

II. *Description of several Marine Animals found on the South Coast of Devonshire.* By George Montagu, Esq. F.L.S.

Read June 18, 1805.

SINCE I last had the honour of addressing a paper to the Linnean Society on the subject of marine animals, much new matter has occurred in that department, and I trust the description of some of these, in addition to correct drawings, will enable those who may hereafter more immediately direct their attention to that study, to identify without doubt the objects in question.

Nothing can be in a greater state of confusion than many genera of the *Mollusca* order; and even those of the *Crustacea* are far from being clearly defined, although their structure greatly conduces to that end, by their unalterable form and durability. For these the cabinets of the curious may be occasionally consulted; but no museum can convey to the mind those distinguishing characters that form the divisions and specific distinctions of the former; their soft and delicate bodies can only be preserved in antiseptic fluids. In spirits, it is true, the mass is preserved, but the form is usually rendered shapeless, the colours vanish, and the membranaceous appendages, which constitute the principal divisional distinctions, are either entirely lost, or so contracted and distorted, that the greater part of the subjects of *Helminthology*, the more simple excepted, become a chaos of undistinguishable matter. The *Mollusca* must be described and figured from living specimens; and those of

the marine division (which are by far the most numerous, and least known), in their own element*.

Favourable as our own country is for the study of marine animals, it is extraordinary that so little has been done in that branch of physiology since the writings of Ellis, who almost exclusively adopted the marine polype, and threw more than ordinary light on that obscure subject, both as to the habitations, or coralline substances, and the animals by which they were formed. But it is equally astonishing that this great naturalist should not have extended his researches further than to zoophites, who must in his various marine excursions, while contemplating the objects of his particular inquiry in their native element, have had under his eye an 'inconceivable variety of other animals, which so far surpass in beauty any of the coralline *Hydræ*, that our astonishment is excited at the total neglect of such unbounded animate beauty as is found to occasionally inhabit the various *Sertulariæ*, which could not but call forth wonder and admiration.

Possibly, however, this eminent philosopher, having in contemplation the completion of that abstruse department which he had adopted, did not choose to have his course diverted by that which an enthusiast seated on his hobby might term a minor object.

To our marine botanists many of the objects in question must also frequently occur, as some are by accident attached to *Algæ*, and others feed on particular *Fuci*. Such as are searching for, and deeply investigating the obscure fructification of these plants, may be capable of forming an idea of the very extra-

* The pelagic species, or those which inhabit the open sea, will quickly die in water less salt, taken at the mouths of rivers, or in estuaries communicating with fresh water.
ordinary

ordinary conformation and splendid colouring of many of the *Mollusca* animals that inhabit the deep; and these, though not their primary object, must arrest their attention, and be highly gratifying to an elevated mind.

To the few, therefore, who have the opportunity, by chance or choice, of examining these creatures in their native element, it is well known how little can be conveyed by even the most minute description, without well executed figures coloured from life; the want of which, added to the very concise descriptive information usually given, has thrown but very obscure light on the subject, even in the zoological works of the most celebrated naturalists: the divisions are undefined by evident and distinct characteristic marks; and, what is worse, obscurity becomes more clouded by the diversity of opinion as to arrangement, which frustrates the very intention of system, and serves only to reduce method again to chaos.

These considerations I must plead in excuse for the want of synonyms in some instances, perhaps, being prefixed to the subjects hereafter described.

As in my former paper, I have accompanied this with outlines only of the *Crustacea*, one or two figures excepted, where colouring was considered as essential.

The subjects given will be found to be mostly new; amongst the *Cancri*, however, two or three which are common, and which have unaccountably been confounded since the writings of Linnæus, are figured to elucidate their respective specific distinctions, and rescue from a state of confusion animals of very different habits.

If in those of the *Mollusca* I should have arranged any one that may not accord with the opinion of the helminthologist, I have to plead the indivisible connection of the links in the

amorphose subjects of this order, and the defective state of generic characters in the infantine progress of this abstruse science.

Should the Society consider these further discoveries of sufficient importance for public information through the medium of their Transactions, it will not fail to stimulate me to a continuance of my researches in this branch of zoology, which my situation affords; and which I shall have the pleasure of submitting from time to time for its opinion.

My object is, as far as possible to ascertain and identify what of the zoologic subjects hitherto described are British, especially in those departments which are the least cultivated, and in which so much remains to be done.

It has been doubted whether several species of the crabs described by Mr. Pennant be really distinct: as far as my own observation has gone, there appears no reason for such doubt, as almost the whole of those given in the British Zoology are in my cabinet, together with nearly an equal number of new species, or such as have never been noticed as indigenous to this country; and which remain to be added to the catalogue of British *Cancra*.

It may not be improper to remark in this place, that in order to show the legs of the crabs as distinctly as possible, those belonging to one side only have been delineated; the arms, however, of both sides have in general been given. In these, as well as in all the other subjects, the natural size is adverted to in the description, where such figures have been magnified; and where no such mention is made, the figure may be considered as representing the proper size.

CRUSTACEA.

CRUSTACEA.

CANCER FLORIDUS.

Tab. II. Fig. 1.

Cancer floridus. Linn. Syst. p. 1041. Herbst. ii. t. 21. f. 120.

Thorax smooth, indented and uneven; front slightly bilobate, sides quadridentate: antennæ minute: arms and hands very large, strong and rugged; fangs large, black, and bluntly toothed: legs short, having the extreme joint covered with a thick brown pile; claws small, brown: the tail is small and narrow, composed of five joints, of which the middle one is by much the largest, the end obtuse.

Length of the largest two inches; breadth two and a half.

Colour purplish-brown.

A variety is marked with two chesnut spots on the thorax, one behind the other, the first ovate, the second sub-rhomboidal.

The females are very inferior in size, and like the rest of this family may at once be known by their superior breadth of tail, which is formed of seven plates much ciliated with hair.

Not uncommon on some parts of the coast of Devon, under large stones, in rocky situations, at low water.

This species, I believe, has never been placed in the catalogue of British *Canceri*; but being now discovered to be indigenous to this island, it may be thought deserving a place amongst the literary communications of this country, notwithstanding it has been figured by Herbst.

This crab was once sent to me by a scientific friend as a Scotch production, with reference to the *C. corrugatus* of Pennant; to which, however, it has but little resemblance when compared*.

* *Cancer corrugatus* appears to be extremely rare; it has once or twice occurred, so that I can with certainty declare it to be not only distinct from this, but also from *C. velutinus*, with which it is most likely to be confounded.

I have

I have also been informed that it has been considered as the *C. orientalis*, *Herbst. tab. 20. fig. 117*; but if carefully compared with that figure, it will be found that the thorax is not in the least like, either in shape or markings, nor has that the dentated margin: whereas *Cancer floridus* of the same author corresponds in all those particulars. I cannot indeed quote Gmelin for this crab with any degree of certainty, as he refers to different species that are trilobated: it is however in all probability the *Cancer floridus* of Linnæus.

