ZOOPHYTOLOGY.

In the 'Transactions of the Tyneside Naturalists' Field Club' has been published a "Catalogue of the Zoophytes of Northumberland and Durham," drawn up by Mr. J. Alder, whose unwearied industry and well-known powers of minute observation we are glad to see thus devoted to the subject of Zoophytology. The work, as it may be termed, is not a mere catalogue of the Sertularian Zoophytes and Polyzoa found upon the coasts of Northumberland and Durham, but includes numerous and copious observations upon various species, and more especially the descriptions of several new genera and species. In the introductory observations the following list is given of species characteristic of the north-eastern shores:

1. Cœlenterata.

1. Actinozoa.

Actinia digitata.
Anthea Tuediæ.
Pennatula phosphorea.

2. Hydrozoa.

Eudendrium rameum.
confertum.
Tubularia Dumortierii.
Halecium muricatum.
Sertularia tricuspidata.
" *fallax.*
" *filicula.*
" *fusca.*
Thuiaria thuja.
Plumularia Catherina.
" *frutescens.*
Grammaria ramosa.

2. Molluscoida.

1. Polyzoa.

a. Cheilostomata.

Gemellaria loriculata.
Cellepora Skenei.
Bugula fastigiata.
murragana.
Flustra truncata.
Carbasea papyrea.
Eschara cribaria.
Retepora beaniana.

b. Ctenostomata.

Farrella pedicellata.
Avenella fusca.
Alcyonidium mamillatum.

Many of which, Mr. Alder observes, are generally rare or wanting in the south and west. Comparing the marine Fauna of the above region with that of the south coast, the most striking deficiency is found in the Asteroid and Helianthoid orders, many genera in which are entirely wanting; as are likewise all the calcareous and corticated corals. Of the more conspicuous south country zoophytes we may note the absence of—

Sertularia nigra.
pinnata.
Plumularia pennatula.
Campanularia gelatinosa.
Anthea cereus.
Adamsia palliata.
Caryophyllia Smithii.

And, among the Polyzoa, of—

Membranipora Lacroixii.
Flustra chartacea.
Caberea Boryi.
Valkeria pustulata.

The catalogue contains 164 species, of which seventeen at least are believed to be new. Mr. Alder arranges them in the following orders and families:

ANTHOZOA.

1. Hydroida.			
Tubulariadæ	15		
Sertulariadæ	30		
Campanulariadæ	18		
Hydridæ	2	—65	
2. Asteroida		3	
Helianthoida		10—78	

POLYZOA.

Cyclostomata	11	
Cheilostomata	54	
Ctenostomata	14	
Pedicellinea	1	
Hippocrepia	6—86	
		164

The more characteristic species of the different bathymetric zones are stated to be the following:

1. Littoral zone.

Sertularia pumila.
Actinia mesembryanthemum.
coriacea.

Lepralia verrucosa.
punctata.
Membranipora pilosa.
Flustrella hispida.
Alcyonidium hirsutum.

2. Laminarian zone.

Sertularia operculata.
Laomedea geniculata.
Campanularia Johnstoni.
Lepralia hyalina.
Membranipora membranacea.
pilosa.
Cellularia reptans.
Flustra foliacea.
truncata.
Alcyonidium hirsutum.

3. Coralline zone.

Tubularia gracilis.
Halecium halecinum.
Sertularia fallax.
filicula.
Antennularia antennina.
Plumularia falcata.
Campanularia Johnstoni.
dumosa.
Reticularia serpens.
Coppinia arcta.
Pennatula phosphorea.
Actinia crassicornis.
Cellepora pumicosa.
Gemellaria loriculata.
Membranipora Flemingii.
unicornis.
Flustra foliacea.
truncata.
Carbasea papyrea.

4. Deep water.

Eudendrium rameum.
Tubularia Dumortierii.
Sertularia tricuspidata.
abietina.
fusca.
Plumularia falcata.
Catherina.
Campanularia volubilis.
dumosa.
Grammaria ramosa.
Actinia digitata.
Diastopora obelia.
Cellepora ramulosa.
Skenei.
Lepralia reticulata.
linearis.

Cellularia ternata.
Peachii.
Bugula Murrayana.
Alcyonidium parasiticum.

The new genera and species described in Mr. Alder's 'Catalogue' are—

1. ANTHOZOA.

Fam. TUBULARIADÆ.

1. *Vorticlava.* Alder (p. 10).

Polype linear-cylindrical or clavate, soft, naked, affixed at the base, solitary (?). Head terminal; tentacles in two rows, stout, dissimilar, the upper row capitate.

