

the chalk, and I am glad to have been enabled to verify Mr. Sorby's statements in every particular. The chalk contains cyatholiths and discoliths identical with those of the Atlantic soundings, except that they have a more dense look and coarser contours. In fact, I suspect that they are fossilized, and are more extensively impregnated with carbonate of lime than the recent coccoliths (figs. 3 and 5).

I have once met with a coccosphere in the chalk, and, on the other hand, in one specimen of the Atlantic soundings I met with a disc with a central cross, just like the body from the chalk figured by Mr. Sorby (fig. 8).

NOTES on some RARE BRITISH POLYZOA, with DESCRIPTIONS of NEW SPECIES. By the Rev. ALFRED MERLE NORMAN, M.A.

THE object of the following paper is to embrace a few notes upon some of the rarer of the British Polyzoa, and to describe several species new to science.

BRETTIA PELLUCIDA, *Dyster.*

Brettia pellucida, Dyster. Quart. Jour. Mic. Sc., N. S., vol. vi (1858), p. 260, pl. xxi, figs. 3—5.

This species is omitted in the 'Catalogue of the British Marine Invertebrate Fauna' published by the British Association. The type specimens were found at Tenby. In 1865 I procured some small fragments when dredging with my friend Mr. Jeffreys in the Minch.

Brettia pellucida seems to be congeneric with *Alysidium Lafontii*, Busk; but that species can hardly belong to the same genus as *Alysidium parasiticum*, Busk. I would propose, therefore, to leave the latter as the type of the genus *Alysidium*, and to remove *A. Lafontii* to the genus *Brettia*.

SCRUPARIA CLAVATA, *Hincks.*

Scruparia clavata, Hincks. Quart. Jour. Mic. Sci., N. S., vol. v (1857), p. 175, pl. xvii, figs. 5—8.

Huxleya fragilis, Dyster. Quart. Jour. Mic. Sci., N. S., vol. vi (1858), p. 260, pl. xxi, figs. 1, 2.

There cannot be, I think, any doubt as to the identity of

Dyster's genus *Huxleya* with the *Scruparia clavata* of Hincks, published in the preceding volume of the 'Microscopical Journal.'

Hab. Filey and Lamlash Bay (Hincks). Tenby (Dyster).

CELLULARIA PEACHII, *Busk.*

Cellularia Peachii, Busk. Ann. Nat. Hist., N. S., vol. vii, p. 82, pl. viii, figs. 1—4; Cat. Marine Polyzoa, p. 20, pl. xxvii, figs. 3—5; Smitt, Öfversigt af K. Vet. Akad. Förhand., 1867, p. 285, pl. xvii, figs. 51—53.

Mr. Busk gives no further locality for this species than "*Hab.* Britain (North?)." I have dredged it off the Northumberland coast and Shetland, and have received it from Scarborough (Bean) and Aberdeenshire (Dawson). Smitt records it from Bahusia and Spitzbergen.

MENIPEA JEFFREYSII, n. sp. Pl. V, figs. 3—5.

Polyzoary dichotomously branched. *Cells* 4—7, at an internode, elongated below; apertures regularly oval, margin a little raised, above three (or four) spines; on the outer angle of each cell is a small process, probably the base of a larger spine, which has been broken off; a small avicularium in front of each cell beneath the mouth; mouth furnished with an operculum, which is *entire*. *Ovicell* erect, smooth.

A minute portion of this species was found by Mr. Peach among sand dredged in Shetland in 1864, and two other still more microscopic fragments were found by him in sand dredged by Mr. Jeffreys and myself in Shetland in 1865. These fragments are amply sufficient to show that we have a new species in them, but not sufficient to enable the characters to be accurately defined. In every cell except one the operculum is broken off; that one Mr. Alder has, in the figure he kindly drew for me, represented as lobed, but the operculum was dirty at the time, and having since cleansed it, I find it to be entire, and that what appeared to be divisions were surface markings only.

