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Report on the Crustacea. By the Rev. A. Merle Norman, M.A.

One hundred and one Crustacea were obtained.

To this number two or three more Entomostraca may yet be added, when the gatherings of the drift net shall have been more minutely examined. The sectional distribution of the species may be thus shown :—

Brachyura	. . 9.	Amphipoda	. . 34.
Anomoura	. . 7.	Isopoda	. . . 5.
Macroura	. . . 7.	Entomostraca.	. 16.
Stomapoda	. . 8.	Pycnogonoidea	. 10.
		Cirripedia.	. . 5.

The object of the present paper is to give a catalogue of the species obtained; a few notes on the rarer forms, and descriptions of the new Stomapods. The description of the new Amphipoda and Entomostraca must be deferred for the present. Mr. Hodge, who is especially devoting himself to the study of the Pycnogonoidea, will report upon the species of that very interesting order.

In the following table the three columns represent the same localities as those in the report on the Mollusca :—

Stenorhynchus rostratus, *Lin.*			r.c.	
Inachus Dorsettensis, *Penn.*			r.	A few young specimens obtained off Berwick Bay. New to our local Fauna.
——— dorhynchus, *Leach*		r.		One small example only.
Hyas coaretatus, *Leach*		c.	c. c.	The most abundant of the larger Crustacea, in deep water.
Portunus holsatus, *Fabr.*	r.c.		r.c.	Specimens small.
——— pusillus, *Leach*		r.	r.	
Eballia tuberosa, *Penn.*	r.c.		r.c.	
——— Cranchii, *Leach*		r.	r.	
Atelecyclus septemdentatus, *Mont.*			r.	Only very young.
Pagurus Bernhardus, *Lin.*	c.	c.	c.	
——— Hyndmanni, *Thompson*	v.r.			One only, east of Tynemouth.
——— lævis, *Thompson*	r.c.	c.	c.	Sandy ground.

1st column : off Tynemouth
2nd — Dogger Bank
3rd — Coquet and Berwick Bay

Pagurus Thompsoni, *Bell*	c.	c.	c.	With the last, and also on harder ground.
Porcellana longicornis, *Penn.*			r.	
Galathea dispersa, *Bate*	r.c.		c.	Widely diffused.
——— Andrewsii, *Kinahan*	r.		c.	
Crangon Allmanni, *Kinahan*	c.	c.	c.	Abundant.
——— spinosus, *Leach*	v.r.		r.c.	A very large example taken off Berwick.
——— bispinosus, *Westwood*		v.r.		Two specimens of this rare species dredged in 40 fathoms, 40-50 miles east of Tynemouth.
Hippolyte pusiola, *Kroyer*	v.c.		r.	
——— securifrons, *Norman*		r.	r.c.	
Pandalus annulicornis, *Leach*	c.	c.	c.	Abundant everywhere.
——— Thompsoni, *Bell*	c.		r.c.	
Mysis spiritus, *Norman*	v.c.	c.	r.	
——— Didelphys, n. sp.	v.c.			A new species.
Diastylis Rathkii, *Kroyer*	r.		r.	
Vaunthompsonia cristata, *Bate*		r.		50-60 miles east of Tynemouth.
——— rosea, n. sp.		v.r.		A new species.
Eudora truncatula, *Bate*		r.		50-60 miles east of Tynemouth, on a muddy bottom.
Cyrianassa ciliata, n. sp.		v.r.		A new species.
——— elegans, n. sp.		v.r.		A new species.
Montagua Alderii, *Bate*	r.			40-50 miles off Tynemouth.
——— pollexiana, *Bate*	c.		r.c.	
Callisoma crenata, *Bate*	v.r.			One specimen, 7 miles off Tynemouth, 25 fathoms, and a second off Berwick.
Anonyx Edwardsii, *Kroyer*	r.	v.r.		40 and 100 miles east of Tynemouth.
——— ampulla, *Kroyer*		v.r.		Only a single example.
——— denticulatus, *Bate*	r.c.		r.	
——— longipes, *Bate*		v.r.		One specimen only.
Ampelisca Belliana, *Bate*	c.	r.	r.c.	
——— Gaimardi, *Kroyer*	c.	c.	c.	
Haploops tubicola, *Lilj.*	v.r.		v.r.	A genus new to Britain.
Phoxus plumosus, *Holböll*	r.	r.		
Œdicerus parvimanus, *B. and W.*		v.r.		

Kroyera altamarina, *Bate and Westw.*		v.r.		
Iphimedia obesa, *Rathke*	c.	r.c.		
Acanthonotus Owenii, *Bate*	c.	r.c.	c.	This fine Amphipod was abundant and widely diffused.
Dexamine Vedlomensis, *Bate and Westw.*	r.c.		v.r.	40-50 miles off Tynemouth, and also off Berwick.
Atylus bispinosus, *Bate*	vr.			Seven miles off Tynemouth, one specimen.
Calliope bidentata, n. sp.	v.r.	v.r.		A new species.
Eusirus Helvetiæ, *Bate*		v.r.		
Microdeutopus anomalus, *Rathke*	v.r.		r.	Seven miles off Tynemouth, and also off Berwick.
Melita proxima, *Bate*		v.r.		One dredged 100 miles off shore.
Eurystheus erythrophthalmus, *Lilj.*			v.r.	A single imperfect specimen.
Megamœra Alderi, *Bate*		v.r.		100 miles off Tynemouth, 25-30 fathoms, one specimen.
——longimana, *Leach*			v r.	
——Othonis, *Edwards*			v.r.	
Heiscladus longicaudatus, *Bate and Westw.*	r.			
——brevicaudatus, n. sp.	v.r.			A new species.
Cerapus difformis, *Edwards*	r c.	r.	r.c.	
Siphonœcetes——	v.r.			One specimen 7 miles off Tynemouth, probably new.
Nænia caudadentata, n. sp.			v.r.	A new species.
Proto Goodsirii, *Bate*	v.r.			One only, 40-50 miles off Tynemouth.
Caprella linearis, *Latr.*	v.r.			
——lobata, *Müller*	r.			
Protella phasma, *Latr.*	c.		r.c.	
Arcturus longicornis, *Low*	c.	r.c.	c.	
——intermedia, *Goodsir*	r.			
——gracilis, *Goodsir*	r.c.		r.	

