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[From the PROCEEDINGS OF THE ZOOLOGICAL SOCIETY OF LONDON,  
February 3, 1903.]

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On the Coelenterata collected by Mr. C. Crossland<sup>1</sup> in Zanzibar.—I. *Ceratella minima*, n. sp. By SYDNEY J. HICKSON, N.A., F.R.S., F.Z.S., Beyer Professor of Zoology in the Owens College, Manchester.

(Plate XIII.<sup>1</sup>)

Our knowledge of the remarkable family of Hydrozoa, the Ceratelladæ, has been ably summarized in the memoir published by Prof. Spencer in the Transactions of the Royal Society of Victoria, 1892 (4). The hitherto recorded species are distributed as follows:—*Ceratella fusca*: Coogee, Boncli (N.S.W.), Broughton Island, Flinders Island, Lord Howe Island. *C. procumbens*: Gape of Good Hope, Natal. *C. spinosa*: Port Natal. *Chitina ericopsis*: New Zealand. *Dehitella atrorubens*: Delagoa Bay. In brief, the family has hitherto been known to occur only in Australasian and S. African waters.

The discovery of a new species of the genus *Ceratella* in the tropical waters of the Zanzibar coast is in itself worthy of note, but especially so in view of the fact that it is associated with corals, alcyonarians, and other animals characteristic of the tropical belt of the East African coast. I am indebted to Mr. C. Crossland, of Glare College, Cambridge, who collected the three specimens during his recent expedition to Zanzibar, for permission to examine and describe them.

The African species of the family have not yet been accurately described, but the accounts of Gray (1) and Carter (2) are

<sup>1</sup> For explanation of the Plate see p. 116.

sufficient to show that the Zanzibar specimens should be described as belonging to a new species.

They appear to be most closely related to the Australian species *Ceratella fusca*, but differ from it in one or two characters which Spencer and his predecessors regarded as of generic importance.

The genus was defined by Spencer as follows:—Colony irregularly branching; more or less expanded in one plane; growing from a creeping base. Main stem flattened, branches rounded and beset with bracket-like hydrophores.

In *C. minima* from Zanzibar the main stem is riot flattened but perfectly cylindrical in form, and the hydrophores are so extremely reduced or rudimentary that they are little more than ridges on the proximal lips of the hydrophores. The branching, moreover, appears to be strictly in one plane, and the terminal branches are much more slender and delicate than in the other species. Before passing on to the specific characters, the size of the specimens must be considered.

The measurements are as follows:—

	Specimen A.	Specimen B.	Specimen C.
	mm.	mm.	mm.
Height of the colony .....	29	22	35
Maximum expanse of the branches .....	65	38	50
Diameter of main stem .....	1·2	0·75	1

The colonies of *Ceratella fusca* are from  $1\frac{1}{2}$  to 5 inches in height; the largest specimens of *C. procumhens* described by Carter were 11 inches long by 5 inches broad, and of *C. spinosa*  $4\frac{1}{2}$  inches long by 2 broad. The height of *Chitina ericopsis* is 14 inches, with a trunk (main stem) 1 inch in diameter. The size of *Dehitella* is not given by Gray, but from the figures it may be judged that it is larger than *Ceratella fusca*. From these figures it is clear that the Zanzibar specimens are much smaller than the average size of the adult colonies of the other species. Are they, therefore, to be regarded as young colonies or as the representatives of a dwarf species? If they are young colonies, it is quite possible that the main stem or trunk becomes somewhat compressed in the plane of branching as the colony grows; but the fact that all the three specimens obtained are of approximately the same size, suggests that they have reached or nearly reached their maximum growth. The dwarfing of the tropical species of a genus that is principally distributed in temperate waters is not without parallel in the group of Coelenterata. The very rudimentary character of the hydrophores, however, cannot be explained by the suggestion of immaturity, and must be regarded as of specific importance. It is true that no gonophores have been discovered in the specimens, but it is quite probable that, as in other Coelenterates of the tropics, their production is rapid and strictly seasonal, so that no argument can be deduced from this character, either for or against the theory of juvenility.

*The Colony.*—The branching is not very profuse, and strictly

confined to one plane (Pl. XIII. fig. 1). The main stem and the larger branches seem to have divided dichotomously with the pre-dominance of the most favoured branch. The terminal branches are very delicate, branches of 6 mm. in length gradually attenuating from 0.2 mm. to 0.1 mm. in diameter. Each terminal branch ends in a facultative growing point, and it appears probable that the growth is continuous. I have compared my specimens from Zanzibar with a beautifully preserved specimen of *Ceratella fusca*, for which the Manchester Museum is indebted to Prof. Spencer; and I have noticed that the Australian species is much coarser in appearance, especially in the region of the terminal branches. I have seen nothing in the Zanzibar species corresponding to what Spencer calls "The growing ends of the smaller branches" in *Ceratella fusca*, which are flattened in a plane at right angles to that in which the general growth takes place and are entirely devoid of zooids. It is possible that the difference may be accounted for on the supposition that in *Ceratella fusca* the growth is seasonal or periodic.

