THE ANNALS

AND

MAGAZINE OF NATURAL HISTORY,

INCLUDING

ZOOLOGY, BOTANY, AND GEOLOGY.

(BEING A CONTINUATION OF THE 'ANNALS' COMBINED WITH LOUDON AND CHARLESWORTH'S 'MAGAZINE OF NATURAL HISTORY.')

CONDUCTED BY

PRIDEAUX JOHN SELBY, Esq., F.L.S.,
CHARLES C. BABINGTON, Esq., M.A., F.R.S., F.L.S., F.G.S.,
J. H. BALFOUR, M.D., Prof. Bot. Edinburgh,
AND
RICHARD TAYLOR, F.L.S., F.G.S.

VOL. XVI.—SECOND SERIES.

LONDON:
PRINTED AND PUBLISHED BY TAYLOR AND FRANCIS.
SOLD BY LONGMAN, BROWN, GREEN, AND LONGMANS; SIMPKIN, MARSHALL, AND CO.; PIPER AND CO.; BAILLIÈRE, REGENT STREET, AND PARIS: LIZARS, AND MACLACHLAN AND STEWART, EDINBURGH: HODGES AND SMITH, DUBLIN: AND ASHER, BERLIN.
1855.

with a fringed border, the others plain. Anterior *adductor* muscle larger than the posterior. *Foot* with a small flat sole, crenulated at the edge, deeply grooved behind and byssiferous; pedal muscles small in front, large behind, close to the adductors. *Palpi* very small. *Gills* oblong, finely striated; the outer ones not quite so deep, furnished with a dorsal border, their free edge grooved only in the middle.

This remarkable shell, which resembles the Palæozoic *Modiolopsis* in the large size of the anterior adductor, is found attached by its byssus to floating weed in many parts of the Southern Ocean.

III.—*Notes on some new or little-known Marine Animals.* By Philip Henry Gosse, A.L.S.

[With two Plates.]

(Fascis II.*)

Class ARACHNIDA.

Order Acarina. Fam. Oribatadæ.

Genus Halacarus (mihi).

Body covered above with a well-defined shield, either entire or transversely sulcated; under surface divided across the middle: rostrum head-like, consisting of a bulbous lip tapering to a point, divided longitudinally beneath, allowing the protrusion of a pair of slender filiform mandibles; palpi terminated by a fang-like unguis: feet cursorious, tipped with two falcate ungues; directed two forward and two backward; thighs remote. Marine. Name from ἅλς, the sea, and ἄκαρι, a mite.

Sp. 1. *H. rhodostigma* (mihi). Plate III. figs. 1–5.

Body divided above and below; claw of palpus slender, little curved; legs nearly equal; thighs of first pair ventricose; claws of all simple; whole surface minutely punctured.

Description.—Length $\frac{1}{72}$nd of an inch from anus to tip of rostrum; colour pellucid whitish, stained with pale red on the anterior half; above and below studded with punctures, which, under a high power, take the form of rosettes (whence the specific name, from ῥόδον, a rose, and στιγμὴ, a point), or the spots on a panther's coat (fig. 4); the punctures are conspicuous on the first thighs, but are scarcely visible on the other limbs. The

* Fasc. I. appeared in the 'Annals' for August 1853.

haunches are moderately distant at their origin, springing from the margin of the body, the shield being notched to give them exit; the third joint of the legs is the largest, much swollen in the first pair (fig. 1); the fifth is also large, and the sixth (the terminal one) is long, but slender, tapering abruptly from the middle; the claws (fig. 5) are simple hooks, much curved, neither pectinated nor tipped with an accessory piece, but the joint from which they spring is tipped with two nearly parallel styles: the legs are equal in length.