Pheryxus longibranchialis, n. sp.	v.r.		A new species found in *Pagurus Thompsoni*.
Oniscoda Deshayesii, *Lucas*	r.	r.	
Nebalia bipes, *O. Fab.*	v.r.		One specimen, 7 miles off Tynemouth, muddy bottom.
Evadne Nordmanni, *Loven*	c.	c.	Pelagic.
Cythere acuta, *Baird*		r.c	A rare species which I have never before met with.
—— pellucida, *Baird*		r.c.	
—— quadridentata, *Baird*	r.c.	r.	
—— obesa, n. sp.		c.	A new species.
—— limicola, n. sp.		r.c.	A new species.
—— —— n. sp.		r.	New to science, if it be not identical with a Tertiary Fossil species, combining characters of *C. viridis* and *C. flavida*.
—— contorta, *Norman*	r.		
Cythereis fimbriata, *Rœmer*		r.	Living specimens. The species was admitted into our Fauna on the evidence of two or three single valves taken in the Firth of Clyde.
Cypridina Brenda, *Baird*	r.c		Synonymous with *C. globosa, Lilj.*, and *Asterope Grœnlandica, Fischer*, dredged 40-50 miles off Tynemouth, on a muddy bottom.
Ichthyophorba hamata, *Lilj.*	r.c.	r.c.	Pelagic. A genus new to Britain.
Anomalocera Patersonii, *Thomp.*	r.c.	r.c.	Pelagic.
Caligus curtus, *Müller*	c.	c.	On cod and coal fish. This is *C. Mülleri, Leach*, and *C. diaphanus, Baird*, but probably not *C. diaphanus, Kroyer*.

Caligus rapax, *Edwards*		c.	On cod.
Anchofella uncinata, *Müller*		r.	On cod.
Balanus porcatus, *Da Costa*	r.c.	r.	Small specimens.
——— crenatus, *Brug*	r.c.		
——— Hameri, *Ascan*	r.		Small specimens.
Verruca Stromia, *Müller*	c.		
Scalpellum vulgare, *Leach*	c.		On sertularian zoophytes.

FAMILY. **Palæmonidæ.**

SUBFAM. ALPHEINÆ, *Dana.*

GENUS. HIPPOLYTE, *Leach.*

HIPPOLYTE SECURIFRONS, *Norman.* (Pl. XII. fig. 1-7.)

Hippolyte securifrons, Norman. *Brit. Assoc. Report*, 1861.

Cephalothorax gibbosus, carinatus, atque dentatus; dentes marginem tertiâ cephalothoracis parte posteriorem non attingentes. Rostrum altum, truncatum, securiforme, squaman antennalem non superans; dentes marginis superioris 6-13, simplices; quorum 2-4 in cephalothoracis carinâ siti, et 3-5 ad rostri extremitatem in senioribus minuti, in junioribus evanescentes. Margo cephalothoracis anterior quatuor aculeorum paribus armatus, duobus supra oculos, tertio infra oculos, quarto ad junctionem marginis anterioris cum marginibus lateralibus. Antennæ interiores perbreves. Segmentum abdominale tertium pone vix productum. Telson tribus vel quatuor aculeorum lateralium paribus, et sex aculeis terminalibus instructum.

This species—the finest British *Hippolyte*—was first dredged by Mr. Jeffreys and myself in the summer of 1861, in seventy or eighty fathoms water, about sixty miles east of Shetland, and was briefly characterized in a paper read at the Manchester meeting of the British Association. During the recent dredging off this coast, several examples of *H. securifrons* were obtained between fifty and sixty miles east of Tynemouth, and also in Berwick Bay; and still more recently a specimen has been sent to me which was pro-

cured by Mr. G. S. Brady, from a fishing boat at Sunderland. I have thus arrived at a far more accurate knowledge of its character, than could be obtained from the original type, and find that an extraordinary range of variation in the form and toothing of the rostrum must be allowed to the species.

The colouring of *H. securifrons* is most gorgeous—brilliant crimson spotted with canary yellow.

The carapace, which is very deep and gibbous, has its front margin armed with four pairs of spines;* two of these are placed together above the eyes, and near the base of the rostrum; a third is situated immediately below the eyes and the fourth at the angle formed by the junction of the anterior and lateral margins.

The rostrum in the mature animal assumes the form of a deep, flattened, hatchet-shaped plate, ending in a strong tooth; the carapace is also keeled and toothed above, through two-thirds of its length. The variation in the armature of the rostrum will be best understood by the description of several examples selected on account of their difference in size.

Number 1 was the largest specimen obtained, which measured two inches and a quarter long, while the total length of the smallest specimen, number 9, scarcely exceeded three-quarters of an inch.

1. $\frac{13}{5}$; 4; 4 and 5—that is 13 teeth on the upper side of the rostrum, and five on the lower; 4 of the 13 upper teeth situated on the carapace; the widest space between any two teeth is between the 4th and 5th. (Pl. XII., figs. 1, 2.)
2. $\frac{11}{5}$; 4; 4 and 5. (Pl. XII., fig. 3.)
3. $\frac{10}{5}$; 3; 4 and 5. (Pl. XII., fig. 4.)
4. $\frac{11}{4}$; 4; 4 and 5. (Pl. XII., fig. 5.)
5. $\frac{10}{5}$; 4; 4 and 5.
6. $\frac{8}{5}$; 4; 4 and 5; young.
7. $\frac{10}{5}$; 4; 5 and 6; young.
8. $\frac{8}{5}$; 3; 3 and 4; young.
9. $\frac{5}{5}$; 2; 3 and 4; young. (Pl. XII., fig. 6.)

* In the Brit. Assoc. Report it was erroneously stated that there were three pair only. Two spines, however, instead of one, are usually present above the eye; though in one instance I could not detect the second spine in that position.

It will be observed, first, that the proportionate depth of the rostrum becomes greater as the animal approaches maturity, and secondly, that although the number of teeth on the upper side of the rostrum increases with age, no such increase takes place with regard to those of the lower surface.

The tip of the rostrum, the short interior antennæ, the scale of the exterior antennæ, and the extremity of the pedipalps are all of nearly equal length. The first feet are stout, of moderate length, a little exceeding half the length of the second pair. The wrist of the second feet is divided into seven articulations.

The posterior margin of the third abdominal segment is but little produced, so slightly indeed that the central lobe would scarcely be noticed unless it was especially looked for.

The telson (Pl. XII., fig. 7) is armed with three (rarely four) pair of spines on its surface, and ends in six spines, the two central and two outer of which are short and blunt, the two intermediate considerably longer.

H. securifrons approaches more nearly to *H. spinus* (Sowerby) than to any other of our recognised species. The latter may be more especially distinguished from the former; *first*, in having the dentated keel continued to the hinder margin of the carapace; *secondly*, in the four posterior teeth being of considerably greater size than the teeth anterior of them; *thirdly*, in the fact that the teeth in the upper margin of the rostrum are themselves furnished with secondary teeth; and *fourthly*, in having the dorsal centre of the third abdomenal segment produced backwards into a conspicuous tooth-like process.

It is not improbable that some of the Hippolytes which have been considered by our collectors to be *H. spinus*, more properly belong to this species. I have figured Pl. XII., fig. 8, the rostrum of *H. spinus*, dredged by me at Oban, for comparison with the rostra of the present species.

