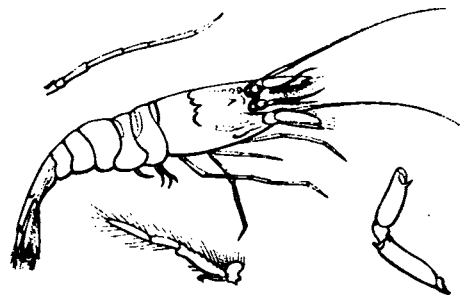
"On March 1st, 1834, several individuals of a species of *Pontophilus* were brought to me, which had been caught in a shrimping-net upon this coast. They had only three spines on the thorax; one in the middle, and one on each side of it. Their colour was much like a shrimp's, but paler, less clouded, and with a sprinkling of golden blots. Their length about an inch. They were called by the

man who caught them 'pug-shrimps;' he said he had never observed them before this last winter. The females were with spawn."

Thus far Mr. Hailstone. Mr. Westwood's observations follow :—

"Of Mr. Hailstone's Crustacea, probably the new *Pontophilus* will be regarded as possessing the highest interest, inasmuch as the propriety of the establishment of the group, which was at first confined to a single species, is thereby proved. The character of this genus, as defined by Dr. Leach, separating it from that of *Crangon* (of which the common edible shrimp, *Crangon vulgaris*, is the type), consisted in the very small size of the second pair of legs, and the length and acuteness of the terminal joints of the external foot-jaws or pedipalpi. These characters, however, to which that of the spinous shell might be added, have been deemed by the French crustaceologists insufficient to warrant the generic separation of the two groups; and, on considering the characters of the new species from Hastings, the correctness of their opinion must, I think, be admitted; since it will be seen, that, in several respects, its characters are quite intermediate between those of the types of *Crangon* and *Pontophilus*. Thus the shell, instead of being armed with a double series of lateral and three rows of dorsal spines, as in the latter, is 3-spinous only, just as in the common shrimp; while the terminal joint of the foot-jaws is scarcely longer than the penultimate joint, and is broad, flat, and obtuse. The central piece of the tail is also much longer than in *Pontophilus spinosus*. Still the minute size of the second pair of legs corresponds with *Pontophilus*; whence it will, perhaps, be more advisable to divide the genus *Crangon* into two sections: first, those with the second and third legs of equal length, the common

shrimp; and, secondly, those with the second leg much shorter than the third, the *Pontophili* of Dr. Leach: and even in the former group, the comparatively delicate and imperfect structure of the second pair is very evident; thus proving, in a natural point of view, the generic identity of the two groups."—*Mag. of Nat. Hist.* vol. viii. pp. 261, 265.



TWO-SPINED SHRIMP.

Crangon bispinosus.

Pontophilus bispinosus, Westwood.
,, ,, Hailstone, Mag. Nat. Hist. VIII. pp. 11, 13, f. 30.

The imperfect description and figure of this species, given by Mr. Hailstone, prevent my coming to any very decided opinion as to the distinctness of its specific character. It has, certainly, some points of resemblance to *C. sculptus*, but it is much smaller, if Mr. Hailstone's linear admeasurement be that of an adult; and there is no indication of any sculpture on the abdomen. The following is Mr Hailstone's description:—

"Pedipalps with the last joint rather longer than the preceding one, and bluntish at its termination. First pair of legs compressed, didactyle, with the thumb very short: second pair rather shorter than the first, didactyle; the last joint half the length of the preceding one, which is com-

pressed: third pair very slender, as long as the first pair, with a simple claw: fourth pair and fifth pair of equal length, rather longer than the third, and somewhat thicker but slender; claws simple. Thorax, with two prominent dorsal spines, one considerably behind the other, and on each side a row of blunt notches. A spine at the outer edge of the external plates of the tail."—*Mag. of Nat. Hist.*, vol. viii. p. 273.

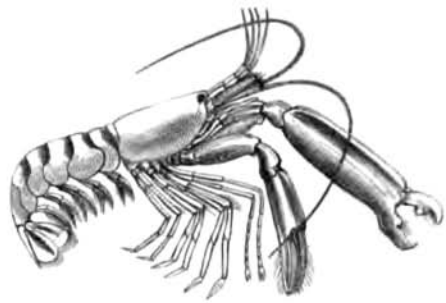
Mr. Hailstone states, in his MS. notes, with which he favoured me some time before his lamented death, that one specimen only of this species had come into his possession, which he found at Hastings in a mass of *Filipora filigrana*.

GENUS ALPHEUS. Fabr.

Astacus,	Fabr.
Palæmon,	Oliv.
Cryptothalmus,	Raffin.
Asphalius,	Roux.
Alpheus,	Fabr., Latr., Leach, Edw.

Generic Character.—External antennæ placed beneath, and to the outer side of the inner; the lamellar palp of moderate size, sometimes slender and pointed. *Internal antennæ* terminating in two filaments, of which the superior is rather thicker than the inferior; the basal articulation short, and furnished with a spiniform scale. *External pedipalps* more or less slender and elongated; terminal joint broad, and somewhat foliaceous. *First pair of legs* didactyle, robust, one much larger than the other, and very differently formed: *second pair* also didactyle, very slender; the carpus multiarticulate: the remaining pairs slender, monodactyle. *Carapace* extending forwards so as to form an arched covering to the eyes. *Rostrum* small or wanting. *Abdomen* long, and much developed.

Of this genus, which is chiefly confined to hot climates, one species only has been found in Britain, and is now first described.



Alpheus ruber. Edwards.

Alpheus ruber, Edw. Hist. Crust. II. p. 351.

Specific character.—Rostrum very small. External antennæ without a projecting spine at the base. Arms with a small spine on the upper edge, at a short distance from the extremity. Larger hand with four carinæ, two on the upper surface, and two on the outer; the moveable finger shorter than the other.

This is the first instance of any species of *Alpheus* occurring on our coast. The only two specimens hitherto found were obtained by Mr. Cocks of Falmouth, who procured them from the stomachs of cod fish. They are unfortunately much damaged by this circumstance, but enough remains for me to recognise, with scarcely a doubt, its identity with *Alpheus ruber* of Edwards.

The carapace in the specimens is so much injured, that it is impossible to ascertain whether a rostrum existed or not, but the Mediterranean species is stated to possess a small pointed one. The arched processes which always protect the eyes in this genus, and the peculiarities of which form good specific characters, are also destroyed.

The general form of the body is slender. The external antennæ have no spiniform palp at the base, which is also a character of *A. ruber*. The internal antennæ have the general characters of the genus, but the specific distinctions of this part are deficient. The anterior feet are in tolerable preservation. The arm in both is about three times as long as it is broad; and on the upper surface is a small spine, situated about one-third from the extremity: the wrist is very short. The larger hand, which is on the left side, is short, the sides nearly parallel, flattened, the upper margin with two carinæ; the outer side also with two carinæ, the inner surface rounded; the immoveable finger is much curved towards the point, which is acute: there is a distinct and deep depression about the middle of its grasping edge, for the reception of a strong tubercle of the moveable finger; this finger is shorter than the other, and becomes broader towards the extremity, where its outer edge is acutely carinated. The smaller hand is also bicarinated above: the fingers are slender and curved, and there is thus a considerable space between them excepting at the points; their inner margins are hairy. The second pair of feet are filiform, minutely didactyle; the carpus long and multi-articulate. The remaining feet are slender and monodactyle.

Such are the characters afforded by the mutilated specimens before me; and I trust the description, imperfect as it is, may be sufficient to enable some more fortunate observer to compare other and more perfect specimens, and determine with greater precision the identity of this with the Mediterranean species to which I have referred it.

GENUS NIKA. Risso.

Processa.	Leach, Latr.
Nika.	Risso, Roux, Edwards.

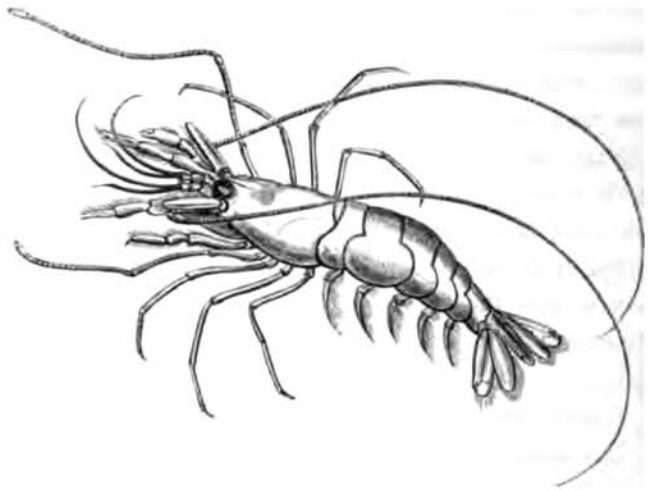
Generic Character.—External antennæ much longer than the body, with the basal scale terminating in a single tooth at the outer side; the inner margin hairy. *Internal antennæ* terminating in two filaments, the inner one the longer. *External pedipalps* pediform, with four exserted joints, the second very long, the terminal one pointed. *First pair of legs* dissimilar; that on the right side didactyle, that on the left monodactyle: second pair more slender, very long, filiform, of unequal length; the arm and wrist multi-articulate, the hand minutely didactyle: the remaining pairs very long, filiform, and monodactyle. *Carapace* somewhat elongate, smooth, having a small, simple, compressed rostrum. *Abdomen* a little bent at the third segment; the external laminæ of the tail transversely divided near the extremity.

Of this interesting genus the only known specimen for a long time was a small one on which Leach founded his genus *Processa*, and which was found by Montagu on the southern coast of Devon. Risso, however, had, a short time before Leach's publication, given to the genus the name of *Nika*, of which Leach was not aware at the time. Risso's name must, therefore, be retained, on the ground of priority of publication.

The remarkable peculiarity by which this genus is distinguished from every other form of crustacean, is the dis-

similar character of the anterior feet, one being didactyle, and the other monodactyle. In every other instance, however the feet forming a pair may differ in length, in size, or in structure, they agree in the character of the terminal portion, and are always both monodactyle or both didactyle; but in this genus one is invariably and distinctly didactyle, while the other is as distinctly monodactyle.

There are probably several species of this genus in the Mediterranean, and I have in my possession two very distinct species found on our coast, one of which is undoubtedly *Nika edulis* of Risso, and the other an entirely new species.



Nika edulis. Risso.

Specific Character.—Didactyle hand longer than the wrist ; both straight. Central plate of the tail longitudinally channelled.

Nika edulis,	Risso, Crust. de Nice, p. 85, t. iii. f. 3.—Hist. Nat. de l'Eur. Mérid. V. p. 72.—Roux, Crust. de la Médit. t. xlv.—Lam. Hist. des Anim. sans Vert. V. p. 203. — Desmar. Consider. sur les Crust. p. 230.—Edw. Hist. des Crust. II. p. 364.
Processa canaliculata,	Leach, Malac. Brit. t. xli.
„ *edulis,*	Latr. Reg. Anim. de Cuv. (ed. 2nd) IV. p. 95.
Nika canaliculata.	Desmar Consid. sur les Crust. t. xxxix. f. 4.

The whole of the carapace and abdomen of this species is even and glabrous ; the carapace evenly rounded, somewhat compressed, terminating in a short, pointed, slightly carinated rostrum ; a short acute point above the outer edge of the orbit. Plate of the external antennæ of almost equal breadth throughout its length ; obliquely truncated at

the extremity; ciliated on the outer margin. Peduncle of the internal antennæ cylindrical; the internal filament much longer than the external. External pedipalps, with the last joint but two equalling in length the terminal and penultimate joints together. Didactyle foot of the first pair rather thicker than the other; the hand and wrist straight: the monodactyle foot terminating in a very small slightly curved finger. Of the second pair, the right is much longer than the left. The fourth pair longer than the third and fifth, the latter being the shortest. The abdomen is evenly rounded, somewhat compressed, continuous with the carapace. The middle plate of the tail channelled throughout its length, and armed with minute spines.

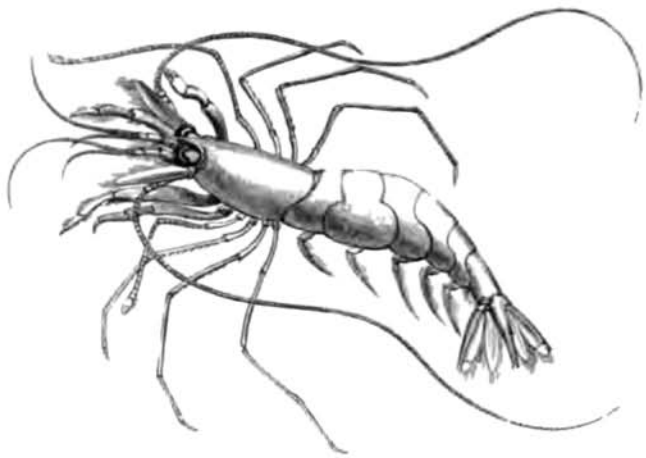
Length two inches to two inches and a half.

The colour of this beautiful species is described by Risso and Roux as of a flesh-red, more or less dotted with yellow and white, and marked along the back with spots of these colours. The body is said to be so transparent that the viscera may be seen through the integument. The female is stated by Roux to be found, at different periods of the year, bearing eggs of a yellowish-green colour, which are deposited on algæ and fuci.

The same author states that this species constitutes an ordinary article of food on all the coasts of the Mediterranean. It lives in shoals with various species of the genera *Palæmon*, *Hippolyte*, *Alpheus*, &c.

After the most careful examination I have been able to institute, I have come to the conclusion that the *Nika edulis* of Risso and those who follow him, and the *Processa canaliculata* of Leach, are identical. It is certainly one of the rarest of our British species. A small specimen was obtained by Montagu at Torcross, on the southern coast of

Devon, and sent by him to Dr. Leach, who founded thereon his genus *Processa*, and figured it in his great work. This specimen is still in the British Museum. That from which my figure and the above description are given was accidentally found by myself in a dish of boiled prawns, on which I was about to breakfast, at Bognor, in the year 1842. Mr. W. Thompson states that there are specimens in the collection made in the south of Ireland by Mr. Vaughan Thompson.



Nika Couchii. Mihi.

Specific Character.—Didactyle hand shorter than the wrist; the former slightly, the latter more considerably curved. Middle plate of the tail attenuated towards the extremity, not furrowed.

The distinctive characters of this new and interesting species are, with the exception of those given above, mostly comparative. The whole animal is longer in proportion to its other dimensions. The carapace, which extends a little further backwards over the posterior thoracic segment at its junction with the abdomen, is longer and more slender; the plates of the external antennæ are longer, and rather tapering towards the extremity. The legs generally are altogether longer and more slender; the didactyle hand and wrist of the first pair are, however, shorter, and both, but particularly the wrist,

curved. The fifth pair of legs are quite as long, or a little longer than the third and fourth. The abdomen is notably more slender, and the lateral processes of the segments extend more obliquely backwards; the sixth segment is nearly cylindrical, and the seventh, or middle plate of the tail longer and much narrower, the terminal half being considerably attenuated; the upper surface has no distinct furrow, as in *N. edulis*, and there is on each side a small spine, about the middle of its length, at the point where it becomes narrower. The lateral plates of the tail partake of the general tendency to attenuation, which so remarkably characterises the form of the species.

Length nearly three inches.

One specimen only of this species has come under my notice, and for this I am indebted to Mr. Couch, who sent it to me about five or six years since. It was taken on the coast of Cornwall. I have much pleasure in dedicating so interesting a species to a naturalist who has not only done much for the local Fauna of his own district, but whose observations on the habits and physiology of many forms of marine animals are peculiarly valuable for their truthfulness and originality.

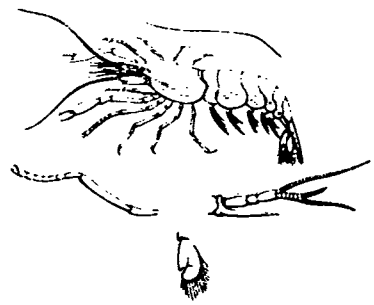
That it is quite distinct from *N. edulis*, the description I have given above sufficiently proves: and it is equally so from any of those, whether varieties or species, named by Risso in his "Crustacés des Environs de Nice." The characters given by this author are, unfortunately, so vague, and the figures in the work just named so bad, that it is frequently impossible to arrive at any tolerable certainty as to the identity of the species described by him, or to ascertain whether the distinctions be specific or not.

GENUS ATHANAS. LEACH.

ASTACUS.	Montagu.
PALÆMON.	Leach.
ATHANAS.	Leach, Latr., Roux, Edw.

Generic Character. — *External antennæ* not longer than the body; the scale oval; unidentate on the outer side at the apex. *Internal antennæ* with three filaments, one shorter and thicker than the others. *External pedipalps* short and slender. *First pair of feet* the largest, unequal, didactyle: second pair very small, filiform; the wrist long and multi-articulate; the hand minutely didactyle: the remaining pairs simple. *Carapace* terminating in a simple rostrum. *Abdomen* even; the external plates of the tail transversly divided.

OF this genus one species only is known. It possesses the peculiarity which is found most strongly marked in the Astacidæ, the transverse division of the external lamina of the tail; a character which also obtains in a less marked degree in *Nika*, and some other genera of the ALPHEADÆ. It differs from all others of the family in having three filaments to the internal antennæ, and from the PALÆMONIDÆ in the simple form of the rostrum and other characters.



Athanas nitescens.

"*Cancer* (*Astacus*) *nitescens*,		MONTAGU, MSS."—LEACH.
Palæmon	„	LEACH, Edin. Encycl. VII. p. 401.
Athanas	„	Id., p. 432.—Trans. Lin. Soc. XI. p. 349.—Encyc. Brit. Suppl. I. p. 421.—Mal. Brit. t. xliv.—EDW. Hist. des Crust. II. p. 366.

THE carapace in this remarkable little creature is very smooth, narrowed anteriorly; the rostrum about half its length, and not extending backwards in a ridge, perfectly simple and pointed. The external antennæ have a cylindrical peduncle about as long as the scale; the latter is nearly oval, hairy on the inner and anterior margin, and with a little tooth on the anterior and outer angle. The internal antennæ have a thick rounded peduncle, terminating in three filaments, the shortest of which is not much more than one-third the length of the longest, and much thicker. The first pair of legs is large and robust in proportion to the size of the animal, and the hand is particularly so: the second pair is very slender; the wrist formed of several joints; the hand very minute and didactyle. The remain-

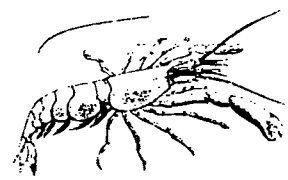
ing pairs are slender and simple. The abdomen is evenly rounded and smooth. The outer plate of the tail transversely divided about one-third from the extremity. In its general aspect it resembles a very young *Astacus*.

The length of Dr. Leach's specimens is rather more than half an inch.

Colour light buff?

The discovery of this species is due to Montagu, who sent it to Dr. Leach, under the name of "*Cancer* (*Astacus*) *nitescens*." The latter author states that "it is occasionally found in pools left by the tide amongst the rocks on the coasts of Devon and Cornwall." It cannot, however, be otherwise than rare in that locality, as Mr. Couch does not introduce it in his "Cornish Fauna." Mr. W. Thompson thus records its occurrence on the Irish coast:—"A single specimen was found under a stone, between tide-marks, at Lahinch, county Clare, by Mr. E. Forbes and myself, in July, 1840." These are the only authentic notices of its existence on the British islands that I am acquainted with. Dr. Milne-Edwards mentions its inhabiting the coast of France, but gives no particulars.