The shield of the body above is subtruncate in front, but projects in a small medial point (fig. 2); its general form is long-oval, with a transverse sulcus at the origin of the second legs; this sulcus, however, does not extend across the whole breadth, being met on each side by a bent longitudinal sulcus, which cuts off a wing-like portion, on which is seated a large crescent-shaped dark eye. Below, the body has two transverse divisions (fig. 1); one at the origin of the first legs, another at the origin of the third; these two impart the aspect of the division into head, thorax and abdomen, of a beetle: there is also a narrow longitudinal portion separated on each side.

The rostrum (fig. 3) forms a thick bulb tapering to a point, from which during life I observed two apparently soft, flexible, filiform, divergent organs (mandibles ?) protruded and retracted (fig. 1). At a strong shoulder on each side of the rostrum, about one-third from its point, is articulated a palpus of four joints, of which the second is by far the largest; the terminal one is a style, slightly curved, pointed, and furnished near the base with two strong bristles on the inner side, and one on the outer. All the joints of the legs are armed with a few short bristles. The vulva (fig. 1) occupies a large oval area at the hind part of the venter, and the anus is terminal.

This little species is not uncommon at Weymouth, among sea-weeds from low-water-mark; and I find it in my tanks, crawling up the glass, always immersed; doubtless introduced with weed-covered stones.

Sp. 2. *H. ctenopus* (mihi). Plate III. figs. 6–10.

Body divided below only; claw of palpus a stout pointed hook; hind legs longest, but otherwise alike; claws of all pectinate; whole surface smooth.

Description.—Length of body to tip of rostrum $\frac{1}{32}$nd of an inch; colour dark-red above with a white line down the centre of the back; under parts cream-white, very satiny; legs transparent-corneous. The shield of the upper parts (Pl. III. fig. 6) is entire, nearly oval, but projecting into a point over the rostrum;

its margins are sinuated and notched at the emission of the legs, and the excavations at those parts are still more strongly marked on the under surface. Beneath (fig. 7) there is a transverse sulcus opposite the origin of the third pair of legs, but bent forward on each side to the second pair; a longitudinal bent sulcus exists on each side, whose limits are undefined. The vulva and anus are both on the under surface, the latter small and situated behind the former, which is large and oval, and both are enclosed in an oval area.

The rostrum (fig. 8) is a globose bulb, drawn out to a more lengthened point than in the former species, its tip extending to the third joint of the palpi. The palpi (fig. 9) are usually projected parallel to the rostrum, but are capable of divergence; the joints have nearly the same relation to each other as in *H. rhodostigma*; but the third bears a stout spur-like spine on its inner face; and the fourth, which is stout at the base, much curved inward and acute, is armed with another spine, but longer and more slender, which likewise points inward and forward.

The legs (fig. 6) are consimilar, except in length; the first and second being to the length of the body as $4\frac{1}{4}$ to $5\frac{1}{2}$, the third and fourth as $6\frac{3}{8}$ to $5\frac{1}{2}$; hence the hind pairs are just half as long again as the fore pairs. The coxæ of the first and second originate close together, but the others are remote from them and from each other. The joints are nearly cylindrical, but diminish slightly to the last, which bears two very moveable sickle-shaped ungues. Each unguis (Pl. III. fig. 10) has an accessory piece set on the under side of its extremity, and is strongly pectinated all along its concave edge. Hence the name, from κτεὶς, a comb, and ποῦς, a foot.

No eyes were visible, unless a black speck on each side of the bulb of the rostrum was an eye, which I much doubt, from the position of the conspicuous organs of vision in the former species. Found (a single specimen) with the preceding.

Whether either of these species has been described before I cannot certainly say. Fabricius (Spec. Insect. ii. 491; ed. Hamb. 1781) has included two Norwegian marine Mites, *Acarus zosteræ* and *A. fucorum*, which he briefly describes;—the former as "*A.* subrotundus, albidus, abdomine rufo;" the latter as "*A.* pallidus, lineis duabus flexuosis nigris, pedibus posticis brevissimis incurvis." Meagre as these characters are, they are sufficient to show that neither of my species was intended.