CANCER TUMEFACTUS.

Tab. II. Fig. 2.

Thorax sub-rhomboidal, smooth, with a slightly reflected margin, and three round tumid elevations placed triangularly: snout sub-bifid: antennæ extremely small: eyes small, hidden within their receptacles: arms short, sub-angulated, the edges uneven: hand short, the outer margin carinated; claws short, toothed, the thumb moderately hooked: legs eight, short, with subulate claws. The tail of the female is very broad, and covers the whole abdomen; the joints are obscure, but appear to be four, slightly ridged up the middle, with a depression on each side of the ridge.

Length three quarters of an inch; breadth rather more.

Colour pale dull yellow.

The very great similitude in contour between this and *Cancer tuberosus* of the British Zoology, might readily occasion their being confounded without comparison: indeed the laconic description given by Pennant for his *C. tuberosus* might have induced one to believe that it was intended for this, had not the figure bespoken the other. The material distinctions are, that this is smooth, of a much paler colour, and that the inequalities on the
thorax

thorax are globose; whereas the other has a longitudinal angulated ridge, intersected by a transverse one that forms a cross*: the legs and arms of this species are shorter, and the latter more uneven; the fangs shorter, and neither turned inwards nor angulated as in the other: the smooth reflexed margin of the thorax is also a strong character in this species.

Whether the *C. tuberosus* was originally taken at Weymouth is not mentioned; but Mr. Pennant took his description from one in the Portland cabinet. The *C. tumefactus* was taken at that place by Mr. Bryer, who kindly favoured me with it.

CANCER DENTICULATUS.

Tab. II. Fig. 3.

Thorax broad before, narrow behind, rugged with spines and tubercles, the margin continued in one series of sub-serrated denticulations: the front between the eyes is quinquedentate, the middle spine the longest: the sides are also quinquedentate, besides a small process over each eye: eyes prominent: antennæ obscure: the arms not longer than the body, angulated, or ridged longitudinally, with blunt spines at the top of the middle joint; fangs angulated and denticulated; the legs are also angulated; claws subulate: tail narrow, regularly tapering.

Length three quarters of an inch; breadth rather more.

This singular species of crab was sent to me, amongst a variety of British *Cancris*, by my late worthy friend Mr. Boys, as the produce of the coast of Sandwich. The living colour could

* I have taken several specimens of *Cancer tuberosus* of both sexes, which differ in nothing but the size of the tail; and therefore these two crabs cannot be considered as possessing only sexual distinction.

not be ascertained, nor the length of the antennæ, the peduncles of which only remain.

I have since observed a specimen in the cabinet of Mr. Donovan, which, I am assured, came from the coast of Scotland.

CANCER ASTACUS SUBTERRANEUS.

Tab. III. Fig. 1. 2.

Body long; thorax smooth, raised in the middle, surrounded by a sulcus; no proboscis, but two small, sub-pellucid, moveable, angulated plates in front that cover the base of the antennæ, through which are observed two contiguous, very minute spots, supposed to be the eyes fixed within the shell: antennæ four, pedunculated, inner pair bifid, scarcely longer than the thorax; the outer pair considerably superior in length, setaceous: the body consists of six smooth, glossy joints, spreading a little in the middle; caudal fins five, broad, with a midrib, and ciliated: one arm extremely large, smooth, and glossy, exceeding the size of the body, and nearly as long; the first joint very small, the second broader, and sloped off on the inner side to a sub-arcuated edge, which projects into a hooked process at the articulation with the first joint; the singular conformation of this part is calculated to receive the end of the next joint when folded, as represented by fig. 2: the two extreme joints are very broad, compressed, sub-marginated, and carinated; fangs large, the moveable one much hooked at the point, both destitute of teeth, except a few faint crenulæ scarcely discernible by the naked eye: the other arm is invariably small, with a plain chelate hand not of the same curious structure as the former: legs four pair, the first with a broad chelate foot; the third and fourth are somewhat similar to each other, being furnished with a simple flat
hirsute

hirsute claw ; but the formation of the second pair is very singular ; they are of a squarish shape, much compressed, and, at the ends, furnished with hair like a brush.

Length, independent of the arms, two inches.

Colour, when alive, more or less orange, sometimes yellow on the sides, and on the caudal fins ; the arms usually pink.

This new and curious species of crab was discovered in digging for *Solen Vagina*, at the depth of nearly two feet beneath the surface, on a sand bank in the estuary of Kingsbridge. It is by no means plentiful ; but a sufficient number has been taken, with much trouble, to learn that the large arm is not constant to one side, nor always so very disproportionate as in that from which the figure was taken.

The crustaceous covering of the body is very thin, and not far remote from membranaceous. The females, as in most of the *Cancer* tribe, more rarely occur : the ova of one taken were fixed under the tail, and of a red colour.

A new and singular species of *Oniscus* is found to inhabit the thoracic plate of this crab, and of which a figure and description are added to this paper.

CANCER ASTACUS STELLATUS.

Tab. III. Fig. 5.

Body long, composed of six smooth joints : thorax smooth behind, the anterior part roughened with minute spines disposed in longitudinal rows, and terminated by a very broad, serrated, trifold proboscis, the middle division of which is longest : antennæ four, pedunculated, the outer pair nearly as long as the body ; inner pair short, bifid : eyes, pedunculated, concealed under the proboscis : arms equal, of a moderate size ; on

the middle joint two or three small spines, and one on the joint nearest the body: hands sub-chelate, somewhat angulated by rows of tubercles beset with long hairs, armed with a slightly hooked moveable fang, and a hooked spine in place of a fixed one, not half so long as the fang, similar to that of *A. Crangon*: legs eight, very hirsute, furnished each with a single claw: caudal fins five, the fixed one sub-bifid, lateral ones with a midrib, and ciliated margin.

Length nearly two inches.

Colour yellowish-white, covered with minute stellated orange spots, as it appears under a lens, which give a predominance to the last.

This species, which, I am inclined to believe, is also a non-descript, was taken with the preceding: it is more rare, but appears, like that crab, to inhabit the subterraneous passages made by the *Solenes*.

CANCER ASTACUS MULTIPES.

Tab. V. Fig. 3.

Cancer flexuosus. *Mull. Zool. Dan.* ii. p. 34. t. 66. *Prodr.* p. 196. n. 2352.

Body slender, incurvated, with seven joints: thorax smooth, destitute of proboscis: antennæ four, as long as the thorax, the middle pair bifid, the interior branch invariably dusky, the other white; exterior pair single, longest: anterior plates like those of the prawn, but more ciliated, the fringe pink, (Fig. 3. A.) eyes large, pedunculated: no visible arms: legs fourteen on each side, remarkably slender, and set in a double series: caudal fins five, the middle one bifid; lateral ones greatly ciliated on the interior margin with pink. (Fig. 3. B.)