The following figure represents one of a series of specimens in the British Museum collection, from Plymouth Sound, remarkable for the large size of the first leg on the right hand side of the body.



GENUS HIPPOLYTE.

CANCER.	O. Fabr.
PALÆMON.	Olivier.
ALPHEUS.	Lamarck, Risso, Sabine.
HIPPOLYTE.	Leach, Desmar., Roux, Edw.

Generic Character. — *External antennæ* placed beneath the internal; the scale externally unidentate. *Internal antennæ* terminating in two filaments: the superior thick, strongly ciliated, and excavated beneath; the inferior slender and setaceous. *External pedipalps* slender and pediform. *First pair of feet* short, equal, didactyle: second pair long, unequal, minutely didactyle; the wrist many-jointed: remaining pairs simple. *Carapace* furnished with a deep rostrum, the carina of which extends over a considerable portion of the median line of the carapace. *Abdomen* abruptly bent downwards at the third segment, which is gibbous, and produced posteriorly.

OF this genus, which was first established by Leach, there are several species inhabiting our coast. They may be at once distinguished from all other *Palæmonidæ* by the peculiar character of one filament of the internal antennæ, which is broad and excavated in its inferior surface. The rostrum is very deep in most species, and the wrist multi-articulate in all. The abrupt curvature of the abdomen varies considerably in the different species.

DECAPODA.
MACROURA.

PALÆMONIDÆ.

SOWERBY'S HIPPOLYTE.

Hippolyte spinus.

Specific Character.—Rostrum anteriorly truncate, extending backwards nearly to the posterior margin of the carapace, deep, many-toothed above; the teeth, on the portion situated on the carapace, which are three or four, larger than those on the exserted portion. Tooth of the scale of the external antennæ terminal; broad filament of the internal antennæ bent upwards at right angles to the peduncle.

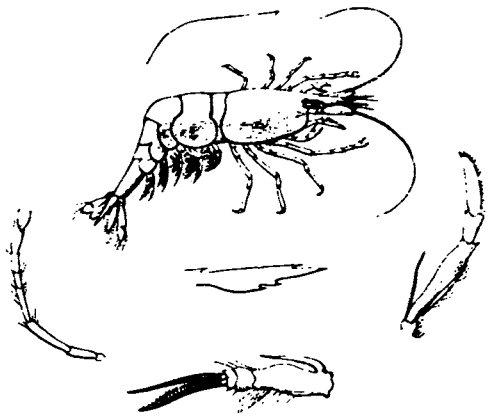
Cancer spinus,	Sowerb. Brit. Misc. t. xxi.
Alpheus „	Leach, Edinb. Encyc. VII. 431.—Trans. of Lin. Soc. XI. p. 347.—Encyc. Brit. Supp. I. 421.
Hippolyte Sowerbæi,	Leach, Malac. Brit. t. xxxix.—Desmar. Consid. sur les Crust. p. 223, t. xxxix. f. 1.—Edw. Hist. des Crust. II. p. 380.

The carapace in this species is furnished with a strong and deep rostrum, the ridge of which rises almost at the posterior edge, and has about four strong and large teeth on that portion which belongs to the carapace, and several smaller ones on the exserted portion, which decrease in size towards the apex; the exserted portion is very deep, terminating in a sharp tooth; the inferior edge with two

teeth, of which the anterior is almost as forward as the apex, from which it is separated by a broad notch, which is minutely toothed. There are also two teeth above each orbit, and others on the margin of the carapace. The scale of the external antennæ extends beyond the rostrum, and has a strong tooth on the anterior and outer margin. Terminal filaments of the internal antennæ very short, the thicker one bent abruptly upwards at right angles to its peduncle. Anterior feet not extending beyond the scale of the external antennæ; the hands robust and rounded. The second pair longer than the third, with the wrist divided into about six distinct articulations. The abdomen is very gibbous, the third segment being strongly carinated, the carina terminating in a strong posterior tooth, standing over the middle of the fourth segment. Middle scale of the tail with four pairs of small spines above.

Length about one inch and a half.

I have thought it right to restore the specific name given by Mr. Sowerby to this remarkable species, which Leach adopted on no less than three occasions, and afterwards altered without any sufficient reason. It is the largest of our British species of *Hippolyte*. It is exclusively a northern species, being found, according to Dr. Milne-Edwards, in the seas of Iceland and Greenland. Mr. Sowerby first described it from a specimen found on the Scottish coast: the one figured by Dr. Leach was obtained at Newhaven, in the Frith of Forth. I have two fine and perfect specimens, which were kindly given to me by Mr. M^{c}Andrew, who procured them by dredging in deep water off the Isle of Man. It is not yet recorded as having been taken on the Irish coast.



VARYING HIPPOLYTE.

Hippolyte varians. Leach.

Specific Character.—Rostrum straight, acuminate above, with a spine near the base, and another at the apex; beneath with a sharp two-toothed carina. Antennal scale with the external tooth one-third from the extremity; internal antennæ with the thick filament only slightly curved.

Hippolyte varians, Leach, Edinb. Encycl. VIII. p. 432.—Trans. Lin. Soc. XI. p. 347.—Encyc. Brit. Supp. I. p. 421.—Malac. Brit. t. xxxviii. f. 6–16.—Edw. Hist. Crust. II. p. 371.

The carapace is less gibbous in this than in most other species, although more so than *H. pandaliformis*, now first described; it is terminated by a straight and elongated rostrum, which has on its upper side a tooth near the base, and a very small one near the apex; beneath there is a short carina, which has two teeth: there is also a small tooth on each side of the base of the rostrum, just over the inner edge of the orbit. The scale of the external antennæ is large, and a little longer than the rostrum; its external tooth is placed at the distance of about one-third from the

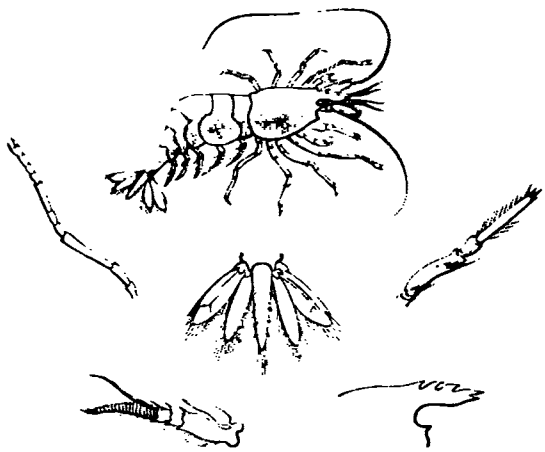
extremity. The thicker filament of the internal antennæ is of moderate size, and is but slightly curved, instead of being abruptly bent at right angles, as in *H. spinus* and some other species. The external pedipalps are of moderate length; the terminal joint short, flattened, rounded, hairy, and furnished with minute spines on its inner margin. The first pair of feet very short, rather thick; the second pair shorter than the third, and the wrist with not more than three or four joints. Abdomen less gibbous than in some species, as *H. Spinus* and *H. Cranchii*. Middle plate of the tail with two pairs of small spines.

Length about three-quarters of an inch.

The usual colour is a beautiful clear green; but, as Dr. Leach states, "it is very variable in colour, occurring with every shade of green, and of every tint between reddish and liver-brown."

This is the most abundant of all our species of *Hippolyte*, though probably not the most extensively distributed. "It is found," says Dr. Leach, "in profusion in pools amongst the rocks on the south-western coast of Devon and Cornwall." It is common all along that coast, and as far as Poole Harbour in Dorsetshire; and, although it is not mentioned by Mr. Couch in his Cornish Fauna, I have received specimens of it from that gentleman from Polperro. It has been found extensively round the Irish coast. Mr. W. Thompson says, "It has been taken commonly by Mr. Hyndman and myself in the rock pools accessible at low-water throughout the Down coast, and has been dredged by us in deep water on the north-east coast, and in Killery Bay, Connemara. Mr. R. Ball has specimens from the shores about Dublin."

It is a beautiful and elegant species, but loses its lovely green colour soon after death.



CRANCH'S HIPPOLYTE.

Hippolyte Cranchii. Leach.

Specific Character.—Rostrum short, incurved at the base, with three teeth above, the apex emarginate, bidentate, the upper tooth the longer; beneath unarmed.

Hippolyte Cranchii, Leach, Malac. Brit. t. xxxviii. f. 17–21.—Edw. Hist. Crust. II. p. 376.—Couch, Corn. Faun.

The carapace is short and rounded; the rostrum short, raised, and somewhat abruptly incurved at the base, where it is broad, and armed with three conspicuous teeth; the apical portion straight, bifid at the extremity, the lower tooth shorter than the upper; the inferior edge is short, and without any tooth; there is no tooth above the orbit. The scale of the external antennæ extends to more than half the length of the filaments of the internal, and

the marginal tooth is terminal. Internal antennæ with the thicker filament very slightly curved. Anterior feet extending forwards a little beyond the antennal scale; second pair with the wrist long, and formed of six articulations. The junction of the thorax and abdomen is very gibbous, the process on the posterior margin of the third segment rounded, and but little prominent. The middle portion of the tail has four pairs of extremely minute teeth, so small as to be discerned with difficulty.

Length about three-quarters of an inch.

This little species, which is about the size of *A. varians*, may be at once distinguished from it by the thicker thorax, the more gibbous abdomen, the strong line of demarcation between those two parts, and especially by the form of the rostrum. It is a widely extended species, and in some parts abundant. It was taken first by Mr. Cranch, and afterwards by Mr. Prideaux, in the Kingsbridge estuary; it is also admitted into Mr. Couch's Cornish Fauna. I have received it from Torbay, and from Salcombe Bay, through the kindness of Mrs. Griffiths and Mr. Alder: it was dredged at Poole by my relative, Mr. Henry Salter; and I have specimens taken by Professor Forbes and Mr. M'Andrew in Loch Fyne. Mr. Wm. Thompson gives it as an Irish species, only on the authority of a specimen in the collection of Mr. Vaughan Thompson: it is exceedingly probable, however, that it will be again found on the coasts of Ireland, as it has so extensive a range on those of England and Scotland.

THOMPSON'S HIPPOLYTE.

Hippolyte Thompsoni. Mihi.

Specific Character.—Rostrum straight, deep, acute, continuous with a slight carina, which extends from near the posterior margin of the carapace; furnished above with eight teeth, of which four, more distant than the others, are situated on the carapace; beneath, with three minute teeth near the apex.

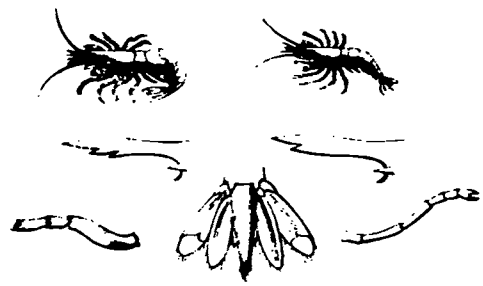
The carapace is of moderate length, the surface slightly scabrous: a carina commences at about two-thirds backwards, and extends forwards to form the upper portion of the rostrum, which, with the carina, is furnished with eight teeth, directed forwards, of which four are situated on the carapace, and are more distant from each other than those on the rostrum itself; the inferior portion of the rostrum has three minute teeth placed towards the apex, which is acute and simple. The scale of the external antennæ extends to more than half the length of the internal, and the latter have the filaments slightly curved downwards, and moderately thick. The anterior pair of feet are of moderate

length; the hand thicker than the wrist, which is rather short, and has but few articulations. The abdomen is remarkably gibbous, and the anterior segments are very slightly scabrous at the sides.

Length nearly an inch.

Of this new species of *Hippolyte* I have seen but one specimen,—a female loaded with extruded ova, which I received from my friend Mr. W. Thompson of Belfast, the acute and successful investigator of the zoological treasures of his own country, by whose labours our knowledge of the natural history of that part of the United Kingdom has been so much enriched, and to whose name I dedicate the species. It was obtained by that gentleman, with specimens of *H. Cranchii*, on the north-west coast of Ireland.

It differs from *H. pandaliformis* in the form of the rostrum, which is shorter, and toothed throughout its whole length, as well as in its general figure, which in the present species has more of the normal aspect of the genus, and less resemblance to the more typical *Palæmonidæ*. From *H. Cranchii* it differs in the longer, straighter, and more toothed rostrum, and in the less gibbous form of the thorax and of the abdomen. With no other species could it be confounded, even at the first glance.



PRIDEAUX'S HIPPOLYTE.

Hippolyte Prideauxiana. Leach.

Specific Character.—Rostrum quite straight, acuminate, above unarmed, beneath with one or two teeth on the anterior portion.

Hippolyte Prideauxiana,		Leach, Mal. Brit. t. xxviii. f. 1. 3, 4, 5.
,,	,, *var.*,	Edw. Hist. des. Crust. II. p. 372.
,,	*Moorii*,	Leach, l. c. f. 2—Edw. l. c.

This little species very much resembles *H. varians;* it differs from that species, however, in the form of the rostrum, which is of more equal breadth throughout the principal part of its length, in the absence of any tooth on its upper side and of the deep carina on the lower.

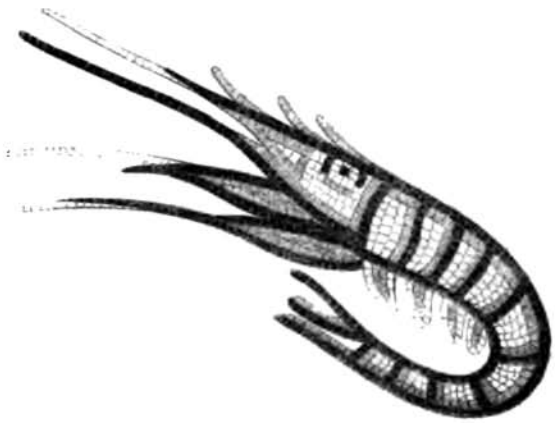
I have thought it right to include the animals defined by Dr. Leach under the above specific names, as one species, being unable to find any distinctive characters of sufficient importance to warrant their separation. I have, therefore, taken *Prideauxiana* as the normal form, and as having the priority in nomenclature; and have given

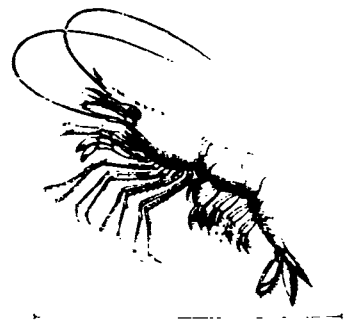
Moorii merely as a variety—a view which Dr. Edwards had already taken in his "History of Crustacea," although it still remains to be proved which of the two forms of rostrum is, on account of the comparative frequency of occurrence, to be considered as normal.

The wrist of the second pair of legs has only two short and one long articulation; the abdomen is remarkably bent at the third segment. The whole animal is smaller than *H. varians*, and of a reddish brown colour.

This is certainly a very rare species, and is not mentioned in Mr. Thompson's Irish Fauna, nor in that of Cornwall by Mr. Couch. I have received it, however, from the neighbouring coast of Devonshire.

The vignette below appears to be a representation of the Common Shrimp (*Crangon vulgaris*), and was taken from a tesselated pavement discovered at Cirencester in 1783. (*Vetust. Mon.* vol. ii.)





Hippolyte pandaliformis. Mihi.

Specific Character.—Rostrum extending beyond the scale of the antennæ, nearly straight, slightly turned upwards, with seven teeth on the upper and three on the lower edge; thicker filament of the internal antennæ moderately curved.

The carapace in this species is evenly rounded, with a slight carina on the anterior third, passing into the rostrum, which is nearly straight, but a little turned upwards towards the extremity, and extending beyond the antennal scale; it is furnished above with seven acute teeth, of which three are on the carina of the carapace, and the remainder on the free portion; beneath are three similar teeth, and the apex is bifid, the upper point projecting beyond the lower. The eyes are remarkably large, as in *Pandalus annulicornis*. The external antennæ have the long filament longer than the body; the scale is rather narrow, particularly anteriorly, with long cilia on the outer edge, and externally a small tooth near the extremity. The thick filament of the internal antennæ is of moderate

size and slightly curved; the external pedipalps slender and pediform; the anterior pair of feet about two-thirds the length of the second; the wrist of the latter six-jointed, the third joint about twice the length of each of the others; the remaining legs long and slender. The abdomen is more slender than in any other species of *Hippolyte* with which I am acquainted; the terminal joint narrow and acutely pointed.

Total length an inch and a half.

The resemblance of this species to *Pandalus annulicornis* is so remarkable, that I have given it a specific name in accordance with that relation, in order to record its probable situation as leading from the normal forms of the genus towards *Pandalus*. It is strikingly abnormal as regards its own genus. The general slenderness of the whole body, the even form of the carapace, the length and form of the rostrum, the length of the legs and antennæ, all exhibit a marked tendency in the direction alluded to. It is, however, in all its essential characters, a true *Hippolyte*.

This constitutes another interesting addition to our native Crustacea, which we owe to the labours of Mr. M'Andrew and Professor Forbes, by whom it was dredged in Loch Fyne, at a depth of about twenty fathoms.

I have two specimens, for which I am indebted to those gentlemen, and this is the only instance in which its occurrence has been recorded.

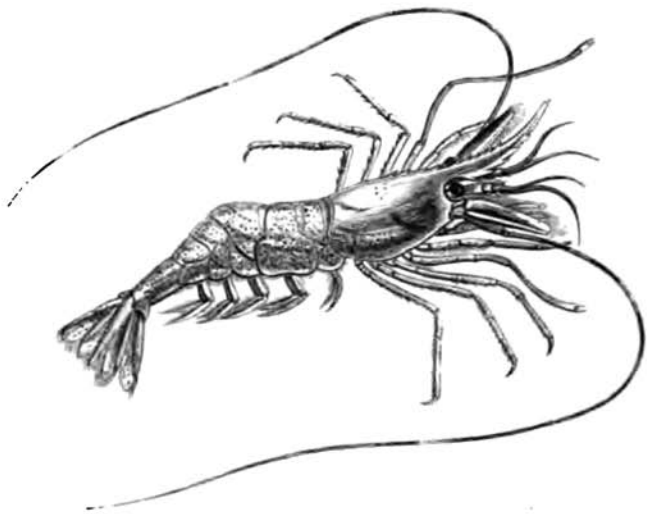
GENUS PANDALUS, Leach.

Astacus.	Fabr.
Palæmon.	Risso.
Pontophilus.	Id.
Pandalus.	Leach, Latr., Edw.

Generic character.—External antennæ longer than the body, the antennal scale unidentate on the outer margin. *Internal antennæ* with two filaments, the external one thicker; basal joint of the peduncle hollowed above for the lodgment of the eyes. *External pedipalps* slender, pediform. *First pair of feet* slender, shorter than the others; the terminal joint styliform, simple; *second pair* filiform, didactyle, unequal; one much longer and more slender than the other, both with the wrist and arm multiarticulate; *third, fourth, and fifth pairs* of feet, slender, slightly diminishing in length. *Carapace* armed with a long rostrum, the carina of which extends half way to the posterior margin of the carapace, the rostrum curved upwards, and denticulate above and below. *Abdomen* with the third joint gibbous, the upper and posterior margin produced backwards.

I have always considered this genus as affording a distinct passage from the genus *Hippolyte* to *Palæmon;* a view of its relations, which has received an important confirmation in the discovery of the *H. pandaliformis*, which may be considered as the osculant species on that side. Like *Hippolyte* it has but two filaments to the internal antennæ and the carpus multi-articulate; so that, in fact, it resembles that genus in its essential characters even more nearly than *Palæmon*.

DECAPODA. *PALÆMONIDÆ.*
MACROURA.



Pandalus annulicornis. Leach.