M. Paul Gervais in his 'Aptères' (iii. 253) mentions that M. Dujardin had described a marine *Oribates*, in the 'Journ. de l'Institut' for 1842; but he has not given the characters, and I

have not been able to find any trace of such a species in the 'Comptes Rendus' for that period.

The only British marine Mite yet recognized, so far as I am aware, is the *Halarachne halichœri* of Professor Allman, which is widely different from these in form and habit, being parasitic within the nostrils of a Seal.

The form now described I cannot refer to any of the published genera: the dorsal shield seems to locate it among the *Oribatadæ,* and near to *Belba* and *Galumna*; but in the form and structure of the rostrum, there is a curious affinity with *Raphignathus* among the *Trombidiadæ.*

Class CRUSTACEA.

Order Podosomata. Fam. Pycnogonidæ.

Genus Phoxichilidium (M.-Edw.).

P. olivaceum (mihi). Plate III. figs. 12, 13.

Rostrum thickened at each extremity, hollowed in the middle, $\frac{2}{3}$rds as long as first joint of mandibles; the portion of the first segment of body anterior to the first pair of legs, about as long as rostrum; fourth joint of first pair of legs dilated; all the legs four times as long as the body; colour olive.

This species is perhaps one of the *many* British forms of this family, which Leach says were in his possession, but which he had not had an opportunity of determining. I found it at Weymouth, in the low spring-tides of April. The characters above given are those in which the specimen differed conspicuously from the *P. coccineum* of Dr. Johnston, by comparison with his figures in the 'Mag. of Zool. and Bot.' i. pl. 13. My specimen was $\frac{1}{8}$th of an inch in length, exclusive of the members; a female, bearing the globose egg-masses that characterize the genus. Fig. 12 represents it of the nat. size; and fig. 13, the fore-parts magnified.

Order Edriophthalma. Fam. Cyamidæ.

Genus Cyamus (Fabr.).

C. Thompsoni (mihi). Plate III. fig. 11.

Body about $\frac{1}{6}$th of an inch in length. Five pairs of feet equally developed; all 5-jointed; all with the penultimate joint large and ovate. Third and fourth segments each furnished with a single small oval appendage.

This species was obtained by Mr. Wm. Thompson of Weymouth, after whom I have named it. It was attached to one of

two specimens of *Hyperoodon bidens,* the capture of which in Portland Roads was recorded in the 'Annals of Nat. Hist.' for November 1854. Four species of *Cyamus* are enumerated by M. Milne-Edwards in his 'Hist. Nat. des Crustacés' (iii. 113), from all of which this specimen differs signally. Indeed that eminent carcinologist's *résumé* of the generic characters must be modified to include this species, which yet is an indubitable *Cyamus.* "The first pair of feet," he observes, "are difficult to perceive when we look at the animal from above;—they are composed of five joints, and are terminated by a *minute* sub-cheliform hand, *slightly* oval. The second pair are very large, hooked, and composed of only four distinct pieces." Now in this new species, the first pair do not differ either in form or size from the second, third, fourth or fifth pair; the hand is as stout, as ovate, and the claw as strong and as much hooked as in the second pair, while this latter pair are composed of five joints as distinct as in the others, and in no wise differing from them.

Class ANNELIDA.

Order Chætopoda. Fam. Nereidæ.

Genus Syllis (Sav.).

Sp. 1. *S. tubifex* (mihi).

Head lobed; post-occipital segment equal to the following; antennæ moniliform; tentacular cirri antenniform; feet lobed, armed with one pencil of hooked setæ; superior cirrus shorter than the breadth of the segment, not moniliform: animal fissiparous, minute, inhabiting a membranous tube.

Description.—Body $\frac{1}{3}$rd of an inch long, dirty-white, composed of about forty-five segments.