The examination of the specimens of *H. securifrons*, from this coast, has proved the extent of variation in this species to be so great that possibly it may hereafter prove to be identical not only with *H. turgida* of Kroyer, but also with *H. Phippsii* of the same author.

FAMILY. **Mysidæ.**

SUBFAM. MYSINÆ, *Dana.*

GENUS. MYSIS, *Latr.*

MYSIS DIDELPHYS,* n. sp. (Pl. XII., figs. 9-11.)

M. vulgari affinis at robustior; squamâ antennali paullo latiore, subelliptică, non spinâ acuta sed tribus ciliis plumosis confectâ; telsone aculeis utrinque paucioribus, fere decem, apiceque bispinoso, (nullis spinulis minutis sicut in *M. vulgari* interpositis,) armato.

A short and robust species, with immense eyes on short footstalks. The configuration of this species reminds us of *M. oculata* (O. Fab). Carapace short, leaving the three posterior thoracic segments, and the dorsal portion of the fourth uncovered, and having in front a very short, but acute rostrum. Diameter of the cornea of the eyes fully equalling, if not exceeding their total length. Antennæ, short. Peduncle of interior antennæ scarcely exceeding the length of the eye. Antennal scale shortly lanceolate or subelliptical (Pl. XII., fig. 10), about twice the length of the eye, fringed with plumose cilia all round its margins; having a short second joint (Pl. XII., fig. 11), which is furnished with five cilia, one being situated on each side and three at its termination.

Telson (Pl. XII., fig. 9), entire, one fourth shorter than the intermediate laminæ of the tail, with about ten teeth on each margin; these teeth are distributed through nearly the entire length of the telson; and the greatest interval between any two teeth is between the fourth and fifth. It will be noticed that in the type specimen there is an irregularity in the armature of the telson, which has eleven teeth on one side but only ten on the other. The telson terminates in two large teeth, one of which is situated at each angle of the apex; there are no smaller secondary teeth between these. The external caudal laminæ are considerably longer than the internal, and have all the margins ciliated.

* *Didelyphys* the Opossum. This and the three following species were briefly described by the author in a paper read before the British Association at Cambridge.

Total length nine tenths of an inch.

The type specimen was dredged in deep water, forty miles off Tynemouth. Within the last few weeks I have had the opportunity of examining another specimen which was taken by Mr. Jeffreys in the Shetland Seas. This specimen which in all respects agreed with that dredged on this coast was sent to me for examination by Mr. Spence Bate, in whose collection it is preserved, and who had attached to it a MS. name, unaware that I had characterized this species at the meeting of the British Association this autumn.

Mysis didelphys is a much stouter species than *M. vulgaris*, to which it is nearly allied. The antennal scale is less produced, and the second joint much shorter and terminates in three cilia instead of in an acutely pointed spine. The telson is also shorter, with fewer lateral spines, and has not the two intermediate apical spines, which are present in *M. vulgaris*. *Mysis didelphys* is found in the open sea at a considerable distance from the coast, while the habitat of *M. vulgaris* appears to be invariably the brackish waters of estuaries and salt marshes.

Family. Diastylidæ.

This curious and abnormal family was well represented by *Diastylis Rathkii* (Kroyer), *Eudora truncatula* (Spence Bate), *Vaunthompsonia cristata* (Spence Bate), and the three following species, which do not appear to have been hitherto described.

Genus. VAUNTHOMPSONIA, *Spence Bate.*

VAUNTHOMPSONIA ROSEA, *n. sp.* Pl. XIII., figs. 1-3.

Vaunthompsonia elongata, flavescens maculis roseis minutis numerosissimis picta; segmenta quinque thoracis posteriora a cephalothorace nudata; pedes abdominales nulli; telson elongatum, appendicum caudalium exteriorum pedunculo par longitudine, spinis septem terminalibus, duobusque utrinque gracilibus armatum; appendicum caudalium pedunculus interne spinosulus; ramus interior triarticulatus interne spinosulus; ramus exterior biarticulatus paucis ciliis simplicibus instructus.

In general form this species is considerably attenuated; the abdomen more especially being much produced. The carapace is short, and in length but little exceeds its breadth. The frontal and lower margins are well rounded, and not furnished with any spines or toothed processes. The five posterior thoracic segments are uncovered by the carapace.

The superior antennæ, which consist of a three jointed peduncle, and two two-jointed sparingly ciliated filaments, are equal to about half the carapace in length.

The first thoracic feet are very long and slender, projecting considerably in advance of the head; the second legs are also of considerable length. The fourth and fifth pairs of thoracic feet are not furnished with any secondary member or palp. The fifth or last thoracic feet (pl. XIII., fig. 3), have the first joint very short, and not so long as broad. The second joint is four or five times as long as broad, with two small but strongly plumose cilia on the hinder margin, and three similar cilia on the front margin. The third joint is not so long as broad, furnished with two short strongly plumose cilia, and two whip-cilia in front of the fourth joint, which is twice as long as broad, has three whip-cilia on its front margin. The fifth joint, which is equal in length with the preceding one, has a single whip-cilium* in front, two plumose cilia behind, and two long whip-cilia attached to the postero-distal extremity. The sixth joint is much narrower than the fifth, and about half its length; its extremity gives rise to a long whip-cilium, and the seventh joint is in the form of a produced nail.

There are no abdominal feet.

The telson is well developed and of considerable size, being half as long again as the sixth abdominal segment, and equal in length to the peduncle of the lateral caudal appendages. It is furnished with two pair of long slender spines on its sides, and has the extremity beset with seven shorter and sub-equal spines.

* I have employed this term to designate a peculiar kind of cilium, which forms a characteristic feature in the furniture of the legs of the *Diastylidæ*. A "Whip-Cilium" is a long cilium, in which its basal portion is simple but the terminal half annulated or closely multiarticulate (pl. XIV., fig. 4a.) These cilia are for the most part not plumose; occasionally, however, the basal inarticulate portion is fringed with hair, and more rarely the cilium is plumose throughout its entire length

The peduncle of the external caudal appendages is armed with a row of short equal spines, along its inner margin.

The inner and upper branch is three-jointed; the first joint with a row of short equal spines along the inner margin, and two or three longer spine-like cilia, on the outer edge; the second joint is half the length of the first, spined on the inner, and with a single very small cilium on the outer edge; the third joint measures about half the length of the second, and ends in two very minute cilia. The outer and lower branch is two-jointed; the first joint is two thirds the length of the first joint of the under branch, and the second joint longer than the first, and reaching to the distal extremity of the second joint of the inner branch; both joints bear a few long, spine-like cilia on their margins, and the second terminates in four long, spine-like plumose cilia.

Total length, a little less than half an inch.

Dredged on soft ground 50 to 60 miles east of Tynemouth.

This species is at once distinguished from *Vaunthompsonia cristata* and *Edwardsii*, and also from the nearly allied *Cuma scorpioides and Iphithoe trispinosa* by the large telson.