At the termination of the thorax between the hinder legs is a large

large tumid pouch in the female, composed of two broad diaphanous membranes that collapse. This abdominal pouch in the month of July was filled with minute embryo young, whose eyes, being nearly as large as their bodies, were visible through the membranous receptacle, and gave it a spotted appearance.

Length an inch and a quarter.

This is sometimes taken amongst prawns at Salcomb, and in the estuary of Kingsbridge; but never having seen any alive, I could not ascertain the colour. After passing through the operation of boiling by accident with the other species, it is of a pale colour, with some spots of dusky, particularly at the joints along the back. Both sexes are alike, except that the male is destitute of the receptacle on the abdomen.

By means of the accurate pencil of Mr. Henry Boys, who favoured me with drawings of many of the marine animals found at Sandwich, I have been able to identify this crab as an inhabitant also of the Kentish coast.

It appears to differ from the generality of this division of *Cancer* by the manner of carrying its young; and I suspect, if it be not viviparous like those of the division *Gammarus*, it retains its young for a considerable time after they are excluded; a circumstance unusual in the lobster tribe.

CANCER ASTACUS GIBBOSUS.

Tab. V. Fig. 4.

Body slender, incurvated, with six joints: thorax smooth; proboscis long, laterally compressed, serrated; a small spine on each side the base of the proboscis, and another beneath each eye: antennæ four, upper pair shortest, bifid; lower pair single, nearly as long as the body: two anterior ciliated plates

as in the preceding species: eyes pedunculated: arms and legs scarcely definable, the anterior pair is terminated by a quadrifid joint, expressed at fig. 4. *a*; the second pair is cheleform, as at *b*; the other three pair appear, when magnified, to have a toothed claw, represented at *c*: besides these there are two very long and slender appendages, that do not strictly appear to be legs, but seem to be auxiliary to the palpi, though they originate so far from the mouth, for they are always placed forward towards the mouth; these are slightly chelate: the caudal fins are similar to those of the prawn, with a small spine near the end of the exterior pair, as at *d*.

What at once distinguishes this from the young prawn, or from any other, is the protuberant and curved formation of the third joint of the body, at which part the posterior end, or what is usually termed the tail, makes a short turn when doubled under the body.

The colour when alive is red.

Length rarely above an inch.

Not unfrequently taken by dredging at Torcross.

CANCER GAMMARUS LOCUSTA.

Tab. IV. Fig. 1.

Cancer Locusta. *Gmel. Syst. p.* 2992. *Turt. Linn. iii. p.* 760.

Oniscus Gammarellus. *Pallas Misc. Zool. t.* 14. *f.* 25. *Id. Spic.*

Zool. 9. t. 4. *f.* 8.

Body smooth, glossy, compressed, with fourteen joints: antennæ four; the lower pair longest: eyes lunated, fixed*: arms

* Not pedunculated, or moveable, but fixed under the shell of the thorax; a circumstance common, I believe, to all this family.

four;

four; hands sub-cheleferous*, small, both pair furnished with a simple fang: legs ten, the four anterior small, the others much longer and larger, their thighs furnished with broad plates: the natatorial fins three pair, usually concealed under the tail: caudal fins properly five, subulate, bifid, the upper one longest; these are more or less serrated with small spines: on each of the three extreme joints of the body is a small fasciculus of spines.

Colour corneous, sometimes sub-rufous.

Length an inch.

This species is wholly marine, never quits the water by choice, is incapable of leaping, and seems to have very little use of its legs out of that element; for when deprived of water it lies on its side, and endeavours to force itself along by the action of the tail. If put into fresh water it soon dies. It is extremely common on all the coasts of Britain, but has been unaccountably confounded with several other species, some of which are greatly dissimilar, as I shall have occasion to notice hereafter.

That the *C. Pulex* and this should have been occasionally mistaken for each other would not have been so very extraordinary, had not their habits been so widely different, since it requires more than a cursory view to discriminate them; there are, however, essential specific distinctions independent of size and habits, which will be noticed in their place.

CANCER GAMMARUS PULEX.

Tab. IV. Fig. 2.

Cancer Pulex. *Gmel. Syst.* p. 1055. *Turt. Linn.* iii. p. 760. *Brit. Zool.* iv. p. 21. No. 33.

As this species is so nearly allied to *C. Locusta*, it is necessary

* A term adopted for a single fang capable of closing upon the hand, answering the purpose of a fixed claw, in contradistinction to cheleferous, or such as are formed with double claws.

only

only to point out the specific distinctions by which at all times it may readily be discriminated.

It never exceeds half an inch in length: the eyes are invariably ovate, not lunated: the three last joints of the body are constantly smooth; and the lower pair of caudal fins are rather the longest. Besides these essential characters of distinction, it is usually more hirsute about the legs than *C. Locusta*; the colour is paler, and most times tinged with green, especially about the antennæ.

The *C. Pulex* is as incapable of living in salt water as the *C. Locusta* is in fresh, although we have the authority of Linnæus and many of his disciples to the contrary. It is also incapable of leaping, and very soon dies when taken out of water.

The males of this as well as of the *C. Locusta* are superior in size to the other sex, which they embrace with their arms, and holding securely by fixing their claws in the joint of the thorax, swim about with them, not unfrequently on their back.

The females of both these species, as well as of most, if not all, of this family appear to be viviparous, and carry their young for some time after birth about the abdomen.

It is not impossible that *Cancer rubricatus*, tab. 5. fig. 1. may have also been confounded with these, though inferior in size, and different in colour and form of the antennæ, as will be more particularized in the description of that species.

CANCER GAMMARUS SALTATOR.

Tab. IV. Fig. 3.

Cancer Locusta. *Brit. Zool.* iv. p. 21. No. 34.

Oniscus Locusta. *Pallas Spic. Zool.* 9. t. 4. f. 7. *Misc. Zool.* t. 14. f. 15*.

Body oblong, sub-compressed, smooth, and extremely glossy,
consisting

consisting of twelve joints: antennæ four, the upper pair remarkably short; the lower extremely large, and equal in length to the body; the anterior half is composed of between thirty and forty approximate articulations roughened with short spines, especially on the interior sides; these are usually deflected beneath or along the sides of the body: eyes sub-triangular, reticulated, fixed: mouth placed beneath, much produced, and armed with formidable toothed forceps or jaws, similar to those of the genus *Locusta*: palpi very large: arms two, not much larger than the hinder legs, furnished with one serrated claw, as simple in structure as those on the legs, and not capable of folding upon the hand as in the two last species: the legs are twelve in number, the first pair immediately behind the arms are very small, and usually concealed under the plates of the body, so that they frequently pass unobserved; the three posterior pairs are very strong, the upper joint broad and flat; these, as well as the arms, are serrated and roughened with short spines: caudal fins two pair, serrated, and bifid, besides a pair of short appendages above, arising from the extremity of the last joint of the tail.