Head small, the lobes well developed and deeply divided, clothed with short hairs. Eyes large, widely diverging; those of each lateral pair about equal in size, and placed so close as to be sometimes in contact. Antennæ three, moniliform, clothed with short bristles; the central one nearly twice as long as the others, composed of about twenty-five well-marked joints; the outer pair having about twelve each.

Proboscis long, the outer portion about $\frac{3}{4}$ the length of the inner. Frontal margin of outer part serrated; inner part covered with small oval tubercles, set closely in quincunx, and in transverse rows.

Post-occipital segment not larger than the rest; furnished with two tentacular cirri on each side, of which the upper is about twice as long as the lower, equalling respectively the an-

tennæ. Those of the two following segments are similar in length and structure, being all antenniform.

Segments slightly incised, much broader than long. Foot short, subconical, obtuse, and divided at the tip into three or four lobes; armed with a bundle of bristles, each of which bears a terminal hook very freely jointed on an oblique knob. Superior cirrus shorter than the breadth of the segment, tapering, not moniliform. Inferior cirrus scarcely projecting beyond the foot, ovate and leaf-like.

The bundles of hooked bristles consist of about sixteen each, but those near the tail appear to have only about twelve. I cannot find any accessory pencil of fine hairs by the closest pressure; but the long slender pair of internal plates are present.

The internal surface of the head-lobes is clothed with vibratile cilia, by the action of which a strong uniform current is drawn into the mouth. The current passing down along the antennæ may at first be supposed to be produced by cilia on these organs, but I could not detect any on close examination. The inferior surface of each foot is also strongly ciliated, and vortices are produced on each of these organs, the whole forming a powerful current from head to tail.

This is one of the species that increase by spontaneous division from the posterior portion of the body. There was, at the tail of the specimen described, an incipient young one of about five or six segments, triangular in its general form and little developed, but well separated, by an incision, from the parent.

This species I frequently found in my glass jars of sea-water at Ilfracombe, especially in those in which I was keeping the Hydroid zoophytes. It climbs to the surface, and then along the very edge of the water, forms a slender membranous tube attached to the glass, open at each end, within which it dwells. If touched at either extremity, it issues forth at the other with much agility, wriggling its segments in lateral undulations. No drawing was made of this species.

Sp. 2. *S. longiseta* (mihi). Plate IV. figs. 14–21.

Head not lobed; antennæ short, not moniliform; no tentacular cirri; feet obtuse, simple, armed with two pencils of bristles, of which the inferior are twice the breadth of the segments; superior and inferior cirri equal, minute; inhabits a membranous tube. (Fig. 14, nat. size; 15, magnified.)

Description. — Head round, not distinctly lobed (fig. 16); three antennæ, slightly fusiform, not moniliform, shorter than the breadth of the head, set in a transverse line: four eyes, brick-red, reniform, the inner pair set a little behind the outer, and rather smaller: no tentacles or tentacular cirri.

Segments about thirty-eight, nearly alike in size, but those of the middle parts more separable; diminishing abruptly at the tail.

Feet slightly developed for the first five or six segments; thence thick, with a semi-oval lobe projecting from the upper portion (Pl. IV. figs. 17 & 20), from which protrudes a fan-like pencil of bristles, which are short (about as long as the foot), slightly curved, consisting of a slender shaft with a terminal notched knob, bearing a short curved blade set in the notch; this blade is longer in the upper bristles (fig. 18) of the pencil than in the lower ones (fig. 19). The lower pencil (figs. 17 & 21) consists of very long, simple, finely-pointed bristles (about twice as long as the breadth of the body), which project laterally or posteriorly, and are not retractile; these long bristles do not appear till the 10th segment, and disappear at the 32nd.

The tail consists of two fusiform appendages, much resembling the antennæ, about half as long as the greatest width of the body.

Colour hyaline, slightly tinged with yellow. Total length $\frac{1}{6}$th of an inch.