Specific Character.—Rostrum the length of the carapace ; anterior half without teeth above, excepting a small one close to the apex.

Pandalus annulicornis. Leach, Malac. Brit. t. xl.—Latr. Encycl. Meth.—Lam. Anim. sans vert. V. p. 203.—Edw. Hist. des Crust. II. p. 384.

The carapace of *Pandalus annulicornis* resembles strongly that of the genus *Palæmon*. The rostrum, as in that genus, is very long ; it is considerably turned upwards towards its extremity ; the carina commences about half-way towards the posterior margin of the carapace, and it is finely toothed to nearly half of the free portion of the rostrum, the remainder being without teeth above, excepting a minute one just above the apex ; beneath, it has five distinct teeth. The eyes are remarkably large. The external antennæ

have very long filaments, which are marked with alternate rings of dark and light colour through their whole length; the base cylindrical, and the scale diminishing in breadth forwards, with a small tooth on the exterior margin at the extremity. The internal antennæ have but two filaments, the external of which is the thicker; the base is hollowed to receive the eyes, and there is, at the anterior margin of this excavation, a fringe of hairs, which covers the inferior part of the eyes, and affords them protection. The external pedipalps have the basal joint hollowed above the terminal joint, furnished with stiff hairs and small spines. The anterior feet are simple, slightly curved, the basal joint cylindrical, the remainder styliform, and acute at the termination. The second pair of feet are of very unequal length and size; one being very slender, very long, the wrist and arm multi-articulate, the didactyle hand very minute; the other thicker, shorter, likewise didactyle, and with the arm and wrist multi-articulate; the remaining feet nearly of equal length, and simple; the terminal joint furnished with a row of spines beneath. The abdomen resembles that of *Hippolyte* in the gibbous form of the third segment; the centre piece of the tail has three pairs of small teeth on its anterior half.

The usual length is from two inches to two inches and a half.

It is of a reddish grey colour, curiously dotted and marked with deeper red.

At first sight this species may be readily mistaken for a common prawn; but a closer examination will shew that its structural relations are much nearer to *Hippolyte* than to *Palæmon*. Its distinction from the prawn appears to have struck several persons about the same time. It was first discovered, according to Dr. Leach, by the

Rev. Dr. Fleming, in Zetland, and in St. Andrew's Bay, Scotland; it was also observed by Montagu on the coast of Devon; and by Mrs. Dawson Turner, who noticed it at Yarmouth, and pointed it out to Mr. J. D. C. Sowerby as distinct from the common prawn. "It is used," says Dr. Leach, "at Yarmouth as an article of food; and is at that place so much esteemed for the table, as to afford constant employment during the summer season to several fishermen, who take it in abundance at a considerable distance from the shore, and name it from that circumstance the sea-shrimp."

The extent of the range of this species is very remarkable. Dr. Milne Edwards mentions its being an inhabitant of Iceland. We see above that Dr. Fleming obtained it at Zetland; I have specimens taken by Mr. M'Andrew and Professor Forbes about the same locality; and it is found commonly on the southern coasts of England. Mr. Couch admits it into his Cornish Fauna, and gives it the expressive name of "Æsop-shrimp" (another proof of its affinity to *Hippolyte*). I have specimens from Poole Harbour, in Dorsetshire, and on the Norfolk coast it is constantly taken and sold as a "prawn." I have occasionally known it brought to the London markets, where, however, it is usually seen of small size. As an Irish species, it is stated to occur in Mr. J. Vaughan Thompson's collection; and Mr. William Thompson adds,—"It has been taken commonly by Mr. Hyndman and myself in the rock pools accessible at low water throughout the Down coast, and has been dredged by us in deep water on the north-east coast, and in Killery Bay, Connemara. Mr. R. Ball has specimens from the shores about Dublin."

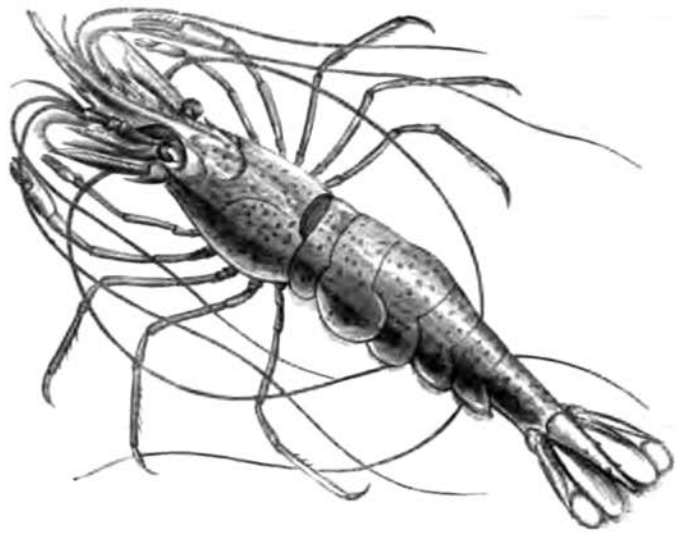
GENUS PALÆMON. Fabr.

Astacus.	Pennant.
Palæmon.	Fabr., Latr., Lam., Leach, Edw.

Generic character.—*External antennæ* placed beneath, and a little to the outer side of the internal; the lamelliform palp very large, nearly oval, rounded and ciliate at the apex and armed with a spine near the extremity of the outer margin. *Internal antennæ* inserted above the external; the first joint of the peduncle very large, depressed, excavated on its upper side to receive the eyes, and armed on the outer side with a strong spine; the two following joints large and cylindrical, the last bearing three setæ of which two are very long, and the other very short and curved. *External pedipalps* of moderate length, pediform, slender, terminating in a slightly curved nail. *First pair of feet* very small and slender; hand didactyle: *second pair* also didactyle, much larger than the former; the remaining pairs simple, monodactyle. *Carapace* of moderate size, broad, terminating in a long, laterally flattened rostrum, which extends usually beyond the peduncles of the antennæ. *Eyes* large and projecting. *Abdomen* large, diminishing regularly towards the tail, and rounded on the upper surface; the terminal segment, which forms the middle portion of the tail, triangular. *Abdominal false feet* very large; those of the first pair furnished with a large ciliated scale, and a much smaller one; the others with two scales, which are also distinctly ciliated.

Although most of the species of this genus are of moderate size, there are some inhabiting the tropical regions which may almost rival the larger *Astacidæ*. The

Palæmon Carcinus, for instance, sometimes reaches to nearly a foot in length, and *P. Jamaicensis* is nearly as large. The common prawn, *P. serratus*, is the species best known and most esteemed in our climate; but a very careful examination of all the means within my reach, has established in my mind, very satisfactorily, the existence of four distinct British species of *Palæmon*, forming one additional to those before defined.



COMMON PRAWN.

Palæmon serratus.

Specific Character.—Rostrum extending considerably beyond the antennal scale; turned upwards anteriorly; bifid at the extremity; above, armed with seven or eight teeth, the anterior third unarmed; beneath, with five or six teeth.

Astacus serratus,	Penn. Brit. Zool. IV. t. xvi. f. 28, p. 19.
Cancer squilla,	Herbst. II. t. xxv. f. 1.
Palæmon ,,	Latr. Gen. Crust. I. p. 54.—Leach, Edin. Encycl. VII. 401.
,, *serratus*.	Fabr. Supp. p. 604.—Leach, Trans. Linn. Soc. XI. 348.—Mal. Brit. XXIV. t. xliii. f. 1–10.—Edw. Hist. Nat. des Crust. II. p. 389.

The carapace of the common prawn is even, rounded, and furnished anteriorly with two points, one above and the other beneath the peduncle of the external antennæ; the rostrum is of great length, the anterior half ascending;

above armed with seven or eight teeth (usually seven, rarely six), which are confined to the posterior portion, the anterior third being slender and unarmed; the extremity bifid, the inferior point being the longer; beneath armed with four or five teeth (usually five). The eyes are large and round. Of the three filaments of the internal (superior) antennæ, the shortest scarcely extends to the extremity of the rostrum; the others are more than twice as long. The external antennæ are very long, being half as long again as the animal from the tail to the extremity of the rostrum; the scale with the sides nearly parallel, anteriorly and posteriorly obliquely truncate, forming a long rhomboid; the inner edge furnished with long hairs. The first pair of feet very slender, ordinarily bent upon itself; the hand and fingers together not nearly as long as the wrist; the second pair extend forwards to the end of the rostrum; the hand rounded, elongate; the fingers slender, as long as the hand; the hand and fingers together twice as long as the wrist; the remaining pairs slender and simple. The abdominal false feet very long; the terminal joint of the abdomen narrowed forwards, with two long slender terminal teeth, and two pairs of small teeth on the sides. Caudal laminæ furnished with long hairs on the terminal margin.

Ordinary length upwards of four inches.

Colour bright grey, spotted and lined with darker purplish grey.

This species, which is so well known as a favourite and delicate article of food, is found in vast numbers on all the coasts of this island. It appears from various accounts that it approaches the shore in its young state, and multitudes of them are taken in shrimp-nets, and sold as shrimps on some parts of the coast. I found that at Bognor the

fishermen consider them, when young, as a distinct species, and assert that, at certain seasons, they drive the true *prawns* from their ordinary place of resort. The probability is that at the season when the young ones have arrived at a certain size, they separate themselves from the older ones, which at that period of the year retire further from the shore. At Poole I have found the young ones of this species associated with two other species of *Palæmon*, and the three are ordinarily sold there under the name of "cup-shrimps," being measured in small cups, instead of being sold by tale, as they are when larger. When of middle size they still retain the name of shrimps at that place, and are only called prawns when they acquire larger dimensions.

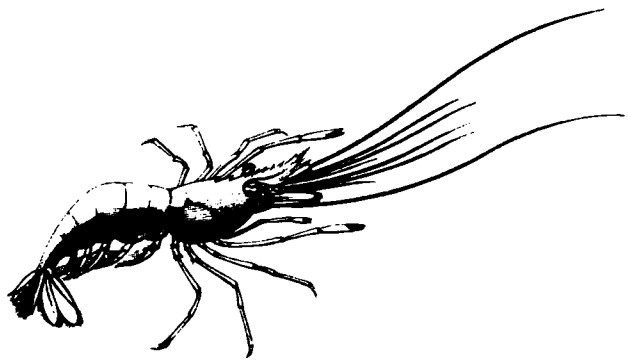
In the adult condition they frequent rocky parts of the coast, delighting in still transparent water, where they may be seen in numerous companies, disporting, in the most elegant and beautiful manner, amongst the long fuci which wave in the tide.

Prawns are sometimes taken in bag-nets, suspended from a circular ring of iron, at the end of a pole; but in many parts, the finest are caught in pots, resembling lobster-pots, but smaller, and made of a closer fabric. At Bognor I found that besides the baited pots or traps, each fisherman had a store-pot, into which he transferred the prawns, when he went his round of the baited pots, and kept them there until they were wanted.

They are found with the ovaries filled with spawn, and with the abdominal false feet loaded with excluded spawn at all seasons of the year. They are chiefly obtained for the London markets off the Isle of Wight and Hampshire coast; but they are much deteriorated by the time which elapses after their capture, before they can be procured in the metropolis.

DECAPODA.
MACROURA.

PALÆMONIDÆ.



Palæmon Squilla. Fabr.

Specific Character.—Rostrum nearly straight; the apex emarginate; above with seven or eight teeth, of which two are on the carapace, and the third immediately above the ocular notch; beneath with three teeth.

Cancer Squilla,	Linn. Syst. Nat. I. 1051.
Astacus „	Fabr. Ent. Syst. II. p. 485.
Palæmon „	Fabr. Suppl. Ent. Syst. p. 403.—Latr. Hist. des Crust. et des Ins. VI. p. 257.—Leach, Edinb. Enc. VII. p. 432.—Malac. Brit. t. xliii. f. 11–13.—Edw. Hist. des Crust. IV. p. 390.—Couch, Corn. Faun. p. 80.—W. Thompson, Crust. of Ireland.

This species differs from the former in a few distinct, but, with one exception, not very tangible characters. The whole animal is much smaller, being not more than half the length; the first pair of feet are shorter in proportion, and the second pair less robust. But it is in the rostrum that the principal and most obvious distinctive characters exist. This part is almost straight, having, however, a very slight curve upwards towards the extremity; it has seven or eight teeth on the upper side, and three on the under; but

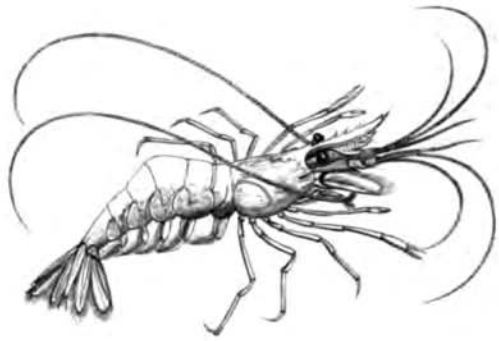
the number alone, although very constant, scarcely constitutes so true and certain a criterion as the fact that of the upper teeth two are invariably placed on the median line of the carapace, posterior to the base of the rostrum, and the third immediately over the margin of the ocular notch. The upper teeth are very acute, spiniform, and directed very much forwards. Those of the under side are broader at the base, triangular, and the posterior one slightly falcate. The apex of the rostrum is bifid, the inferior point being the longer.

Of fourteen specimens examined I found the teeth on the upper and under side of the rostrum as follows:—Seven had $\frac{3}{3}$, five $\frac{2}{3}$, one $\frac{2}{2}$, and one $\frac{1}{1}$, so that the normal number is $\frac{3}{3}$ or $\frac{2}{2}$.

The total length, from the rostrum to the tail inclusive, of the largest specimens I have examined, was two inches one line.

This species is pretty widely distributed along our coasts. I have obtained it from Ireland through the kindness of Colonel Portlock; and Mr. W. Thompson records it as common on the shore of Belfast Lough, in rock pools, on the Down coast, as well as in deep water. He also mentions having met with it commonly in rock pools about Ballantrae, Ayrshire. It occurs on the Cornish and Devonshire coast, but Mr. Couch considers it rare in the former county, although Dr. Leach mentions it as very abundant in the latter. At Poole, in Dorsetshire, it forms a considerable proportion of the "cup-shrimps," a name given there to the young prawns of three different species, which are sold by measure.

DECAPODA. *PALÆMONIDÆ.*
MACROURA.



Palæmon Leachii.

Specific character.—Rostrum nearly straight, with five or six teeth above, and three beneath ; one only of the former situated behind the line of the ocular notch ; apex generally emarginate.

Amongst the smaller *Palæmonidæ* found in Poole Harbour, to which I have already alluded as being sold there under the name of "cup-shrimps," there are found a considerable number which differ materially in the form of the rostrum, as well as in the number of teeth with which it is furnished, from either of the species hitherto described. I have thought right to describe it as a distinct species, which I cannot doubt to be correct. It differs from *P. Squilla* in the smaller number of the teeth in the upper crest of the rostrum, and in the fact that one of those teeth only is placed posterior to the ocular notch. From *P. varians* it is more obviously distinct.

Of twenty specimens taken promiscuously, the number of teeth on the upper and under edges of the rostrum were as follows:—ten had $\frac{5}{3}$, seven $\frac{4}{3}$, two $\frac{6}{4}$, and one had only two teeth beneath. The normal number, therefore, may be considered as $\frac{4}{3}$.

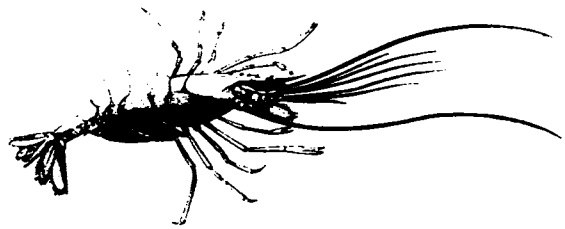
the number alone, although very constant, scarcely stitutes so true and certain a criterion as the fact th the upper teeth two are invariably placed on the me line of the carapace, posterior to the base of the rost and the third immediately over the margin of the o notch. The upper teeth are very acute, spiniform, directed very much forwards. Those of the under sid broader at the base, triangular, and the posterior slightly falcate. The apex of the rostrum is bifid, inferior point being the longer.

Of fourteen specimens examined I found the teet the upper and under side of the rostrum as follows:—S had $\frac{8}{3}$, five $\frac{7}{3}$, one $\frac{8}{3}$, and one $\frac{7}{4}$, so that the normal nu is $\frac{7}{3}$ or $\frac{8}{3}$.

The total length, from the rostrum to the tail inclu of the largest specimens I have examined, was two i one line.

This species is pretty widely distributed along coasts. I have obtained it from Ireland through the l ness of Colonel Portlock; and Mr. W. Thompson re it as common on the shore of Belfast Lough, in rock p on the Down coast, as well as in deep water. He mentions having met with it commonly in rock pools a Ballantrae, Ayrshire. It occurs on the Cornish and D shire coast, but Mr. Couch considers it rare in the fo county, although Dr. Leach mentions it as very abu in the latter. At Poole, in Dorsetshire, it forms a siderable proportion of the "cup-shrimps," a name there to the young prawns of three different species, v are sold by measure.

DECAPODA. *PALÆMONIDÆ*
MACROURA



Palæmon Varians. Leach.

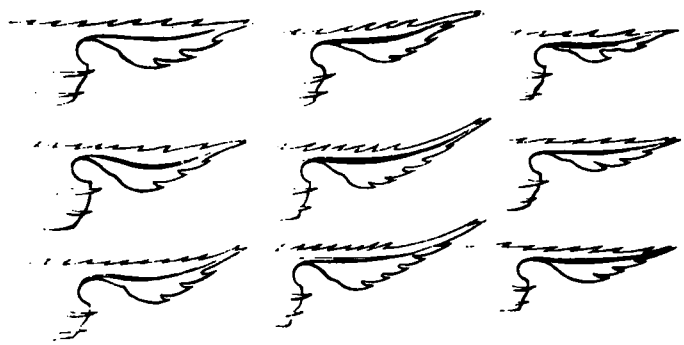
Specific character.—Rostrum perfectly straight, the apex entire ; above with four to six teeth, beneath with two. Scale of the external antennæ rounded at the apex.

Palæmon varians, Leach, Edinb. Enc. VII. p. 401. 431.—Id. Trans. Lin. Soc XI. p. 349.—Id. Malac. Brit. t. xliii. f. 14-16.—Edw. Hist. des Crust. IV. p. 391.

The absolute restriction to two teeth on the inferior crest of the rostrum in this species, would distinguish it from all other British species of *Palæmon*, even without the additional characters of the small number of teeth on the upper crest, and the entire apex. The whole rostrum is perfectly straight, lanceolate, acute at the apex, as long as the scale of the external antennæ ; one of the teeth on the upper crest is always placed a little behind the ocular notch. These teeth are generally four in number, sometimes five, very rarely six ; beneath there are never more than two teeth ; I have seen one specimen in which there was only one. The external antennæ are of moderate length, not much exceeding that of the body ; the scale anteriorly rounded, in which character it differs from *P. serratus.* The hand of the anterior pair of feet is slightly tumid ; the upper finger hairy.

This species is less widely distributed, as far as we can at present judge, than either of the former ones. It is, however, found on the Devonshire and Dorsetshire coast, and onwards as far as that of Norfolk. Mr. Couch does not include it in his Cornish Fauna. Mr. Thompson states that a few specimens have been taken in Belfast and Strangford Loughs, and I have received it myself from Ireland through the kindness of Col. Portlock.

The vignette consists of several variations of the rostrum in three species of Palæmon. The first three on the left are of *P. Squilla*. The three in the middle belong to *P. serratus*, and the three on the right to *P. Leachii*.

