Family III. **Bonellea** (2 genera).

I. Cephalic appendage simple ..... 1. *Thalassema.*
II. Cephalic appendage bifurcate ..... 2. *Bonellia.*

Genera incertæ sedis 3 : *Ochetostoma, Lesinia, Halicryptus.*

Family IV. **Priapulea** (3 genera).

I. Branchiæ supported on a stem .... { 1 ..... 1. *Priapulus.* / 2 ..... 2. *Chætoderma.*
II. Branchiæ borne on a prolongation of the body .. 3. *Trypanius.*

Family V. **Loxosiphonea** (2 genera).

I. Body bearing 1 scute ..... 1. *Loxosiphon.*
II. Body bearing 2 scutes ..... 2. *Diesingia.*

Family VI. **Aspidosiphonea** (genus *Aspidosiphon*).

Family VII. **Sipunculea** (2 genera).

I. Buccal cirri simple ..... 1. *Sipunculus.*
II. Buccal cirri pinnate or ramified ..... 2. *Dendrostomum.*

Generæ incertæ sedis 2 : *Ascosoma, Anoplosomatum.*

[To be continued.]

II.—*Carcinological Gleanings.*—No. II.

By C. Spence Bate.

[Plate II.]

Brachyura.

Achæus Cranchii.

This species is spoken of by Bell as being rare, two specimens only having been recorded—one from Falmouth, the second from the south coast of Ireland. Certainly this little Crab is by no means uncommon off the coast of South Devon, in depths of from 6 to 20 fathoms of water, as we have taken it with the dredge in Plymouth Sound, and frequently had it brought in by the trawlers.

Among the specimens that we dredged, two were taken from about 6 fathoms of water, near the Knap buoy, off the western end of the Plymouth Breakwater, which appear to belong to a very distinct variety. Our attention was first drawn to it from observing a peculiarity in its habit, differing from that of the known species, which is that it covers itself with weed, as we know is commonly done by animals of the allied genus *Pisa*.

Certainly in *Pisa* this is no accidental circumstance, since all the spines are sharp-pointed and curved, thus forming strong hooks, on which hang the various kinds of weed.

My friend Mr. Hamilton Whiteford informed me some time since that he had in his aquarium a crab of this genus, which, having cast its skin in confinement, he observed to gather pieces of weed from the surrounding rocks, and with its claws place them on the spines, so decorating itself that to a very great extent it destroyed its natural appearance.

Some who have written on this habit have imagined this clothing of itself to be the result of an instinctive love of artificial decoration, innate in the creature. I am more inclined to believe that it arises from a sense of danger, and a consequent desire of the animal to conceal itself beneath such things as appear to hide and therefore protect it, than from any natural coxcombry inherent in the animal.

In the typical form of *Achæus Cranchii* the spines are straight —a circumstance that gives the animal generally a hairy appearance. In this variety the spines are all curved, and lie so close to the surface of the animal, that, to unassisted vision, the body and legs appear quite smooth; but closer inspection shows that these spines are all hooked, as in the genus *Pisa*. Careful observation of these two varieties of *A. Cranchii* fails, however, to detect, beyond the form of the spines, any very marked dissimilarity of form or structure sufficient to warrant their being arranged as specifically distinct.

Anomura.

Of the interesting genus of Soldier Crabs (*Pagurus*) six or seven species exist on the south coast of Devon, viz.:—

Pagurus Bernhardus.
—— *Prideauxii.*
—— *cuanensis.*
—— *Hyndmanii.*
Pagurus lævis.
—— *ulidianus.*
—— *Dillwynii.*

Of the species known as *Pagurus ulidianus*, Mr. Bell, in his work on the British Crustacea, remarks "that it is extremely like the young of *P. Bernhardus*;" and certainly, until we can capture a specimen carrying ova, there is every reason to believe that the two are but different stages in the growth of the same animal.

Of *Pagurus Dillwynii* no specimen has hitherto been recorded since the one originally described in the 'Annals of Nat. Hist.' (1851), from a specimen taken on the coast of South Wales, near the Worms Head, Glamorganshire. So long a period has elapsed, that on more than one occasion we have thought it prudent to have a peep at the original specimen, to assure ourselves that we had not committed a mistake.

