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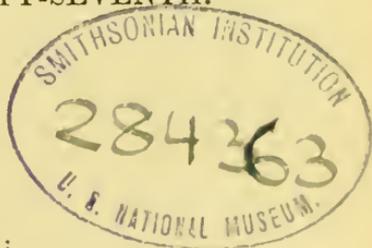
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Quod si cui mortalium cordi et curæ sit non tantum inventis hærerere, atque iis uti, sed ad ulteriora penetrare; atque non disputando adversarium, sed opere naturam vincere; denique non belle et probabiliter opinari, sed certo et ostensive scire; tales, tanquam veri scientiarum filii, nobis (si videbitur) se adjungant.—*Novum Organum, Præfatio.*

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SOLD ALSO AT THE APARTMENTS OF THE SOCIETY,

MDCCCLXXXI.

41. SILURIAN UNISERIAL STOMATOPORÆ and ASCODICTYA. By GEORGE ROBERT VINE, Esq. (Communicated by Professor P. MARTIN DUNCAN, F.R.S., F.G.S.) (Read June 22, 1881.)

THE genus *Alecto* was founded by Lamouroux in 1821 for a group of adherent Polyzoa. In 1814 Leach had used the word *Alecto* for a genus of Echinoderms; and Mr. Hincks says that it is still employed in connexion with the Crinoidea. On this account its further use for species of Polyzoa is objectionable. In 1825 Prof. Bronn used the word *Stomatopora*, and in 1826 Goldfuss used *Aulopora*, as names for individuals of the same genus as that founded by Lamouroux. For uniserial species d'Orbigny employed Prof. Bronn's name; but Blainville, Johnston, Milne-Edwards, Busk, and DeFrance used the original word "*Alecto*" for species described by them in their various writings.

The generic characters of *Stomatopora* have been given by various authors; and additions have been made from time to time. The rather full description given by Goldfuss\* of *Aulopora dichotoma*, together with figures of the species, renders identification comparatively easy. But somehow there has been a confusion in later identifications, and the *Aulopora intermedia* † type of Münster has been mixed up with Goldfuss's type. Both of these are present in the Jurassic formation; and it is, I will admit, rather a difficult matter to say where the one ends and the other begins. If, however, authors would distinguish between the two types, we should be able to get at the true range of the species, because each has an individual facies of its own. Hall, in describing the species found in the Trenton Limestone of America ‡ (Trenton Falls, Oneida county), makes this distinction:—In *Alecto inflata* we have the tubes short and individually separate; whilst in *Aulopora arachnoidea* the tubes are not distinct or separated from the general consistence of the branch. Jules Haime, in his descriptions of the fossil Bryozoa of the Jurassic rocks, places the whole of his species under one genus; and I prefer this method rather than object to it. Thus, *Stomatopora antiqua* from the Inferior Lias of Valière, *S. Terquemi* from the Inferior Oolite, and *S. Bouchardi* from the Oxford Clay are of the *Aulopora intermedia* type; and this holds good with species found in our own country. *Stomatopora dichotoma*, *S. dichotomoides*, D'Orb., and *S. Waltoni* are of the same type as that given by Goldfuss as *Aulopora dichotoma*. In *S. Desondoni*, Haime, from the Inferior Oolite of Longwy, we have a passage-form between *Aulopora intermedia* and the genus *Proboscina*, and then species of *Proboscina* passing by gradations, with a tendency on the one hand to the *Idmonææ*, and on the other to the larger

\* Petrefacta Germaniæ, p. 218, pl. 65. f. 2.

† Ibid. p. 218, pl. 65. f. 1.

‡ Palæontology of New York, vol. i. p. 77.

*Stomatopora*. There are in all the species and genera named individual characters, if isolated, that would indicate affinities in the whole group; and Mr. Hincks is wise in grouping all these genera under one family name, that of the Tubuliporida.

Prof. H. Alleyne Nicholson, in working out material submitted to him for examination by Mr. U. P. James, of Cincinnati, and also material collected by himself, saw fit to rename the species of Hall *Hippothoa inflata*, and, according to his description, shifted the species from the suborder Cyclostomata to that of the Cheilostomata of Busk. I could not from the first agree with the Professor; but I was unable to dispute the point raised by him otherwise than by the mere expression of opinion; for up to the present time no record has been given of species of *Stomatopora* found in our own Palaeozoic rocks. I am now able to carry back the true uniserial *Stomatopora* to the Lower Wenlock Shales of Shropshire.