Genus. CYRIANASSA, *Spence Bate.*

Cyrianassa ciliata, n. sp. Pl. XIII., figs. 4-9.

Duo priora abdominis segmenta pedibus natatoriis instructa. Antennæ inferiores longissimæ. Telson brevissimum tertiam pedunculi appendicum caudæ lateralium partem haud superans, rotundatum, inarmatum. Pedunculus appendicum caudæ lateralium interne ciliatus, ciliis plumosis; ramus interior biarticulatus ciliis spinisque dense obsitus, extremitate fortiter unguiculatâ; ramus exterior uniarticulatus, planus, ciliis longissimis, annulatis atque plumosis instructus.

The carapace is slightly hispid, truncate in front, and furnished with a toothed process at the antero-lateral margin.

The antennæ, as in the genus generally, are remarkable for their very great length.

Five segments of the thorax are uncovered by the carapace.

The first foot (Pl. XIII., fig. 4), have the first joint curved forwards, and three to four times as long as broad, with the posterior margin as well as the proximal half of the anterior margin fringed with plumose cilia; there is also a spine near the distal extremity of the anterior margin; the second, third, and fourth joints incline backwards, the second has the anterior, and third and fourth both margins beset with plumose cilia, these three joints are short, and taken together are only equal in length to the first. The fifth joint is equal to the fourth, and has only a single plumose cilium at the distal extremity of the anterior margin. The sixth segment has an oblique palm which is furnished with a tuft of numerous long, slender, and slightly curved spines. The secondary member of the leg, or palp, together with its expanded basal joint scarcely exceeds in length the first joint of the leg itself.

The fourth foot (Pl. XIII., fig. 5), is stout and strongly built, and is furnished with a palp which equals itself in length. The first three joints are furnished with one or two plumose cilia, the second and third having also one or two small spines on the anterior margin. The fourth joint has the postero-distal extremity provided with three or four long whip-cilia. The fifth joint terminates in two long whip-cilia.

The fifth foot (Pl. XIII., fig. 6), has the first joint very long,—equalling half the total length of the leg—and furnished with four plumose cilia on the posterior margin, and one at the distal extremity of the anterior margin. The second joint, which is very short, has a single plumose cilium on the front margin. The third joint resembles very nearly the second. The fourth joint, which is also very short, has two minute spines, situated anteriorly, and three whip-cilia having their basal portions plumose attached to the postero-distal extremity. The fifth joint terminates in two whip-cilia.

The telson (Pl. XIII., fig. 6), is very short, scarcely one third of the length of the peduncle of the lateral caudal appendages, and has the extremity rotunded and unarmed.

The peduncle of the lateral caudal appendages has the inner margin clothed with an intermixture of spines and cilia which

have one of their margins only plumose. The interior branch is two-jointed; the first joint has the entire length of the inner margin edged with spines of unequal length, and also some cilia of the same character as those of the peduncle on the basal half, there are likewise a few plumose cilia on the outer margin; the second joint is half the length of the first; spined like it on the inner margin, and terminates in a strong, sharp, claw-like spine, from the outer base of which springs a long simple cilium which reaches considerably beyond the extremity of the claw. The exterior branch is in the form of a flattened oar-like blade, having the inner margin gradually rounded off to meet the outer. It slightly exceeds the length of the first joint of the interior branch and appears to consist of a single joint, although, at about one-third of its length there is an indication of a diagonal division across half of its breadth. The inner margin and apex are densely clothed with numerous and very long cilia. These cilia (Pl. XIII. fig. 8, 8*a*) are of a very remarkable character, having the shaft multi-articulate or annular, and the margins plumose. The outer margin of the exterior branch has a few much smaller cilia.

The structure of the shell consists of numerous little semicircular plates, which are granular on their surface, and overlap each other like the tiles of a house (Pl. XIII., fig. 9).

There are two pair of abdominal feet. Each foot consists of a large and broad basal joint ciliated on the inner edge, and two rami, the inner of which is one jointed, and the outer two jointed; both furnished with very long plumose cilia.

Length, six tenths of an inch, without the antennæ.

Dredged in deep water off Tynemouth.

CYRIANASSA ELEGANS, *n. sp.* (Pl. XIV., fig. 1-6).

Abdominis segmenta tria priora pedibus natatoriis instructa Antennæ longissimæ. Telson elongatum, spines octo (duobus centralibus subtilissimè ciliatis) terminalibus, spinâque gracili utrinque infra medium sitâ ornatum. Appendicum caudalium pedunculus inarmatus; rami ambo sparsè spinosuli.

The exterior antennæ (Pl. XIV., fig. 1) are very long. The last joint of the peduncle is large and cylindrical, and has the inner half girt with numerous semicircles of fine cilia (Pl. XIV., fig. 1*a*). The filament is of very great length and remarkably slender.

The fourth pair of thoracic legs (Pl. XIV., fig. 3) are slender, and have the basal joint equalling half the length of the leg, with two or three minute cilia on the posterior border, and one towards the distal extremity of the anterior border. The second joint is very short, with a plumose cilium on each border, and also two long whip-cilia in front. The third joint has three whip-cilia in front. The fourth a minute whip-cilium in front, and two small spines on the posterior margin, from the distal extremity of which there also proceed two long whip-cilia. The fifth joint terminates posteriorly in a long whip-cilium, and anteriorly in a long two jointed spine, which is the sixth joint. The second member or palp is as long or nearly so as the leg itself.

The last thoracic legs (Pl. XIV., fig. 4) are slender, having their first joints four times as long as broad, with two plumose cilia on the posterior, and one on the anterior margin. The second joint, which is broader than long, is furnished with two whip-cilia on the anterior margin. The third is three times as long as broad, with two whip-cilia in front. The fourth, fifth, and sixth joints closely resemble those of the preceding pair, but are more slender.

There are three pairs of abdominal feet, which are appendages of the first three segments. Each of these feet, consists of a large oblong basal joint (Pl. XIV., fig. 5) and two branches. The inner branch consists of a single joint furnished with eight plumose cilia, and having on the outer margin a curious little nipple-like process with a slightly cleft extremity. The outer branch is two jointed, the last of which terminates in six long plumose cilia.

The telson (Pl. XIV., fig. 6*a*) is large and produced, equalling in length the peduncle of the lateral caudal appendages, and is armed with a spine on each side, and with eight spines set round the extremity. The two centre and the two outer of these spines are the longest, and the two centre under a high power of the microscope are found to be very finely ciliate on the edges.