Found at Weymouth on the side of a glass in which I had placed a tuft of *Rhytiphlœa*. It makes a gelatinous tube attached to the glass (fig. 14), in which it moves freely backwards and forwards by means of its long setæ.

Order Chætopoda. Fam. Sabelladæ.

Genus Othonia (Johnston).

Gill-fans two, composed of several soft, thick, curled-inward, pectinated, ciliated stems set like a star around the mouth: body composed of twelve to thirty-five segments, all furnished with lateral pencils of bristles, but without hooks. Animal inhabits a membranous tube, open at both ends, which it often forsakes.

The discovery of two other species of this genus renders necessary a revision of the generic characters; as some of those enumerated by Dr. Johnston (Loudon's Mag. N. H. viii. 183) are merely those of the single species then known, *O. Fabricii*.

Sp. 1. *O. Fabricii* (Johnst.). Plate IV. fig. 22.

Segments fourteen; first and last with a pair of eye-like spots: pinnæ of gills graduated in length; bristles simple.

Description.—Head with two well-defined eyes, and a ring of vibratile uncinate cilia. Gill-fans wrinkled; pinnated; the pinnæ long, and so graduated that the tips are level; they often curl

inward at the tips; their colour is a clear green. Segments fourteen, all but the last two furnished on each side with a pencil of stiff long bristles, few, converging to their tips, deeply seated, nearly straight, but curved forward at the points, simple; wholly retractile. Last segment round, with a pair of well-defined eye-like spots.

Length $\frac{1}{12}$th of an inch.

This little species is common at Weymouth, coming out of tufts of *Rhytiphlœa pinastroides* when these are kept in glass vases. The little Annelid crawls up the side of the glass, often going tail-foremost; a curious fact, when considered in connexion with the eye-like spots on the last segment, which cannot be distinguished from the true eyes of the anterior extremity.

It is possible that this may be the immature condition of one of the succeeding species. The ring of uncinate cilia suggests youth.

Sp. 2. *O. Bairdii* (mihi). Plate IV. figs. 23, 24.

Segments above thirty, without eye-spots at either extremity; gills each composed of five or six stems, set with a double row of short pinnæ: bristles with an oval expansion at their base.

Description.—Gill-fans two, ample, each consisting of five (or six) stems divided almost to the base, each set with a double row of short ciliated pinnæ, not graduated, curling inwards in a plumose manner. Segments (in the specimen described) thirty-four, all but the last two with pencils of bristles; three in each pencil (fig. 24) very short, finely-pointed, with an oval blade-like dilatation at the base of each. The segments diminish quickly but gradually to the last, which forms a blunt point, and is unspotted. No eyes are visible on the head, nor any ring of cilia.

Length $\frac{1}{6}$th of an inch; colour whitish-green, opaque; gill-fans hyaline.

A single specimen was found with the preceding, at Weymouth, in April. I have dedicated the species to my esteemed friend, Dr. William Baird of the British Museum.

Sp. 3. *O. Johnstoni* (mihi). Plate IV. figs. 25–28.

Segments above thirty, without eye-spots; gills each of about sixteen stems, some of which are simple, others set with graduated pinnæ: bristles with an expansion near the tip.

Description.—The gill-fans are composed of many (about sixteen) stems, some of which are quite simple, others set with numerous long, but graduated pinnæ in two rows, and others in an intermediate condition, the pinnæ being rudimentary or short (fig. 26). The stems (fig. 28) are hollow, with close-set transverse lines (*septa* ?); and the pinnæ are covered with small

vibratile cilia. These fans are very deciduous, for, in captivity, I have seen the animals voluntarily throw off in succession more than a dozen of the stems, separating them at the base: probably they are renewable, as I know to be the case, from repeated observations, in *Sabella.*

Segments about thirty-three; nearly equal, except that they diminish rapidly at the posterior extremity, tapering somewhat abruptly to a blunt point. All but the last two are furnished with graduated pencils of bristles, about eight or ten in each pencil. In those of the anterior segments the bristles are of two forms (fig. 27), the shorter consisting of a slender, acutely-pointed stem, which is dilated near the tip into an oval plate, through the centre of which the stem passes; the longer ones are of essentially the same structure, but the dilatation is gradual and elongate, and therefore blade-like or lanceolate. Both kinds end in finely-drawn points, which are much curved. Towards the hinder part of the body all the bristles take the latter form.