At Mr. Peach's request, I have dedicated the species to my friend Mr. Jeffreys, with whom I have spent so many a happy hour in examining the Fauna of our seas.

This species approaches, in its general characters, to the Arctic *Menipea* which is figured by Smitt, in his recently published papers on Scandinavian Polyzoa, as *Cellularia*

ternata, forma duplex, but differs from it in the presence of the oral spines and operculum, and the absence of well-marked lateral avicularia. As I cannot regard the form figured by Smitt as a variety of *M. ternata*, and it seems desirable to point out the distinguishing characters which separate it from its allies, I draw up the following description from the figures referred to, and name the form after its discoverer.

MENIPEA SMITTI, n. sp. (*not British*).

Menipea ternata, γ, forma duplex, Smitt. Öfversigt af K. Vet. Akad. Förhan., 1867, p. 283, pl. xvi, figs. 25, 26.

Cells in a double row, as many as twelve to an internode, elongated; oral aperture ovate, not furnished with spines or operculum. A lateral avicularium of moderate size, and also a small suboral avicularium in front of each cell.

Found by Malmgren in 50 fathoms, at Spitzbergen, in 1861.

SCRUPOCELLARIA SCRUPEA, *Busk*.

Scrupocellaria scrupea, Busk. Cat. Marine Polyzoa, p. 24, pl. xxi, figs. 1, 2.

— — Heller. Die Bryozoën des Adriatischen Meeres (1867), p. 10.

Guernsey and the Minch (A. M. N.). Adriatic Sea (Grube and Heller).

The ovicells in this species, which had not apparently been seen by Busk, are imperforate; and in this respect the species differs from the *Crisia pilosa*, Audouin (Savigny, 'Egypt,' pl. xii, fig. 1), to which, in its other characters, it is closely allied.

SCRUPOCELLARIA SCABRA, *Van Ben*.

Sertularia halecina, Fabric. Faun Groenl., p. 443 (fide Smitt).

Flustra scruposa, Fab. Nye Zool. Bidr. in Vid. Selsk. Phys. Skr., 1821, p. 33 (fide Smitt).

Cellarina scabra, V. Beneden. Bull. Brux., vol. xv, p. 73, figs. 3—6.

Cellularia scrupea, Alder. Trans. Tyneside Nat. Field Club, vol. iii, p. 148.

Scrupocellaria scruposa, Busk. Quart. Journ. Mic. Sci., vol. iii, p. 254.

Scrupocellaria Delilii, Busk. Jour. Mic. Soc., vol. vii, p. 65, pl. xxii, figs. 1—3 (but not *C. Delilii* of Audouin).

— Alder. Quart. Jour. Mic. Sci., N. S., vol. iv (1864), pl. iii, figs. 4—8; Nat. Hist. Trans. Northumberland and Durham, vol. i, p. 163, pl. viii, figs. 4—8.

Cellularia scabra, Smitt. Öfversigt af K. Vet. Akad. Förh., 1867, p. 283, pls. xxvii—xxxiv.

The species described by Busk and Alder is most certainly not the *Crisia Delilii* of Audouin (Savigny, 'Egypt,' pl. xii, fig. 3), which is characterised by an unusually developed lateral avicularium, and an erect vibracular capsule, while in the Madeira and British species the avicularium is not larger than usual in the genus, and the vibracular capsule is large and *placed transversely*. Mr. Alder had not seen Savigny's figure, and ascribed his specimens to *S. Delilii*, fide Busk.

SCRUPOCELLARIA INERMIS, Norman. Pl. V, figs. 1—3.

Scrupocellaria inermis, Norman. Report of the British Association, 1866 (1867). Report, p. 203.

Polyzoary rather stout, yellowish horn-coloured, dichotomously branched. *Cells* oblong; apertures elliptical, having a broad flattened margin without spines or operculum. *Marginal avicularia* not prominent; no central avicularium. *Vibracular capsules* subtriangular, scarcely so broad as high, with the open margin, stretching diagonally downwards and inwards; vibracula short. *Ovicells* smooth and imperforate, set at a slight angle inclining inwards. Height about half an inch.