The peduncle of the caudal appendages (Pl. XIV., fig. 63) is slender and not furnished with either spines or cilia. The rami are equal in length to the peduncle, the inner three jointed, the outer two jointed. The first joint of the inner ramus is longer by one-third than the corresponding joint of the outer ramus, but on the other hand, the second joint of the inner ramus is shorter by one-third than the second joint of the outer, and thus the two joints of both rami taken together are nearly equal. The first joint of the inner ramus has two or three minute spines on the exterior margin, and two slender spines at the distal extremity of the inner margin; the second joint has about four slender spines on the inner margin, but none on the outer; the third joint is tipped with a minute cilium. The first joint of the outer ramus has two slender spines, and both margins of the second joint have three or four slender spines.

Taken 100 miles east by north from Tynemouth, in 20-25 fathoms, sand.

We have yet much to learn respecting the Diastylidæ. We know little of what must be considered generic characters among these Sessile-eyed Stomopods, still less what are to be regarded as sexual, and what as specific distinctions. The generic characters ascribed by Mr. Spence Bate to *Vaunthompsonia* or *Cyrianassa* will require much revision, so as to embrace the species described in the present paper. In the allied family of the *Mysidæ* considerable difference is found to exist in the conformation of the abdominal legs of the sexes. Judging from analogy, therefore, we may predict that a sexual divergence in these organs exists among the *Diastylidæ*. On the other hand, as I have found that the telson and caudal appendages supply valuable and constant specific characters among the *Mysidæ*, I have chosen these organs together with the posterior thoracic feet as the bases of the specific character among the Diastylidæ. It may be thought that the descriptions of these parts in this paper are unnecessarily prolix, but taking into consideration our present deficiency of knowledge respecting these Crustacea, it has been deemed that prolixity is a fault on the right side.

Cyrianassa elegans is easily distinguished from the other forms

described *C. ciliata* with its short telson approaches more nearly to Mr. Spence Bate's two species, but the description of these latter forms are so brief, that we have no means of judging how far *C. gracilis* and *C. longicornis* agree with *C. ciliata*. The known species of Cyrianassa may, however, be thus separated:—

C. elegans, Norman. Telson produced. Abdominal feet, three pairs.

C. gracilis, Spence Bate. Telson very short. Abdominal feet, five pairs.

C. ciliata, Norman. Telson very short. Abdominal feet, two pairs.

C. longicornis, Spence Bate. Telson very short. Abdominal feet, one pair.

It must be understood that the foregoing Catalogue has reference to the Crustacea exclusively as regards the particular expedition to which it refers; and that many species here recorded as r., are abundant in other localities off our coast.

Crangon Allmanni (Kin) was dredged abundantly everywhere. I also found this species to be common in deep-water in the Shetland seas, and Mr. Edward has taken it at Banff. It will probably prove to be widely distributed around our coast, and that shrimps dredged in the Coralline Zone, and hitherto referred to as *Crangon vulgaris* belong to this species.

Crangon spinosus (Leach). A few examples dredged in 35 fathoms, 20 miles east of Tynemouth, and also in deep water off Berwick. A specimen from the latter locality was remarkably large, measuring two inches and a quarter from the extremity of the telson, to the end of the antennal scales.

Mysis spiritus (Norman.) The *male* of this species, which was not previously known, was found in some numbers, together with more numerous females. It was taken on all the sandy ground which was dredged. The fourth abdominal foot of the male terminates in two long nearly equal, ciliated, branches, and thus differs widely from the same organ in *M. flexuosa* (Müller), which has the inner branch very short, and the outer very long, and girt through its distal half with a spiral row of exceedingly minute spines. The male of *Mysis flexuosa* (Müller) is synonymous with *Themisto brevispinosa* (Goodsir), and the genus *Themisto*,

(Goodsir), or *Macromysis* (White) must be merged in *Mysis*, the male of which it represents. I believe also that I recognise Goodsir's *Cynthilia Flemingii* in the male of another Mysis, which is abundant on this coast, and which if it be not *Cynthilia Flemingii* is as yet undescribed. The male Mysis, to which I refer, agrees with the description of *Cynthilia Flemingii* in all respects, except that a "minute organ" which *is* attached to the abdominal feet is not "convolute," and is totally different in character from the true "convolute organ" of *Cynthilia (Cynthia) Thompsoni* (Edwards); and the question is, did Goodsir describe the organ erroneously.

Haploops tubicola (Liljeborg). Seven miles off Tynemouth, and in deep water off Berwick. The genus is new to Britain.

Œdicerus parvimanus (Bate and Westw.) was dredged from 40 to 100 miles off Tynemouth. And I also procured it last year when dredging in 25 fathoms, about seven miles off Seaham. Only a single specimen—the type in my collection—was previously known.

Kroyera altamarina (Bate and Westw.). One specimen—the second known—taken 100 miles east off Tynemouth, in 25-30 fathoms.

Dexamine Vedlomensis (Bate and Westw.). This species was described from a single example procured by myself last year in Vedlom Voe, Shetland. The five specimens now taken off this coast make us better acquainted with the species. The antennæ in all the specimens have the same characters, and the notch on the fourth segment of the pleon is deeply cut, and has the anterior edge produced and projecting backwards, so as to overhang the notch (see the figures in the *British Sessile Eyed Crustacea*); another apparently constant specific character is afforded by the backs of the second and third segments of the pleon not only being strongly toothed posteriorly as in *D. spinosa*, but also minutely serrulate. The dorsal armature varies considerably; three of the specimens from this coast agree with the type; a fourth has no spine on the last segment of the pereion; and the fifth has no spines on the last segment of the pereion, and the first of the pleon. The colour is white, with the eye, mouth,

telson, bands on the uropoda, a few spots on the periopoda and minute specks on the body, brilliant crimson. It is remarkable that *D. spinosa* (Mont) the best known member of the genus is not among the eighty-two species of Amphipoda which I have either seen or which have been recorded from the north-eastern coast. *D. tenuicornis* (Rathke) has been sent to me by Mr. G. S. Brady, who has taken it abundantly in rock pools at Sunderland.

Eusirus Helvetiæ (Bate). The species was described from the anterior half of an animal procured at Banff by Mr. Edward; the discovery, therefore, of two perfect specimens in deep water, off the Northumberland coast is of considerable interest.

Calliope bidentata, a new species; 40-50 miles off Tynemouth in 40 fathoms, and 100 miles off Tynemouth in 25-30 fathoms.

Heiscladus longicaudatus (Bate and Westw.), from 7-50 miles off Tynemouth in 25-40 fathoms.

Heiscladus brevicaudatus. An undescribed species, procured in deep water off Tynemouth.

Nania caudadentata. A new species, dredged in deep water off the Northumberland coast.

It will be noticed also in the list of species that *Phryxus longibranchialis*—a highly interesting parasitic Isopod—and three species of *Cythere* and *Ichthyophorba hamata* Liljeborg) are also additions to the British Fauna.

EXPLANATION OF THE PLATES.

PLATE XII.

Fig. 1-6. *Hippolyte securifrons*, (a little enlarged), and various forms of its rostrum.
7. *H. spinus*; crest of carapace and rostrum.
8. *Mysis Didelphys*, Telson and caudal appendages.
10. Antennal scale; *fig.* 11, its extremity more highly magnified.