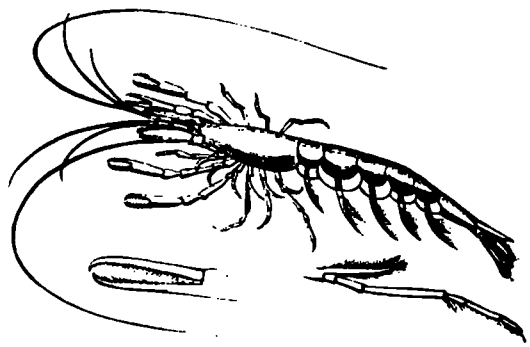


GENUS PASIPHÆA. Sav.

Alpheus.	Risso.
Pasiphæa.	Savigny, Risso, Desmar. Latr. Leach, Edw.

Generic character.—External antennæ placed beneath the internal; the basal joint of the peduncle narrower than the succeeding one. *Internal antennæ* with the peduncle slender, and terminated by two filaments, one of which is considerably longer than the other. *External pedipalps* very long, slender, and pediform; furnished at the base with a lamellar ciliated palp. *First and second pairs of legs* didactyle, rather robust, nearly of equal length; the fingers slender and curved; *third, fourth, and fifth pairs* very slender, monodactyle, the fourth pair the shortest. *Carapace* very much elongated, compressed, narrowed anteriorly. *Abdomen* very long, much compressed; the fifth segment broad and squared at the lateral margin; the sixth very long; the seventh narrow and wedge-shaped; *the false feet* of the first segment with the filaments rudimentary, the others with two equal.

The history of this remarkable genus has hitherto been involved in some obscurity. In the description of our species I have given some reasons for believing that as yet one species only is known.



Pasiphæa Sivado, Risso.

Specific character.— External caudal laminæ longer than the internal, which are longer than the middle one.

? *Alpheus Sivado*, Risso. Crust. de Nice, t. iii. f. 4. p. 93.—Desmar. Consid. sur les Crust. p. 240.—Latr. Regn. Anim. de Cur. IV. p. 99.

? *Pasiphæa* „ Risso, Hist. Nat. de l'Eur. Merid. V. p. 81.—Edw. Hist. Nat. des Crust. IV. p. 426.— Guer. Iconog. du Reg. Anim. (Crust.) t. xxii. f. 3.—Thompson, Ann. Nat Hist. V. p. 256.

„ *Savignii*, Leach, MSS. in Mus. Brit.—Edw. l. c. p. 426.

„ *brevirostris*, Edw. l. c. p. 426.

The general form of this remarkable species distinguishes it at first sight from every other known Crustacean. The whole body is exceedingly compressed laterally, and the carapace elongated and somewhat attenuated forwards. There is scarcely a perceptible rostrum; but immediately behind the anterior margin of the carapace, is a small triangular tooth, with the point turned forwards, and a similar one, but smaller, on each side just above the origin

of the superior or internal antennæ. The superior antennæ have a cylindrical peduncle, the basal joint of which is hollowed for the lodgement of the eyes; the filament is double. The external or inferior antennæ are placed immediately beneath the former; the peduncle is cylindrical, terminating in two filaments, one of which is about as long as the body, the other extremely short; the lamina or scale is narrow-ovate, and ciliated along the inner margin. The eyes are much larger than their peduncles. The external pedipalps are long, slender, and pediform, each furnished with a long palp which is a little thicker than it and about half its length. The first pair of feet are rather more robust than the second, the hand thicker in the middle, the fingers shorter than the hand, and curved at the points which are acute, and cross each other when closed; the arm is furnished with a series of short remote teeth; the second pair are ordinarily rather longer than the first, more slender, the fingers as long as the hand, and furnished along their prehensile edge with a dense series of short, stiff hairs. The third pair is extremely slender, filiform, and simple; the fourth pair, by much the shortest, being not more than half the length of the fifth, the penultimate joint furnished on its inner margin with a brush of stiff hairs, and the terminal joint ciliated; the fifth pair very long and slender, the terminal joint ovate, furnished with a lash of hairs of twice its length. The abdomen is very long and much compressed; the second segment broad and rounded; the fifth broad and squared at the lateral margin; the sixth remarkably long and narrowed; the seventh or central lamina of the tail very narrow and wedge-shaped. The external laminæ of the tail are longer than the internal, which are intermediate in length between the former and the median lamina or seventh abdominal segment.

The abdominal false feet have two equal filaments, with the exception of the first pair, of which one of the filaments is extremely small or rudimentary. The eggs are remarkably large and not numerous.

The colour of the Mediterranean species described by Risso, and which I believe to be identical with this, is thus given by that author:—The body is white, slightly iridescent, transparent, banded with red at every articulation; the eyes black; the antennæ, pedipalps, and feet red, and the caudal scales dotted with the same colour.

Total length of specimens from the Bristol Channel about three inches.

I have already alluded to the obscurity in which this genus has been involved; and which has arisen, in great measure, from the extremely erroneous figure given by Risso in his "Histoire des Crustacés de Nice," &c. This figure in fact is so bad, that it affords no ground whatever for any determination of the species: it is indeed much to be regretted that in a work in which so many interesting species were first described, the figures are almost universally so imperfect as to afford no specific character which can be at all depended upon. Savigny, in his masterly "Memoires sur les Animaux sans Vertébres," establishes the genus by name, but without any description, retaining the specific name of *Sivado* after Risso. Leach, who appears from some other circumstances to have been unacquainted with Risso's earlier work, gives to a specimen in the British Museum the name of *P. Savignii*, but he has not, as far as I am aware, published any account of it. Milne Edwards, upon the credit of Risso's figure, has considered the Mediterranean species as distinct from the British; and he has added a third species, which he calls *P. brevirostris*. I do not think, however, that the cha-

racters by which this eminent carcinologist distinguishes the latter supposed species can be considered as constant, as I have seen British specimens which vary considerably in the degree of ciliation in the parts from which he deduces his distinctions. It is, finally, very evident that the figure of Guérin in his "Monographie," imperfect and unsatisfactory as it is, and which he refers to *P. Sivado*, belongs to our British species; and the result of all these considerations in my mind, is the full conviction that we are at present acquainted with but one species of this genus: I have therefore retained Risso's original specific name of *Sivado*. It now remains that I should state what is known about this species as a native of Britain. It appears probable, from the following extract of a letter from Dr. Leach to Mr. Baker of Bridgewater, that the first British specimen known was in the collection of Mr. Sowerby; and it also appears from the same passage that Mr. Baker had himself sent another individual of this species to Dr. Leach with some other crustacea and insects. Dr. Leach writes, "I cannot refrain from noticing two species which give me the most pleasure. The one is a species of the genus *Pasiphæa* of Savigny. I have seen a specimen of this genus in Mr. Sowerby's collection, and I believe it to be the same species." Subsequently Mr. Baker obtained several others, taken, I believe, in the Bristol Channel, which are now, through his kindness, in my possession, and I have lately received from Mr. M'Andrew, two individuals, a male and a female, taken by him in the Irish Channel, the latter having the ova excluded and attached to the abdominal false feet. It would appear by the following notice in the fifth vol. of the "Annals of Natural History," by Mr. W. Thompson, that the specimen in the British Museum was originally taken on the coast of Ire-

land. "*Pasiphæa Sivado.* In the British Museum there is a specimen so named and labelled 'Ireland.' From the donor, the Rev. James Bulwer, I learned that it was taken by him in the vicinity of Dublin."

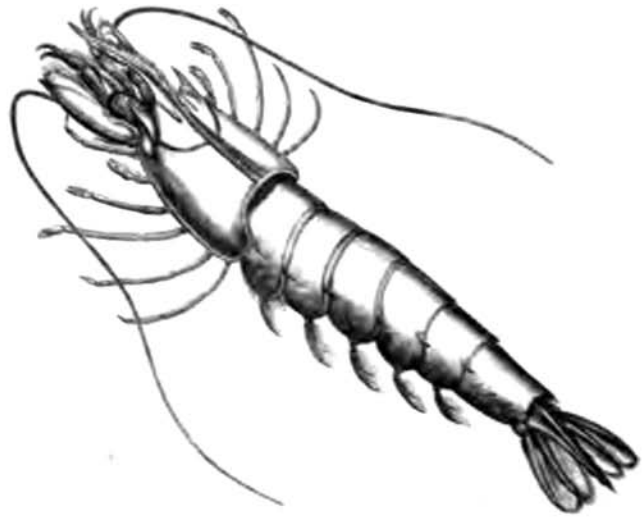
I have, for obvious reasons, dwelt more at large than in a case of less difficulty would have been necessary, on the characters as well as the nomenclature of this species. It is now for others, who may have the opportunity, to compare Mediterranean with British specimens, in order to ascertain whether I am right in considering them as all appertaining to one species.

GENUS PENÆUS. FABR.

PALÆMON.	Oliv.
PENÆUS.	Fabr. Bosc. Latr. Leach, Edw.

Generic character.—External antennæ about as long as the body, the scale slightly decreasing and rounded at the apex, ciliated on the inner margin. *Internal antennæ* with the first articulation very broad, hollowed above, forming a cavity for the eyes; the outer margin armed with a tooth, and the inner furnished with a lamellar and ciliated appendage; the last two joints very short. The filaments of these antennæ are double and generally very short. *External pedipalps* long, slender, and pediform, furnished at their base with a long, curved, ciliated appendage. *Feet* all with a small appendage at the base; the *first three pairs* didactyle, increasing in length from the first to the third. *Carapace* with a prominent median crest, extending into a long toothed rostrum. *Eyes* very large and round. *Abdomen* large and much compressed; its posterior half carinated. *False feet* much enclosed by the lateral portions of the abdomen, terminating in two unequal ciliated plates.

One species only of this genus has been found on our coasts.



Penæus Caramote. Desmar.

Specific character.—Filaments of the internal antennæ shorter than the last two articulations. Thorax trisulcate posteriorly; rostrum bent downwards, above multidentate.

Alpheus caramote	Risso, Crust. de Nice, p. 20.
Penæus „	Desmar. Consider. sur les Crust. p. 225.—Risso, Hist. Nat. de l'Eur. Mer. V. p. 57.—Edw. Hist. des Crust. II. p. 413.
„ *trisulcatus*	Leach, Malac. Brit. t. xiii.

The carapace is large and somewhat ventricose; the rostrum extending to the peduncle of the internal antennæ, armed above with numerous (about twelve) rather strong teeth, and beneath with one or two points only, the latter placed a little in front of the line of the eyes; on each side of the rostrum is a crest, which is continued backwards to near the margin of the carapace, thus forming a deep groove on each side of the median crest of the

rostrum, the posterior portion of which is also traversed by a third longitudinal groove. A strong tooth at the anterior margin of the carapace, above the insertion of the internal antennæ, and at the outer and upper margin of the orbit, a smaller tooth at its inner side, and a third very small one at the posterior termination of a small lateral groove which passes backwards from the face of the second tooth. The eyes are round and remarkably large. The inferior or internal antennæ have two extremely short filaments, shorter than the last two articulations of the peduncle. The scale of the external antennæ is somewhat narrower and evenly rounded towards the extremity, and ciliated along its anterior and inner margin. The external pedipalps are pediform, gradually tapering to the extremity, and terminating in a small acute finger. The first three pairs of feet didactyle, increasing in length from the first to the third, which is rather the longest of the five. The hand of the first pair is the most robust, that of the second rather the longest: the fourth and fifth pairs are simple. The abdomen is much compressed, particularly posteriorly, and rises to an acute carina for the greater part of its length backwards. The fourth and fifth segments are notched on each side. The last segment, or medium portion of the tail, is long, narrow, triangular, acute, longitudinally grooved, furnished with a strong tooth on each side near the apex.

The length of the British specimen, figured by Leach, from the rostrum to the extremity of the tail is not more than three and a half inches. Risso gives five inches, and Milne Edwards seven as the length of those of the Mediterranean.

I have felt compelled, upon careful examination, to consider the British species of *Penæus*, to which Leach, pro-

bably from not having seen any Mediterranean specimen of *P. caramote*, gave the name of *P. trisulcatus*, as identical with that to which the former name has been given by Rondeletius, by Risso and Edwards. In this conclusion I am borne out by the opinion of the last-mentioned distinguished naturalist. Like some other of the Mediterranean species found on our shores, it is very rare with us. Leach mentions but two specimens known to him, nor is it mentioned in any of the local Faunas either of England or Ireland. The two specimens known were both taken on the Welsh coast.

GENERA CUMA, Edw., ALAUNA and BODOTRIA, Goodsir.

In the 13th volume of the "Annales des Sciences Naturelles," Dr. Milne Edwards described a small Crustacean under the name of *Cuma Audouinii;* but in his "Natural Hist. of Crustacea," he expresses his doubt whether this little animal be anything more than the larva of a decapodous form, and places it amongst other doubtful examples in an appendix.

In 1843, however, Mr. Harry Goodsir published in the "Edinburgh New Philosophical Journal," a very full and clear description of this and two other species of *Cuma*, and of two allied species which he considers as the types of two new genera, to which he gives the names respectively of *Alauna* and *Bodotria*. The whole of these I have ventured to consider *provisionally* as constituting a small family, probably belonging to the lower decapods, which appears also to be Mr. Goodsir's own opinion, though expressed with doubt, in which doubt I entirely agree. This author satisfactorily determined that they are perfectly developed animals and not mere larvæ.

As I have never had an opportunity of seeing the animals, I take the liberty of giving the whole of Mr. Goodsir's account of this remarkable family, which is too concise to require or admit of condensation.

For the anatomical details I refer to the plates illustrating the paper.

"During the summers of 1841 and 1842, I obtained a number of crustaceous animals, which I arranged promiscuously under the genus *Cuma* of M. Edwards, it being my intention to publish them at that time under this arrangement. I waited, however, until it could be satisfactorily proved whether they were perfect animals, or, according to the suspicions of M. Edwards, merely the larvæ of some Decapodous Crustacea. I have now satisfied myself that they are perfect animals, and at the same time have discovered the types of two new genera, which places the group in a still more interesting point of view.

"I have applied the name *Bodotria* to one of these genera, and *Alauna* to the other; the former being the ancient name of the Firth of Forth, at the mouth of which all these animals were got; and the latter, the ancient name of the river Forth.

"The latter of these genera (*Alauna*) may be the genus *Condylurus* of Latreille, as I have never seen that author's description; but whether it be so or not there cannot be any danger in applying the name *Alauna*, as *Condylurus* had been previously used amongst the Mammalia.

"As I had a greater number of specimens of the *Cuma Edwardsii* than of any of the others, I have been enabled to make out the structure of that species with greater minuteness.

"These animals are very like small prawns in their general appearance; but they bear perhaps in this respect a greater likeness to the species of the genus *Nebalia* than to any other known Crustaceans.

"The shell is hard and brittle, cracking under pressure. All the species are of a pale straw colour. The thoracic portion of the body is large and swollen; it is composed of six segments; the abdomen is longer; and is composed of seven segments.

"M. Edwards, in his Memoir on the genus *Cuma*, published in the 13th vol. of the Ann. des Sc. Nat., considers that the whole of the first and largest segment of the body constitutes the head. In

all the specimens which I have dissected, I have found a suture running across this segment, immediately before the middle part of it; this is observed very distinctly in the *Cuma trispinosa*, in the *Bodotria arenosa*, and also in the genus *Alauna*. The first of these parts I consider to be the head; the second part as the first thoracic segment. To the first we find attached the rostrum, eyes, antennæ, organs of the mouth, and footjaws four in number. The second part bears the first pair of true ambulatory legs; these legs constituting (according to M. Edwards) the third pair of footjaws.

"The second thoracic segment is quite obsolete in M. Edwards's species (*Cuma Audouinii*); it is but slightly observed in the *C. Edwardsii*; in the *C. trispinosa*, however, it becomes quite apparent, being of considerable breadth at the dorsal portion. In the *Alauna rostrata*, also, we find this segment quite developed throughout its whole extent, and the second pair of thoracic legs arising from it.

"These two thoracic segments (the first and second) bear the compound legs in the genera *Cuma* and *Bodotria*, in which two genera the four following segments bear the four pairs of simple legs. In the genus *Alauna*, however, we find a different arrangement, there being an equal number of simple and compound legs, three pairs of each.

"The eyes in this tribe of animals are exceedingly small; they are pedunculated, but sessile,* and are placed very close together; they are situated near the posterior part of the head, a short distance behind the rostrum, and on the mesial line. They are covered by the shell, owing to which, and their proximity to one another, the animal is at first sight apt to be considered as monoculous. The rostrum is short and truncated in the genus *Cuma*; is almost altogether awanting in *Bodotria*, but is well developed in *Alauna*, being of considerable length and pointed.

"The antennæ undergo considerable changes in the different genera of this tribe. In *Cuma* we find the superior antennæ con-

* This passage appears to be inconsistent. The two great families of Malacostraca are essentially distinguished from each other by the eyes being relatively pedunculated (*Podophthalma*) or sessile (*Edriophthalma*).—T. B.

sisting of a single scale-like joint, armed with a number of strong spines; the inferior antennæ are five-jointed, being in general very little longer than the rostrum. In *Bodotria* the superior antennæ are altogether obsolete, and the inferior antennæ are very short. In *Alauna*, again, we find the antennæ more developed; the superior consisting of a single-jointed peduncle, and a long multiarticulate filament which is covered with hairs. The inferior pair are eight or nine-jointed, and are somewhat larger than the rostrum. The organs of the mouth consist of one pair of maxillæ, three pairs of mandibles, and two pairs of foot-jaws. These last organs will be found minutely described under *Cuma Edwardsii*, the species which I have been enabled to examine most minutely.

"The true legs may be classed into compound and simple. The compound legs, as we have already stated, are four in number in the genera *Cuma* and *Bodotria;* but six in *Alauna*. The first, or compound legs, are divided into two parts, the anterior or ambulatory, and the posterior or natatory. The simple legs are much shorter than the compound, and are more adapted for prehension; but they are unarmed with claws, and are seldom used for this purpose.

"The abdomen is moniliform, seven-jointed, in all the genera. The last joint is very small in the genera *Cuma* and *Bodotria;* but in *Alauna* we find this segment very much developed. All the genera have the sixth abdominal segment armed with a pair of long bifurcated styles. The genera *Cuma* and *Alauna* are quite free of appendages to the other abdominal segments; but in *Bodotria* we find that all the abdominal segments are armed with a pair of bifurcated appendages.

"Owing to the opacity of the shell, I have not been able as yet to make out the minute parts of the anatomy of these animals. The intestinal canal consists of a long straight tube, considerably dilated as it passes through the thoracic portion of the body; when it reaches the abdominal portion it suddenly becomes much narrower.

"The anal aperture is found in the seventh abdominal segment.

"The branchiæ are situated on each side of the thorax, immediately above the insertions of the legs, and approach, in their comb-like appearance, to those of the higher Crustacea. Interiorly, each of them is connected with the superior foot-jaws, and, excepting that connection, lies apparently quite free in a sac formed by the reflection of a thin transparent membrane, which lines the internal surface of the thorax. The superior part of the branchiæ consists of one continuous piece, which is bent in a hook-like manner at its posterior extremity; the branchiæ themselves arise from the inferior edge of this part, and are about sixteen or seventeen in number; they are not laminated like those of the higher Crustacea, but consist of one large piece, which is apparently composed of a great number of cells.

"The organs of generation are not apparent in the male, but in the female, and, especially when she is loaded with spawn, these organs are at once perceptible. They are very similar in their structure and appearance to the same parts in the female *Mysis*. They consist of four scales, which arise from the inferior edge of the thoracic segments. These scales are of an irregular oval shape, concave internally, and convex externally, and they are overlapped by one another. The eggs are of considerable size, and of a bright straw colour. It is from the genus *Cuma* only that these observations were taken in regard to the organs of generation.