Length three quarters of an inch.

Colour when alive corneous; when dried it becomes paler, and by exposure to the sun gains a tinge of pink; and the antennæ partake of orange yellow. It is frequently found on the seashores, bleached white.

This is the species which is found in such vast abundance on all our sandy coasts, burrowing under the various rejectamenta of the sea, devouring both animal and vegetable matter with great avidity; and in its turn is the principal food of the ringed plover, and other shore birds. It is one of those insects whose service is most apparent in contributing to the dissolution of putrid matter.

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The *C. Saltator* is without doubt the animal referred to by Pallas, and this confirms the opinion that Gmelin has confounded it with his *Cancer Locusta*, having quoted both the *Oniscus Gammarellus* and *O. Locusta* of that author for it. That it is Pennant's *C. Locusta* there can be little doubt, as he particularly mentions the quality of leaping, a power denied to the other species.

It may be suspected that the *C. Saltator* is amphibious, or perhaps only sub-aquatic, residing chiefly under the moist sand, about high water mark, or concealing itself beneath the various matter ejected by the sea, not only to feed, but to avoid the powerful rays of the sun. The most cursory observer cannot have passed unnoticed the multitudes which are seen skipping about in all directions upon our sandy beaches in a summer evening.

It appears very extraordinary that two insects so greatly dissimilar as this and the *C. Locusta* should have so long been confounded, for in neither habit nor manners do they in the least agree.

Whether the greater part of these commit themselves to the deep during the colder season has not been ascertained; but as it never has occurred to me at any time of the year in the water, I am inclined to believe they burrow deep under the sand, and occasionally come up, as some are to be met with at all seasons when the weather is temperate.

CANCER GAMMARUS LITTOREUS.

Tab. IV. Fig. 4.

Pulex marinus. *Baster Op. Subs. ii. p. 31. t. 3. f. 7. 8.*

Body smooth, glossy, with twelve compressed joints: antennæ four, the upper pair very short; the lower pair half as long as the body, the anterior half composed of between twenty and thirty

thirty minute articulations: eyes fixed, sub-orbicular, sub-angulated: arms two, small; hands broad, flat, ovate, sub-cheleferous, sub-crenated in front; fang smooth, long, hooked, closing upon the crenated edge of the hand by the side of a blunt tooth: legs ten, the two anterior pairs slender, the others strong, and serrated with spines; the thighs laminated, the posterior pair remarkably large, and angulated in the last joint but one; the claws small: caudal fins slender, two pair jointed, bifid; above these a small, simple, bifid appendage.

Length nearly an inch.

Colour, when alive, yellowish-brown, turning afterwards to rufous.

This species, though not so frequent as the *C. Saltator*, is oftentimes found on our sandy shores, possessing much of the same habits as that insect, and like it is a leaper. Whether it remains on shore at all seasons is uncertain, but I suspect it is only sub-aquatic, never having taken it in the sea.

The *C. littoreus* is doubtless the species figured by Baster as above referred to, and which Gmelin has erroneously quoted for the Linnean *Cancer Pulex*. In the general appearance, as well as habits, it approaches *C. Saltator*, especially in its protruded jaws, though inferior in size: the antennæ are also less; but the most obvious distinguishing characters are the large subcheleferous hands, and angulated joints of the posterior pair of legs. The hands of *C. grossimanus* most resemble those of this species; but even in that particular there are minute distinctions, besides very material ones in other parts.

CANCER GAMMARUS GROSSIMANUS.

Tab. IV. Fig. 5.

Body very slender, compressed, smooth, with eleven joints:

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antennæ

antennæ four, the upper pair longest, but shorter than the body: eyes linear; arms four, subchelate, the fore pair very small; hands indented, hirsute; hinder pair large, ovate, compressed; fangs long and hooked, folding upon the edge of the hand, and partly received into a slight groove ciliated with hair: legs ten, the two anterior pairs small, the others much longer, with broad flat thighs: caudal fins five, bifid, the upper one longest.

Length about five lines.

Colour, when alive, pale-yellow, sometimes mottled with pink.

The anterior arms might be considered as palpi, but are much longer than those usually are; these, however, are generally so closely folded up as frequently, in dead specimens, to evade the eye.

Not uncommon on our rocky shores, in the pools left by the receding tide.

Although the hands of this and of *Cancer littoreus* are somewhat similar, yet there is a material distinction, especially in this being destitute of the knob or blunt spine. In the joint of the wrist and other parts the specific distinction is too obvious to require entering into detail, as a comparative view of the figures will evince.

CANCER GAMMARUS TALPA.

Tab. IV. Fig. 6.

Body with numerous joints slightly depressed: antennæ four, the outer pair longest, all tufted with hair at the end: eyes small, fixed, placed immediately behind the antennæ; beneath these is a small spine pointing forward: arms four, the anterior pair chelate; hands ovate; fangs plain and hooked: the second pair are of a very singular structure, the three last joints broad, flat, and pectinated on each side with long hooked spines, somewhat

what resembling the fore feet of a mole: legs ten, each furnished with a small subulate claw; the two posterior pairs appear to be natatorial, and are so extremely hirsute as to be almost concealed: the tail, or posterior part of the body, is also covered so closely with hair as to render the extreme joints indistinct; at the extremity are two long setiform appendages tufted with hair, which are capable of closing together instantaneously.

Length of the body about four lines.

Colour yellowish-white: the hair and divisions between the joints partake most of the former.

This very curious species of *Cancer* was first discovered on the large scallop, *Pecten maximus*, from Salcomb, but appears extremely rare.

CANCER GAMMARUS RUBRICATUS.

Tab. V. Fig. 1.

Body slender, compressed, with twelve smooth joints: antennæ four, the lower pair shortest, the upper nearly as long as the body: eyes crimson, reticulated, sub-angulated, and rather protruded forward between the upper and lower antennæ: arms four, similar; hands small, oblong, and sub-cheleferous; fangs hooked: legs ten, the two anterior pairs short, the others considerably larger, all beset with bristles, especially at the joints: caudal fins two pairs, the last joint bifid; above these, two very short appendages.

Length half an inch.

Colour usually reddish, or pale pink, minutely and closely speckled with a darker shade of the same.

This species, which is not common, approaches much nearer to *Cancer Pulex* than any other: independent, however, of its

being smaller, more slender, and differing in colour and habits, it may readily be distinguished from it by the superior antennæ being the longest; and from *C. Locusta* by the same mark, and by the short upper caudal fins or appendages, as well as by being destitute of the spines on the last joints of the tail.

CANCER GAMMARUS FALCATUS.

Tab. V. Fig. 2.