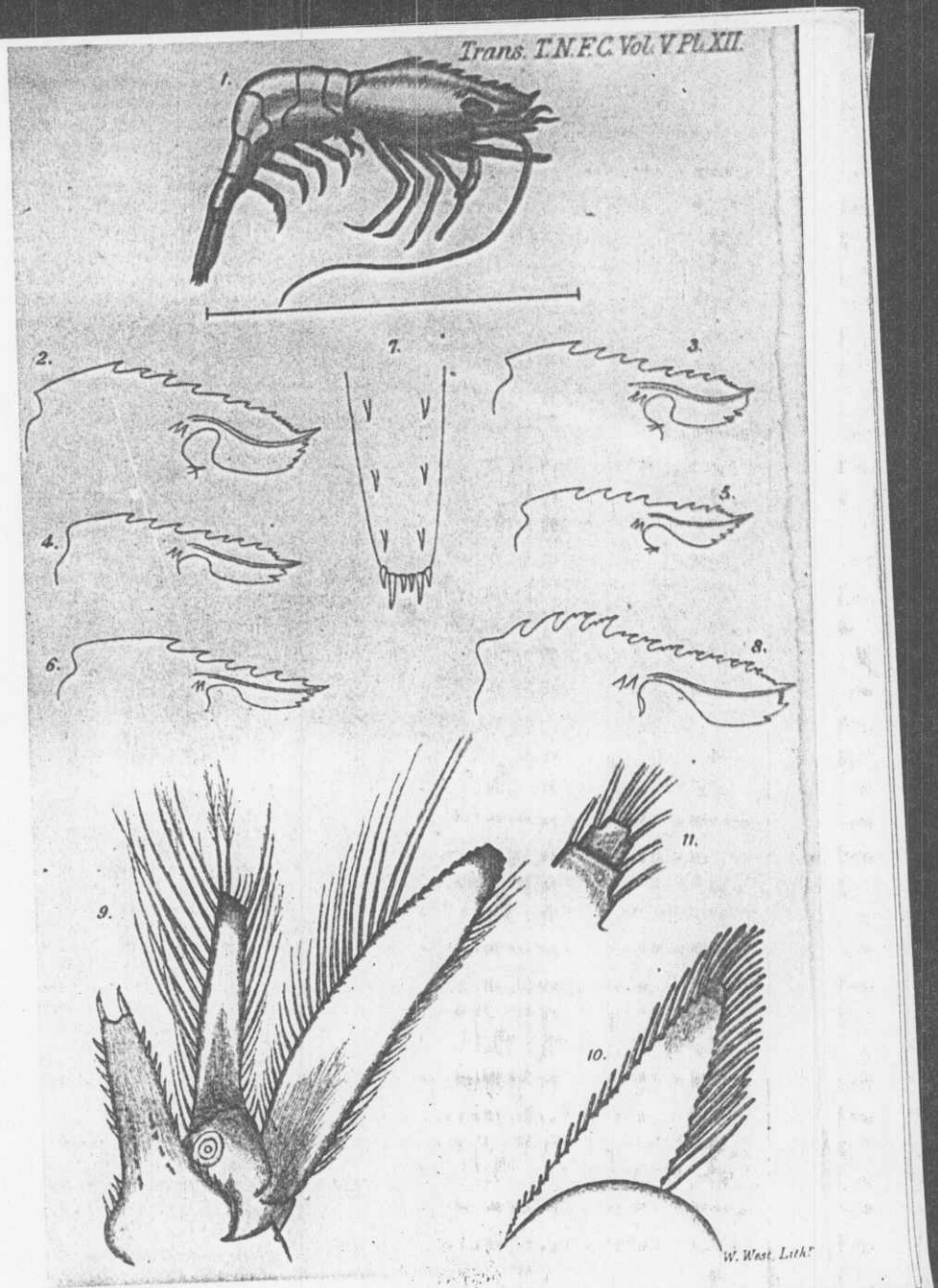
PLATE XIII.

Fig. 1. *Vauthompsonia rosea*, magnified.
2. Tail; (*a*), telson; (*b*), peduncle of lateral caudal appendage; (*c*), its inner; (*d*), its outer branch.
3. Last thoracic foot; 3 *a*, whip cilium, more highly magnified.
4. *Cyrianassa ciliata*, first thoracic leg (*a*); palp. (*b*); *fig.* 5, fourth thoracic leg (*a*); palp. (*b*); *fig.* 6, last thoracic leg; *fig.* 7, abdominal foot; (*a*), inner; (*b*), outer member; *fig.* 8, tail; (*b*), telson; (*c*), peduncle of lateral appendages; (*d*), its inner; and (*e*), its outer branch; *fig.* 8 *a*, cilium from apex of outer branch of lateral appendage; *fig.* 9, portion of shell.

PLATE XIV.

Fig. 1. *Cyrianassa elegans*, exterior antenna; (*a*), semicircle of cilia on inner half of peduncle; *fig.* 2, mandible; *fig.* 3, fourth thoracic leg; (*a*), foot; (*b*), palp.; *fig.* 4, last thoracic leg; *fig.* 4*a*, whip cilium more highly magnified; *fig.* 5, abdominal foot; (*a*), nipple like process on inner member; *fig.* 6, tail; (*a*), telson; (*b*), peduncle of lateral appendage; (*c*), its outer or lower branch; (*d*), its inner or upper branch.