It may be as well to say a few words about the material used by me for this and other papers (to follow) on Silurian Polyzoa. It is now pretty generally known that, for the purpose of assisting Mr. Thomas Davidson, F.R.S., in his labours on the Silurian Brachiopoda, Mr. George Maw, F.L.S. and F.G.S., of Benthall Hall, Shropshire\*, has had washed and carefully picked, for Brachiopoda, about 18 tons of Wenlock shales. The *debris* of these washings were after this laid aside for the use of other specialists. Some time since I applied to Mr. Davidson, and afterwards to Mr. Maw (Mr. Davidson supporting my request), for some of this refuse, for the purpose of working out stratigraphically the Polyzoa and smaller Actinozoa. My request being granted, Mr. Maw sent me on the 19th of March over two hundredweight of the *debris* for this purpose. I intend to use the whole of this material honestly; for I feel convinced that it can be only by labours such as these that a true idea of the abundance of the Polyzoal life of former epochs can be obtained; and, though picking out fragments from such a mass, by the aid of a hand-glass, may be both painful and tedious, I shall prefer to work on different groups, as material accumulates, rather than delay writing till the whole has been picked. I have already gone over about thirty pounds of the *debris* from the eleven localities and horizons; and it may be interesting, as showing the difference between the shales of the Carboniferous and the shales of the Wenlock series, when I say that a single pound of unwashed Hairmyres clay would yield me in the washing more individual specimens than I have been able to get from the thirty pounds of the Wenlock *debris*. In the Carboniferous the fragmentary organisms are tolerably well preserved and perfect; in the other the Polyzoal remains seem to have been much waterworn, but, with the exception of one locality, not sufficiently injured to prevent identification.

We are indebted to Prof. Hall for the first indication of the existence of uniserial *Stomatopora* in Silurian rocks. It is quite

\* See Geological Magazine, Jan., March, &c. 1881.

possible that Lonsdale and other workers on the Silurian organisms may have had a previous knowledge of the fact of their existence in these rocks; but no detailed account was furnished. For the working-out of these and other forms of *Stomatopora* we are equally indebted to Prof. Nicholson, M.D., F.G.S., &c.

*Silurian Stomatopore.*

1. STOMATOPORA INFLATA.

*Alecto inflata*, Hall, Palæont. of New York, vol. i. p. 77, pl. xxxi. figs. 7a, b, = *Hippothoa inflata*, Nicholson, Ann. & Mag. Nat. Hist. Feb. 1875, pl. xi. figs. 1, 1a.

"*Zoarium*\* attached, arachnoid; *zoecia* short, much expanded above, contracting at the aperture and narrowing rapidly below; orifice large, opening obliquely upwards."

This is Hall's description of his species. Nicholson says that the branches of his specimens are linear, and the "cells uniserial and pyriform, each springing by a contracted base directly from the cell below: about four cells in the space of one line." There is nothing, however, in his description that would ally the species with the *Hippothoe*; but in working out my own Upper-Silurian types I have given prominence to every feature that had any tendency to a Hippothoid character.

The geological position of Hall's species is the Trenton Limestone. Nicholson's specimens are from the Hudson-River Formation, Cincinnati Group.

2. STOMATOPORA DISSIMILIS, mihi. Figs. 1-8 (p. 616).

*Zoarium* adnate, branching, generally attached to stems of Crinoidea, very rarely to broken shells: branches linear, sometimes wavy and anastomosing. *Zoecia* invariably uniserial, and, in the best preserved, very finely ribbed transversely; the oral extremity slightly raised; orifice circular or subcircular. *Ooecial* cells rather ventricose and strongly ribbed (?). Each normal *zoecium* about half a line; average about 6 to 3½ lines.

*Loc.* Upper Silurian; "Buildwass beds," Harley, near Wenlock, rather rare; also base of Wenlock shale, Buildwass Bridge, Shropshire, rather common.

I have not found any specimens of this species in any other of the eleven localities which I have searched for Polyzoa. In searching the material from these two localities, I found it to my interest to examine on both sides every fragment of shell and Crinoid that came under my glass; the consequence of this is that I have specimens, more or less perfect, of about fifty colonies. The drawings are made from three of these, because they afforded me better facies than the others. What I have given are characteristic of the whole.

\* To present a uniformity in the descriptions, I change the exact words of authors to those in present use: thus, Hall's word "Coral" is changed to *Zoarium*, "Polyzoary" of authors to the same.

Figs. 1-3.—*Stomatopora dissimilis*, Vine, from the *Buildwas beds*,  
Upper Silurian, Shropshire.

Fig. 1.



Fig. 2.