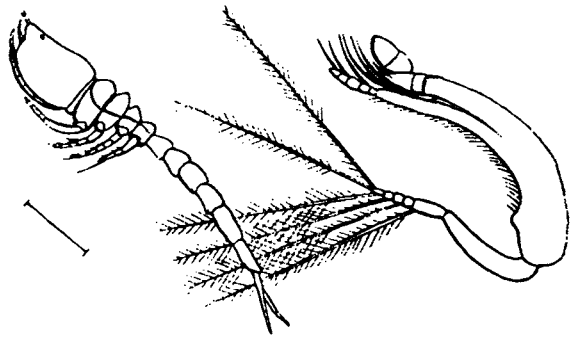
"When a portion of the skin, or shell rather, is placed under the microscope, it presents a very beautiful appearance; it apparently consists of a great number of nuclei, arranged in some degree of order. These nuclei are stellated, and here and there larger nuclei may be observed, the edges of which are quite smooth.

"The structure of these animals is so peculiar, as to render the assignation (at present) of a proper place in a natural arrangement of the class, a point of very considerable difficulty. This arises in a great measure, without doubt, from our very limited knowledge of the class. I rather think, however, that they should be ranged among the lower *Decapoda macroura*.

Genus Cuma (*Edwards*).

Generic Characters.—The superior antennæ are single-jointed, and scale-like; the inferior antennæ are five-jointed. The caudal styles have the double terminal scales biarticulate, the last of which is always the shortest.

Cuma Edwardsii, mihi.



C.—With the superior antennæ rhomboidal; with the ambulatory division of the first pair of legs, with the first joint bent at an obtuse angle; with the thumb-like process single-jointed, and with the last joints clavate. Length 4 lines. Hab. Frith of Forth.

Description.—The whole animal is of a fine straw-colour, with a delicate tinge of pink, which is brighter in certain lights; the shell is quite rough, which is caused by the great number of shallow foveæ with which the whole surface is thickly covered. This, and the following species, are perhaps the smallest of the genus; at the same time, they are much thicker and stronger in proportion to their size than the other species. The rostrum is short, thick, and suddenly truncated obliquely. The antennæ are minute; the first or superior pair are almost obsolete; they consist of one joint only, which is rhomboidal: the extremity of each is armed with several strong but minute hairs or spines; they arise from the truncated extremity of the rostrum. The inferior antennæ arise from the inferior surface and base of the rostrum; they are considerably larger than the superior pair; they are five-jointed, the third joint being the longest, the fifth or last is extremely small, and is armed with three very strong pointed and articulated spines. These pair of antennæ are somewhat longer than the rostrum. The footjaws are rather powerful, and have a great resemblance to the following pairs of feet. The first, or superior pair, are the smallest; the first joint is of considerable length, being equal to all the others combined; it is rather bent and broad, and is armed at its distal extremity with two thumb-like processes or tubercles. Two very long and slender spines, which

are almost as long as the foot-jaw itself, arise from the middle part of this segment; the external spine is free of spinules altogether, but the internal is armed, on its external edge only, with a great number of articulated spinules. The second segment of this footjaw is very short, and its posterior edge bears two very short articulated spines of equal length; these spines are spiniferous. The third segment is almost equal in length to the first, and, like the second, also gives rise to nine or ten articulated and spiniferous spines. The fourth segment is small and rounded, being also armed on its posterior edge with simple spines. The fifth segment is thumb-like, and spinous on its posterior edge.

The external pair of footjaws are much larger than the internal; they are five-jointed, and are armed in the same way as the first pair, except that the external edge of the first segment is armed at regular intervals with small tufts of very fine hairs; the extremity of the second segment is also armed with a very long articulated and spiniferous spine. These two extremities just described are in general lying in such a way as to cover the organs of the mouth.

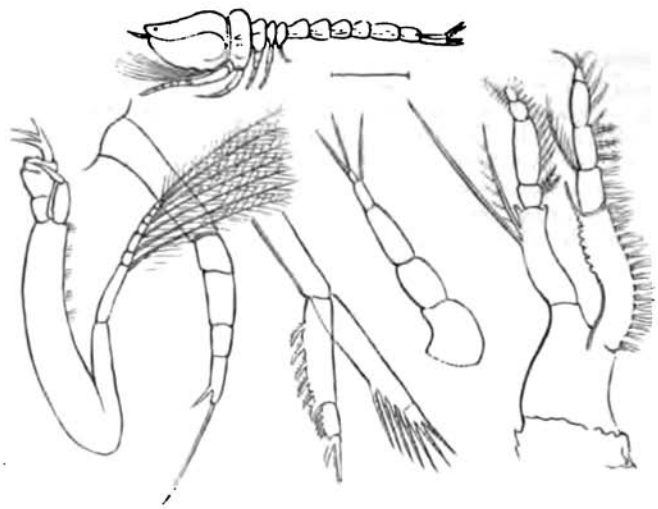
The first two pairs of legs are constantly concealed beneath the carapace when the animal is at rest, covering the footjaws and the organs of the mouth, and appear only to be used when the animal is swimming. The anterior or ambulatory division is five-jointed; the first joint is about twice the length of all the others combined; it is considerably bent and very broad; its internal edge is armed at regular intervals with pennicillated tufts of hair; the three following segments are quite free of spines, but the last is armed at its extremity with a strong claw and two smaller spines. An articulated thumb-like and chelate joint arises from the extremity of the first segment, immediately internal to the last four segments. The natatory or posterior division of this leg is multiarticulate; the first two segments are longest, being equal in length to the first segment of the anterior division; the remaining segments are minute, about nine or ten in number, each of which gives off a very long spiniferous setum, which is articulated at its distal half. The second thoracic leg of this species presents to us one of those beautiful and delicate structures which it is impossible either to describe or to delineate with even a remote degree of accuracy. The ambulatory division is very long and slender, six-jointed; the first joint is long and very much flattened, but tapers from the middle towards its distal extremity, which is armed with a very long and pointed spine; the following joints are all equal to one another in length, except the last, which is minute. The natatory division of this leg is seven- or eight-jointed, and is equal in length to the first segment of the other division. The last five segments are all armed with long articulated and spiniferous setæ, which smaller spines are again spinulose. The four following pairs of legs are simple, that is, they are merely ambulatory; they are all six-jointed, and are very spiny. The segments of the body from which they arise are all ovoid, their dorsal edge being sharp and pointed.

The abdominal portion of the body is long and slender, seven-jointed and moniliform; the last joint is minute, and lies between the caudal styles which arise from the extremity of the sixth segment; these styles are of no great length in this species; they are composed of three parts; each style consists of a

long-jointed peduncle, from the distal extremity of which two biarticulated scales arise; these scales lie one above the other. The first segment of the peduncle is somewhat longer than the sixth abdominal segment; the first segments of the scales are about half the length, and the last segment about one-fourth the length of the peduncle; the inner edge of the superior scales is armed with a number of long, pointed, and articulated spines. The spines which arise from the inner edge of the inferior scales are more numerous; they are all bent, their points being turned backwards; the convex or anterior edges of all these spines are very much serrated.

I have named this species after M. Edwards, the founder of the genus, and the leading crustaceologist of the day.

Cuma Audouinii. Edwards.



C.—With the superior antennæ very small; with the first joint of the ambulatory division of the first pair of legs almost bent at right angles; the terminal joints oval, and the thumb-like process multiarticulate. Long, four lines to five. Hab. Frith of Forth.

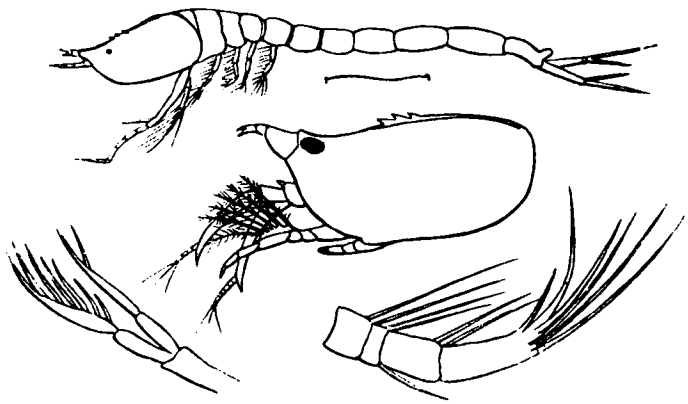
Description.—Under casual observation this species is very apt to be mistaken for that last described, but by careful examination the difference is found to be very material. In its general appearance, this species resembles the *Cuma Edwardsii*. The first thoracic segment, however, is longer and not so rounded; the rostrum is shorter and more pointed, and the eyes are larger; the flattened surface on the sides of this species is not so decided. The second thoracic segment is more hid; the third is larger, ovoid, and rounded; the adjoined

scale projects backwards; the fourth segment is of the same shape as the third, but not nearly so large; the fifth ends in a sharp point, both superiorly and inferiorly; the sixth thoracic segment is clavate. The superior antennæ are very small, and scarcely to be distinguished from the rostrum. The inferior antennæ are very similar to those of the *Cuma Edwardsii*. The footjaws are also similar in their structure to those of the last-described species; the ambulatory division of the first leg is five-jointed; the first joint is very much bent, and is of considerable breadth; the two last joints are quite oval, and the last nonchelate. The internal thumb-like process, instead of being composed of one joint only, as in the last described species, consists of four or five segments, which are all armed with short spiniferous and pointed spines; the natatory portion of this leg is multiarticulate, the extreme joints being very small, so as to place the long spiniferous setæ very close to one another.

The second pair of legs are very short. The last four pairs of legs are similar in their structure to those of the last described species. The abdomen and caudal fins also bearing a similar resemblance.

This species is apparently the *Cuma Audouinii* of M. Edwards, but whether it is or not I cannot be quite certain.

Cuma trispinosa, mihi.



C.—With the dorsal ridge of the carapace surmounted by three spines, with the ambulatory division of the first pair of legs extremely short, and with the second thoracic segment well developed. Long, eight lines. Hab. Frith of Forth.

Description.—This is a most characteristic species, and brings out several points of material consequence in the character of the genus. This species has the body quite smooth, and of the same colour as the preceding. It is the largest of all the species, but is more slender. The thoracic segments are not so deep as those of the preceding species, and the lateral compression is awanting. The

rostrum is sharp-pointed, and bent considerably upwards; the eyes are small, and the dorsal ridge immediately behind the eye is surmounted with three thick short spines. The second thoracic segment is of considerable extent at its dorsal part, but is quite obsolete at the middle; it again, however, makes its appearance at its inferior part, where it supports the second pair of compound legs. The four following segments gradually decrease in size:—the superior antennæ are of considerable size, oblong and spinous. The inferior antennæ are much longer than the rostrum. The ambulatory division of the first pair of legs is extremely short, and the first joint is of no great breadth. The natatory division it about the same length as the first joint of the anterior division.

The second pair of legs are very long and slender; the first segment is not broader than the following joints, and is armed internally at its extremity with a very long spine.

The simple feet are extremely spiny.

The abdominal portion of the body is very long and slender, the fifth segment being the longest. The caudal styles are long, slender, and pointed; the internal scale has the last joint pointed and armed with two spines; the last segment of the external scale is more obtuse.

Genus Alauna, mihi.

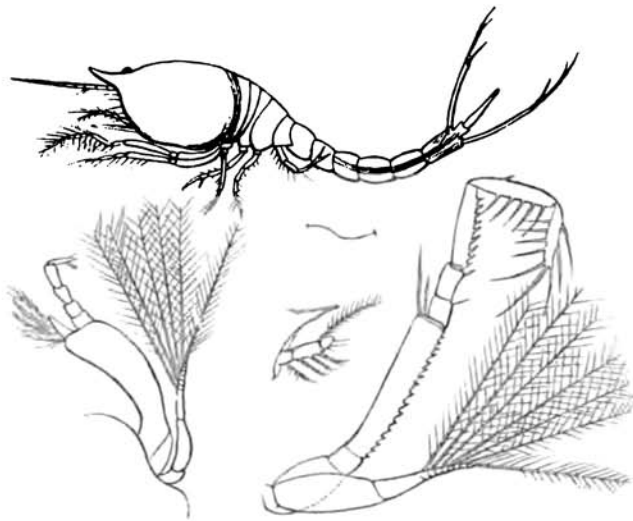
Generic Characters.—The superior antennæ are composed of a peduncle and a multiarticulate filament. The inferior antennæ are eight-jointed. The first three pair of legs are compound. The internal scale of the caudal style is composed of three segments, and the external of one.

Alauna rostrata, mihi.

Description.—The whole animal is of a beautiful bright straw colour, inclining to yellow. The thoracic portion of the body is very large and swollen. The first segment or carapace is almost oval. The rostrum is long, pointed, and is bent upwards at its extremity. The eyes, which are of considerable size, are situated at the base of the rostrum. The superior pair of antennæ are very slender, consisting of a delicate filament covered with hairs, which arises from a short peduncle; these antennæ are almost equal in length to the rostrum.

The inferior antennæ are much longer, consisting of eight joints slightly spinous; the distal extremity of the third is armed with a strong multiarticulate spine. The footjaws are seen projecting considerably beyond the edge of the carapace; they are very spiny, and the last joint but one is armed with a long articulated spiniferous spine.

The first pair of legs are extremely short; the thumb-like process at the extremity of the ambulatory division is single-jointed and spiniferous. The second pair of legs are also short. The ambulatory division of the third pair of legs is very long and slender, being almost as long as that of the second pair of legs; the fifth joint is the longest. The natatory division is as long as the first four joints of the ambulatory. The simple legs are very spiny on their anterior edges.



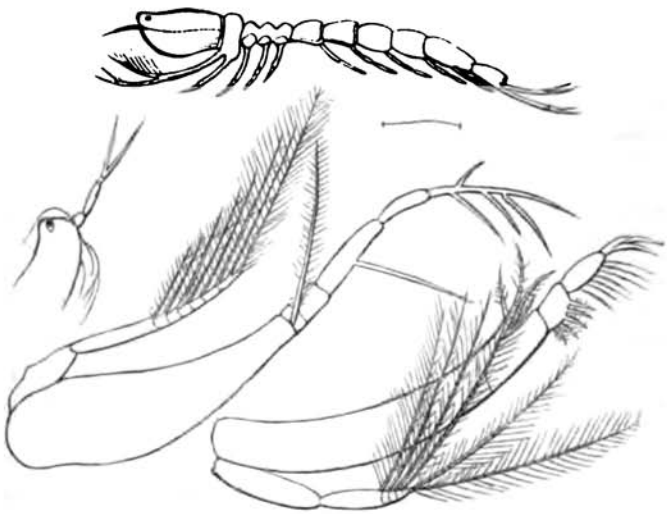
The abdomen is short and thick, seven-jointed, the last joint being produced into a long spine which is spiniferous on either edge ; the anal aperture is seen near the base of this segment. The caudal styles arise from the sixth segment, and they are much more complicated that those of the foregoing genera. The first segment is slightly clavate, longer than the seventh abdominal segment, and armed with a single row of spines on its inner edge. The internal scale consists of one joint only ; it is very spiny, and is about half the length of the external. The external scale is composed of three joints, the first two of which are equal in length to one another ; the third is about twice the length of both of these, and is very spiny at its extremity. Long, half-an-inch. Hab. Frith of Forth.

Having only obtained one specimen of *Alauna rostrata*, and one also of *Bodotria arenosa*, I have not been able to examine the structure of these two genera satisfactorily.

Genus Bodotria, mihi.

Generic Characters.—The first, second, third, fourth, and fifth abdominal segments are each armed with a pair of bifurcated finlets. The two terminal scales of the caudal styles are single-jointed.

Bodotria arenosa, mihi.



Description.—The carapace is almost oval, rostrum awanting, that part of the carapace being merely rounded off. The superior antennæ are quite obsolete. The inferior pair are of considerable length, and are terminated by means of two long spines.

The ambulatory division of the first pair of legs has the first joint of a very great size, being very much flattened and slightly curved. The four remaining joints, together with the internal thumb, are very spiny. The natatory division of the leg is six-jointed, the four last joints giving rise to as many long spiniferous spines, which are articulated at their distal halves. The external edge of these spines are spiniferous at the articulated half only. The ambulatory division of the second pair of legs has the first segment very broad, and tapering gradually towards its distal extremity, from which arises a very long, articulated, and spiniferous spine.

The abdominal finlets are five in number. They are composed of two parts, viz., the first or pedicle, and the second or bifurcation; the pedicle is of considerable length, from the extremity of which there arise two scales, which are armed on their margins with long spiniferous spines, which are much longer than the finlet itself.

The first segment of the caudal styles tapers very slightly, and the two terminal scales are each of them single-jointed, and end by means of very fine points. The external is armed at its extremity with two spines. Long, five lines.

This genus forms doubtless a link between the *Stomopoda* of M. Edwards and the higher Crustacea.

"In their habits all these animals seem to agree. I have not been able to observe anything peculiar in them. They swim with very great rapidity, and on stopping they fall to the bottom on the sand or gravel, without attempting to lay hold of anything, as I have already remarked, seldom using their feet as a means of prehension. They free themselves with great dexterity from any weight which may happen to fall on them. I have often placed the point of a needle on their thorax and pressed them down into the sand; the animal immediately frees itself with very little apparent trouble, by means of its tail. The extremity of the tail is placed against the needle with one of the styles on either side of it, and by pressing upwards in this way, it soon regains its liberty.

"They frequent sandy banks, and chiefly those where there is a little sea-weed."

GENUS MYSIS, LATR.

CANCER.	Muller, Otho, Fabr.
MYSIS.	Latr. Lam. Leach, Edw.

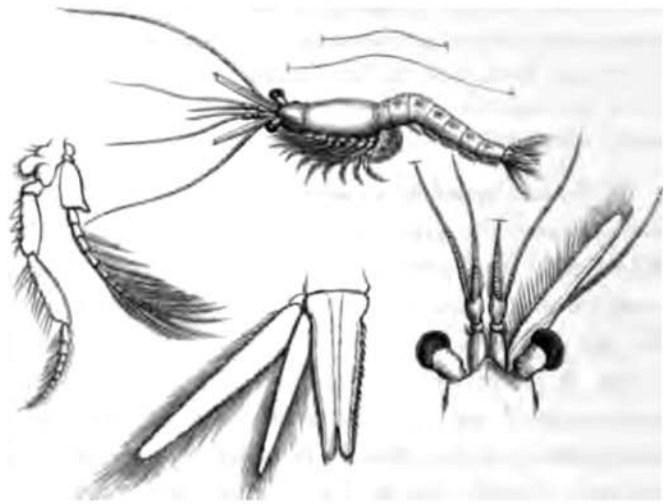
Generic character.—External antennæ inserted beneath the internal, the first joint giving attachment to a laminar appendage, similar to that in the *Palæmonidæ,* which is much elongated and ciliated on the inner margin; the two succeeding joints of the peduncle slender and cylindrical, the terminal filament filiform, and longer than the *internal antennæ,* which are inserted beneath the eye, near the median line, and have two terminal filaments. *Pedipalps* consisting of two pairs entirely pediform. *The first pair* short, composed of three distinct branches; the internal portion pediform, of five joints, hairy, and doubled upon itself in front of the mouth; the middle branch or palp elongated, and composed of numerous articulations; the basilar joint very large, with a ciliated strap-shaped process on each side; the third or external branch, or flabelliform appendage, is represented by a semimembranous scale directed upwards, and lying under the margin of the carapace. *Second pair of pedipalps* of the same form, but wanting the flabelliform appendage. *Feet* of six pairs, composed of corresponding elements with the external pedipalps and five pairs of feet in the DECAPODA; each consisting of two branches, decreasing in length from before backwards, and formed for swimming; the first four pairs have no flabelliform appendage; the last two are furnished with it. This part in the male is very small, but in the female it is greatly developed, and forms on each side a broad plate bent under the sternum, the two thus forming a pouch, in which the eggs are first deposited, and within which the young are secluded, and pass the early period of their life. *Carapace* covering only the

anterior part of the thorax, the two sides bent downwards and inwards so as to be applied against the base of the feet; anteriorly it becomes very narrow, and terminates in a short flattened rostrum. *Eyes* large, short, with the base hidden under the anterior margin of the carapace. *Abdomen* very slender, tapering, elongated, nearly cylindrical. *Tail* as in the macrourous DECAPODA.