	1. Off Tynemouth.	2. Dogger Bank.	3. Current and Herring Bay.	
† Tapes virginea, *Linn.*			r.c.	
Mactra elliptica, *Brown*	r.	r.	r.	
† solida, *Linn.*	r.			
† subtruncata, *Da Costa*	r.		r.	
Tellina pygmæa, *Philippi*			r.c.	
† Psammobia Ferroensis, *Chemn.*	r.		r.	
tellinella *Lam.*			v.r.	
† Syndosmya alba, *Wood*	v.r.			
† intermedia, *Thomp.*		v.r.		Two specimens.
† prismatica, *Mont.*	r.			
Solen pellucidus, *Penn.*	r.		r.	
*† Mya arenaria, *Linn.*	r.			
*† truncata, *Linn.*	r.	r.	dead.	Young only, except the dead specimens.
*† Uddevallensis			dead.	
† Corbula gibba, *Davi*	v.r.			
Nemra brevirostris	v.r.			
*† Saxicava rugosa, *Linn*	r.c.	r.	r.c.	
*† sulcata, *Smith*			dead.	
Thracia phaseolina, *Lam.*	r.			
villosiuscula, *Macy.*	r.			
TUNICATA.				
Polyclinum————	r.			Specimens not preserved.
Botryllus————	r.			Do.
Clavelina lepadiformis, *O.F.Müll.*			r.	
Ascidia intestinalis, *Linn.*		r.c.	r.c.	
parallelogramma, *O.F.M.*		r.c.		
* conchilega, *O.F.Müll.*		r.c.		
sordida, *A. & H.*		r.		
Molgula arenosa, *A. & H.*	c.	c.	c.	
Cynthia glacialis, *Sars*			r.	
coriacea, *A. & H.*		r.		
grossularia, *Van Bened.*		r.c.	r.c.	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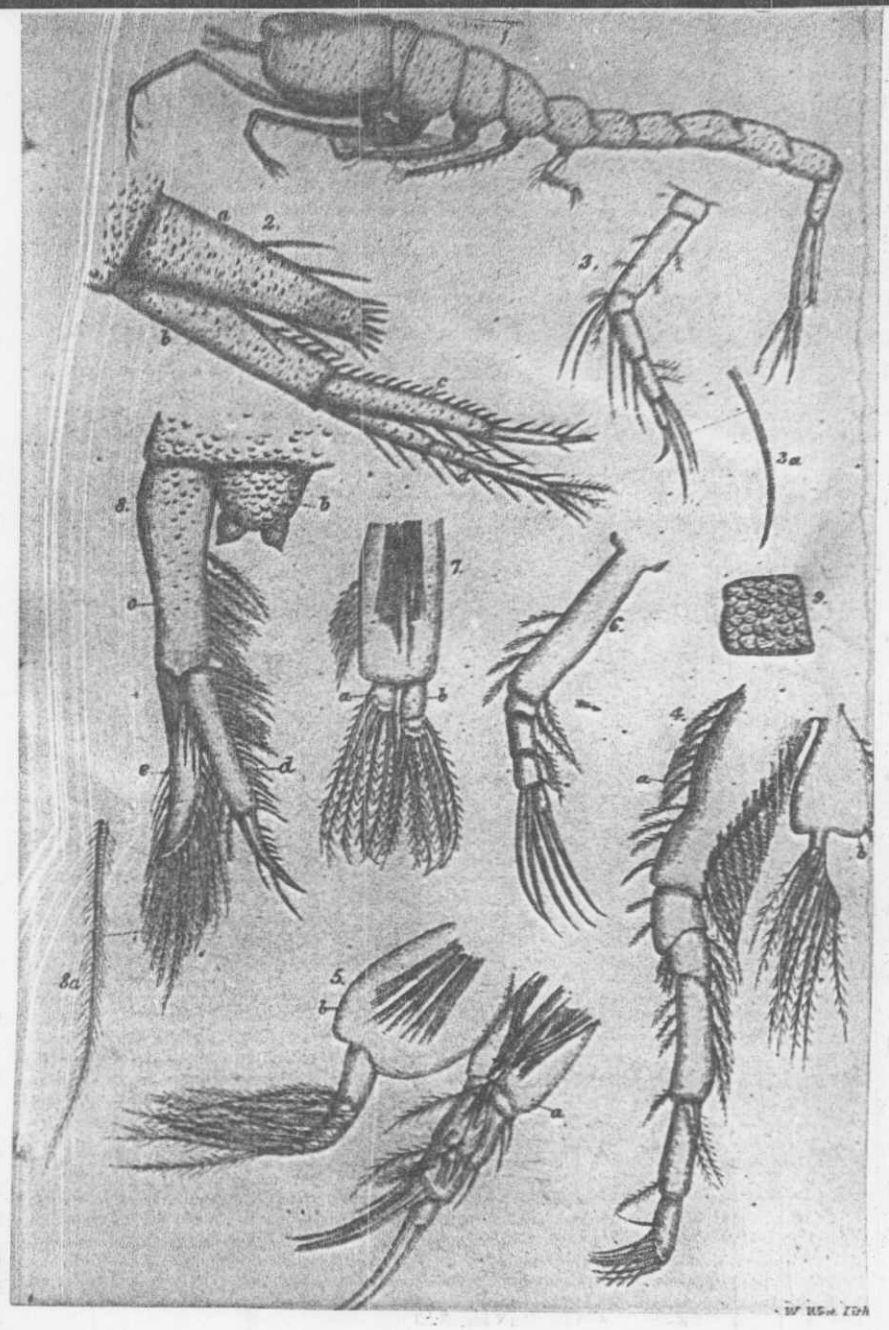
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Baltic, and the larger to the North Sea; and as it is asserted that the whales are the cause of their flying south, why do we not see the whale on every coast every year? Mr. Yarrell, in his valuable work on Fishes (vol. ii. p. 112), truly says, "There can be no doubt that the herring inhabits the deep water all round our coast, and only approaches the shore for the purpose of depositing its spawn within the immediate influence of the two principal agents in vivification—increased temperature and oxygen; and as soon as that essential operation is effected, the shoals that haunt our coast disappear, but individuals are to be found, and many are caught throughout the year."

11. Various other fishes have similar habits in spawning. The salmon ascends the rivers from the sea at particular periods for the purpose of spawning: for this fish no distant seas have, however, been assigned. The sprat appears in shoals in various localities of the coasts of the British Islands from November to March. The shad or *Alosa* is found in shoals in some of our rivers from May to July—in the Severn generally in May, and it continues there about two months; in the Mediterranean, near Smyrna and Rosetta; and it ascends the Nile as high as Cairo in December and January. The pilchard appears in shoals on the coast of Cornwall from June to the end of the year; and the tunny comes in-shore on the coasts of the Mediterranean in summer. All these fishes appear to have the same habit of gregariously visiting various coasts and rivers at particular seasons for a similar purpose; but no one would on this account pronounce them natives or inhabitants of a distant quarter of the globe. In short, from all the circumstances known of the natural history of the herring, in regard to its visits on our own coasts and the coasts of other countries, it is reasonable to conclude that it inhabits the seas in the neighbourhood of the coasts on which it spawns, and that it arrives at particular seasons near the coasts for the purpose of spawning, the shoals leaving the coasts immediately thereafter; and the early or late, and distant or near approach to the coasts in different years perhaps depends, as before remarked, on the clear and warm or dark and cold weather of the season, as well as upon the depth of water at the feeding- and spawning-grounds.