Body slender, with twelve smooth compressed joints nearly destitute of gloss: antennæ four, ciliated with hair beneath; the lower pair extremely large, and nearly as long as the body: eyes small: arms four; hands of the hinder pair very large; oblong, and sub-chelate, furnished with two spines on the inner edge; fangs falciform, with one tooth; the fore pair of arms and hands extremely small, scarcely visible by a common pocket lens, and might be considered as palpi, were it not for their situation: legs ten, hirsute, the two anterior pairs very short, slender, and usually drawn up and concealed by the plates of the body: the other legs moderately large; thighs broad and flat: caudal fins three pairs, subulate.

Length five lines.

Colour crimson, or mottled with a mixture of white; antennæ marked the same.

This curious and rare species inhabits the deep, amongst *Sertularia*, and *Algæ*, and has only been taken by dredging at Torcross.

PHALANGIUM SPINOSUM.

Tab. V. Fig. 7.

Body linear: snout long cylindric deflected: no feelers: eyes four, fixed in a conical tubercle on the top of the fore part of the
body

body behind the snout, placed two forward, two backward, and appear under a microscope strongly reticulated; the tubercle on which they are seated, verrucose: on the back between the hinder pair of legs is an erect cylindric tubercle, which in some point of view might be mistaken for a tail; the summit of this is furnished with two minute spines: legs long, slender, spinous.

The tubercle, with the eyes, is represented at fig. 7. a.; the foot at b.

Length of the body a quarter of an inch.

Colour rufous-brown.

The female is furnished with a pair of long jointed appendages, which originate at the fore part of the thorax, and turn underneath, as described by the figure.

The use of these antennæ-like members is for holding and carrying about their eggs. This sexual distinction in most, if not in all, of the marine species of *Phalangium* does not appear to have been noticed as such; and for want of this knowledge the same species have been differently described. These female appendages are very conspicuous both in *Phalangium Balenarum* and *Grossipes*, and are frequently found holding a quantity of eggs agglutinated to each.

This might have been referred to *P. hirtum* of Turton, but the want of the four palpi prevents it from being placed in his division of *Nymphion*.

PHALANGIUM ACULEATUM.

Tab. V. Fig. 8.

Phalangium spinipes. *Gmel. Syst.* p. 2942. 16? *Fabr. Fn. Gröenl.* p. 292. No. 211? *Turt. Linn.* iii. p. 715?

Body linear, with four joints like the last: snout cylindric, tubular,

tubular, deflected: feelers four, the upper pair chelate; the lower pair minute, and hid beneath: eyes four, seated on a conic tubercle differing in shape from that of *P. spinosum*, Fig. 8. c. On the posterior part of the back is an erect tubercle similar to that on the last species; but the legs are longer in proportion, furnished with slender spines or bristles at the joints.

Less than the preceding.

Colour dusky black.

Possibly this is the Gmelinian *P. spinipes*: if so, we are informed that it is found in the Norwegian Sea. It is not of frequent occurrence on our coasts, but sufficient to know that the female is possessed of the filiform receptacles for the ova.

Doctor Turton has given a species of *Phalangium* under the title of *hirtum*, without reference or synonyma, that appears only to differ from *P. spinipes* in being hairy instead of spinous, and is probably the same; for the distinction between hair, bristles, and slender spines, on the limbs of these small animals, is so extremely vague, that a more minute definition of such subjects is required to truly enlighten the more abstruse parts of natural history.

ONISCUS TESTUDO.

Tab. V. Fig. 5.

Body sub-ovate, composed of eight joints rising to a ridge on the back; the plates elevated at their edges; the four first fall very low on the sides, and obscure the anterior legs: along each side of the body a row of small tubercles: the front sub-bifid: antennæ four, very short, lower pair hid beneath: eyes prominent, black: posterior end obtusely pointed; caudal fins beneath, obscure: legs fourteen, short and strong, the three posterior pairs longest; all furnished with a simple claw.

Length

Length two lines.

Colour dull red, with a white spot on the anterior part of the back, but as the insect dies this mark is lost. *Rare.*

ONISCUS GRACILIS.

Tab. V. Fig. 6.

Body long, slender, sub-compressed, sub-cylindric, with eight joints terminated by five large caudal appendages truncated at their ends; these are deflected nearly at right angles with the body, the middle one fixed; lateral ones jointed, and spread a little upwards in a semicircular form: antennæ four, short: legs fourteen, the anterior pair large, with broad feet, and slightly hooked claws; the rest short and slender.

Length five lines.

Colour pale, clouded with rufous. *Rare.*

ONISCUS THORACICUS.

Tab. III. Fig. 3. 4.

Body ovate, inequilateral, with about fifteen indistinct joints indented at the sides, the six posterior shooting into long lateral fasciculate, fleshy, ramous appendages, and the extremity furnished with six simple recurved ones, two of which are larger than the rest: antennæ four, short, the outer pair longest, and only visible above: the two first joints of the body furnished with a long flat, oar-like, fleshy fin or cirrus on each side; the other joints with similar short ones: legs fourteen, very short, crooked, and concealed beneath: the abdominal valves are large, cover the whole under part of the body, and form a receptacle for the ova, which, in the specimens before me, is vastly distended with many thousands of a pale orange colour.

Length,

Length, including the posterior appendages, scarcely half an inch.

Colour usually orange ; lateral appendages whitish.

The male is very inferior in size, of a more slender form, and destitute of the cirri on the anterior part of the body ; and those on the posterior joints are simple, not branched as in the female : in other respects they agree.

This curious species of *Oniscus* inhabits the thoracic plate of *Cancer subterraneus*, (Tab. III. fig. 1.) concealing itself between the fleshy part and the shell, and forming a tumour on one side. From this situation I have extracted it alive, and have kept it in that state for several days in a glass of sea water. In the few of that rare species of crab I have obtained, two or three of these parasitical insects have occurred, and have always been attended by the male, who attaches himself firmly by his claws to the ventral fins, or appendages.

As this insect seems to be possessed of little or no locomotive power, it is probable the greater part of the eggs or young must perish ; for it must be in one of these states that it finds its way under the thoracic shell of the crab, and there receives that nourishment which in all probability is the only means of its existence.

The very disproportionate size of the sexes is wisely adapted to an animal whose habitation is so confined.

ONISCUS SQUILLARUM.

This is another parasitical species, inhabiting the same part of the prawn or pandle as the last is found to do in *Cancer subterraneus*.

The

The body is inequilaterally ovate*, composed of thirteen flat joints, the articulations forming as many scallops on the sides: antennæ and eyes obscure: legs fourteen, very short, crooked, and usually folded up and concealed under the seven first, or anterior scallops on each side: the under part of the body between the legs is covered with broad membranes that collapse and form a receptacle for the eggs, which are extremely small and numerous.

Length rarely half an inch.

Colour pale greenish, and glossy above; the abdominal membranes dark at their edges.

