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to examine. It is very inferior in size to the C. nutans of Sars, and the number of tentacles is somewhat smaller; but in all other points it agrees with that species.

[To be continued.]

#### EXPLANATION OF PLATE VI.

Figs. 1-4. Halecium tenellum, natural size and magnified.
Figs. 5, 6. Coryne fruticosa, magnified.
Figs. 7, 8. Sertularia fusiformis, natural size and magnified : 7 a, gonotheca magnified.

# XVII.—On the Nomenclature of the Foraminifera. By W. K. PARKER, M. Micr. Soc., and T. R. JONES, F.G.S. [Continued from vol. vi. p. 347.] Part. VI. Alveolina.

THE nomenclature of this genus serves to illustrate the confusion of terms in which these and others of the *Foraminifera* have been entangled. Deshayes and D'Orbigny have each given an account, but the following history is fuller and more complete.

Fortis\* and Deluc<sup>†</sup> wrote of fossil *Alveolinæ* about the same time (1801 and 1802). The former figured and described three varieties (from Gerona, Roussillon, and Grignon), and treated of them as members of his comprehensive group *Discolithus* (*Disc.* xi, xi a, & xi b). Deluc described and figured one from Bengal<sup>‡</sup> and one from Grignon §, and remarked that they must be varieties of one species, which he referred to as "le petit fossile ovoïde à côtes de melon." In 1802, a short paper appeared in the 'Bullet. des Sciences Soc. Philom.' no. 61. p. 99, signed C. V., noticing two minute shells which Bose had found in calcareous sandstone near the village of Auvert (or Anvers), near Pontoise, in the valley of the Oise, and which he referred to Lamarck's *Alveolites* (a genus of Corals, instituted in 1801). These are named || respectively "Alvéolite grain de fétuque" ¶ and "Al. grain de millet." The

\* Journ. de Phys. vol. lii. p. 106 &c. pl. 2. figs. 7, 8, 9, 1801; and Mémoire sur les Discolithes, 1802, in the Mém. Hist. Nat. Italie, vol. ii. p. 112 &c. pl. 3. figs. 6-11, pl. 4. fig. 4. In 1770, Guettard figured what appears to be a spheroidal *Alveolina* (Mémoires sur diff. part. des Sciences et Arts, vol. iii. p. 430, pl. 12. fig. 15), under the name of "Madrépore globulaire feuillé."

† Journ. de Physique, 1802, vol. liv. p. 176 &c. pl. 1. figs. 11-14.

‡ Alveolina ovoidea, D'Orb. § Alveolina Boscii, Defr.

|| See also Bosc's Hist. Nat. Coq. 1802 (Buffon de Déterville), and his article "Alvéolite" in the 'Nouveau Dict. Hist. Nat.' 1816.

The figure given of this was subsequently referred to by Brongniart (1822), in Cuvier's 'Ossemens Fossiles,' ii. p. 270, as Alveolites Milium, Bosc. It ought to be A. Festuca, the other being A. Milium.
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figures accompanying the note show that the former (pl. 5. fig. 3) is a fusiform Alveolina, the latter (fig. 4, very bad) being possibly a shorter and thicker ovoidal Alveolina (although Defrance refers to it subsequently as being his Fabularia discolithes). These are noticed by G. L. Duvernoy in the 'Dict. Sc. Nat.' 1816, vol. i. p. 557, in the article "Alvéolite," where the Alveolites of Bosc are still confounded with Lamarck's genus of Corals of the same name. In the Supplement to the same volume (article "Alvéolites," p. 136), Defrance observes that "l'espèce à grain de fétuque" is Fortis's Discolithus\* xib, and that Fortis's Disc. xi a, from Vendemiers in Roussillon, is a larger form. Defrance here states that both the foregoing and the "Alvéolite grain de millet" occur abundantly near Paris, in the "calcaire coquillier grossier," at Grignon, Montrouge, Meudon, Valognes, and Courtagnon, and at Chaumont also; but here the "Al. grain de fétuque" is the biggest, the other being very small. He adds, provisionally, another species (*Alveolites Larva*), from Valognes, smooth, pointed at the ends, and sometimes 18 millimetres (8 lines) in length. In 1820 (Dict. Sc. Nat. vol. xvi. pp. 103, 104), Defrance separated the so-called "Alvéolites" of Bosc from Lamarck's genus of Corals, and named one of them (grain de fétuque) "Oryzaire-Bosc" (Oryzaria Boscii), and the other (grain de millet) "Fabulaire-discolithe" (Fabularia discolithes †). The type of the latter t he had from Grignon, and a variety from Valognes; and from Chaumont he had another, which he named "Fabulaire sphéroïde." In 1803, Fichtel and Moll § figured and described two fossil forms (from Austria and Hungary), which they termed Nautilus Melo,  $\alpha$  and  $\beta$ . In 1808, De Montfort || published new generic and specific names (Borelis melonoides and Clausulus Indicator) for the two varieties figured by Fichtel and Moll, and a binomial appellation (Miliolites sabulosus) for the fossil fusiform variety common at Grignon.