On the Crustacea, Echinodermata, and Zoophytes obtained in Deep-sea Dredging off the Shetland Isles in 1861. *By the* Rev. Alfred Merle Norman, *M.A.*

This paper was supplementary to that of Mr. Jeffreys, and contained an account of the Crustacea, Echinodermata, and Zoophytes obtained during the same dredging-expedition. Mr. Norman mentioned that about 140 species of Crustacea were met with. Eighteen of these, viz. 7 Podophthalmia and 11 Edriophthalmia, were new to Britain. The Podophthalmia consisted of *Portunus pustulatus* (Norman, n. sp.), distinguished by its pustular carapace, by the latero-anterior teeth, which in form resemble those of *longipes*, and by having the swimming-blade of the last pair of feet sculptured with a raised longitudinal and a marginal line; *Pagurus ferrugineus* (Norman, n. sp.); *Crangon serratus* (Norman, n. sp.), allied to *spinosus*, but furnished with seven rows of teeth on the carapace, having an acutely pointed simple rostrum (without the lateral denticular processes which are present in *spinosus*), and a central keel on the fifth segment of the abdomen (instead of diverging lines); *Sabinæa septemcarinata* (Sabine); *Hippolyte polaris* (Sabine); *Hippolyte securifrons* (Norman, n. sp.), nearest akin to the Californian *H. affinis* (Owen), having the rostrum in the form of a broad flat plate armed with eleven teeth above, four or five of which are on the carapace and four below, three pairs of spines on the carapace, the first on each side of the base of the rostrum, the second on the anterior margin just below the eye, the third, very minute, at the junction of the anterior and lateral margins, and three pairs of spines on the telson; *Ctenomysis alata* (Norman), a new genus of Mysidæ allied to *Noctiluca*. *Ctenomysis* has six pairs of thoracic feet, furnished on their inner base with large scales, which serve to protect the external branchiæ situated beneath them; the subabdominal legs are bifurcate and multiarticulate; and the species is easily distinguished by the remarkable form of the antennal scales, which are broad and triangular, and instead of being porrected, are spread at right angles to the body. The front margin of the carapace terminates in five spine-like processes, three frontal, and one on each side below the eyes.

The Edriophthalmia new to Britain which were discovered consist of *Œdiceros jarrmanus* (Spence Bate, n. sp.), the genus also new to Britain; *Dexamine tenuicornis* (Rathke); *Liljeborgia Shetlandica* (Spence Bate, n. sp.); *Krŏyera altamarina* (Spence Bate, n. sp.); *Calliope Fingalli* (Spence Bate, n. sp.); *Amphithoë albomaculata* (Krŏyer); *Siphonacetus typicus* (Krŏyer); *Dexamine Vedlomensis* (Spence Bate, n. sp.); *Megamara* ——; *Heiselados longicauda* (Spence Bate, n. sp.), a new genus differing from *Amphithoë* in having only one branch to the last pair of pleopoda; and *Bopyrus Galatheæ* (Spence Bate, n. sp.).

The author also gave an account of the other rare Crustacea—Podophthalmia, Edriophthalmia, and Entomostraca (including fish-parasites)—which were met with.

Mr. Norman next proceeded to notice the Echinodermata, and stated that forty-seven species were found. The rarer of these were—*Comatula rosacea* (Link) and *Sarsii* (Lovén); *Ophiura* ——, n. sp.; *Ophiocoma Goodsiri* (Forbes) and *filiformis* (Müller); *Ophiopeltis securigera* (Von Düben and Koren); *Asterias* ——, perhaps distinct from *aurantiaca*, having shorter arms, less flattened spines on the under surface, and fewer tubercles on the margin than in the ordinary form; it was dredged in great abundance sixty miles from land in 70–90 fathoms; *Echinus virens* (Von Düb. and Kor.), *Flemingii* (Ball), *neglectus* (Lamarck), and *Norvegicus* (Von Düb. and Kor.), the last very abundant on the Outer Haaf; *Cidaris papillata* (Leske), spines only; *Amphidotus ovatus* (Leske); *Brissus lyrifer* (Forbes); *Cucumaria frondosa* (Gunner) and *fucicola* (Forbes and Goodsir)?; *Psolus phantopus* (L.); *Oenus brunneus* (Forbes) and *lacteus* (Forbes and Goodsir); *Thyone raphanus* (Von Düb. and Kor.); *Synapta digitata* (Montagu), a vinous purple variety from 70 fathoms; *Phascolosoma radiata* (Alder), and two or three species of *Sipunculus*.

The Zoophytes were next passed in review. The author stated that fifty-nine Polyzoa and fifty-three Hydrozoa and Actinozoa were observed. Among the former were—*Onchopora borealis* (Busk); *Cellularia Peachii* (Busk); *Membranipora Flemingii* (Busk), *Rosselii* (Audouin), and *rhynchota* (Busk), and an undescribed species; *Lepralia concinna* (Busk), *violacea* var. *cruenta*, *punctata* (Hassall), *granifera* (Johnst.), *unicornis* (Flem.) var., and *monodon* (Busk); *Alysidota Alderi* (Busk); *Tubulipora truncata* (Jameson); *Idmonea Atlantica* (Forbes); together with a *Cellepora*, a *Hornera*, and an *Alecto* not yet determined. Of Hydrozoa there were—*Clava multicornis* (Johnst.) and *cornea* (Wright); an undescribed *Hydractinia*, which Mr. Alder has also taken at Cullercoats; an undetermined *Atractylis*; *Coryne implexa* (Alder); *Eudendrium* ——, n. sp.; *Tubularia gracilis* (Harvey), variety; *Sertularia tenella* (Alder), *Gayi* (Lamx.), *gracilis* (Hassall), *alata* (Hincks), *pinaster* (Ell. and Sol.), and *tamarisca* (L.); *Plumularia myriophyllum* (L.) and *frutescens* (Ell. and Sol.); *Laomedea flexuosa* (Hincks) and *Lorèni* (Allman); *Campanularia Johnstoni* (Alder); *Calicella gracillima* (Alder); *Reticularia serpens* (Hassall); and *Grammaria ramosa* (Alder). Among the Actinozoa were—*Tealia digitata* (Müll.), which was abundant on shells of *Fusi* (*antiquus*, *gracilis*, *propinquus*, and *Norvegicus*), and on *Buccinum Dalei* on the Outer Haaf, in from 70–90 fathoms water; *Zoanthus Couchii* (Johnst.), the simple attached and also the free branching state; the splendid *Ulocyathus arcticus* (Sars) in 65 fathoms sand, Outer Haaf; *Caryophyllea Smithii* (Flem.) var. [the *Turbinolia borealis* (Flem.)]; *Pennatula phosphorea* (L.); *Virgularia mirabilis* (L.), and *Sarcodictyon catenata* (Forbes).

With reference to the Sponges, the author remarked that a considerable number had been collected, especial attention having been paid to the small encrusting forms, and that they had been placed in Dr. Bowerbank's hands for examination and description.

On the Cervical and Lumbar Vertebræ of the Mole (Talpa Europæa, *L.*). *By* Professor Owen, *M.D., LL.D., F.R.S.*

Few of our native quadrupeds have had their osteology more frequently described and studied than the common mole, by reason of the singular and extreme modifications of certain parts of the skeleton, and their readily recognizable adaptation to the peculiar sphere and habits of life of the animal. The author had not anticipated, therefore, in making a recent scrutiny of the skeleton, finding anything worth special notice that had not been noticed before, and could scarcely persuade