1. *V. humilis*, n. sp. Alder (p. 10, Pl. I, figs. 1, 3).

Body white, semi-transparent, nearly of equal thickness throughout; upper tentacles 5, short and stout; lower tentacles 10, about three times the length of the upper. Length of body, $\frac{3}{10}$ inch.

Hab. On *Corallina officinalis*, between tide-marks. Cullercoats, also at Felixstow.

2. *Eudendrium*, Ehrenb.

1. *E. confertum*, n. sp. Alder (p. 13, Pl. I, figs. 5—8).

Polype white or pale flesh-coloured, with a longish ovate head, surrounded by a single row of tentacles. Polypary tubular, yellowish, horn-coloured, strongly wrinkled across, but not annulated, slightly branched and expanding a little towards the apertures; base, a densely reticulated and closely adhering crust. Height, $\frac{1}{4}$ to $\frac{1}{2}$ inch.

Hab. On old shells of *Buccinum undatum* and *Fusus antiquus* from deep water. Cullercoats.

2. *E. capillare*, n. sp. Alder (p. 15, Pl. I, figs. 9, 12).

Polypary minute, very slender, thread-like, a little branched, transparent, pale horn-coloured, smooth, excepting two or three faint rings near the origin of each branch. Polypes terminal on the upper branches, vase- or pear-shaped, with a single row of eighteen or twenty, long, slender tentacles; reproductive capsules on separate short branches near the lower part of the stem, or clustered on verticillate pedicles; two or three capsules in linear series on each pedicle. Height, $\frac{1}{2}$ inch.

Hab. Parasitic on *Antennularia ramosa.* Embleton Bay.

3. *Tubularia.*

1. *T. implexa*, n. sp. Alder (p. 18, Pl. VII, figs. 3—6).

Tubes small, very slender, generally more or less contorted below, smooth, wrinkled, or regularly annulated beneath a smooth, transparent epidermis; slightly and sub-unilaterally branched; the branches going off nearly at right angles to the stem, and a little constricted at their base. Gregarious, forming a densely tangled mass of $\frac{1}{2}$ to $\frac{3}{4}$ inch in height.

Hab. Deep water, thirty miles east of Holy Island.

Fam. SERTULARIADÆ.

1. *Sertularia*, Linn.

1. *S. tricuspidata*, n. sp. Alder (p. 21, Pl. II, figs. 1, 2).

Stem slender, alternately branched, twisted at intervals, and jointed above

each cell; cells alternate, rather distant, smooth, exactly cylindrical; a little bent outwards, with a three-toothed rim; ovicapsules strongly ribbed across, with a narrow funnel-shaped aperture. Height, 1 to 2 inches.

Hab. Deep water.

2. *S. tenella*, n. sp. Alder (p. 23, Pl. II, figs. 3, 6).

Minute, creeping, throwing up short unbranched or slightly branched stems, which are slender, zigzagged, and jointed above each cell; cells alternate, rather distant, elongate, barrel-shaped, finely wrinkled across; aperture erect, patent, squared, and four-toothed. Length, ½ to 1 inch.

Sertul. rugosa, var., Johnst.

Hab. Plum. falcata, and other zoophytes. Not common.

Fam. CAMPANULARIADÆ, Johnst.

Laomedea, Lamx.

1. *L. neglecta*, n. sp. Alder, p. 33, Pl. III, figs. 1, 2.

Polypary minute; stem filiform, sub-flexuose, with two or three alternate simple branches, each bearing a cell; the stem annulated, with from four to seven rings above the origin of each branch, and sometimes slightly ringed below; the branches ringed throughout, cells narrow and deep, with alternate deep and shallow crenations, forming about eight bimucronated denticles round the margin. Polype with fifteen or sixteen slender tentacles. Height, ⅓ inch.

Hab. Between tide-marks, on under side of stones.

2. *L. acuminata*, n. sp. Alder (p. 34, Pl. III, figs. 5, 8).

Polypary minute, scarcely branched, with a slender annulated stem; the annulations strongest at the base, and becoming fainter or disappearing towards the cell. Cells thin, membranous, finely striated longitudinally, elongate pod-shaped, squared below, and tapering to a fine point above; margin slightly crenulated. Polype, when extended, two or three times as long as the cell; tentacles 20, muricate, united by a web at the base. Height, $\frac{1}{10}$ inch.

Hab. Old shell of *Fusus antiquus* from deep water. Cullercoats.