One or two small specimens of this *Scrupocellaria* were dredged by Mr. Jeffreys and myself in Shetland in 1863, and it was again found in the following year by Mr. Peach. In 1866 I met with a small specimen when dredging in the Minch. Its characters come very near to those of *S. scruposa*, but it differs in its more robust form, in the broad flattened margin of the apertures, and in the absence of spines; the marginal avicularia are less prominent, and the vibracular capsules are broad and triangular, with the open margin extending diagonally downwards. This last is, perhaps, the best character to distinguish the two species, as the

vibracular capsules of *S. scruposa* are narrow and erect, with the opening extending perpendicularly downwards.

HIPPOTHOA EXPANSA, n. sp. Pl. VI, figs. 1, 2.

Polyzoary adherent, branched, spreading, calcareous and semitransparent. *Cells* oblong-ovate, ribbed transversely, and very minutely striated longitudinally, tapering below into a tubular stem; aperture terminal at the upper end, rather small and rounded, with a sinus below, the rim thin and a little elevated. The cells and connecting tubes are bordered by a thin calcareous expansion, through which the tubes run, those of each branch arising from the side of a cell at a very slight angle, the branches occasionally anastomosing. Length of cells about one twentieth of an inch, expansion of polyzoary from a quarter to half an inch.

Dredged in 100 fathoms off Unst, Shetland, in 1864, by Messrs. Jeffreys and Peach.

The specimen from which this description is taken is upon an old shell of *Pecten Islandicus*, a species which has not been found recent on our coast. There are also adhering to the same shell a *Spirorbis* and a *Lepralia (ventricosa)*, which are common in the same seas at the present time, and an unknown *Cellepora*, apparently subfossil. The *Hippothoa*, however, is quite fresh, preserving a gloss and transparency which leave little doubt of its being a recent species. This, the only known specimen, is now, with the rest of the collection of the late Mr. Alder, in the Museum at Newcastle-upon-Tyne.

ÆTEA SICA, Couch.

Hippothoa sica, Couch. Corn. Fauna, iii, p. 102, pl. xix, fig. 8; Johnston, British Zoophytes, 2nd edition, p. 292.

Ætea recta, Hincks. Catalogue of Zoophytes Devon and Cornwall, p. 35, pl. vii, fig. 3.

— *anguina*, β , *forma recta*, Smitt. Öfversigt af K. Vet. Akad. Förh., p. 281, pl. xvi, figs. 5, 6.

This species is probably distributed all round our coasts, as I have procured it from the following localities:—Guernsey, Cornwall, Antrim, West of Scotland, and Shetland. Smitt finds it in Scandinavia.

CABEREA BORYI, *Audouin*.

Crisia Boryi, Audouin. Explic. Savigny, Egypt, pl. xii, fig. 4.

Cellularia Hookeri, Fleming. Brit. Animals, p. 539 (not *C. Hookeri*, Johnston).

Caberea Boryi (plates named *C. zelanica* and *C. patagonica*), Busk. Cat. Marine Polyzoa, p. 38, pl. xvi, figs. 4, 5, and pl. xxxviii.

— — Heller. Die Bryozoën des Adriatischen Meeres, p. 13.

This species is essentially a southern form. It is common in Guernsey, and I have also found it in Jersey. On the English coast I believe it has only been met with at Torquay (Hooker) and Budleigh-Salterton (Hincks). It was originally described from the coast of Egypt, and Heller finds it in the Adriatic. Busk gives the following localities:—Cumberland Island; New Zealand; E. Falkland; S. Patagonia, 49° S.; Port St. Julian, Patagonia; Strait of Magellan; Algoa Bay. If these habitats be all correct, the range of this species is most extraordinary. No other Polyzoa—probably *very* few marine animals—have so extensive a distribution. *L. Boryi* may at once be distinguished from the next species by the presence of its oral opercula.