\* Fortis's term "Discolithus" has been generally overlooked by naturalists, and the French form of the plural, "Discolithes," misused for it.

**†** This is the Discolithus ix. of Fortis (op. cit. p. 109, pl. 2. fig. Z); and, as it was named Nummulites ovata by De Roissy in 1804 (Hist. Nat. Mollusques, Suite de Buffon, vol. v. p. 59), it had already a specific name.

<sup>‡</sup> From the published figures given by De Blainville and D'Orbigny, we know the species that Defrance here refers to. Bosc's "Alvéolite grain de millet" (Bullet. Soc. Philom. no. 61. pl. 5. fig. 4) is most probably an ovoidal *Alveolina*.

§ Test. Microscop. &c.; see Annals of Natural History, 3rd ser. v. p. 182. || Conchyliolog. Systémat.; see Ann. Nat. Hist. 3rd ser. vi. p. 342.

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In 1811, Parkinson \* figured and described a fossil Alveolina under the generic name of Fasciolites †.

In 1812, Lamarck<sup>†</sup>, taking no account of Montfort's genera, and without referring to others, gave the genus the name of Melonites, using Fichtel and Moll's figures as the base of his observations. In 1816 (Encycl. Méth. descript. plates) Melonites was again used by Lamarck, and both Melonia and Melonites appear in 1822 (Hist. Nat. Anim. s. Vert. vii.), Lamarck's two species standing as M. sphærica and M. sphæroidea. Melonia (Mélonie), provisionally established for such recent members of the group as might turn up (according to Lamarck's nomenclatorial plan), was sometimes confounded with Montfort's Melonis (also "Mélonie"), especially as De Blainville, besides adopting Lamarck's "Melonia" (Dict. Sc. Nat. 1824, vol. xxxii. p. 176), misprinted "Melonia" for "Melonis" (Dict. Sc. Nat. 1824, vol. xxx. p. 17). Cuvier also (reuniting Montfort's three genera) and others followed Lamarck. Deshayes used "Melonia" in the 'Dict. Class. Hist. Nat.' 1826, vol. x. p. 350, and in the continuation of the 'Hist. Nat. Vers' (Encycl. Méthod. vol. iii.), 1830. In 1826, D'Orbigny  $\delta$ , endeavouring to reduce the then existing chaos to order, went back to the oldest definite name, namely "Alveolites;" and, modifying its termination, both to distinguish it from that of Lamarck's Coral, and to match it with the majority of the names of *Foraminifera*, especially such as have recent representatives (according to Lamarck's plan), he adopted it under the form of *Alveolina*, and arranged under it seven specific forms (six fossil and one recent), with their synonymy. In 1828, Deshayes ||, in a paper on the Alveolinæ, describing five species, and in the 'Encycl. Méthod.' vol. ii. (1830), published in full for the most part what D'Orbigny had given in abstract, adopting D'Orbigny's term Alveolina. In 1846, D'Orbigny¶ states that he had then seen nine species of Alveolina, two of which were living (New Holland and Cuba), and seven were fossil. Of the latter the majority were from the Tertiary beds of Paris, Bordeaux, the Pyrenees, and Austria, one

\* Organic Remains of a Former World, vol. iii. p. 158, pl. 10. figs. 28-31; also in his 'Outlines of Oryctology,' 1822.