No distinct branchial apparatus has as yet been observed in this remarkable genus; and, as is observed by Dr. Milne Edwards, "The only appendage which appears to be so modified in its structure, as to become more adapted than the rest of the body to serve the purposes of a respiratory organ, is the *lash* of the first pair of pedipalps, which in other respects are similar to those found in numerous species possessed of branchiæ." It is, however, not at all improbable that this may be the true organ of respiration.

The development of the young in this genus, as well as their anatomy generally, has engaged the attention of the late Mr. J. Vaughan Thompson, and a very elaborate monograph of their structure will be found in his "Zoological Researches," to which the reader is referred for full information.

The affinities of the family *Mysidæ* are very incorrectly indicated by the position which Dr. Milne Edwards has assigned them amongst the *Stomopoda*. In almost all the essential points of structure they are certainly more nearly allied to some of the *Decapoda;* but as they are also remote even from these, I have not considered it right to reduce them to that group, or to attempt to fix their natural relation to the two groups, particularly as a local Fauna does not offer the best vehicle for changes in general arrangement.



Mysis chamæleon. J. V. Thomps.

Specific Character.—Middle plate of the tail bifurcate; rostrum obtuse, not more than one-third the length of the ocular peduncle.

Mysis spinulosus?	Leach, Trans. Lin. Soc. XI. p. 350.—Desmar. Considér. sur les Crust.—Edw. Hist. des Crust. III. p. 457.
„ *Leachii?*	J. V. Thompson, Zool. Researches, p. 27.
„ *Chamæleon,*	Ib. p. 28, t. ii. fig. 1—10.—Edw. l. c. p. 457.

The general form of this species is much elongated. The carapace slender, terminating in a very short rostrum, in some scarcely projecting, in others forming an obtuse triangle, and never extending more than one-third the length of the ocular peduncle. The internal antennæ have the peduncle somewhat club-shaped, the first joint being elongated, cylindrical, and small, the last two, and particularly the terminal one, much broader, and both very short; the whole peduncle does not extend much more than one-third the length of the scale of the external antennæ: the scale

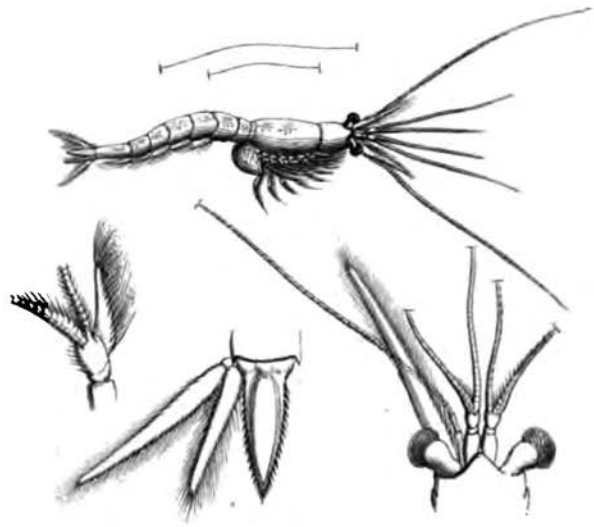
becomes a little narrowed forwards, is obliquely truncate at the apex, with a small tooth on the outer angle, and it is ciliated with rather long hairs on the inner side and at its extremity. The middle plate of the tail is bifurcate at the apex, longitudinally grooved on each side of the median line, minutely toothed on the sides, and with a stronger tooth on each apex. The lateral laminæ are ciliated on all sides with long hairs; the inner is long-lanceolate, and acute; the outer is longer, and rounded at the extremity.

It often reaches the length of an inch and a quarter.

"Nothing," says Mr. Vaughan Thompson, "can shew the fallacy of colour in distinguishing the species, more clearly than the variety of tints which *Mysis chamæleon* assumes, as it occurs here in the river Lee and the harbour of Cove, and which have suggested its trivial name; in the upper part of the river, below the city of Cork, it occurs of different shades of grey, inclining at times to black, having invariably the greater part of the anterior scales, inner branch of the inferior antennæ and joints of the outer laminæ of the tail, black, and the fringe of the scales tinged with pink; lower down amongst the littoral fuci, it takes various tints of brown; and those obtained from sites abounding in Zostera and Ulvæ, present us with green colours of greater or less intensity."

I have quoted the above account of the variation of colour in this species in the author's words, in order to shew that difference of colour alone can afford no ground for considering this species as distinct from the *spinulosus* of Leach. And yet Mr. Vaughan Thompson, in his description of the latter (which he names *M. Leachii*), gives colour as the only tangible distinction. I am decidedly of opinion that they constitute but one species, and I have retained the name of *chamæleon*, as *spinulosus* is equally applicable to various other species of the genus.

This is, perhaps, the most common and the most widely distributed of our native species. I have received it from various parts of the coast, both of England and Ireland, but from no place in such numbers as from Weymouth, where it sometimes swarms. My late lamented friend, Mr. William Thompson, informed me that he has taken this species in numbers from the stomach of Corregonus Pollan, caught in Lough Neagh, shewing that it occasionally inhabits fresh water.



Mysis vulgaris. J. V. Thompson.

Specific Character.—Middle plate of the tail lanceolate, the apex entire; rostrum very short, obtusely triangular, extending to about half the length of the ocular peduncle; antennal scale nearly as long as the carapace.

Mysis vulgaris, J. V. Thompson, Zool. Researches, p. 30, t. i.—Edw. Hist. des Crust. III. p. 459.

General form less robust than in *M. chamæleon.* The carapace slender, somewhat cylindrical, slightly constricted at its anterior third, terminating in a very short, obtusely triangular rostrum, which scarcely extends to the middle of the ocular peduncle. The peduncle of the internal antennæ much resembling that in the former species; scale of the external antennæ not less than four times the length of the peduncle of the internal; subulate, obtuse at the points, ciliated on both sides, and without an apical tooth. Middle plate of the tail lanceolate, acute, spinulose on the

sides; lateral plates somewhat subulate, ciliated on each side.

Mr. J. V. Thompson appears to have been the first to distinguish this species of *Mysis*, to which he gave the name *vulgaris*, probably from its being the most common species in the locality where he found it. It is, however, more rare on our coasts, and probably, as it had escaped detection, also on those of other countries. The specific name which he assigned to it is always one of doubtful propriety, and I would fain have assigned to it that of the distinguished naturalist by whom it was first discovered and described, but from a disinclination ever to change a specific name excepting under urgent circumstances.

It appears to be a local species, and as far as we are at present able to say, is principally found on the Irish coast; "abounding in the Lee," says Mr. J. V. Thompson, "even up to Cork," and I have specimens collected by Mr. W. Thompson in Belfast Lough. From the former species it may be at once distinguished by several prominent characters, particularly the longer antennal scale, and the simple acute apex of the middle caudal lamina. Its colour is pale, translucent grey.

The following is Mr. Vaughan Thompson's account of its habits. "They swim with the body in a horizontal position, and abound in the Lee, even up to Cork, from the early part of spring to the approach of winter; during the still period of the tide at low water, they repose upon the mud and stones at the bottom of the river, and as the tide rises, may be observed forming a wide belt, just within its margin, the youngest swimming nearest to the shore, the oldest further out, and in deeper water: they appear to be mostly females, the males being few in proportion. This species contributes towards the food of various young

fish, from which they frequently escape, by springing up out of the water."

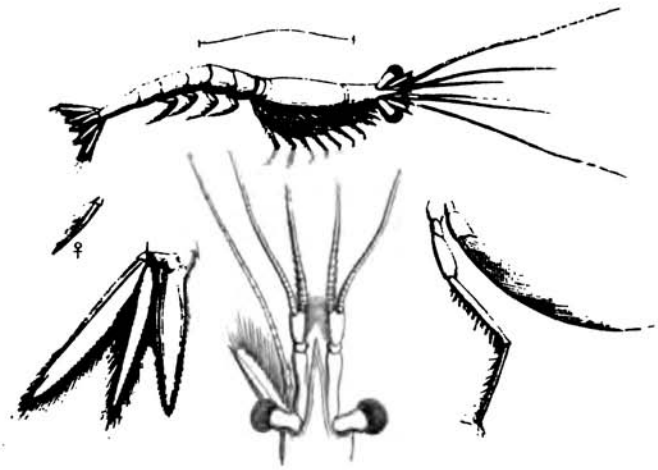
Is it not probable that *M. integer* of Leach (*Scoticus* of Thompson), may be identical with this species? His description is too imperfect to enable us to ascertain this, but they agree in such particulars as are known, excepting in size and colour, both of which are variable characters.

The following is his account of the species.*

"Tail with the middle lamella entire; length one-third of an inch. Colour pellucid cinereous, spotted with black and reddish brown. Eyes black. Females more abundant than males.

"At low tide, near Loch Ranza [in the Isle of Arran], the pools were full of this species, swimming with its head uppermost, and its eyes spread, making a most grotesque appearance."

* Lin. Trans. XI. p. 350.



Mysis Griffithsiæ. Mihi.

Specific Character.—Middle plate of the tail lanceolate, constricted near the base, apex entire, slightly obtuse ; rostrum lanceolate, extending beyond the penultimate joint of the peduncle of the internal antennæ ; antennal scale scarcely longer than the rostrum.

Mysis rostratus ? Guer. Iconogr. Crust. t. xxiii. f. 2.

Carapace much elongated, and more slender than in either of the former species, terminating forwards in a long, acute, lanceolate rostrum, extending beyond the penultimate joint of the peduncle of the internal antennæ, which is itself longer and more slender than in the former species. Scale of the external antennæ shorter than the peduncle of the internal, rounded at the apex, with a small external spine, ciliated only on the inner margin. Abdomen very slender and tapering; middle plate of the tail lanceolate, somewhat constricted near the base, the apex entire, very slightly obtuse, the margins spinulose ; the inner lateral lamella very narrow, tapering regularly

to the end, fringed on both sides with long hairs; outer lamella broader and longer, fringed with long hairs on the inner margin, and at the apex, and with a few short stiff hairs only on the anterior third of the outer margin.

Length three quarters of an inch.

I can scarcely persuade myself that this can be the species figured, but not described, by Guerin under the name of *M. rostratus*, although the characters in many respects agree with his figures. The form of the rostrum, of the antennal scale, of the peduncles, of the eyes, of the tail, and indeed of every part figured, although bearing a general resemblance, differs so much in detail that we are left in the dilemma either of considering the representations worthless from their inaccuracy, or of giving a distinct specific name to ours. As no description exists of M. Guerin's species, I have adopted the latter alternative, and have named it in honour of a lady to whom natural history is greatly indebted, and from whom I received the only specimens of this species known. Mrs. Griffiths obtained them at Torquay.

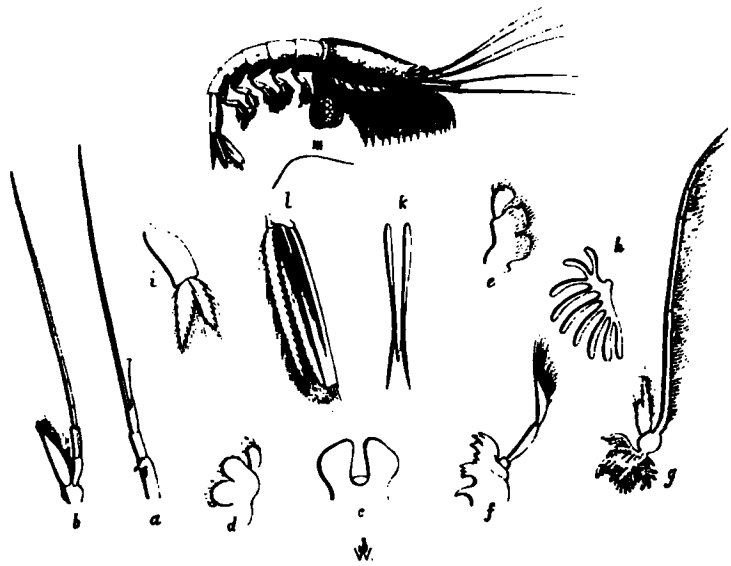
GENUS THYSANOPODA, Edw.

*Generic character.**—*External antennæ*, as in *Mysis*, inserted beneath the internal, and furnished with a small antennal scale, the basal joint broad and almost globular. *Internal antennæ* inserted close beneath the eyes; furnished with two filaments. *Pedipalps* two pairs, entirely pediform, perfectly resembling the legs themselves. *Feet* similar to each other and to the pedipalps, excepting the last pair; the basal joint short and thick; the stalk very long, and furnished with long hairs on the inner side; the palp short, lamellar, and hairy; the last pair of legs much shorter, consisting only of the palp, which is more developed. *Carapace* as in *Mysis*. *Abdomen* with the lateral processes more developed than in that genus; the first five segments furnished with natatory false feet—the appendages of the sixth segment forming the lateral caudal laminæ, and the seventh constituting the central, slender, and furnished at the apex with two needle-shaped appendages. *Branchiæ* external, consisting of eight pairs, attached at the base of the several pairs of thoracic natatory members; the pedipalps and true feet increasing in size and development from the first to the last. They consist of a stem, or stalk, each furnished with numerous lateral branches. *Eggs* contained in a pair of oval sacs dependent from within the base of the posterior feet.

This very remarkable genus of Mysidæ was first described by Dr. Milne Edwards, in the Annales des Sciences, from an Atlantic species which he found in the collection of crustacea formed by Mons. Reynaud, and placed in the

* In the engraving at the head of the description of our species, are the details of all the essential parts; for the beautiful and accurate delineation of which I feel greatly indebted to Mr. Westwood's well known care and accuracy.

Paris Museum. The remarkable peculiarity in the respiratory apparatus distinguishes it at once from every other form of crustacea, and notably from its congeners in the same family; and the situation of the ova, which I am enabled to supply from the new species about to be described, is not less remarkable.



Thysanopoda Couchii.

Specific Character.—Branchiæ with only one series of leaflets. Middle point of the trifid apex of the central caudal lamina, not half the length of the lateral ones.

The general aspect of this curious species indicates at once its near relation to Mysis, which the detail of its organization confirms. The present species differs from *Th. tricuspida*, the species on which Dr. Milne Edwards founded the genus, in several points,—the most striking of which are the following. In Edwards's species the branchiæ, in addition to the primary leaflets ranged in a single series along the stalk, have very numerous secondary filaments attached to them—a circumstance which I have not

observed to exist in a single case of the numbers I have examined of our present species. Judging from the figures in Dr. Edwards's plates, the carapace in the present species is smaller and more cylindrical; the cleft in the lower lip is more hollowed, the palp of the thoracic feet is less developed, the abdominal false feet are shorter, and very differently formed; the middle lamina of the tail also presents some difference in the relative length of the middle and lateral points of its tricuspid apex. One of the most interesting circumstances in the organization of this species is the form of the ovisacs, which, instead of being mere pouches closely adherent to the thorax, are dependent from their attachment by a distinct peduncle. This structure was unknown until I detected it in a single individual, the only female amongst a large number of specimens sent to me by my friend Mr. Couch, who obtained them on the Cornish coast, from the stomach of a mackerel, which appeared to have been making a feast of this rare and interesting little crustacean. The following account has been kindly furnished to me by that gentleman, and shews that it can scarcely be considered as an ordinary inhabitant of our coasts. "The mackerel from which the curious shrimps Thysanopoda were taken, were caught almost at mid-channel, or almost ten leagues from us; perhaps seven or eight south of the Lizard; and I have not seen any since, although I am much in the habit of searching the stomachs of mackerel and other fishes. There were myriads in the stomachs of the mackerel at the time when I obtained those which I sent you." I have dedicated the species to that indefatigable and acute observer, to whom we are indebted for so many valuable contributions to natural science.

The following is a description of the details of the wood-

cut; *a*, superior antennæ; *b*, inferior antennæ; *c*, lower lip; *d*, first maxilla; *e*, second maxilla; *f*, mandible; *g*, one of the thoracic feet, with branchia attached; *h*, a branchia; *i*, abdominal false foot; *k*, middle caudal lamina; *l*, lateral caudal laminæ.

GENUS SQUILLA.

SQUILLA.	Rondel.
CANCER.	Lin. Herbet.
SQUILLA.	Fabr., Latr., Leach, Desmar. Roux, Edw., &c.

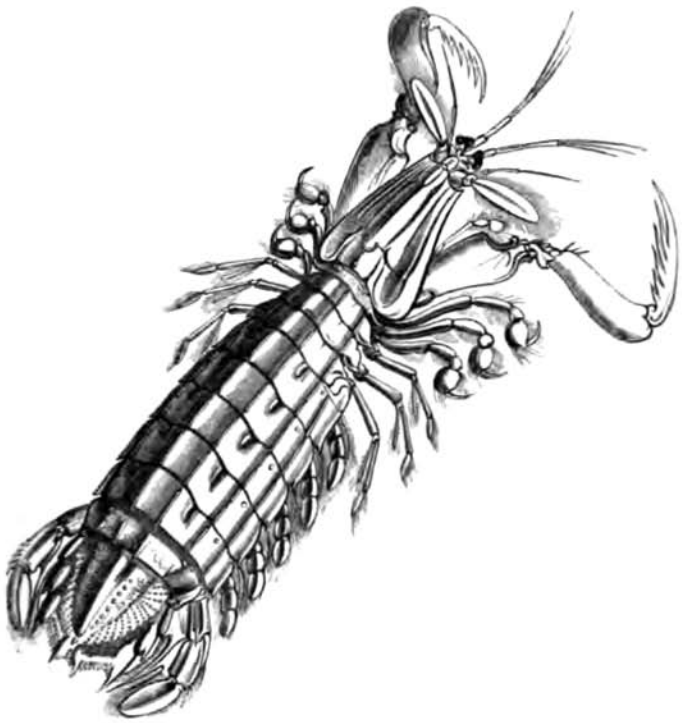
Generic character.— *Antennary segment* moveable, nearly quadrilateral. *External* or *inferior antennæ* inserted on each side the antennary segment, beneath the anterior margin of the carapace; the first and second joints of the peduncle short and thick, the latter bearing at its extremity a broad, oval scale; the terminal filaments slender and short. The *internal* or *superior antennæ* attached to the anterior margin of the antennary segment, and composed of a tri-articulate peduncle terminating in three filaments of moderate length. *Mouth* situated under the posterior third of the carapace. First pair of *thoracic members* forming a pair of robust claws, of which the terminal joint is furnished with long and sharp teeth, and is capable of being doubled upon the penultimate joint, into a groove of which it is received, forming a powerful prehensile implement. The three pairs following the claws are small, and terminated by a rounded hand, with a single finger, forming a single claw like that in *crangon;* the three posterior thoracic members much smaller, slender, cylindrical, and furnished with a styliform appendage attached to the extremity of the antepenultimate joint. *Carapace* longer than broad, divided by longitudinal sulci into three portions; not covering the first two cephalic nor the last four thoracic segments. *Abdomen* rounded above, each segment furnished with a pair of broad natatory false-feet, the basilary joint quadrilateral, each bearing two lamellar branches, the exterior of which gives attachment on its posterior face, and close to the peduncle, to a tufted *branchia.* The last segment of the abdomen is very large, forming the middle plate of the tail, the

lateral portions of which are formed as usual by the appendages of the sixth segment; the basilary joint of these is very robust, and is prolonged into a long pointed scale, which stretches out beneath and between the two terminal branches.