During this present summer, while on a visit at Teignmouth,

observing a woman shrimping on the sandy beach, we requested to have a look at the contents of her bag, and were delighted to find, amongst a small catch of the common Shrimp, numerous specimens of *Pagurus Dillwynii*. After purchasing her entire stock, we hastened to the beach, and, within the margin of the incoming tide, took numerous specimens, which we kept alive for a short time. This, the prettiest of all the pretty genus, has the habit of burrowing in the sand; and it is probably owing to this circumstance that the animal has not been met with more frequently. But, curious to relate, since it has been found at Teignmouth, we have dredged it, in about 4 fathoms of water, in Bigberry Bay, and also taken a single specimen, in about 6 fathoms, as near to Plymouth as the mouth of the river Yealm.

An interesting point in the history of the development of this genus we have been enabled to make out: it is about the last week of April or the first of May that the larva appear most abundantly to quit the ova. Early in June we were enabled to capture many specimens of the young animal in various degrees of progressive development—a circumstance that has enabled us to determine that the genus *Glaucothoë*, founded on *G. Peronii*, and described by Prof. Milne-Edwards in the 'Ann. des Sc. Nat.' for March 1830, is none other than an immature stage of the genus *Pagurus*, at which period the little creature possesses all the characters of a Macrurous Decapod, and swims freely in the ocean, until, obliged by increasing age to take refuge in the cast-off shell of a univalve Mollusk, it sinks to the bottom, and commences life as a Hermit Crab.

Macrura.

In the genus *Palinurus* exists a curious and interesting structural condition of the inferior pair of antennæ, which, I believe, has never been pointed out.

In all Macrurous Decapoda the inferior pair of antennæ is furnished with a scale or articulated process (*scaphocérite* of Milne-Edwards), which is invariably situated at the distal extremity of the third joint of the peduncle. Now, in *Palinurus* this scale or squamiferous appendage is so incorporated with the wall of the peduncle as to exhibit its form on the surface only, thus demonstrating that the third and fourth joints of the peduncle are fused together; and the lateral scale is incorporated with it also. Pl. II. fig. 3 *c*.

Crangon.

In the elaborate memoir of the late Prof. Kinahan on the genus *Crangon* (Trans. Royal Irish Acad. vol. xxiv. p. 46) we think

that either he has erroneously figured the common Shrimp (*C. vulgaris*), or the common Shrimp of the Irish coasts differs from the edible Shrimp of the English markets.

The small and delicate second pair of pereiopoda that Prof. Bell has described as being "nearly as long as the third," and figures rather shorter than the first pair, Dr. Kinahan has figured as long again as the first pair: the animal is also drawn more slender generally than is the common Shrimp. Neither can we see the desirability or convenience of the generic separation of those species that possess the second pair of pereiopoda short, from those that have the same appendages of somewhat greater length.

Caradina.

In adding this genus for the first time to the list of the British Crustacea, we do so merely in words, since it has, we believe, been long known under the name of *Hippolyte varians* of Leach. It is remarkable that this species should have so long remained misinterpreted, since it is recorded as abundant along the south coast of England, from Cornwall to Poole Harbour, as well as having been found extensively round the Irish coast.

Though the colour of the animal generally is a pale transparent green, having a darker line along the prima via, we have not unfrequently taken it of a deep claret-red. This variation in colour I am inclined to believe is due to the weed on which it has been recently feeding; for indubitably the colouring-matter is due to the fluids in circulation, and not to any pigment existing in the dermal tissues. It is probably from this variability of colour that the species has received its distinguishing name. We have occasionally taken this species when dredging at Plymouth, but never so abundantly as of late, in rather deeper water just outside the breakwater.

We had previously observed the peculiar robust-looking first pair of pereiopoda; but it was not until very recently that we discovered they had the structure which has been described as the character of the genus *Caradina*, in which the propodos articulates with the carpus, not centrally, but at the infero-anterior angle, and thus appears as a partially dislocated joint.

There is a second form, that appears to us to be specifically distinct from the preceding. It is more slender generally, and has the rostrum long and narrow, having two teeth above, one near the base, flanked by a lateral tooth on each side just above the orbit, and one near the apical extremity of the rostrum, which corresponds with one on the under side immediately beneath it; and in one specimen we saw a second tooth also, posterior to this last. To this species we give the name of

Caradina tenuis. Pl. II. fig. 1.

The distinction between this and the preceding species consists in the more slender proportions generally of the latter, and in the position of the teeth on the rostrum, which in *C. varians* has the basal tooth on the dorsal surface further from its base, and the infero-subapical tooth a little posterior to the supero-subapical tooth, whereas the tooth that is situated near the base of the inferior surface of the rostrum is in *C. tenuis* placed but little posterior to the subapical tooth.