2. *Campanularia.*

1. *C. Johnstoni*, n. sp. Alder (p. 36, Pl. II, fig. 8).

Stem creeping, plain; pedicles long, with numerous close-set rings at the base, and more or less ringed at the top; middle portion usually plain, sometimes ringed; cells deep and rather large, with ten to twelve strong denticles round the rim; ovicapsules nearly sessile on the creeping stem, ovate-oblong, strongly plicated transversely and truncated at the top. Length, one and a half to two tenths of an inch.

Hab. On seaweeds, zoophytes, shells, &c. Common.

2. *C. Hincksii*, n. sp. Alder (p. 37, Pl. II, fig. 9).

Stem creeping, plain; pedicles long, nearly smooth, with two or three slight spiral twists at the base and two or three spherical rings at the top, one of which is within the cup: cells rather long, with parallel sides, wrinkled or lineated longitudinally; marginal denticles 10, of a squared or castellated form, a little indented at the top. Height, about ⅓ inch.

Camp. volubilis, var., Hincks, in 'Ann. Nat. Hist.,' 2d ser., vol. ii, p. 180.

Hab. On shells and zoophytes from deep water.

3. *C. gracillima*, n. sp. Alder (p. 39, Pl. IV, figs. 5, 6).

Stem erect, compound, sub-unilaterally branched; cells very slender, long, tubular, thin, set on loosely twisted pedicles of about two whorls; aperture entire. Height, 1 inch.

Hab. On shells and zoophytes from deep water.

A very similar if not identical species occurs in Bass Strait (Busk).

3. *Grammaria*, Stimpson.

"Polypidom rectilinear, elongated, cylindrical, composed of aggregated tubes, generally without branches, which, when they occur, are of the same character as that from which they spring. Cells arranged on all sides, in more or less regular and equidistant longitudinal rows, giving a section of the stem a star-like appearance."

G. ramosa, n. sp. Alder (p. 40, Pl. IV, figs. 1—4).

Polypary stout, horn-coloured, irregularly branched; branches arising from a constricted base; cells cylindrical, bending outwards to a distance nearly equal to the width of the stem, with an even margin, behind which they are frequently annulated with one or two lines of growth; they are set in about four longitudinal rows, the adjoining cells alternating and the opposite cells nearly in a line with each other. Height, 1—2 inches.

Hab. Deep water; rather rare.

II. Polyzoa.

Fam. Membraniporidæ.

1. *Membranipora*, Blainville.

As considerable confusion and obscurity involve the various British species of *Membranipora*, a genus to which Mr. Alder appears to have paid considerable attention, and which he has in great measure now cleared up, it will be advantageous to notice his arrangement of the several species belonging to it which have occurred to his observation. These are—

1. *M. membranacea*, Linn. *Flustra membranacea*, Johnst. *M. membranacea*, Busk. Cat., p. 56, pl. lxviii, fig. 2.
2. *M. pilosa*, Linn., Johnst., Busk.
3. *M. lineata*, Linn. Alder (p. 53, Pl. VIII, figs. 1, 1 *a*).

Cells oval; the margin with four or five spines on each side, bending inwards, generally rather slender and not flattened on the sides. Ovicapsule large, galeate, slightly frosted, with an arched rib near the top. Avicularia subsessile, or a little elevated, situated on one or both sides of the ovicapsule, more rarely at the top, and sometimes at the bottom of the cell.

Flustra lineata, Linn., Johnston.

Membranipora lineata, Busk. Cat., p. 58.

4. *M. spinifera*, Johnst. Alder (p. 53, Pl. VIII, figs. 2, 2 *a*).

Cells oblong-oval; the margin with numerous stout, linear, or subclavate spines, about seven on each side, erect or leaning inwards. Ovicapsule shal-

low, smooth, with two or more spines (?). Avicularia, on the top of club-shaped spines, developed sparingly on any part of the margin of the cell.

Flustra spinifera, Johnst. 'Transact. of Newcastle N. H. Soc.,' vol. ii, p. 266, pl. ix, fig. 6.

Flustra (?) *lineata*, Johnst., 'Brit. Zooph.'

5. *M. craticula*, n. sp. Alder (p. 54, Pl. VIII, figs. 3, 3 *a*).

Cells in linear series, small, oval; margin with five to seven spines on each side, which are shining, flattish at the edges, and lie closely over the aperture; one or two of the uppermost spines are erect, long, and cylindrical. Ovicapsule rather small, smooth, and cylindrico-globose, with a rib across the middle. An avicularium generally at the top of the ovicapsule, sometimes at its side.