It has been observed by Dr. Milne Edwards, that the distinctness and separation of the normal segments, especially those of the head and thorax, are carried further in this family than in any other form amongst the crustacea; and in this view it may be considered as offering the nearest approach to the typical structure, and the key to the homologies of the class. Some further allusion to this circumstance will be found in the introduction, and it will be sufficient here to refer the reader to the descriptions given by the excellent author just named, of the characters of the family, and of the different genera; and, in connexion therewith, to the plates in which the details of the external anatomy are given.* The species of the family are very widely distributed; and even of the genus Squilla, the coasts of Europe, Asia, Africa, and America, furnish examples. Of the three species which are known to inhabit the Mediterranean, two have now been found upon our South-western coast, both first discovered by the acute and indefatigable researches of Mr. Couch.

In the characters given above I have included those which are most characteristic of the family of Squilladæ, as well as those which are distinctive of the genus, as this is the only generic representation of the family indigenous to Britain.

* Hist. Nat. des Crust. II. p. 509 et seq. pl. 1, &c.



Squilla mantis, Rondel.

Specific Character.—Prehensile finger with six long teeth; abdomen with eight longitudinal crests, the two central ones near together; posterior margin of the middle portion of the carapace straight.

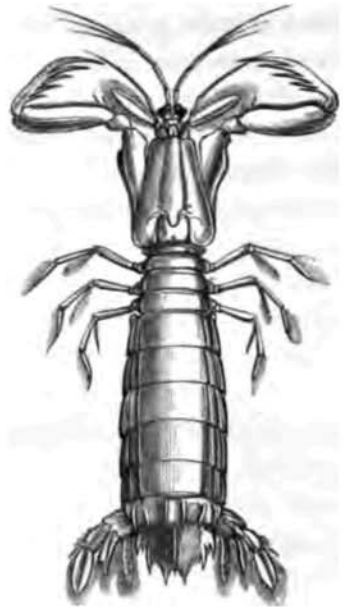
Squilla mantis,	Rondel. Poissons II. p. 397.
Cancer (mantis) digitalis,	Herbit. II. t. xxxiii. f. i. p. 92.
Squilla mantis,	Latr. Hist. des Crust., &c., VI. t. lv. f. 3, p. 278.—Risso, Hist. des Crust. des Env. de Nice, p. 113.—Hist. Nat. de l'Emp. Mérid. V. p. 85.—Edw. Hist. Nat. des Crust. II. p. 52.

The carapace of this species is much narrowed anteriorly, and the anterior angles are slightly spiniform; the rostral

plate semiovate; the middle portion of the carapace has a longitudinal median crest, which bifurcates anteriorly, and it is separated from the lateral pieces by a deep groove, which is continued transversely to separate the posterior portion; the lateral pieces have on each side two raised lines or crests, the outermost of which extends back to near the posterior margin. The claws very long and robust; the last joint furnished with six sharp, slightly curved teeth, inclusive of the extremity; the next joint with a deep groove for the reception of the last when closed, and the inferior margin of the groove is denticulated, and furnished with three moveable teeth at the base. The three posterior segments of the thorax with four crests. The abdomen is very broad and thick, broader and flatter towards the extremity, and having eight distinct crests, including the lateral margin of the segments; the two middle ones are nearer to each other than the others, and on the sixth segment terminate each in a sharp spine. The last abdominal segment (middle lobe of the tail) about as long as it is broad, furnished with a high median crest, terminating in a tubercle, at a short distance from the margin—the surface generally marked with a number of impressed points, arranged in curved lines. The margin is raised and thickened, and furnished with two pairs of lateral spines or tubercles, and there are two pairs of sharp strong spines on the anterior portion, with numerous small denticuli between them. The laminar prolongation of the basilary joint of the appendages to the sixth segment extends backwards as far as the external caudal scale, and is furnished with two very strong pointed horns. The first joint of the outer caudal lamina is strong and thick, and furnished, on its outer margin, with several strong spines which appear to be moveable.

The length of the English specimen, which is a female, from the frontal plate to the end of the tail, is four inches and a half. I have a male specimen from the Mediterranean which is no less than six inches.

Mr. Couch, to whom I am indebted for the specimen above referred to, informs me that "the Squillæ were brought from the distance of about a couple of leagues, where the bottom is rocky, with some spots of sand."



Squilla Desmarestii, Risso.

Specific Character.—Prehensile finger with five teeth; abdomen with four longitudinal crests, the middle portion smooth, excepting the sixth segment, which has two additional elevations.

Squilla Desmarestii, Risso, Crust. de Nice, t. ii. fig. 8, p. 114.—Hist. Nat. de l'Eur. Mérid. V. p. 86.—Desm. Consid. sur les Crust. p. 251.—Latr. Encycl. X. p. 471.—Roux, Crust. de la Médit. t. xl.—Edw. Hist. Nat. des Crust. II. p. 523.—Couch, Cornish Fauna, p. 81.—Yarrell, Loud. Mag. VI. p. 230.

The present species of Squilla differs in many striking characters from the former. The carapace has nearly the same general form, but is comparatively rather less narrowed anteriorly; it is less strongly marked, and the grooves and

elevations neither so numerous nor so distinct. There is scarcely any trace of longitudinal crests, and it is wholly without spines on the anterior portion. The falciform finger of the claws is armed with five sharp teeth; the penultimate joint has the upper margin of the groove most minutely denticulated. The four exposed thoracic segments are smooth. The abdomen has on each side two low longitudinal crests, and the sixth segment two additional ones near the centre; the remainder of the surface is smooth. The terminal segment has a median crest, and the margin is furnished with six strong teeth, the interspaces being minutely denticulated. The laminar prolongation of the basilary joint of the appendages of the sixth segment projects nearly in the same proportion as in *Sq. mantis*; and the lateral caudal scales do not offer any striking peculiarity.

The length of full-sized specimens is three inches and a quarter.

This remarkably pretty species was first distinguished by Risso, who gives a description and an indifferent figure of it in his "Crustacés des environs de Nice," and repeats the description in his subsequent work, "L'Histoire Naturelle de l'Europe méridionale." A beautiful figure is given by Roux in his unfortunately unfinished work on the Crustacea of the Mediterranean. Its first occurrence on our coasts is recorded by my valued friend Mr. Yarrell in the sixth volume of Loudon's Magazine, with a figure, which is, however, very fallacious, from its being taken from a specimen which had become corrugated in drying. This specimen, with another, was taken by Mr. Couch on the coast of Cornwall, where they were found amongst seaweed; and thus another interesting addition is made to those which I have already had to record, to the partial

identity of the Mediterranean Marine Fauna with that of our southern coast. The same fact is recorded by Mr. Couch in his Cornish Fauna.

I am lately informed by Mr. A. G. More of Bembridge, Isle of Wight, and of Trinity College, Cambridge, that it has also been taken repeatedly off Bembridge, by the fishermen of that place, on a muddy bottom grown over with "grass" (*zostera*); and from a sketch with which that gentleman has favoured me, and the testimony of the fishermen, it would appear that it has there attained nearly the size of those taken in the Mediterranean; whilst those found on the coast of Cornwall have not exceeded two inches and a quarter.

From the authorities already quoted, we learn that this species abounds amongst the rocks near the coast, in company with various Palemonidæ; and Roux informs us that it is commonly eaten fried, with such smaller Macroura. Its habits are wholly nocturnal, as it hides itself always during the day. Its eggs are deposited in March and August.

The colours of this species are described as very pleasing. The general tint is a yellowish brown; the pincers white, with a slight hue of rose. The scales of the antennæ and those of the tail are fringed with long rose-coloured cilia. Two remarkable varieties are mentioned—one of a delicate rose-colour, and the other a deep yellow, slightly varied with brown.

APPENDIX,

CONSISTING OF SPECIES OBTAINED DURING THE PROGRESS OF THE WORK.

Xantho tuberculata, R. Q. Couch, m. s.

Specific Character.—Carapace slightly depressed anteriorly; latero-anterior margin with four triangular teeth; hands and wrists tuberculated, rugose; fingers nearly black, the moveable one with three grooves; third joint of the ambulatory legs denticulated on the upper edge.

The carapace is slightly depressed anteriorly, more so than in *X. rivulosa*, but somewhat less than in *X. florida*. The rostrum slightly waved, minutely emarginate; the anterior portion of the carapace somewhat rugose; the regional lines of demarcation sharp and distinct, the elevations slight and flattened; the latero-anterior margin with four triangular teeth. The anterior pair of feet robust, nearly equal; the hands and wrists somewhat transversely tuberculated and rugose; the wrist with two distinct tubercles anteriorly; the moveable finger has three grooves, one on the inner and two on the outer side. The whole of the ambulatory feet have the fourth, fifth, and sixth joints hairy, with longer cilia on the edges; the third joint distinctly denticulated along the upper margin, with a hairy patch beneath.

The general colour of "the carapace is light flesh colour brown; and the first pair of claws almost transparent yellow." The fingers are black or very dark brown.

I have no hesitation in adopting the view of my friend, Mr. R. Q. Couch, in considering this species as distinct, not only from either of those already described in this work, but from all others previously known. It differs from both the former conspicuously in the distinctly tuberculated hands and wrists, in the entire hairy covering of the three terminal joints of the ambulatory feet, and in the denticulated upper margin of their third joint. It differs from *X. rivulosa* and agrees with *X. florida* in the depressed form of the rostrum,—while it agrees with the former and differs from the latter species in the grooving of the moveable finger.

For the discovery of this interesting addition to our British Carcinology, we are indebted to Mr. Richard Q. Couch, of Penzance, who has kindly sent me the only specimen I have seen. He informs me that it appears to prefer deeper water than the other two species, as he found it repeatedly in the crevices of the *Eschara foliacea*, in the deep water off the Runnell Stone, in Mount's Bay. In the summer it approaches the shore and is found under stones. It spawns in June.

The name of *tuberculata* has been given to the species by its discoverer, from whom and from his father, Mr. Jonathan Couch, of Polperro, I have had so many claims upon my acknowledgments for their intelligent and ready assistance in the progress of the present work.

LONG-LEGGED SWIMMING CRAB.

Portunus longipes. Risso.

Specific Character.—Front slightly four-lobed; latero-anterior margin much shorter than the latero-posterior; legs remarkably long.

Portunus longipes,		Risso, Crust. des Env. de Nice, t. i. f. 5, p. 30; Hist. Nat. de l'Eur. Merid. V. p. 4,—Latr. Encycl. X. p. 192.—Roux, Crust. de la Medit. t. iv.—Edw. Hist. Nat. des Crust. I. p. 445.
„	*infractus,*	Otto, Mem. de l'Acad. de Bonn, XIV. t. xx. f. 1.
„	*Dalyelii*	S. Bate Annals of Nat. Hist. 1851, p. 320, t. xi. f. 9.

The general form of this interesting species is very different from that of the others of the genus. It is altogether more slight and slender in its proportions. The carapace is flattened, and, in the male, broader than it is long, in the proportion of three to two; in the female the disproportion is not so great. It is divided transversely by a ridge, which terminates at each side in a long and sharp

tooth, the posterior of the five which occupy the latero-anterior margin; of these teeth the middle one is broader than the others, and the posterior is much longer; they are all somewhat curved forwards. The anterior portion of the carapace is minutely granulated, and has several slight elevations; the front is slightly four-lobed, the division more strongly marked in the male. The first pair of legs strong and angular; the wrist having a strong tooth on the inner anterior angle; the hand with two carinæ above, the inner one terminating in a small spine. The moveable finger with three distinct longitudinal carinæ, and deep intermediate grooves. The three following pairs of feet long and slender, increasing in length to the fourth, which is the longest of all; flattened, the last three joints longitudinally grooved: the fifth pair slender and weak, the terminal joint lanceolate and slightly grooved. The abdomen, in the male, triangular, the last joint abruptly narrowed; in the female, broad and much rounded.

The colour of this species is a rich deep brownish red, with reddish grey spots; the abdomen yellowish or pinkish white.

The occurrence of this truly Mediterranean species on our southern coast is interesting, as affording another instance of the partial identity of the Fauna of the two shores, to which I have already had occasion so repeatedly to refer. It had not, I believe, been found on our shores until it was dredged on the coast of Cornwall in the year 1848, by my friends Prof. E. Forbes and Mr. M'Andrew, from whom I received a male specimen, and subsequently, through the kindness of Mr. Cocks of Plymouth, a female, which was taken by that gentleman. I also received a specimen from Mr. R. Q. Couch, of Penzance, during the year above-mentioned. It is doubtless the species

described by Mr. Spence Bate as new, in the "Annals of Natural History, for 1851, under the name of *Portunus Dalyellii*, from a specimen obtained in Oxwich Bay, near Swansea. The lateral spines are very largely developed in the figure given by Mr. Bate, but not more so than in many Mediterranean specimens, and scarcely more than in Roux's figure. It is at a glance distinguished from all other species by the character from which the name has been given, namely, the length and slenderness of the legs.

GENUS THIA, Leach.

Cancer.	Herbst.
Thia.	Leach, Risso, Latr. Edw.

Generic character.—External antennæ of moderate length, inserted beneath the front, just at the inner side of the orbits. *Internal antennæ*, transversely folded beneath the front. *External pedipalps* extending forwards to the antennal fossa; the inner branch with second joint shorter than it is broad, its anterior inner angle truncate and submarginate. *Orbits* extremely small. *Eyes* scarcely visible. *Carapace* somewhat heart-shaped, considerably narrowed at the posterior portion, nearly horizontal from before backwards, much arched from side to side; the front broad, lamelliform, entire, bounded by a small notch on each side. *Anterior legs* short, and slightly compressed, the fingers deflexed; the remaining pairs still shorter, each terminating in an acute styliform joint. *Abdomen* in both sexes very narrow; in the male with the three middle joints united; in the female the seven joints all moveable.

A Genus established by Leach, in his "Zoological Miscellany," on a species of which he was ignorant of the locality.

Thia polita, Leach.

Cancer residuus ?	Herbst, t. xlviii. f. 1.
Thia polita,	Leach, Zool. Miscell. II. t. ciii.—Guerin, Icon. du règne anim. t. iii. f. 3.—Edw. Hist. des Crust. II. p. 144.
Thia Blainvillii,	Risso, Hist. Nat. de l'Eur. Merid. v. p. 19.

The carapace in *Thia polita* is perfectly smooth and polished; the circumference is almost entire, excepting a small notch over each orbit; its outline is contracted towards the posterior portion, and the posterior margin is truncated in the male, and slightly hollowed in the female; it is nearly horizontal from the front to the posterior margin, and much arched from side to side; the front is prominent and evenly arched; the whole of the margin is ciliated with long hair. The orbits are very small, and the minute eyes are ordinarily concealed within them. The anterior pair of legs are robust, the surface polished; the hand is rounded, the posterior outer angle obliquely cut away for the articulation of the wrist; the fingers are slightly deflexed, and armed with a few small tubercles. The remaining legs are shorter than the former, the hinder ones being the shortest; the joints, particularly the pen-

ultimate, rounded and somewhat gibbous; the terminal one subulate and acutely pointed, the whole of them strongly ciliated. The abdomen in the male is five-jointed, from the soldering of the middle three joints, but their distinction is still obvious from the transverse groove not being obliterated; it is narrow triangular, the last joint very small: in the female the abdomen is seven-jointed, and a little broader than in the male; in both it is fringed with long hair.

Length, 0·6 of an inch, breadth rather more.

We owe our knowledge of this rare species, as indigenous to Britain, to the researches of Dr. Melville, the learned Professor of Natural History in Queen's College, Galway. It was found by him buried in the sand, and three specimens, one male and two females, obligingly forwarded to me. Both the females were loaded with spawn. Hitherto this is the only instance of its occurrence as a native of our coasts.

The species was first figured by Herbst in his great work, but somewhat imperfectly; I cannot, however, join with Dr. Leach and Milne Edwards in doubting that Herbst's species is identical with that of the individual on which Leach founded his Genus *Thia*. The habitat of that specimen was unknown; but Risso has described, under the name of *Th. Blainvillii*, what I cannot but believe to be this species. It is stated by Dr. Milne Edwards to inhabit "La Manche" and the Mediterranean.

It is right to mention that there is one character in which the Irish specimen differs from the descriptions given by Leach and Milne Edwards; namely, in the much shorter length of the antennæ; but Guerin's figure, in the "Iconographie du règne animal," exactly agrees in this respect with the former.

GENUS DROMIA, Edw.

Cancer.	Linn. Herbst.
Dromia.	Fabr. Latr. Leach, Edw.

Generic character.—*External antennæ* placed beneath the ocular peduncle; the auditory tubercle, occupying the base, very large, and perforated at the external angle; the next joint large and nearly cylindrical, forming the inferior boundary of the orbit, and armed with a strong tooth. *Internal antennæ* with the basal joint nearly cylindrical; the antennary fossæ longitudinal and distant, and incomplete at the outer side. *Anterior feet* very robust, terminating in a strong claw, the extremities strongly toothed, and spoon-shaped. The *second and third pairs of feet* of moderate and nearly equal length, terminating in a sharp somewhat curved nail; the basal joint of the third in the female pierced with the opening of the generative apparatus; the *fourth and fifth pairs* very small, turned over the back of the carapace, against which they are closely pressed, each terminating in a small but perfect double claw. *Carapace* somewhat globular, the regions distinctly marked; the front inclined and small. *Orbits* deep. *Eyes* with short peduncles.

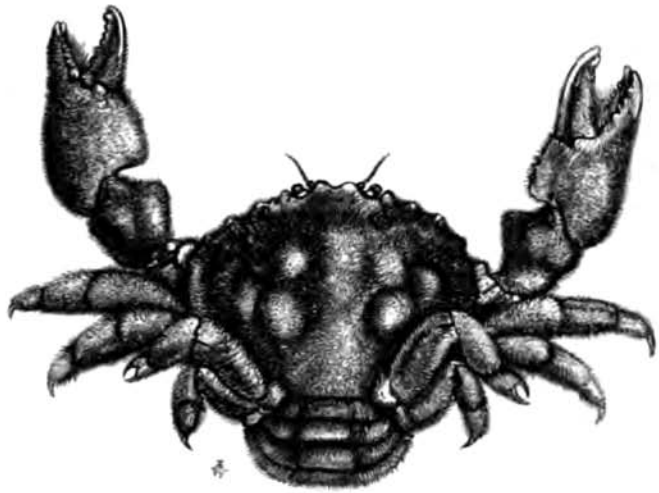
The characters of this remarkable genus are, to a certain extent, intermediate between the brachyurous and macrourous forms. In the young state the great predominance of the posterior or abdominal regions of the body approximate it in some measure to the latter; and the general form of the cephalo-thoracic portion, especially in the adult condition, is not less assimilated to the former division of the class. The characters of the posterior pairs of feet at once remove it from either of these, and indicate its true

place to be amongst those anomalous forms which have been associated by Dr. Milne Edwards into the intermediate group, the ANOMOURA.

The species of this genus are very widely distributed. The Indian and African shores, those of the Red Sea and of the Mediterranean, the islands of the West Indies, and the coasts of South America, have furnished various species; and our own southern coast has of late years been found to give a place of habitation to one of the most conspicuous species.

DECAPODA.
ANOMOURA.

