

has hitherto been done towards explaining the causes of the phenomenon. When the above observations were made I was not aware of any instance of a change in the direction of the spiral; but since then, Professor Morren of Liege has pointed out to me the occurrence of a double direction in the spire formed by the twisting of the tendrils of *Bryonia dioica*; and I have subsequently observed in the tendrils of a species of *Passiflora* a twisting not only in two opposite directions, but in alternately different directions for five or six times to the end of the spire.

XLII.—*On the Tentacular Classification of Zoophytes.* By
JOHN HOGG, Esq., M.A., F.R.S., F.L.S., &c.

IN his able and beautiful work on the ‘British Zoophytes,’ Dr. George Johnston has reviewed most of the classifications that have as yet been brought forward for those extremely interesting animals, which have been generally called Polypes (*Polypi*) by most French naturalists, as well as for their *structures* or *habitations*, that have received, of late, the common appellation of Polyparies (*Polyparia*) from the same writers.

In the first place I may remark that three methods of classification present themselves to the investigator of this portion of natural history; first, that which is derived from the Polyparies or dwellings of the animals;—the second is taken from the natural organization and forms of the animals alone, that is to say, from the Polypes themselves; and the third, that method which may be founded on a combination of certain characters deduced both from the animals and likewise from their dwellings.

Now, as an example of the first method, in my sketch of the ‘Natural History of the vicinity of Stockton-on-Tees,’ which was written in the spring of 1825, but not published until the year 1827, I introduced an arrangement of many of our native Polyparies, grounded chiefly on the views of our own illustrious zoophytologist, the accurate Ellis; and in order that it may be clearly understood, I trust I may be pardoned for here subjoining an outline or synopsis of it.

POLYPARIA.

Section I. SIMPLICIA.

Family I. *Corallinoidea*.

Order I. VESICIFERA.

Genus. Sertularia (of the old authors).

Order 2. TUBIFERA.

Genus. Tubularia.

Order 3. CELLIFERA.

Genera. Cellularia and Flustra.

Family II. *Coralloidea*.

Order 4. PORIFERA.

Genera. Cellepora and Millepora.

Order 5. STELLIFERA.

Genus. Madrepora.

Section II. COMPOSITA.

Order 6. CORTICIFERA.

Genus. Corallina.

Family III. *Creatoidea*.

Order 7. OSCULIFERA.

Genus. Alcyonium.

Order 8. GELATINIFERA.

Genera. Spongia and Spongilla.

It will be obvious to every one acquainted with Ellis's work on Corallines, that the first three orders correspond with, and are nearly the same as, the primary divisions of that author; viz. 1. Vesiculated Corallines; 2. Tubular Corallines; and 3. Celliferous Corallines. And indeed, the above, if considered solely in relation to the British Polyparies or the inanimate and unorganized habitations of the animals—or as they have been aptly termed *Polypidoms* by Dr. G. Johnston—may perhaps prove to the student as useful an arrangement as any other which has hitherto appeared.

Next, in pursuance of the second method of classification, and which most zoologists will at this day coincide with me as being the only true foundation for the systematic arrangement of zoophytes, I here venture to classify them according to their tentacles (*Tentacula*); which organs, considering their structure, their great use, and functions, I have, for several years past, accounted as presenting the best and most natural

forms and characters for that purpose. Although Dr. Arthur Farre, by separating this class of animals into two divisions—the *Ciliobrachiata* and the *Nudibrachiata** Polypi—first publicly called the attention of the scientific world in his valuable paper in the ‘Philosophical Transactions’ for the year 1837, to the importance of the tentacula, which he has named *brachia*, with respect to a more correct classification of them.

Class ZOOPHYTA.

Sub-Class I. BINOSCUA.

Tribe I. *Tentaculis armatis.*

Order 1. CILIOTENTACULA.

Genera. Flustra, Cellularia, Cellepora, Plumatella, &c.

Sub-Class II. UNOSCUA.

Order 2. NODITENTACULA.

Genera. Hydra, Sertularia, &c.

Order 3. PINNITENTACULA.

Genera. Gorgonia, Pennatula, Alcyonium, &c.

Order 4. GLANDITENTACULA.

Genus. Coryne.

Tribe II. *Tentaculis nudatis.*

Order 5. PLANITENTACULA.

Genus. Tubularia, &c.

Order 6. TUBITENTACULA.

Genera. Actinia, Madrepora, &c.

A few observations for the sake of briefly explaining this classification will be sufficient. The first subclass comprehends those zoophytes that are endowed with a higher and more perfect organization, and possess both a separate mouth and a distinct anus, which is signified in the appellation of *Binoscula*. As far as we are at present acquainted with these animals, they all have their tentacles armed, or fringed, with vibratory cilia.

The second subclass includes the *Unosculous* Zoophytes, or those which possess only a single hole or orifice, serving as well for their mouth as their anus: they are by far the most numerous. The order 2, *Noditentacula*, represents such ani-

* These terms are both somewhat objectionable, as being likely to be confounded with *Ciliobranchia* and *Nudibranchia*, names previously in use among the French writers.

mals as have their tentacula studded with minute projections, knots, or nodules, which are also said to be sometimes furnished with little bristles or setæ; for example, the *Hydræ* and the *Sertulariadae*. The order 3 embraces the genera *Gorgonia*, *Pennatula*, and others, whose animals retain well-defined pinnæ along their tentacles. But in order 4, we have, I believe, as yet discovered only one genus, *Coryne*: here the tentacula are furnished at their tips with small glands.

The second tribe possess tentacles unarmed, and quite devoid of any projections or appendages whatsoever; in which, the order 5, *Planitentacula*, comprising the *Tubulariæ*, exhibit perfectly smooth and plain tentacula; and the order 6, *Tubitentacula**, as the *Actiniadae*, have their tentacles hollow, perforated at both extremities, and much resembling tubes or siphons.

I must however beg distinctly to state, that I propose this classification merely as an attempted, but by no means as a perfect one; because there may, not improbably, occur other variations and forms in the tentacula of even our British zoophytes with which I am now unacquainted, and which may necessarily lead to some modification in one or more of the previous orders; but for those of the foreign genera, some additional orders will doubtless have to be hereafter instituted.

From this systematic arrangement the *Corallines* and *Sponges* are excluded; because in the absence of all marks of any animal organization, and of every distinct animal property as yet discoverable in them, I must agree with Doctors Link, Müller, and Johnston, and several other distinguished authors, in restoring them to the Vegetable kingdom.

* Some one may perhaps be inclined to find fault not only with the nomenclature here used, *Zoophyta Ciliotentacula*, *Tubitentacula*, &c., but also with founding a classification principally upon the variations and differences which are discernible in *one* set of organs; him I would remind of the Linnaean arrangement of Insects, where he will notice *Insecta Lepidoptera*, *Neuroptera*, and several more variations in the *ptera* or wings alone. And I need scarcely add, that this arrangement of the immortal Swede will, in all probability, long survive many of the modern systems, which are grounded on the more numerous characters afforded by *several* organs.



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