CABEREA ELLISII, *Fleming*.

Flustra Ellisii, Fleming. Mem. Wernerian Soc., vol. ii, p. 251, pl. xvii, fig. 1.

— *setacea*, Fleming. British Animals, p. 536.

Cellularia Hookeri, Johnston. Brit. Zoophytes, 2nd edit., p. 338, pl. lx, figs. 1—2 (but not *C. Hookeri*, Fleming).

Caberea — Busk. Cat. Marine Polyzoa, p. 39, pl. xxxvii, fig. 2.

— *Ellisii*, Hincks. Cat. Zoophytes Devon and Cornwall, p. 63; Smitt, Öfversigt af K. Vet. Akad. Förhand., 1867, p. 287, pl. xvii, figs. 55, 56.

This I find to be one of the more common Polyzoa in the Shetland seas. I have also dredged it in the Minch, the most southern habitat in which the species has as yet been found. Coasts of Scandinavia and Finmark (Smitt).

BICELLARIA ALDERI, *Busk.*

Bicellaria Alderi, Busk. Quart. Journ. Mic. Sci., 1860, p. 143, pl. xxviii, figs. 1—3; Smitt, Öfversigt af K. Vet. Akad. Förh., 1867, p. 289, pl. xviii, figs. 4—8.

— *unispinosa*, M. Sars. Geol. Zool. og Jagttagelser anstillede paa en Reise i en Deel af Trondhjens Stift, 1863, p. 34.

The ovicells in this species remind one, in their form, of the flower of the calceolaria, to the form of which they bear a close resemblance. They lean backwards, are imperforate, polished, sculptured with fine raised lines radiating in a fan-like form from the centre of the lower margin, and terminating at a circular, similarly raised line, which girdles the ovicell near its summit.

The only spot in Shetland in which I have dredged this interesting *Bicellaria* is 5—7 miles east of the Island of Balta, in 40—50 fathoms. The ground is soft; the dredge comes up choked with thousands of *Ascidia sordida*, great quantities of *Tubularia gracilis*, *Halecium halecinum*, &c., and attached to these Hydrozoa is found the *Bicellaria*. Since the species was described by Mr. Busk from Mr. Barlee's specimens it has been found by Professor Sars in Norway, and described under the name above quoted.

BUGULA CALATHUS, n. sp. Pl. VI, figs. 3—8.

Polyzoary consisting of a number of strap-formed, dichotomously dividing branches, spreading regularly round on all sides from the base, and forming an elegantly shaped shallow cup, all the straps generally of about equal length; drying of a yellowish horn colour. *Cells* in about 6—8 rows, oblong above, with two stout, blunt spines at each angle. *Ovicells* globular, large, imperforate, smooth, polished, with a raised, thread-like, transverse line near their base. Lateral avicularia large; smaller avicularia here and there on the margins of the inner cells. Height of a large specimen three fifths of an inch, diameter one inch and a quarter.

Under stones between tidemarks, Herm.

This species comes very near to *B. flabellata*, and much more so in its microscopical than in its general characters. Instead of being convoluted, as is generally more or less the case with *B. flabellata*, it always takes the form of an elegant simple cup, and the breadth is much greater in proportion to the height than in the allied species. *B. flabellata* turns

to an ashy colour in drying, but *B. calathus* preserves the yellowish horn-coloured hue which it has in life. The ovi-cells are proportionately somewhat larger, the lateral avicularia much larger, and the spines shorter and blunter than in *B. flabellata*, of which a figure (fig. 9) is given for comparison.

My late friend Mr. Alder agreed with me in considering the species here described to be distinct from *B. flabellata*; and for the accurate illustrations of this and the other species here described, except the Hemescharæ, I am indebted to him as among the last of many kindnesses. Some of the figures were among the last drawings that he made before he was seized with the fatal illness which deprived us of the most able and the most accurate of British marine zoologists.