† The same as Alveolina oblonga, D'Orb., and Melonia Fortisii, Desh.
‡ Extrait de son Cours de Zoologie, &c., par M. Delamarck. We have inadvertently omitted to notice this work in our Monograph on the Lamarckian Species of Foraminifera in the Annals Nat. Hist. 3rd ser. vol. v. and vol. vi.

# § Annales des Sc. Nat. 1826, vii. p. 306. || Annales des Sc. Nat. 1828, xiv. p. 230. ¶ Foram. Fossiles du Bassin Tertiaire de Vienne, p. 143, &c. 11\*

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only having been found in the Lower Chalk (Craie chloritée inférieure—l'étage Turonien) at the mouth of the Gironde. In Bronn's 'Leth. Geognost.' 3rd edit. vol. iii., we find another elaboration of the nomenclature of this genus. Objecting to "Discolithus," "Alveolites," and "Alveolina," Bronn follows Ehrenberg in adopting Montfort's term "Borelis" (which we regard as unnecessary); and, with the four species described in the 'Lethæa,' the synonymy is abundant. D'Archiac and Haime also give the synonymy of three species (Fossiles de l'Inde, 1853, p. 348, &c.).

The following is a still more complete synopsis of the chief known varieties of *Alveolina*.

1. Nautiloid, discoidal, much-compressed variety. Alveolina Rotella, D'Orb.

- 1846. Orbiculina Rotella, D'Orb. For. Foss. Vienn. p. 140, pl. 7. figs. 13, 14. D'Orbigny himself notices the marked difference between this and the known Orbiculinæ in the style of its spiral growth and its outer border.
- 2. Spherical and oblate-spheroidal variety. Alveolina Melo, var. a, F. & M.

1802. Discolithus XI., Fortis, Mém. ii. p. 112, pl. 3. figs. 6, 7; pl. 4. fig. 4.
1803. Nautilus Melo, var. a, F. & M. Test. Micr. p. 118, pl. 24. figs. a-f.
1808. Clausulus Indicator, De Montf. Conch. Syst. i. p. 178.
1816. Melonites sphærica, Lamarck, Encycl. Méth. pl. 469. fig. 1 a-f.
1824. Melonia sphærica, Blainville, Dict. Sc. Nat. xxxii. p. 176, Conch. pl. 15. fig. 2.

1826. Alveolina Melo, D'Orb. Ann. Sc. Nat. vii. p. 306. no. 2.
1828. Alveolina Melo, Desh. Ann. Sc. Nat. xiv. p. 230.
1846. Alveolina Melo, D'Orb. Foram. Foss. Bassin Vienne, p. 147, pl. 7. figs. 15, 16.
1853. Alveolina Melo, Carter, Journ. Bombay Asiat. Soc. v. p. 134, pl. 2. fig. 15.
1853. Alveolina Melo, D'Arch. & H. Foss. de l'Inde, p. 348.

3. Prolately spheroidal variety. Alveolina Melo, var.  $\beta$ , F. & M.

1803. Nautilus Melo, var.  $\beta$ , F. & M. Test. Micr. p. 118, pl. 24. figs. g, h. 1808. Borelis melonoïdes, *De Montf*. Conch. Syst. i. p. 170. 1816. Melonites sphæroidea, *Lam.* Encycl. Méth. pl. 469. fig. 1 g, h. 1824. Melonia sphæroidea, *Blainv*. Dict. Sc. Nat. xxxii. p. 176, Conch. pl. 15. fig. 3.

1826. Alveolina Melo, D'Orb. Ann. Sc. Nat. vii. p. 306. no. 2.

1828. Alveolina Melo, Desh. Ann. Sc. Nat. xiv. p. 230.

1838. Melonia costulata, Eichwald, Zool. Spec. ii.; Viln. pl. 2. fig. 1.

1839. Alveolina pulchra, D'Orb. Foram. Cuba, pl. 8. figs. 19, 20.

1842. Melonia (Borelis) sphæroidea, *Ehrenb*. Monatsber. Akad. Wiss. 1842, p. 274.

1846. Alveolina Hauerii, D'Orb. Foram. Foss. Vienn. p. 148, pl.7. figs. 17, 18. 1848. Alveolina subpyrenaica, var. globosa, Leym. Mém. Soc. Géol. France,

# 2 sér. i. p. 360, pl. 13. fig. 10. 1853. Alveolina sphæroidea, *Carter*, Journ. Bombay Asiat. Soc. v. p. 134, pl. 2. fig. 16. 1853. Alveolina sphæroidea, *D'Arch*. & H. Foss. de l'Inde, p. 348.