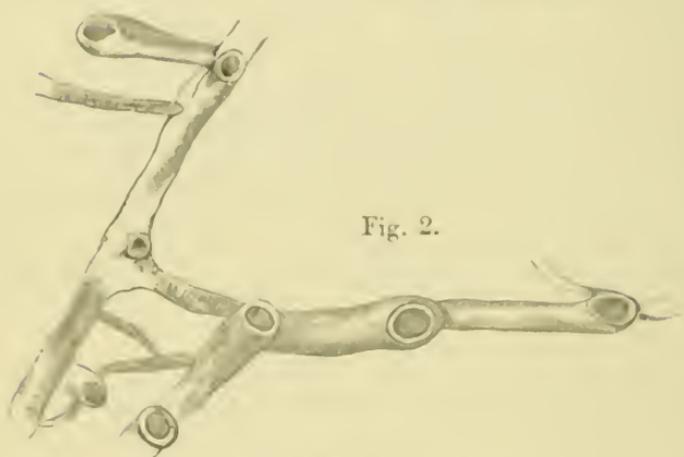
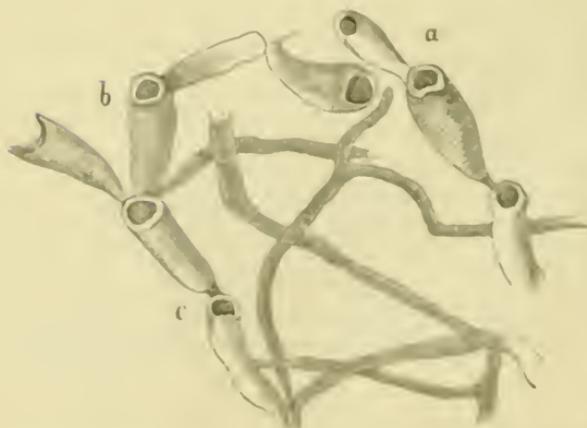


Fig. 3.



- |                                     |   |
|-------------------------------------|---|
| 1. Colony adherent to Crinoid stem. | } Each of these colonies has been drawn with the Camera lucida, from three separate specimens on Crinoid stems, the habit of each colonial growth being somewhat dissimilar in character. |
| 2. " " " "                          |   |
| 3. " " " "                          |   |

Fig. 4.

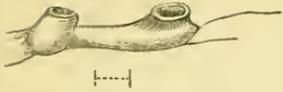


Fig. 5.



Fig. 6.

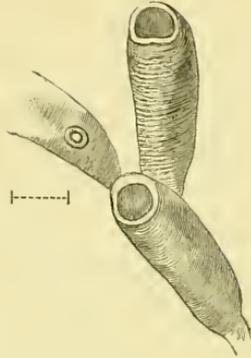
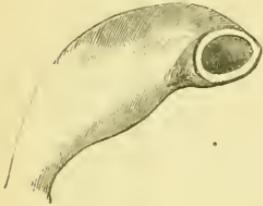


Fig. 7.



Fig. 8.



4. Profile of two cells from No. 3 colony, only lower down on specimen.  
 5. Magnified cell on same colony (fig. 3, a).  
 6. Three cells from same colony (fig. 3, b).  
 7. Cell from same colony, with caudate elongation (fig. 3, c).  
 8. Cell from another colony. The stoloniferous processes on specimen No. 3 do not belong to the Polyzoon colony, but to *Ascodictyon*. Upper Silurian, Buildwass beds, base of Wenlock shale, Shropshire.

The habit of the colonial growth, as given in fig. 1, is similar to that of *Aulopora dichotoma*, Goldf. Generally speaking, about every second cell gives origin to a fresh one; and this is the beginning of a new branch. I cannot, however, give this as a character, on account of its variableness. The origin of fresh colonies of this beautiful species is a most interesting study. Without speaking positively on this point, I have in one small fragment probable evidence that clusters of cells are developed from one of the "rosettes" of *Ascodictyon stellatum*, Nich. and Ether.\* Around this cluster primary cells of various colonics are disposed; some colonies have a linear arrangement of from three to five cells; the primary cells are also disposed singly on different parts of the fragment of broken shell; a larger mass of cells clustered in one spot give origin to several linear branches of what I am disposed to believe are new colonies. It may, however, be possible to explain this feature by stating that one rosette gives origin to several linear branches, and the whole clustered together would be the parental nucleus of one colony variously disposed. There is sufficient evidence to show that some colonies at least sprang from an independent primary cell.

Amongst living *Stomatopora* a most remarkable feature is shown in the figures of *S. fasciculata*, Hincks, pl. lix. figs. 4, 5†. In his descriptive text (p. 441) Mr. Hincks separates this from all other

\* Ann. & Mag. Nat. Hist. June 1877.

† Hincks, Brit. Marine Polyzoa, vol. ii.; text, vol. i.

known species, and places it in a division by itself (*C. Colony clustered*). In the figure there are several peculiar clusters of cells, including from two to five or seven cells. There are no stoloniferous processes. In comparing the feature given here by Hincks with that of Nicholson's figure of *Ascodictyon stellatum*, and both of these with my own specimen, I cannot arrive at any other conclusion than that some of the *Ascodictya* of the Palaeozoic rocks are in some way homologous with the cluster found upon Hincks's unique and solitary specimen of *S. fasciculata*.