BUGULA PURPUROTINCTA.

Bugula fastigiata, Alder. Cat. Zoophytes Northumberland and Durham, p. 59.

Cellularia plumosa, Johnston. Brit. Zooph., 2nd edit., p. 341, pl. lxi (*but not of Busk*).

This Bugula seems generally to take the place of *B. plumosa* in the north, but both species are found on the coast of Durham. I have dredged it at Shetland and on the Northumberland coast, and have received it from Seaham, county Durham (Mr. Hodge), and Scarborough (Mr. Bean). The beautiful purplish-red tint it assumes when preserved will enable it at once to be distinguished without any microscopical examination from *B. plumosa*; it is also a much larger and stronger species. Norway (Sars).

Mr. Alder referred this Bugula, which he well described, to the *Sertularia fastigiata* of O. Fabricius; but Smitt has pointed out ('Öfversigt af K. Vet. Akad. Förh.,' 1867, p. 291) that Fabricius, in a subsequent paper ('Nye Zool. Bidr., in Vid. Selsk. Skr.' (Havniæ), vol. i, 1821, p. 35), stated that the *S. fastigiata* of his 'Fauna Groenlandica' was synonymous with *Sertularia argentea*; and, judging from the synonyms given by Linnæus, it would seem that the *Sertularia fastigiata* of the 'Syst. Nat.' is our *B. plumosa* rather than the present species, which it becomes necessary, therefore, to name.

BUGULA TURBINATA, Alder.

Bugula turbinata, Alder. Mic. Journ., vol. v, p. 174, pl. xvii.

This pretty species appears to be much more common and

generally diffused than *B. avicularia*, with which it was formerly confounded. Specimens from under the granite rocks at Herm are most beautifully developed.

FLUSTRA BARLEII, *Busk*.

Flustra Barleii, *Busk*. Quart. Jour. Mic. Sci., vol. viii (1860), p. 123, pl. xxv, fig. 4.

— *membranaceo-truncata*, *Smitt*. Öfversigt af K. Vet. Akad. Förh. (1860), p. 358, pl. xx, figs. 1—5.

The *polyzoary* in this species is very thin and remarkably brittle. The species is very scarce in Shetland. Much as I have dredged there, I have only met with a few fragments in about fifty fathoms off Unst, and the original examples procured by Mr. Barlee still remain the only good ones in my collection. It has very recently been described by *Smitt* from Arctic specimens.

ESCHARA ROSACEA, *Busk*. Pl. VI, figs. 10—12.

Eschara rosacea, *Busk*. Ann. Nat. Hist., 2nd ser., vol. xviii, p. 33, pl. i, fig. 4.

Escharoides rosacea, *Smitt*. Öfversigt af K. Vet. Akad. Förhand. (1867), Bihang, p. 25, pl. xxvi, figs. 155—159.

Polyzoary consisting of flat, subpalmate, foliaceous lobes, composed of two layers of cells placed back to back; the lobes variously curved, and not in the same plane. *Cells* elongated ovate, granulated, only slightly convex, quincuncially arranged; mouth sunken, well arched above, with a sinus on the lower lip, and an avicularium, which has a lateral direction, appearing on one side of the sinus; mandible semicircular. *Ovicell* semiglobose, granulated.

Loch Fyne, on small stones and old shells of *Pecten opercularis*, now first added to the British Fauna. Known previously on the coast of Norway, where it has been procured by *McAndrew*; *Finmark* (*Lovén*); *Spitzbergen* (*Malmgren*).

The size of a large British specimen is three quarters of an inch broad, and not quite as high. Figs. 10 and 11 are drawn from a British specimen; fig. 12 is added to show the ovicells, and is taken from a Norwegian typical example sent to Mr. Alder by Mr. *Busk*.

According to *Smitt*, the *Eschara rosacea* of *Sars* is not *Busk*'s species, being distinguished from it by having the mandible of the avicularium triangular, and he has named it *Escharoides Sarsii*.