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1853. Alveolina costulata, *Eichwald*, Leth. Rossica, Dern. Période, p. 8, pl. 1. fig. 4.

1854. Borelis sphæroidea?, Ehrenb. Mikrogeol. pl. 37 D. figs. 1-3. 1854. Borelis (Melonia) Melo, Ehrenb. Mikrogeol. pl. 37, 10. fig. 1.

Nos. 2 and 3 cannot be at all distinctly separated, the variation being so slight. They should be united (as Fichtel and Moll as well as D'Orbigny had them) under the one term "Alveolina Melo."

4. Elongate-oval variety. Alveolina ovoïdea, D'Orb.

1802. Deluc, Journ. Phys. liv. p. 179, pl. 1. figs. 11, 12.
1802. Discolithus XI. a, Fortis, Mém. ii. p. 113, pl. 3. figs. 8, 9.
1811. Fasciolites, Parkinson, Org. Rem. iii. p. 158, pl. 10. figs. 28-31.
1826. Alveolina ovoïdea, D'Orb. Ann. Sc. Nat. vii. p. 306. no. 3.
1826. Alveolina oblonga, D'Orb. Ann. Sc. Nat. vii. p. 306. no. 4.
1826. Alveolina Fortisii, Desh. Dict. Class. Hist. Nat. x. p. 352.
1828. Alveolina oblonga, Desh. Ann. Sc. Nat. xiv. p. 232.
1840. Fasciolites elliptica, Sow. Trans. Geol. Soc. Lond. 2 ser. v. p. 329 &c., pl. 24. figs. 17, 17 a.
1846. Alveolina subpyrenaica, Leym. Mém. Soc. Géol. France, 2<sup>e</sup> sér. i. p. 360, pl. 13. fig. 9.
1853. Alveolina elliptica, Carter, Journ. Bombay Asiat. Soc. v. p. 134, pl. 2. fig. 17.
1853. Alveolina ovoidea, D'Arch. & H. Foss. de l'Inde, p. 349.

5. Fusiform variety. Alveolina sabulosa, Montf.

1802. Deluc, Journ. Phys. liv. p. 179, pl. 1. figs. 13, 14.
1802. Discolithus XI. b, Fortis, Mém. ii. p. 114, pl. 3. figs. 10, 11.
1802. Alvéolite grain de fétuque, Bosc, Bullet. Sc. Nat. Philom. Soc. no. 61. pl. 5. fig. 3.
1808. Miliolites sabulosus, De Montfort, Conch. Syst. i. p. 174.
1820. Oryzaria Boscii, Defrance, Dict. Sc. Nat. xvi. p. 104.
1822. Alveolites Milium, Brongn. Cuvier's Ossem. Foss. ii. p. 270.
1826. Alveolina Boscii, D'Orb. Ann. Sc. Nat. vii. p. 306. no. 5.
1826. Melonia Boscii, Desh. Dict. Class. Hist. Nat. x. p. 352.
1828. Alveolina Boscii, Desh. Ann. Sc. Nat. xiv. p. 233.

Cylindrical or subcylindrical variety. Alveolina elongata, D'Orb.
 1816. ?Alveolites Larva, Defrance, Dict. Sc. Nat. i. p. 137.
 1826. Alveolina elongata, D'Orb. Ann. Sc. Nat. vii. p. 307. no. 6.
 1826. Alveolina Quoii, D'Orb. Ann. Sc. Nat. vii. p. 307. no. 7.
 1828. Alveolina elongata, Desh. Ann. Sc. Nat. xiv. p. 234.
 1828. Alveolina Quoii, Desh. Ann. Sc. Nat. xiv. p. 234.