Hab. Deep water.

6. *M. Flemingii*, Busk. Cat., p. 58, pl. lxi, fig. 2; pl. lxxxiv, figs. 4, 5, 6; pl. civ, figs. 2, 3, 4. Alder, p. 55, Pl. VIII, fig. 4.

7. *M. Pouilletii*, Audouin.

Cells ovate, broadish below, rather larger than in *M. Flemingii*, and without the inner expansion; margin granulated with a thin rim; spines four or six, round the top of the cell, short; one only, on each side, visible below the ovicapsule. Ovicapsule large, globose, or elongated, strongly granulated and occasionally perforated. Avicularia dispersed; sometimes a small one on each side of the ovicapsule.

M. membranacea, Johnst.

M. Pouilletii, Audouin, 'Expl.' I, p. 240; Savigny, 'Egypt,' pl. ix, fig. 12.

8. *M. unicornis*, Fleming, (p. 56, Pl. VIII, fig. 6).

Cells stout, oval; margin granulated, with two spines on each side near the top, one of which is usually covered by the ovicapsule. Ovicapsule subcylindrical, smooth, with a strong rib above the margin and surmounted by a conical avicularium.

Flustra unicornis, Fleming.

Mem. membranacea, Johnst. (pars).

Lepralia squama, Dalyell.

2. Fam. CELLULARIADÆ.

1. *Bugula*, Oken.

B. fastigiata, Fab. Alder, p. 59.

Polyzoary one to four inches high, stout, bushy, irregularly branched; becoming purplish or rusty-red when dry; cells biserial, cylindrical, elongate, attenuated below; aperture wide above, elliptical below, with a stout cylindrical jointed spine at the upper and outer angles, and a denticle in front of it; no spine at the inner angle. Avicularium large, with a longish beak. Ovicapsules very shallow.

Sertularia fastigiata, Fab.

Cellularia fastigiata, Fleming, Dalyell.

Cellularia plumosa, Johnst., 'Brit. Zooph.,' p. 341, pl. lxi.

Hab. Laminarian zone. Very common.

3. Fam. SALICORNARIADÆ.

1. *Salicornaria*, Cuvier.

1. *S. sinuosa*, Hassall.

Doubts having been previously entertained with respect to the distinction of this form from *S. farciminoides*, Mr. Alder "found it necessary to subject both kinds to a careful re-examination." The result of which has confirmed him in the belief that they are really distinct species. The best character, he says, is found in the avicularium. This organ in *S. farciminoides* is semicircular and arched upwards; that of *S. sinuosa* is triangular and points downwards, always sloping a little to one side. In addition to this the form of the under lip of the cell differs in the two species: in *S. farciminoides* it is slightly arched in the centre; whilst in *S. sinuosa* it is quite straight, and rather projecting, with a sinus at each end.

We now quite agree with Mr. Alder in regarding the two species as distinct.

Sub-order. CTENOSTOMATA.

Fam. ALCYONIDIADÆ, Johnston.

1. *Alcyonidium.* Lamx.

1. *A. mamillatum*, n. sp. Alder (p. 64, Pl. V, figs. 3, 4).

Encrusting, semitransparent, brownish; covered with rather long, stout, and strongly wrinkled papillæ, from which the polypides issue; tentacles 16—18.

Hab. On old shells, deep water.

2. *A. albidum*, n. sp. Alder (p. 64, Pl. V, figs. 5, 6).

Encrusting, semitransparent, yellowish-white; general envelope inconspicuous; polypides prominent, ventricose, flask-shaped, sub-recumbent, becoming erect towards the aperture, which is truncated when contracted; tentacles 18.

Hab. The stem of *Plum. falcata.*

2. *Farrella*, Ehr.

1. *F. pedicellata*, n. sp. Alder (p. 68, Pl. VI).

Body (of cell) ovate-oblong, yellowish, transparent, with long and very slender pedicles, uniform in thickness throughout, arising from a creeping fibre; tentacles 12. Length of cell, $\frac{1}{30}$ inch.

Hab. Old shells of *Buccinum undatum* and *Fusus antiquus*, in deep water.

On some NEW BRITISH POLYZOA. By the Rev. T. HINCKS.

(*Concluded from* No. XIX, p. 176.)

THE following is the conclusion (accidentally omitted) of a paper which appeared in the last number of the 'Journal.' It completes the description of the *Alcyonidium hexagonum* (Hincks)—the *A. Mytili* of Dalyell.