The animal throws off at will a transparent gelatinous membrane, which forms a tube just large enough to hold its body, and the sides of which are pushed out by the bristles during their movements.

Length $\frac{1}{2}$ an inch; colour greenish-white.

I have named this species after Dr. George Johnston, who may be called the father of our marine invertebrate zoology. It is the most common of the three at Weymouth, being found abundantly in shells and stones, dense sea-weeds, &c., from tide-marks and deep water.

Class POLYZOA.

Order Infundibulata. Fam. Vesiculariadæ.

Genus Nolella (mihi).

Cells erect, subcylindrical, springing singly, but closely, from an undefined polymorphous incrusting mat; tentacles eighteen, forming a bell. Name from *nola,* a little bell.

N. stipata (mihi). Plate IV. fig. 29.

Cells about $\frac{1}{36}$th of an inch long, whitish, sub-opaque.

I found this species numerous in mats on the fronds of *Phyllophora rubens,* dredged between the Abergavenny and Portland Breakwater, in Weymouth Bay. It is very near *Bowerbankia,* but the number of its tentacles distinguishes it from all recognized genera, except *Avenella* (Dalyell), from which, however, it

totally differs in habit and form. The opacity of the cell prevented me from discerning whether it has a gizzard.

EXPLANATION OF PLATES III. AND IV.

PLATE III.

Fig. 1. *Halacarus rhodostigma*, magnified, ventral surface.
— 2. *Ibid.* dorsal surface of trunk.
— 3. *Ibid.* rostrum and palpi.
— 4. *Ibid.* punctures of surface.
— 5. *Ibid.* ungues of foot.
— 6. *H. ctenopus*, magnified, dorsal surface.
— 7. *Ibid.* ventral surface.
— 8. *Ibid.* rostrum and palpi.
— 9. *Ibid.* right palpus.
— 10. *Ibid.* one unguis of a foot.
— 11. *Cyamus Thompsoni*, magnified, ventral surface.
— 12. *Phoxichilidium olivaceum*, nat. size.
— 13. *Ibid.* fore-parts magnified.

PLATE IV.

Fig. 14. *Syllis longiseta*, in its tube, nat. size.
— 15. *Ibid.* magnified.
— 16. *Ibid.* head, somewhat laterally.
— 17. *Ibid.* a right foot seen from behind.
— 18, 19. *Ibid.* setæ of the upper pencil.
— 20. *Ibid.* a middle segment, from above.
— 21. *Ibid.* the same, from below.
— 22. *Othonia Fabricii*, magnified.
— 23. *O. Bairdii*, magnified.
— 24. *Ibid.* a pencil of setæ, more enlarged.
— 25. *O. Johnstoni*, nat. size.
— 26. *Ibid.* magnified (middle segments omitted).
— 27. *Ibid.* bristles of two forms.
— 28. *Ibid.* a portion from a stem of the gills, with two pinnæ.
— 29. *Nolella stipata*, magnified.