The most incurious cannot but have noticed the tumour so common on the thorax of the prawn or shrimp during the summer months, that is occasioned by the lodgement of this animal, whose growth occasions the distortion of the shell. This tumour forms a secure asylum for the protection of the more than usually soft and membranaceous bodies of these parasitical *Onisci*.

That an insect so extremely common, and obvious to the most cursory observer, should not have found a place in the *Systema Naturæ* appears very extraordinary; and I have been induced to describe it, because it seems to have been omitted by even the more modern systematists; or is certainly misplaced, and not where it ought to be.

The male, which has hitherto escaped observation, is probably very minute, as in the preceding species.

* The dissimilarity in the sides of these insects is occasioned by the unequal pressure they receive from the thoracic shell of the crab; this inequilateral growth is therefore not constantly alike, but depends on the side of the thorax each individual inhabits.

MOLLUSCA.

BULLA HYDATIS.

Tab. VI. Fig. 1.

Animal not referable to any class in the *Systema Naturæ*.

Test. Brit. p. 217. Vig. 1. fig. 2.

In the *Testacea Britannica* the animal is described from a dead specimen; and the figure referred to only represents the receded state of the animal previous to dissolution.

Recent opportunity of examining many of the living animals of an unusually large size affords the means of correcting the mistake in describing it as being destitute of eyes: and I trust a figure taken from one in a lively and extended state will not be unacceptable, more especially as it is of singular appearance and beauty.

When the animal is in motion, two black eyes on the top of the head are visible without the aid of a glass; these are sunk in small white depressions, remote from each other, but somewhat central in the shield that covers the whole anterior part: the sustentaculum is very large, extending behind, and on the sides, into broad finlike membranes that reflect, and almost conceal the shell; the two lateral ones turn under the shield at their anterior edges: the posterior membrane is divided from the others; the right side of this is spread on the place where it is crawling; and the left side takes a turn round the posterior end of the shell, and reflects over it. When the edges of the shield are thrown up, and open to view the space between that and the sustentaculum, on each side is observed a yellow marking in elegant ramifications like a feather, but not apparently detached as in the animal of *Bulla plumula* *.

* *Test. Brit. Vig. 2. fig. 5.*

The animal when fully extended is nearly double the length of the shell: length of the specimen figured, two inches and a half; of the shell, one and a quarter.

The colour is a mixture of purplish-brown, cinereous and orange, disposed in minute confluent specks, darkest on the lateral fins.

DORIS LONGICORNIS.

Tab. VII. Fig. 1.

Body long, slender; posterior end acuminate; head rounded in front: tentacula four, of which the first pair are very long, setiform, and extend forward; the other pair are remote, short, and erect: eyes two, small and black, situated at the base of the hindmost tentacula: on the right side, near the eyes, is a cluster of short cirri; and at a little distance from these commence four series of longer ones, of a pink colour, spotted with white, standing transversely, and extending down the sides; these cover the middle of the animal; the other parts are yellowish-white, tinged with pink about the eyes.

Length half an inch.

DORIS NODOSA.

Tab. VII. Fig. 2.

Body obovate, convex above, surrounded by a broad membranaceous margin: tentacula two, short, with perfoliated tips, and retractile, within depressed receptacles: on each side the back are four equidistant nodules or papillæ: at the posterior end of the back are nine or ten ramous appendages: the sustentaculum is broad, bilobated in front, and acuminate be-

hind: from this part the membranaceous margin of the body is detached.

Length half an inch.

Colour white, with a tinge of pink on the back.

Both this and the preceding species have but rarely occurred, and may prove to be entirely new; at least I am unable to refer to any figure or description of them.

APHRODITA CLAVA.

Tab. VII. Fig. 3.

Aphrodita squamata. Gmel. *Syst.* p. 3108? *Brit. Zool.* t. 23. f. 26?

Aphrodita punctata. Mull. *Zool. Dan.* iii. p. 25. t. 96. f. 1. *Prodr.* p. 218. n. 2642?

Body with about twenty-four joints, and as many peduncles and fasciculate feet on each side; the bristles yellow: squamæ twelve or thirteen pair, of an ochraceous-yellow, mottled, and speckled with purplish brown, palest at their anterior margin; these usually divide down the middle of the back, but in this particular the animals of this class are variable, as much depends on the state of extension or contraction: along each side is a row of clavated cirri, with a slender appendage at their tips, and just below the club, marked with a brown band; these surround the animal, and might at the anterior end be mistaken for tentacula; the lateral ones originate between the scales.

Length an inch and a half.

Of the various species of *Aphrodita* which have hitherto come under inspection, this appears to be the nearest allied to *A. squamata*; but as the greater part of them chiefly differ in less obvious particulars than in general appearance, they require more
minute

minute description in order to ascertain the different species with any degree of precision. In most instances where they possess conspicuous lateral cirri, their shape will be found greatly to assist in discrimination.

Our reference to Gmelin for this species, it must be confessed, is not without very considerable doubt, especially as he has quoted a figure in Baster not in the smallest degree like, nor is it even of this genus. But possibly our species may be the same as that described by Pennant.

AMPHITRITE INFUNDIBULUM.

Tab. VIII.

Body long; joints numerous, distant, of an orange colour annulated with whitish: fasciculi very small; branchiæ obscure: at the base of the tentacula a scalloped membrane: tentacula two, semicircular when spread, and nearly uniting into a regular circle; these are each composed of about thirty-seven rays, connected by a transparent web, except at the points, which turn a little inwards; the outside of these singularly beautiful arms is smooth, and of a purple colour, darkest at the tips of the rays; the inside is most elegantly ciliated with two rows of fimbriæ along each ray, of a chesnut colour shaded to a purple near the centre: mouth purple, the lips bordered with chesnut.

This animal is capable of the most sudden contraction, from eight or ten inches in length, to three or four; it has between a hundred and fifty and a hundred and sixty joints, becoming very small at the posterior end.

The case or tube formed by this species of *Amphitrite* is wholly gelatinous, of a very firm and elastic nature, greenish on the outside, but usually stained black by the soil they inhabit. These cases are composed of many layers or strata, and

when the first coat is removed, the remaining part is quite hyaline, and the animal nearly as distinctly seen as through glass.

This new and interesting species I discovered in the estuary of Kingsbridge, near the Salt stone, but not common, and only uncovered at the lowest ebb of spring tides. The case is buried beneath the surface, and is only discoverable by a small portion above, appearing like a piece of black jelly. When the tide returns, the animal displays its beautiful tentacula, but rarely exposes its body. Confined in a glass of sea'water, it sickens in a few days; and if not changed, evacuates its tube and dies.

In its native abode it recedes on the least alarm, and when the gelatinous case is taken in the hand, and the animal is extended within it, the sudden contraction within the tremulous tube produces a singular, and instantaneous, vibrative shock to the parts in contact, that, being unexpected, creates surprise.