DROMIADÆ.



Dromia vulgaris, Edwards.

Specific Character.—Carapace broader than it is long; latero-anterior margin with four strong teeth, the second having a tubercle at its base; the last joint of the abdomen in the male broader than it is long.

Cancer dromia,	"Olivi Zool. Adriat. p. 45" (M. Edw.).
Dromia Rumphii,	Bosc, Hist. des Crust. I. p. 229.—Desmar. Consider. sur les Crust. p. 137.—Blainv. Fauna Franc. Crust. t. vii. fig. 1.—Risso, Hist. Nat. de l'Eur. Merid. V. p. 32.—Edw. Règ. anim. de Cuv. Edit. 3. Crust. II. f. 1.
Dromia vulgaris,	Edw. Hist. Nat. des Crust. II. p. 173.

This species, which has at length been undoubtedly proved to inhabit our southern shores, and probably too in considerable numbers, has the carapace strongly knobbed above, especially at the anterior portion, and very much raised so as to approach the globular form; the front with three teeth, which become less prominent by age; there is a

fissure above the external angle of the orbit, and a tooth beneath that cavity. The latero-anterior margin has four strong teeth, the bases of which are long; the first situated beneath the line of the orbit, the second furnished near its base with a tubercle or small secondary tooth, thus appearing almost as if double; the third occupying a larger portion of the margin than either of the others, and the last the smallest. The latero-posterior margin nearly as long as the latero-anterior. The first pair of legs are robust and nodulated; the hand has several small conical teeth on its upper and inner edge. The claws are smooth and polished, strongly denticulated and internally hollowed at the extremity, the denticles of each finger shutting into the interspaces of the other; the moveable finger much curved on the upper side; the wrist largely nodulated; the second and third pairs of legs much shorter than the first, terminating in a strong, sharp, curved nail; the fourth and fifth pairs are doubled back over the posterior part of the carapace, flattened, and each terminating in a sharp, tolerably perfect, double claw. The abdomen in the male is much curved longitudinally, and the joints are distinct; the terminal one broader than it is long. In the female the abdomen is extremely broad and much curved; each joint elevated in the centre, and on each side. The whole animal, body and limbs, covered with dense short hair, which in the young state is of a buff colour, and in the adult dull brown.

Length of the carapace of a full grown male two inches and a half, breadth three inches.

I have carefully examined the hair with the microscope, in individuals of various ages, and have not found in any one instance the club-shaped hair assigned by Dr. Milne Edwards to this species. The hair is in all cases setaceous,

very acute at the point, and is itself furnished with minute hairs along its sides.

The first intimation of the present species as a native of Britain, occurs in an announcement by Mr. John Edward Gray, at a meeting of the Zoological Club of the Linnæan Society, as long since as June 22nd, 1824. These were stated to have been seen by that gentleman in Billingsgate Market, amongst some oysters, which had been brought from Whitstable Bay, on the Kentish coast. This fact is recorded in the "Zoological Journal," Vol. I. p. 419. In the "Zoologist," 1848, p. 2325, occurs a notice of no fewer than nine full sized specimens having been dredged on the coast of Sussex. Mr. Newman gives the details of its occurrence, and a figure of the species, having received it from Mr. George Ingall. About the same time my lamented friend Mr. Dixon, of Worthing, sent me three specimens which had been procured off Selsey Bill. Mr. Newman alluding to Linnæus's name of an allied species, *cancer* "*dormia*," supposes it to refer to its sedentary and lethargic habits. Linnæus was, however, too good a scholar thus to render a derivative from *dormio;* it is plainly a misprint for *dromia*, from the Greek Δρόμων, a little running crab; and in the "Amœnitates Academicæ," Linnæus himself gives the correct spelling.

I some years since received numerous young specimens from Sicily, every one of which had the carapace entirely covered with a sponge which had grown over it, concealing even the two hinder pairs of legs, which were closely pressed against the back, and rendered immoveable. It is a common Mediterranean species.

Pagurus Thompsoni, mihi.

Specific Character.—The whole of the legs hispid and spinous; anterior pair unequal; the wrist as long as the hand; eye stalks extending to half the length of the last joint of the peduncle of the external antennæ; antennal spine curved outwards, and furnished with a row of small spines on the outer edge.

The carapace is polished, but sparsely marked with impressed dots; the front nearly entire. The eye-stalks are cylindrical, and furnished with a regular longitudinal series of minute tufts of hair along the upper surface; they extend forwards to the middle of the last joint of the peduncle of the external antennæ. The antennal spine is curved outwards, spinous and hairy on its outer edge. The internal antennæ are half as long again as the peduncle of the external. The anterior feet very unequal, bristly, and spinous; the larger hand twice as long as it is broad, hairy, beset with spinous tubercles, of which there is a stronger series along the outer side; the moveable finger with

a strong tubercle fitting between two smaller ones on the other finger when closed; wrist about as long as the hand, and equally hairy and spinous, with a row of longer spines along the inner edge. Smaller anterior leg nearly linear, the proportions, clothing, and armature somewhat similar to the larger, but the opposing edges of the fingers without tubercles. Third and fourth pairs of feet very long, covered with stiff hairs and small spines; the last joint armed with a series of strong spines along the inferior edge, and terminated by a sharp nail.

The general aspect of this species reminds one of *P. Prideauxii*, the proportions of the parts being somewhat similar; but it differs not only in some proportional characters, but strikingly in the spinous and hispid clothing of the whole of the legs. It bears in these latter circumstances some relation to *P. Cuanensis*, but from this it may be distinguished by the proportions between the wrist and hand, the form of the wrist, the relative proportions of the eye stalks and antennal peduncle, and other characters.

I have a melancholy gratification in dedicating this species by name to a gentleman who for many years was justly considered as the representative of the Zoology of Ireland, and whose acute discrimination and persevering enthusiasm in his favourite pursuit, were only equalled by the liberal and unselfish feeling with which he placed his treasures in the hands of his fellow labourers, whenever he believed the interests of science would be thereby furthered. The specimen from which the above description is taken, was placed in my hands by my lamented friend only a very few days before his untimely death deprived the science of Ireland of one of its most distinguished ornaments, and society of as kind and true hearted a man as ever lived.

Mr. Thompson's note given me with the specimen is as

follows:—"Dredged at fifty fathoms, entrance of Belfast Bay, by Mr. Hyndman." It was in the shell of the common whelk, *Buccinum undatum*.

The vignette is from a tesselated Roman pavement discovered at Cirencester in 1783.

BLUE-BANDED HERMIT CRAB.

Pagurus fasciatus. Mihi.

Specific Character.—Anterior legs unequal; hand oval, smooth; eye-stalks as long as the penultimate joint of the external, and nearly half as long as the whole of the internal antennæ; body and legs banded alternately with red and blue.

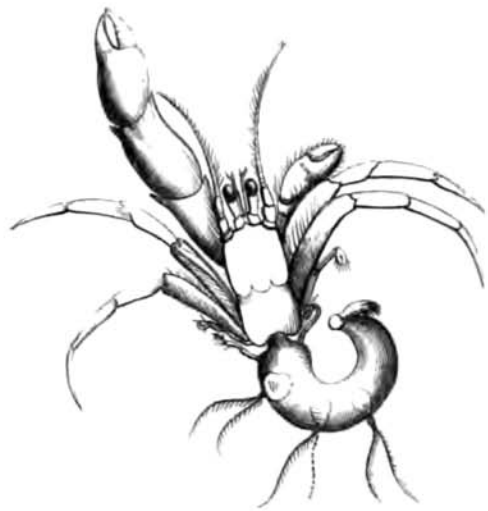
The carapace is smooth and even, ovate, rounded in front, truncated and slightly emarginate behind. External antennæ as long as the whole of the body, the peduncle cylindrical, the second and last joints of nearly equal length, and apparently without any spine. The internal antennæ are of moderate length, less than twice as long as the peduncle of the external. Eye stalks nearly cylindrical, slightly curved outwards, as long as the penultimate joint

of the external antennæ. The anterior pair of feet are robust, of unequal size; the hand is oval, broader anteriorly, slightly pointed at the extremity of the fingers; the moveable finger fitting the other closely; the wrist subquadrate, broader than it is long; the second and third pairs with the penultimate joint ciliated on the inner edge.

The body is obscurely, and the whole of the legs distinctly marked with alternate bands of red and blue.

The whole of the above description is given from a coloured drawing, for which I am indebted to Mr. Cocks, of Falmouth, and from which also the woodcut is taken. It was obtained by him at Falmouth. I have never seen a specimen, but I am confident that Mr. Cocks's accuracy of delineation may be implicitly relied on.

This species may at once be distinguished from every other known on our coasts. The only one to which, from the form of the hands, it bears a *primâ-facie* resemblance, is *P. Hyndmanni*, but from this it differs in the form of the thorax, the comparative length of the internal antennæ, and many less obvious characters. The distinct alternate bands of blue and red render it one of the most beautiful of the genus.



"*Pagurus Dilwynii.*" Sp. Bate.*

"CARAPACE smooth and polished. Colour bluish, marked with brown.

"First pair of feet unequal, the *left* being much longer than the right; smooth to the naked eye, but under a lens perceived to be minutely granulated. The second and third joints are armed with teeth, which give the limb an angular character. The *right* is very short and covered with hair.

"The external antenna is about two-thirds the length of the longest of the first pair of feet, and hairy; its base as long as the eye-stalks, which are slender and long. The basal tooth, with which the antenna of this genus is generally armed, is wanting.

* Annals of Nat. Hist. 1851, p. 320, pl. x. fig. 11.

"The false feet in the female are *long* and feathery, and divide at the *base*.

"The most striking difference between this and other British species of the *Paguridæ*, is exhibited in the form of the first pair of feet, and the length of the external antennæ.

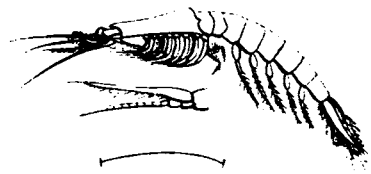
"Having met with only this solitary specimen, it is impossible to say but that the right foot of the first pair, which is usually the longer, may be in the process of being reproduced from loss; although I am inclined, from its well-developed character, to believe that the left is in this species the more important of the two. The false feet, which in the female are generally forked, are so in this specimen, but very much nearer to the base than in the common species.

"It burrows very rapidly in the sand. Taken near the Worms Head, Swansea.

"Mr. Couch has informed me, since this has been in the hands of the printer, that he has also found the species in Cornwall.

"The name applied to this species is one long-known to science, and honoured as the stimulator of natural history in this locality in the person of L. W. Dillwyn, Esq., Sketty Hall."

The foregoing description and figure are copied from those given by Mr. Spence Bate, in the "Annals of Natural History," as I have never seen the species.



GENUS CYNTHIA. J. V. Thompson.

Generic character.—"Subabdominal fins composed of two joints, four last fins with the terminal plume double, with an opake bifurcate, and convolute organ rising between each."

Cynthia Flemingii. H. Goodsir.

Specific Character.—"Inferior antennal scale almost twice as long as the peduncle. A thick fringe of strong hairs bordering its edge. Rostrum slender and finely pointed. Volute organ between the plumose setæ of the subabdominal fins minute; edges of the middle plate of the tail spined.

"Long. eight lines. Hab. Frith of Forth.

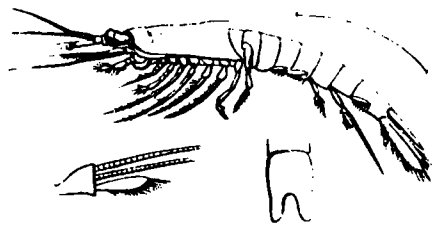
"*Description.*—The whole body of an opake straw-colour, with the reticulated portions of the eyes black. Superior antennæ with the peduncle three-jointed, the two cetaceous portions arising from the second joint of the peduncle, the last joint ovate, surrounded with a thick fringe of hairs; these hairs are bent downwards at their extremities, so as to form a concavity on the lower surface. The peduncle is about twice the length of the eyes. The peduncle of the inferior antennæ extends to the origin of the setaceous portion of the superior antennæ; the two last joints are slender and clavate. A long, slender, and

pointed scale arises from the first joint of the peduncle, above the setaceous portion; this is twice as long as the peduncle, and is thickly fringed with long hairs, which are directed inwardly so as to meet those of the opposite side. The carapace is not very large, curved at its posterior edge, and produced at its posterior and inferior angle.

"Abdomen slender, the inferior edge of each segment considerably produced, and all of them but the last bearing a fin composed of two joints; the first joint is scale-like clavate; the second is multiarticulate and plumose; all of them but the first pair double. The bifurcate convolute organ, between the double plumes, is very minute. Middle plate of the tail edged with spines on its sides, and entire at the extremity. External caudal fins twice as long as the middle plate, and pointed.

"The bifurcate and convolute organ between the double plumes of the four last subabdominal fins, together with the number of joints in these fins, seem to be the most striking characters of this genus. Mr. Thompson, in the third memoir of his 'Zoological Researches,' says, 'It is not in the number of joints alone, however, that they (subabdominal fins) differ, their form and structure is also essentially different. In *Cynthia* the four last of these members are each composed of a very large bilobate scale, supporting at its apex two taper articulate fins, strongly ciliated with plumose setæ; from between these originates an opake organ which bifurcates, its two extremes of unequal length being rolled inwards, the one over the other.'

"Mr. Edwards considers that these last are the branchial apparatus.



GENUS THEMISTO. H. Goodsir.

Generic character.—"External antennæ armed with a scale. First, second, and fifth segments of the abdomen bearing fins like the mysis. Third and fourth with the peduncles bi-articulate, and each peduncle giving off two branches; the external branch of the fourth very long and slender, semi-articulated.

Themisto longispinosa. H. Goodsir.

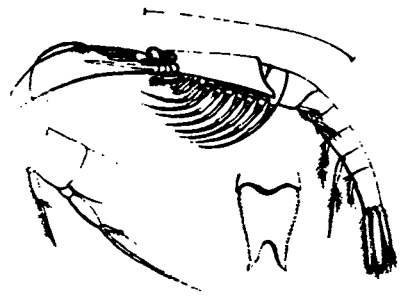
Specific Character.—"Superior antennal scale of the same length as the terminal joint of its peduncle; armed at its extremity with a thick tuft of hairs. Inferior antennal scale twice as long as its peduncle; fringe not strong. Third subabdominal fin with its internal branch minute. Internal branch of the fourth with a few long hairs from the extremity only. External branch reaching from the extremity of the caudal fins. Internal caudal fin truncated.

"Long. three-quarters of an inch. Hab. Frith of Forth.

"*Description.*—The whole body of a dark yellowish or greenish colour. Eyes large, reaching to the extremity of the peduncle of the inferior antennæ. The reticulated portion black, and produced backwards inferiorly. Rostrum very short but sharply pointed. First joint of the peduncle of the inferior antennæ very strong, the two following slender; the setaceous portion of the antennæ arising from

the extremity of the last. The scale arises from the inner and superior part of the first joint of the peduncle; it is hardly twice the length of the peduncle, slender, and tapering very gradually to the extremity; it is rather thinly fringed. The upper surface of the peduncles of the superior antennæ hollowed out, forming a bed for the eyes. A short ovate scale arises from the inferior part of the last joint, immediately below the origins of the setaceous portions of the antennæ. A thick bunch of matted hair arises from its extremity, which gives it the appearance of being bi-articulated. The inferior edge of the external seta of the superior antennæ bears a thin fringe of very strong hairs, which are thickest and strongest near the base. The carapace is not large, leaving two of the thoracic segments exposed posteriorly; it is rounded at its anterior and inferior angle, and considerably produced at its inferior and posterior angle. A strong bi-articulate and chelate palpus arises from each side of the mouth. The abdomen is slender, but the segments are not produced inferiorly. The branchial subabdominal fins are five in number; they arise from all the abdominal segments except the last [two]. The first, second, and fifth are like those in the genus *Mysis*, namely, a single plumose joint; the third and fourth are pedunculated,—the peduncles being composed of two joints. The first joint is minute, the second is of considerable length; two branches arise from the extremity of the second joint; these branches, in the third fin, are both plumose; in the fourth one the internal only is plumose. The external branch of the fourth consists of a very long six-jointed spine, which reaches beyond the extremity of the caudal fins; it is very finely pointed; the internal branch about the same as the first joint of the external branch. The caudal plate is slightly swollen near

the base; its edges are serrated, and its extremity bifurcated; the bottom of the fourth being rounded, and the extremities of the fork also blunted and rounded. The internal caudal fins are truncated at their extremities; the external are paddle-shaped, and rounded at their extremities. Both of these fins are fringed at their extremities and inferior edges with long hairs."



Themisto brevispinosa. H. Goodsir.

Specific Character.—" Superior antennal scale not so long as the peduncle. Inferior antennal scale four or five times as long as the peduncle. Internal branch of the third subabdominal fin minute; the internal branch of the fourth longer than the first joint of the external branch; the external branch extending a little beyond the base of the caudal fins, ending by means of a dart-like point. The lateral caudal fin ending in a sharp point superiorly, and rounded inferiorly; the internal fin oblong, ovate, and pointed. The lateral edges of the middle plate bearing a single row of long, sharp, and bent spines, contracted near the base and the bottom of the fork, forming an acute angle; prongs pointed.

" Long. one inch. Hab. Frith of Forth.

" *Description.*—The whole body more robust than that of the last-described species, and of an opake white colour, with a single row of black spots along the dorsal mesial line of the abdominal segments. The first joint of the peduncle of the inferior antennæ very short and almost circular; the two following are slender. The scale which arises from the superior part of the first joint above the true antennæ is very strong at the base, and then tapers gradually to a fine point. A fringe of long hairs borders its inferior edge. These hairs are matted at the extremity so as to give them the appearance of a second joint; two or three short strong spines arise from the extremity of the

scale. The third joint of the peduncle of the superior antennæ is considerably produced at its superior angle. The scale which arises beneath the setaceous portions is strong, bent upwards at its extremity, and pointed, but not fringed. The eyes are large; the reticulated portion circular.

"The rostrum is of considerable length, but it is not sharp. The internal branch of the third subabdominal fin is minute; the external one is long, slender, and finely pointed; it is also fringed with very long hairs. The internal branch of the fourth fin is longer than the first joint of the external branch; and it is both more strongly ringed and more moveable than that of the last-described species. The external branch extends a little beyond the base of the caudal fins. The sixth or last joint of this branch suddenly contracts near the extremity to about half its original thickness, ending in a dart-like point. The external caudal fins end in a sharp point inferiorly, and are rounded inferiorly; the internal fins are oblong, oval, and pointed at the extremity. These are both fringed at their inferior edges and at their extremities. The lateral edges of the middle plate armed with a single row of strong hooked spines. It is contracted near the base, and the angle formed by its bifurcation is very acute; the extremities of the prongs are also sharp-pointed, and of a black colour."

Amongst the numerous and interesting additions to our knowledge of the smaller Crustacea, for which we are indebted to Mr. H. D. Goodsir, are the three foregoing species of the family Mysidæ. As I have never seen specimens of either of them, I have thought it best to give, verbatim, Mr. Goodsir's own descriptions, although somewhat diffuse, with copies of his figures.

In addition to the species included in this Appendix, I may refer to some which have been described in recent periodical publications, from the observations of Mr. Spence Bate, Mr. William Thompson of Weymouth, and others. I have not transferred these descriptions to this work, partly because I am not in all cases quite satisfied with the grounds on which the species have been considered as distinct, and because they may be readily examined in their original place of publication. At the same time I am anxious to express my gratification at this accession of young intelligent naturalists in this field of observation, from whose active and continued labours the most valuable results may be anticipated.

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