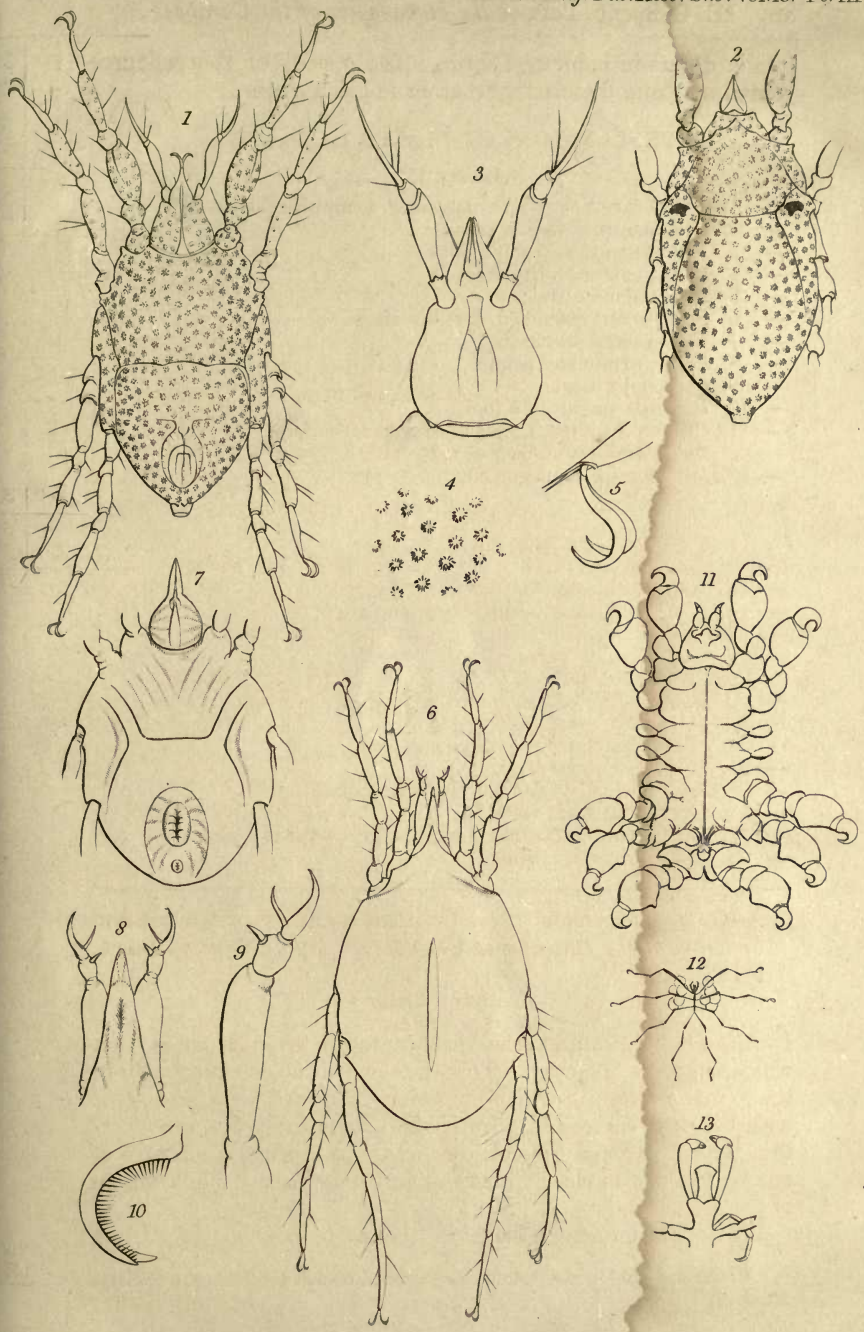
IV.—*On the Homologies of the Carapace and on the Structure and Function of the Antennæ in Crustacea.* By C. SPENCE BATE, F.L.S. &c.*

[With two Plates.]

IN the class Crustacea the most anterior articulation is that which supports the eyes. This is shown most conspicuously in the genus *Squilla*, in which animal it is united by a free joint with the next succeeding; but if this lucid example were wanting, the relative position of the ophthalmic ring in advance of any of the rest is clearly manifest in the larva and pupa stages of the Decapoda.