The essential character of this species is the connected fibres of the tentacula, in which it differs from all others hitherto described.

TEREBELLA TENTACULATA.

Tab. VI. Fig. 2.

Body long and slender, composed of more than two hundred annulations, each furnished with two fasciculi of very minute bristles: no eyes: branchiæ obscure: from the sides issue very long, red, capillary appendages, most numerous near the anterior end, but the point, or snout, is destitute of them, and becomes more acuminated; the mouth is placed beneath: the posterior end is also obtusely pointed.

Length eight or nine inches.

The colour of the upper part is olive-green, the under part dull orange.

The lateral filiform appendages are continually in motion, appearing

pearing like slender red worms contorting in all directions round the animal; after death these usually curl up, when they first become orange, and in a little time wholly lose their colour.

This curious species of vermes was taken from a piece of timber that had been perforated by *pholades*, and was destitute of any natural covering.

It is extremely difficult, in the present state of our imperfect knowledge of the marine *Mollusca*; to class many of them by the characters prescribed by even the more modern authors. That the difference in opinion as to the arrangement of such amorphose animals whose connecting links are so extremely similar, and appearance so variable, will scarcely ever admit of their being brought within the reasonable bounds of generic distinction, must be obvious to those who have attended more closely to the subject of helminthology: the best authors seem to confirm this opinion by their discordant arrangement.

It may be doubted whether the animal in question be nearest allied to the *Terebella* or *Nereis*, or even whether it strictly belong to either.

NEREIS PINNIGERA.

Tab. VI. Fig. 3.

Body long and slender, with numerous opaque white joints transversely marked with yellow, and furnished at the sides with long flat appendages that flow over the back: tentacula scarcely distinguishable, unless the longer appendages in front be such: eyes four, chocolate colour: the posterior end suddenly decreases, and becomes very small, as if that part had been newly formed; a circumstance of no unreasonable conjecture, as it is well known that many of the *Mollusca* tribe are capable of reproduction.

Length an inch and a half.

HOLOTHURIA

HOLOTHURIA PENTACTES, var.

Tab. VII. Fig. 4.

Cylindric, white, covered with a mottled film or epidermis that seems to obscure the real colour: along the body are five rows of papillæ disposed in double series, that at times give it a sub-pentangular form; but shape is a vague character in many of these animals, as in this some parts are often inflated, while others are contracted. The anterior end, for an inch or more, is of a purplish-brown, and furnished with eight large, and two very small contiguous, elegantly ramous tentacula of a purple and yellow colour; the tips of all the smaller ramifications are of the latter. When the animal was alive it was observable that one of the least arms, or tentacula, was always covering the mouth, and for that purpose were alternately in motion: the space within the arms is purple; the lips or margin of the aperture white: the posterior end is furnished with a small pentangular opening of a red colour, through which the water was observed to be taken in, as well as ejected.

Length, when fully extended, six inches; diameter half an inch.

It is probably an inhabitant of the deep, as it was found on the sands at Milton, after a storm. When put into a glass of sea water it showed no signs of life for a considerable time, but was contracted, so that the tentacula, and all the anterior end coloured with purple, were drawn in and obscured.

This species of *Holothuria* bears more affinity to *H. Pentactes* than to any other; yet after a careful examination of the various figures given by several authors, some doubts remain on the subject.

LUCERNARIA

LUCERNARIA AURICULA.

Tab. VII. Fig. 5.

Lucernaria Auricula. *Gmel. Syst. p. 3151.*

Holothuria lagenam referens, tentaculis octonis fasciculatis. *Mull. Prodr. Zool. Dan. 2812.*

Pellucid, green, brown, purple, red, or yellow, and all the intermediate shades in different subjects: peduncle short, cylindric, sub-angular: arms usually eight surrounding the mouth, connected by a thin membrane almost to the top, the apex of each furnished with numerous short clavate appendages; between each arm on the margin of the web is a small oval reflected vesicle.

Length three quarters of an inch; expansion of the arms full as much.

The arms of these animals are in continual motion, catching their prey, and carrying it to their mouths.

Of the three known species of *Lucernaria*, this is the only one which has occurred on our coasts, and that not frequent; several, however, were taken together in Salcomb Bay, at an unusually low tide, adhering to algæ.

The figure represents a variety with only seven arms.

REFERENCES TO THE FIGURES.

Tab. II. *Fig.* 1. Cancer floridus.

2. ——— tumefactus.

3. ——— denticulatus.

Tab. III. *Fig.* 1. 2. ——— subterraneus.

3. 4. Oniscus thoracicus.

5. Cancer stellatus.

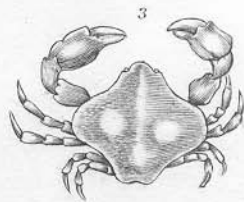
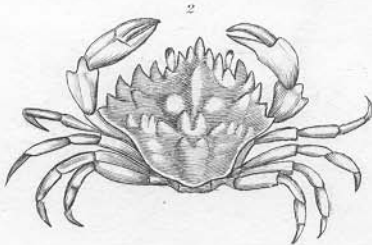
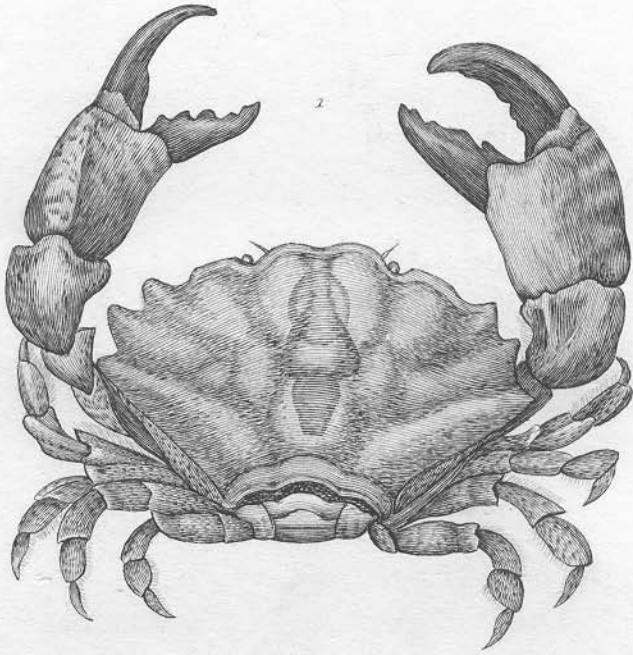
- Tab. IV. *Fig.* 1. Cancer Locusta.
2. ——— Pulex.
3. ——— Saltator.
4. ——— littoreus.
5. ——— grossimanus.
6. ——— Talpa.