In all other respects the two species agree; so that we think it not at all improbable that they may be but the two sexes of one species. To this supposition strength is given from the circumstance that, while we took numerous specimens of *C. varians*, most of which were carrying ova, none of the few specimens of *C. tenuis* were so. But to this negative evidence we have to oppose another of a negative character also, which is that we have no experience of any species of Prawns that bear such sexual distinction, both as to size and form. The length of *C. varians* is an inch, that of *C. tenuis* half an inch.

Isopoda.

Some time since, Dr. Fritz Müller sent us some specimens of an Isopod which he has named *Sphæroma terebrans*, procured from timber that had been immersed in the sea; since which we have received, through Mr. Brisbane Neill, some very similar specimens from Capt. Mitchell, of the Madras Museum. A close examination is required to distinguish a specific character separating these from the Brazilian specimens; and I think that the only one that can be relied upon is, that the pointed and hook-shaped termination of the appendage of the mandible in Müller's specimens, is represented in those from Madras by a flat broad joint. I therefore think that, minor variations being taken into consideration, together with the distance of the two habitats, we do not err in considering the following a distinct species from that found by Fritz Müller. We therefore propose for it the name of

Sphæroma vastator. Pl. II. fig. 4.

The animal is of a long oval shape, without any distinct coxæ, and furnished with four longitudinal parallel rows of tubercles or blunt teeth on the three posterior somites of the pereion and the anterior portion of the pleon.

The *eyes* are round and prominent. The superior antennæ have the first joint of the peduncle broader than the second,

which is very short and round; the third is twice as long as the second, but much shorter than the first, and the flagellum gradually tapers to an obtuse point, and is formed of several articuli, of which the first is much the longest. The inferior antennæ are subequal with the superior, being perhaps slightly longer.

The mandibles are robust, and furnished with strong pointed incisor teeth as well as a powerful molar tubercle, between which exists a process armed with six or seven strong, equal-lengthed, serrated spines, which are probably used in the tearing down of the wood into which the animal burrows. The secondary appendage to this organ is short and three-jointed; the third joint is the shortest and is nearly as broad as long; it is ciliated upon the flexile margin with hairs, which gradually increase in length towards the apex of the appendage.

The maxilliped, or third siagonopod, consists of five joints, of which the basal is longest and broadest, and carries the other four as an appendage, in this somewhat resembling the form of the second pair of gnathopoda in the Crabs.

The two pairs of gnathopoda and the first pair of pereiopoda resemble each other in form and size. They are slender and comparatively feeble appendages, and furnished on the anterior margin with long plumose hairs—suggesting, from their similarity of feature with the same appendages in *Arcturus*, that the latter is not such an anomalous Isopod as some carcinologists have supposed; the coxa is fused with the dorsal portion of the somite, and forms an overhanging lateral plate-like process; the basis and ischium are long and slender, and the latter is furnished with a thick row of plumose hairs on the anterior margin, which stands at right angles with the joint; the meros is short, anteriorly produced to a point, and furnished with a row of plumose hairs similar to the preceding; the carpus and propodos are short, slender, and furnished with short cilia on both anterior and posterior margins; the dactylos is short, curved, unguiculated, and armed with a small subapical tooth or secondary unguis.

The last four pairs of pereiopoda resemble each other in general form; they are very robust and strong, and are furnished on the anterior and posterior margins with rows of stout bushy hairs, which appear to increase in number and strength posteriorly, and some of which take a spinous character in the last two pairs, as on the distal extremity of the propodos, where they become spines with serrated margins.

The first three pairs of pleopoda consist of a broad basal supporting an inner and an outer plate, the former of which is broadest at the base and ciliated at the apex; the latter is pear-

shaped, being largest near the apex, and furnished with a row of plumose cilia along the outer margin.

The fourth and fifth pairs of pleopoda have the inner and posterior plates converted into branchial organs, consisting of five or six foliaceous plates overlying one another. The posterior pair is marginal, and consists of a single branch on a strong and fixed peduncle, which is produced to a point directed inwardly; to the under surface of this, near the middle, articulates the solitary ramus; this is slightly curved and produced to a pointed apex, and is furnished with five or six sharp teeth on the outer margin; the inner margin is smooth, and so is the inferior, both of which last are furnished with short fine cilia, in this offering perhaps the readiest distinguishing feature from the South American species, which has this appendage fringed with long and coarse hairs.