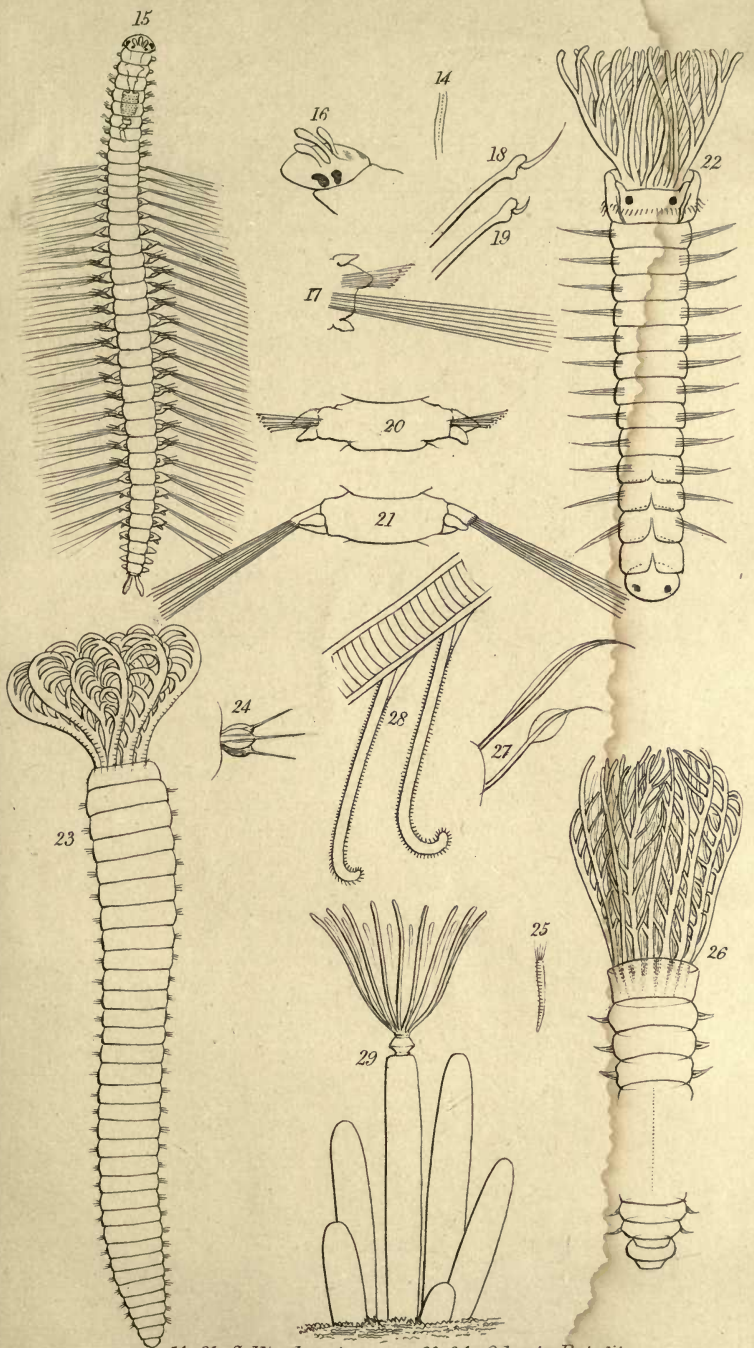
Dissection moreover leads to the same conclusion. Upon

* Communicated by the author, having been read at the Linnæan Society, April 17, 1855.



1–5. *Halacarus rhodostigma*. 11. *Cyamus Thompsoni*.
6–10. ..... *ctenopus*. 12. 13. *Phoxichilidium olivaceum*.

P. H. Gosse, ad viv. del. J. De C. Sowerby



14–21. *Syllis longiseta*. 23. 24. *Othonia Bairdii*.
22. *Othonia Fabricii*. 25–28. *O. Johnstoni*.
29. *Nolella stipata*.

P. H. Gosse, ad viv. del. J. De C. Sowerby sc.