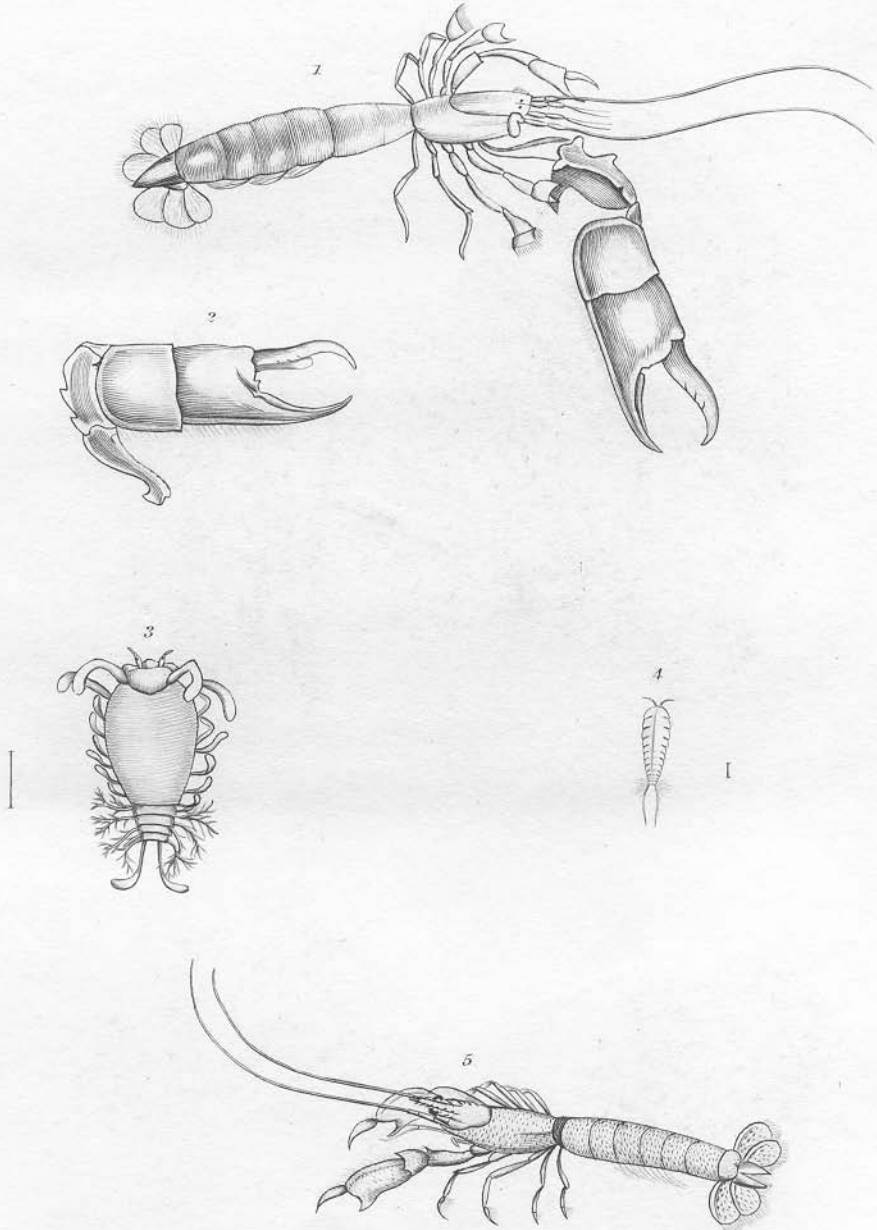
- Tab. V. *Fig.* 1. ——— rubricatus.
2. ——— falcatus.
3. ——— multiples.
4. ——— gibbosus.
5. Oniscus Testudo.
6. ——— gracilis.
7. Phalangium spinosum.
8. ——— aculeatum.

- Tab. VI. *Fig.* 1. Bulla Hydatis.
2. Ferrebella tentaculata.
3. Nereis pinnigera.

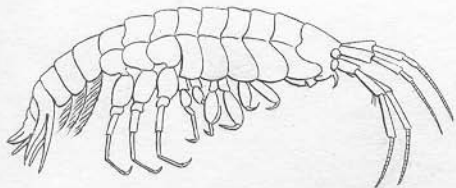
- Tab. VII. *Fig.* 1. Doris longicornis.
2. ——— nodosa.
3. Aphrodita Clava.
4. Holothuria Pentactes, var.
5. Lucernaria Auricula.

- Tab. VIII. Amphitrite Infundibulum.

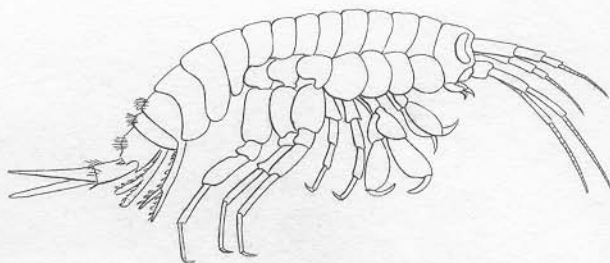




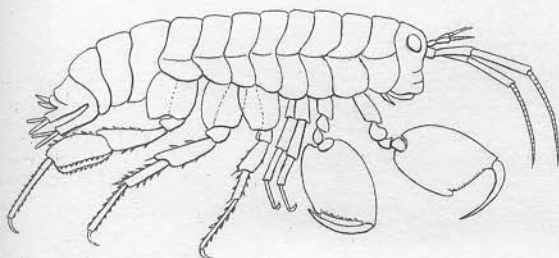
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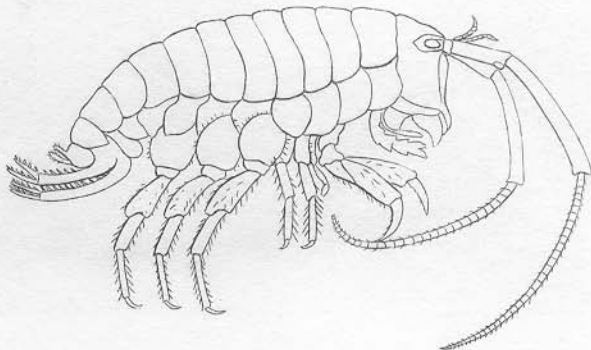
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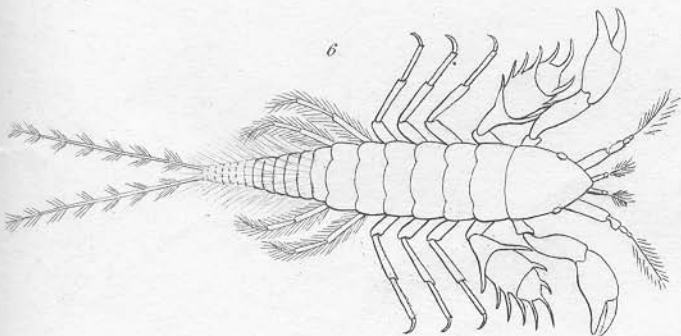
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