Besides the above-noticed varieties of *Alveolina*, which are both recent and of Tertiary age, there are some very interesting varieties occurring in the Carboniferous Limestone, of Palæozoic age. These belong to the genus *Fusulina*, proposed by G. Fischer de Waldheim for some fusiform Foraminifers occurring in great

# abundance in the white Carboniferous Limestone of Russia\*.

#### \* Oryctograph. Moscou, p. 126, pl. 13. figs. 1-11.

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1830. Fusulina cylindrica, Fischer, Oryctographie du Gouvernem. de Moscou, p. 17, pl. 13. figs. 1-5.

1830. Fusulina depressa, Fischer, ibid. figs. 6-11.

- 1845. Fusulina cylindrica, D'Orb. Géol. Russ. ii. (Palæont.) p. 15, pl. 1. fig. 1.
- 1846. Fusulina cylindrica, D'Orb. Foram. Foss. Vienne, p. 112, pl. 21. figs. 15–17.

1859. Fusulina cylindrica, Eichw. Leth. Rossica, 5th livr. p. 349.

In the 'Geology of Russia and the Ural Mountains,' vol. ii. p. 15, pl. 1. fig. 1, D'Orbigny figured and described the *Fusulina* cylindrica, and again in his 'Foram. Foss. Vienn.' p. 112, pl. 21. figs. 15–17; and it may be noticed that the figures show a re-

markable longitudinal, slit-like septal aperture, and that his description also points to a Nonionine style of shell.

In his great work \* on fossil microscopic remains, Ehrenberg has illustrated several varieties of Alveolina from the Carboniferous Limestone of Russia under the generic names "Alveolina" (the fusiform varieties) and "Borelis" (the more globular forms): most of these he recognized in 1842 and 1843<sup>+</sup>, comparing them with the Melonia sphæroidea of Blainville; and he stated also that Fusulina was a closely allied shell (Bericht. 1842, p. 274). He has also, in the 'Mikrogeologie,' figured several natural siliceous casts of a shell, which he also terms "Alveolina" and "Borelis," according to their fusiform or spherical shapes, but which at first sight appear to belong to a Nonionine Foraminifer, such as D'Orbigny described his "Fusulina" to be. These casts indicate the presence of a large slit-like aperture in the shells to which they belonged; and the lateral portions of the chambers taper off more or less rapidly. Of this Nonionine form Ehrenberg's figures illustrate five varieties, namely-

- 1. Alveolina prisca, *Ehrenb*. Mikrogeol. pl. 37. x1. figs. 1, 2 (the shell of the *Alveolina* of this name is also figured on the same plate).
- 2. Borelis labyrinthiformis, *Ehrenb*. Monatsb. Berlin, 1843, p. 106; Mikrogeol. pl. 37. XI. fig. 3.
- 3. Borelis Palæolophus, Ehrenh. Mikrogeol. pl. 37. x1. figs. 4, 5.
- 4. Borelis Palæophacus, Ehrenb. Mikrogeol. pl. 37. x1. fig. 6.
- 5. Borelis Palæosphæra, Ehrenb. Mikrogeol. pl. 37. x1. figs. 7, 8.

Four of these vary merely in the gradually greater compression of the shell (their order, if arranged according to the amount of compression, being fig. 1, fig. 7, fig. 6, and fig. 4).

Ehrenberg's Alveoline shells from the Carboniferous Limestone are—

1. Borelis princeps, Ehrenb. Monatsb. Berlin, 1842, p. 274; Mikrogeol.

pl. 37. x c. figs. 1-4.

\* Mikrogeologie, von C. G. Ehrenberg. fol. Leipzig, 1854. † Monatsberichte Akad. Wissensch. Berlin, 1842, p. 273; 1843, p. 105.

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Alveolina montipara, Ehrenb. Mikrogeol. pl. 37. x. c. figs. 5, 6.
 Borelis sphæroidea?, Ehrenb. Monatsb. Berlin, 1842, p. 274; Mikrogeol. pl. 37. x. d. figs. 1-4.
 Borelis constricta, Ehrenb. Monatsb. Berlin, 1842, p. 274; Mikrogeol. pl. 37. x. d. figs. 5, 6.
 Alveolina prisca, Ehrenb. Monatsb. Berlin, 1842, p. 274; Mikrogeol. pl. 37. x. d. figs. 7-9.