ESCHARA QUINCUNCIALIS, Norman. Pl. VII, figs. 1—3.

Eschara quincuncialis. Rep. of the Brit. Assoc. 1866 (1867).
Report, p. 204.

Polyzoary white, smooth, polished, cylindrical. *Cells* distant in linear series, regularly arranged in quincunx round an imaginary axis, swollen, mammæform; mouth key-hole shaped, rounded above, with a small sinus below, and a small inconspicuous avicularium on the margin. *Ovicell* small, with 1—4 round perforations.

The type specimen is apparently a mere fragment, and is not more than a quarter of an inch long. It is, however, clearly distinct from all the allied species with which we are acquainted. It was dredged by Mr. Jeffreys and myself in 1866 in deep water in the Minch.

HEMESCHARA STRUMA, n. sp. Pl. VII, figs. 6—8.

Polyzoary sometimes encrusting stones, at others creeping over *Porella cervicornis*, and stretching from branch to branch of that coral, in both cases rising here and there into free frill-like expansions; yellowish, glistening. *Cells* immersed, quincuncially arranged, obovate; throat greatly swollen (goitre-like), surface channelled with irregular depressions, which, however, round the edge assume the form of wedge-shaped foveolæ; a rounded avicularium just within the lower lip; mouth broader than high, upper and lower lips simple, well arched, meeting at a point at the sides. *Ovicell* semicircular, not much raised (about equal in elevation to the goitre-formed throat), surface uneven, not punctate.

The more mature cells are seen to be separated from each other by a raised line, and the marginal foveolæ become much more distinct. The figures are taken from young cells.

The cells of this species are, in their general character, very like those of *L. concinna*; they are, however, considerably larger than in that species, and the surface is channelled with foveolæ, instead of being rough and granulated; the mouth is also of different form, and broader than long, instead of the reverse.

Dredged in 100 fathoms about twenty-five miles north of the Island of Unst, the most northern of the Shetland group. It is very rare, and the specimens obtained are small, the free expansions not exceeding half an inch high, and consisting of a single series of cells.

HEMESCHARA SANGUINEA, n. sp. Pl. VII, figs. 9—11.

Polyzoary spreading in a film-like, semi-attached state over shells, and sometimes rising in frill-formed, free expansions, consisting of a single series of cells; colour deep red, shining. *Cells* subquadrangular, distributed in nearly straight subparallel lines, and quincuncially arranged, flattened, perforated; perforations large, circular; mouth well arched above, having a central sinus on the lower lip, on each side of which is a little notch cut in sideways (see fig. 11); no oral avicularia. *Ovicells* semiglobose, tumid, perforated, surface between the perforations raised into nodulous processes.

H. sanguinea differs from the other species here included in the genus in not having any oral avicularium. Several specimens were dredged off Fermain Bay, Guernsey, based on shells (*Pecten maximus*, *Pectunculus glycymeris*, &c.), and one on *Eschara foliacea*.

I suspect that Busk's figures, pl. lxxviii, figs. 1 and 2, are drawn from this species. They are called *Lepralia pertusa*; but in *L. pertusa* the cells are ovate and very tumid, the mouth without any sinus on the lower lip. That species is well figured (Busk, pl. lxxviii, fig. 3; and pl. lxxix, figs. 1 and 2).

CELLEPORELLA LEPRALIOIDES, n. sp. Pl., VII, figs. 4, 5.

Polyzoary small, encrusting, in little lobed patches on small stones. *Cells* irregularly disposed, cylindrical, elongated, semi-erect, upper portion free (except in marginal cells), surface rugose; mouth nearly circular, apical, opening upwards; peristome much raised, no avicularia. There are large scattered punctures here and there upon the sides of the cells, but they are not always very easily seen.

Hab. Shetland, in 90 to 110 fathoms, living on small pebbles. This is another addition to the large assemblage of Polyzoa which live in the deep waters of the Shetland seas, and have not been found elsewhere off our coasts.