The profile of two cells, fig. 4, shows the true Stomatoporous development. There are some cells in fig. 3 that are of a most peculiar character. They differ in a few particulars from other cells; and these I have ventured to suggest may be the *oocœia* of the colonies. I may, or I may not, be right in my conjecture on this point. Unless these be *oocœia*, I have not been able to trace in any other cells the least indication of ovarian chambers. 5 is a good illustrative example of the cell referred to. Other points of structure are alluded to in the description of the figures.

In the *Annals and Magazine of Nat. History* for June 1877, Messrs. Nicholson and Etheridge, Jun., described and figured a most peculiar and "anomalous genus of Palaeozoic fossils." The name given to the group was *Ascodictyon*; and several species were described as found in Devonian and Carboniferous rocks. The systematic position and affinities of the fossils were not established by the authors when the paper was written. From material in my own cabinet I ventured to suggest, in a letter to Prof. Nicholson, what, judging from the Carboniferous fossils, I believed to be the probable affinities. I have now discovered in the Silurian shales of Shropshire several specimens of the species given by Nicholson; and so carefully are the characters of the Devonian fossils made out, that I can trace in the Silurian specimens a most remarkable resemblance. In the stellate rosette and stoloniferous processes there are differences so slight that I was inclined to place my own fossils under the same generic and specific names, distinguishing one only with a varietal term\*.

### 3. ASCODICTYON STELLATUM, Nich. & Eth., Jun.

I have only two specimens of this type. There are a few differences, which it may be well to indicate by giving it the varietal name, *siluriense*, mihi.

Colony composed of calcareous clusters of ovoid cells, having a somewhat stellate character; each cluster containing from four to seven cells, which are connected together by creeping filamentous cords, some of which anastomose at intervals.

*Lac.* Buildwas beds, near base of Wenlock Shale, Shropshire.

\* Since this was written, I have been able to work out fuller details of this most remarkable group; and I may add that Professor Nicholson has furnished me with specimens of his so-called *Hypozoa cylata*, particulars of which will be given in a future paper on the *Palyzoa* of the Wenlock Shale.

## 4. ASCODICTYON RADIANS?, Nich. &amp; Ether. (Provisional placement.)

I have several colonies of this beautiful type apparently similar to those found in the Carboniferous rocks of Scotland. The colonies are not so prolific, however, in the Silurian as they are represented to be in the East Kilbride district. In the Silurian the clusters rarely exceed two or three; in many cases there is only one stellate group of "elongated vesicles." For the present I merely record their discovery, reserving more detailed description for some future time when my material is better worked.

*Loc.* Buildwass beds, near base of Wenlock Shale, Shropshire.

*Hab.* On stems of Crinoidea and fragments of shell.

Without committing myself to any systematic classification (other than that suggested in the text) of these peculiar fossils, I think it would be unwise and ungenerous on my part to conclude this paper without speaking most approvingly of the labours of Prof. Nicholson and Mr. Robert Etheridge, Jun., in the same direction as my own. Prof. Nicholson remarks, in the paper on *Ascodictyon*\*, that this "genus, so far as our present knowledge goes, is confined to the Devonian and Carboniferous periods." I am now able to extend its range.

## ASCODICTYON, Nich. &amp; Ether. Jun.

Upper Silurian.....	<i>A. stellatum</i> ,	var. <i>siluriense</i> , mihi. ....	Shropshire.
Middle Devonian...	<i>A. stellatum</i> ,	Nich. & Eth. ....	Hamilton, Ontario.
" "	<i>A. fusiforme</i> ,	" "	" "
Upper Silurian.....	<i>A. radians?</i> ,	" "	my own cabinet.. Shropshire. "
Carb. Limestone ...	<i>A. radians</i> ,	" "	" " Scotland.
" "	<i>A. stellatum</i>	" "	" " "

## STOMATOPORA, Bronn, uniserial species.

Lower Silurian.....	<i>S. inflata</i> , Hall .....	Trenton Limestone, America.
" "	<i>S. inflata</i> , ( <i>Hippothoa inflata</i> , Nich.) .....	Hudson-River For- mation.
Upper Silurian.....	<i>S. dissimilis</i> , Vine; my own cabinet .....	Buildwass beds, Shropshire.
Permian .....	<i>S. Voigtiana</i> , King.	Humbleton, York- shire.

## DISCUSSION.

The PRESIDENT stated that very important results were being obtained from these washings of Mr. Maw's of Upper Silurian rock. Some of those obtained by Mr. Davidson were of the highest value. *Aulopora* had been made a receptacle for very various forms.

Prof. DUNCAN said that the value of Mr. Vine's researches was very great. The numbers of Polyzoa produced were very great; and some of the *Heteroporeæ* were singularly recent in aspect.

\* Ann. & Mag. Nat. Hist. June 1877.