Nos. 2 and 5 differ from the others in being fusiform. No. 4 appears to be the same as the Fusulina Hyperborea, Salter, Belcher's Arctic Voyage, 1855, ii. p. 380, pl. 36. figs. 1-3. We have examined (with the assistance of Mr. George West) the structure of some Russian specimens equivalent to No. 3, and find them to be really Alveolina, but having the following interesting features, which Mr. G. West, who so well knows the characters of Alveolina, having worked with Dr. Carpenter on that subject, recognized and pointed out to us. In this palæozoic Alveolina the chambers have a simple character as compared with those of the recent Alveolina: the transversely long chambers are divided, by comparatively few secondary septa, into rather large compartments, the gibbous roofs of which give a faintly nodular appearance to the surface of the shell; whilst the recent Alveolina (see Dr. Carpenter's Monograph on this species, Phil. Trans. 1856, pl. 28. fig. 23) has its chambers divided into very numerous narrow oblong cells, giving a striated appearance to the shell. An analogous difference in structure is observed (as Mr. G. West has also remarked to us) between the simple and the compound Orbitolites, as is well shown in Dr. Carpenter's Monograph on the Orbitolites in the Phil. Trans.

# 1856, pl. 5. figs. 1 & 6.

In some shells the septal apertures may be seen obscurely as minute round openings; but in other individuals the principal aperture of the middle chambers forms a slit-like opening, as shown by D'Orbigny. If the casts figured by Ehrenberg bore small offshoots on the casts of the lateral portions of the chambers, answering to intercommunicating passages, they would then appear to correspond more exactly to the interior of these curious *Alveolinæ* than they now do.

Another old Alveolina is Ehrenberg's Borelis (Melonia) sphæroidea (Monatsbericht. Berlin, 1843, p. 105; and Mikrogeol. pl. 37. IX. A. figs. 1-3), obtained by him from the yellow "Melonien-Jurakalk" of the Kaiserstuhl, Baden. In this specimen the figured sections are those of the simple form; but the exterior has much of the aspect of a compound Alveolina. The recent Alveolina Melo (from Karst, near Trieste) is figured, for

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comparison, in the 'Mikrogeologie,' pl. 37. 10. fig. 1 a-f, under the name of *Borelis* (*Melonia*) *Melo*.

All the Alveolinæ, recent and fossil, that we have yet seen present but one specific characterization in their structure, however much their external form may vary in shape from round to cylindrical, or in size from the dimensions of a grain of sand to one or more inches in length. For nomenclatorial purposes the first-established specific appellation, accompanied by varietal names, will serve well — Alveolina Melo, varr. sabulosa, elongata, &c. For particulars as to its structure we refer the reader to Dr. Carpenter's Monograph on Alveolina in Phil. Trans. 1856.

**XVIII.**—Notes on the Hydroid Zoophytes. By Prof. Allman.

1. On the Locomotive Sexual Zooid of Dicoryne conferta.

IN the 'Annals of Natural History' for November 1859 I described, under the name of *Dicoryne*, a new genus of Tubularidan Zoophytes, assigning to the species on which I founded the genus the name of *stricta*.

Since then, Mr. Alder has obtained perfect specimens of a zoophyte which in his valuable "Catalogue of the Zoophytes of Northumberland and Durham" he had previously described under the name of *Eudendrium confertum*, and has satisfied himself that my *Dicoryne stricta* is identical with the *Eudendrium confertum* of that work.

Having recently seen, in the possession of Dr. Strethill Wright,

specimens of the *Eudendrium confertum* sent to him by Mr. Alder, I have no hesitation in assenting to Mr. Alder's view of the identity of the two animals—an identity which I did not before recognize in consequence of the original description and figure of *Eudendrium confertum* having been apparently given from imperfect specimens, as no notice is taken in them of the very characteristic proliferous polypes (*Gonoblastidia*, Huxley). While, however, there can be no question as to the validity of

the genus *Dicoryne*, the specific name of *stricta* which I gave to the zoophyte must be abandoned, and that of *conferta*, which had been assigned to it by Mr. Alder, its discoverer and original describer, retained.

When I published an account of this remarkable genus, I had seen only male specimens; since then, however, female individuals have fallen into my hands, and I have been enabled to make a more complete investigation of the structure of the gonophores and of the phenomena connected with the sexual reproduction of the zoophyte.

# ZOOLOGY, BOTANY, AND GEOLOGY.

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

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