According to Capt. Mitchell, this animal was procured "from a piece of wood which had formed part of a railway bridge over one of the backwaters on the west coast of the Indian peninsula. The wood was honeycombed with cylindrical holes, from about $\frac{1}{10}$th to $\frac{2}{10}$ths of an inch in diameter, placed close together. In many of these holes the animal was rolled up like a ball."

The colour of the animal, as it appeared when it arrived in England in spirits, is not to be depended on as resembling that of the living creature; but it was a subdued sage-green. Its length is about $\frac{1}{3}$rd of an inch, while its breadth is about half as much. Certainly these two closely allied species are among the largest and most powerful wood-destroyers that we know.

Many things have been tried to protect submarine wood from the ravages of its many excavators; but the only things that appear to have any success are the red oxide of iron and creosote. The works at Portland, which have been built with wood saturated with the latter, are, we are informed, entirely free from the depredations of these creatures.

Mahogany and probably teak wood, as well as the hemlock-tree of North America (which last, however, is, we believe, useless for most purposes), are, we are informed, exempt from their depredations.

We think that there can be little doubt that these and probably all wood-borers make the excavations for the purpose of food, preferring those trees that have sappy or innocuous juices to those of a hard or baneful nature. The mouth appears well adapted in this species for the purpose: the mandibles are strong and powerful appendages, and furnished with a rasping organ, while the strong posterior pairs of pleopoda are well adapted for the purpose of pressing the animal forward in its cavity; the

posterior pair of pleopoda must be very effective organs also, by the leverage that may be attained through them for assisting the animal to turn easily in its narrow cave.

EXPLANATION OF PLATE II.

Fig. 1. *Caradina tenuis*: 1″, rostrum.
Fig. 2″. *Caradina varians*, rostrum; 2 *h*, first pair of pereiopoda.
Fig. 3 *c*. *Palinurus vulgaris*, second pair of antennæ; c^3, scaphocerite.
Fig. 4. *Sphæroma vastator*: c, cephalon; *b*, superior antenna; *c*, inferior antenna; *d*, mandible; *d″*, mandibular appendage; *f*, second siagonopod; *g*, third siagonopod; *h*, *i*, gnathopoda; *k*, first pair of pereiopoda; *l*, second pair; *m*, third pair; *n*, *o*, fourth and fifth pairs; *p*, *q*, *r*, first three pairs of pleopoda; *s*, fourth pair; *t*, fifth pair; *v*, posterior pair of pleopoda.
Fig. 5. *Sphæroma terebrans* (Fr. Müller): *d″*, mandibular appendage; *v*, posterior pair of pleopoda.

III.—*Contributions to an Insect Fauna of the Amazons Valley.*

COLEOPTERA: LONGICORNES. By H. W. BATES, Esq.

[Continued from vol. xvi. p. 314.]

Genus CACOSTOLA (Dej. Cat.), Fairmaire.

Fairm. Ann. Soc. Ent. Fr. (1859), p. 532.

This genus, imperfectly characterized by M. Fairmaire, comprises a number of small-sized linear insects, closely allied to *Hesycha* and *Trestonia*, but distinguished by their narrow forms, obscure coloration, and especially by their much shorter heads, the muzzle being very little prolonged beyond the lower margin of the eyes. The antennæ are moderately distant at their bases, their supporting tubercles having a conical projection on their inner sides; they are slender, filiform, naked, and very little longer than the body; their first joint forms a smooth club, their third joint is in some species curved, and their terminal joint is at least as long as the preceding. The thorax is short and cylindrical, with a scarcely perceptible prominence in the middle of each side, and the surface punctured, not wrinkled transversely. The elytra are linear, obtusely rounded at their apices, and their surface is free from ridges and tubercles. The legs are short, the thighs clavate, and the claw-joint of the tarsi longer than the remainder taken together. The sterna are narrow, the pro- and mesosterna of equal width, and simple. The species are found, like the *Trestoniæ*, clinging to slender decaying branches of trees.

1. *Cacostola simplex*, Pascoe.

Pachypeza simplex, Pascoe, Trans. Ent. Soc. n. s. v. pt. 1. p. 44.

C. linearis, griseo-fusca; thorace elytrorumque lateribus griseo

1

2″

1″

2h

4m

3c

c3

4

4d

4f

4h i & k

4l

4g

4s

4n & o

q & r

4t

4v

5v

5d″

E.M.B. lith.

W. West imp