The branches of *C. minima* are invariably rounded. I have seen no evidence of a compression or flattening in any region. The surface is relatively smooth and free from any spines. The hydrophores are represented by very narrow ridges on the proximal border of the hydropores. The principal horny fibres, running longitudinally with a slightly spiral twist, may be clearly seen through the superficial ectoderm, and in the spirit-specimens give a ribbed appearance to the surface (Pl. XIII. fig. 2).

The Zooids are numerous on the terminal branches, less numerous on the thicker branches, and very scarce on the main branches, as in *Ceratella fusca*. On the terminal branches they are arranged slightly to one side of the two lateral lines at intervals of about one millimetre opposite or alternate to one another. A few zooids occur more irregularly distributed.

On comparing such a terminal branch with one of *Ceratella fusca*, it is at once apparent that in the Australian species the zooids are more numerous and much more irregularly distributed on all sides of the branch. Each fully expanded zooid projects about 0.7 mm. from the hydropore, and is about 0.14 mm. in diameter. It bears a variable number, but usually nine capitate tentacles, each about 0.1 mm. in length.

No gonophores were found on any of the three specimens I have examined. The skeleton in the terminal branches consists of one or two main longitudinal horny rods supporting numerous looping and irregular bands, which maintain the cylindrical form of the branch (Pl. XIII. fig. 3).

In the larger branches the main longitudinal rods are more numerous, and, being chiefly superficial in position, give a slightly spiral, longitudinally striated or ribbed appearance to the surface, in this respect offering a marked contrast to *Ceratella fusca*.

A series of sections through a small branch shows that these present a thin continuous coat of ectoderm covering the whole branch, as described and figured by Spencer in *Ceratella fusca*,

The arrangement of the canals and the general histology does not appear to differ materially from the description given by the same author; but as the state of preservation of the Zanzibar specimens was not perfect, a detailed and critical examination of the sections was not made. I was fortunate enough to find, however, a few nematocysts that were exploded but remained *in situ*. They are (Pl. XIII. fig. 4) very similar in form to the small nematocysts of *Millepora*, and exhibit a vesicle and neck 0·01 mm. in length, armed with four barbs or spines. The thread was invariably broken, and I have no means of measuring its extreme length.

The endoderm of the tentacles is solid.

The diagnosis of the species is as follows:—

CERATELLA MINIMA, sp. nov.

Colony probably erect, branching strictly in one plane, irregularly and not very profusely. The main stems and all the branches cylindrical in form. Hydrophores very slightly developed. Skeleton consisting of dark brown longitudinally disposed horny fibres, united by loops and bands, forming in the larger branches a dense and firm but flexible skeletal plexus.

Zooids situated slightly to one side of the plane of branching of the colony, alternately or in pairs, at distances of about 1 mm. on the terminal branches. Largest colony 29 mm. in height, with a maximum expanse of 65 mm.

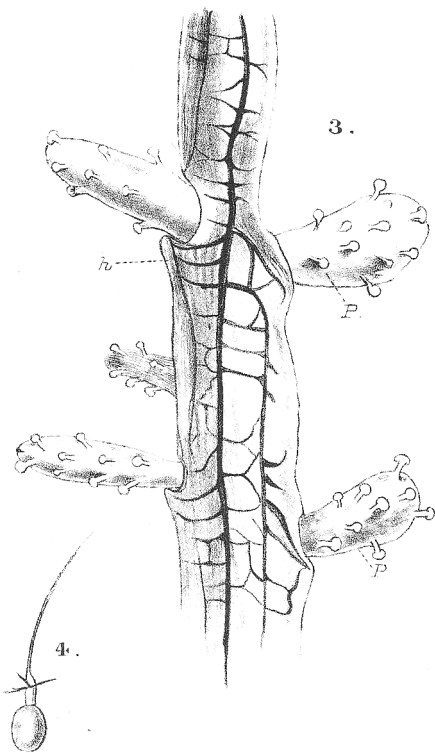
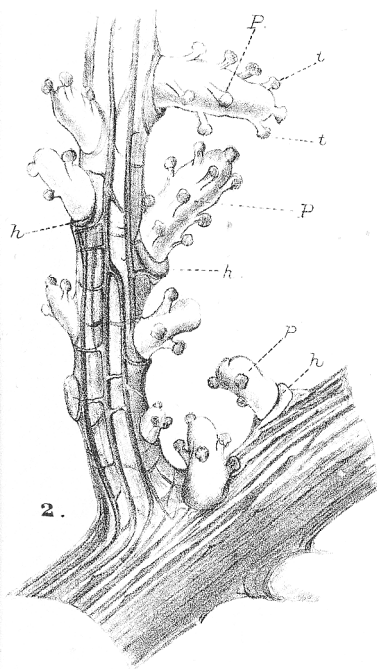
*Locality.* Zanzibar, shallow water.

#### LITERATURE.

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3. W. M. BALE.—Some new and rare Wydroida in the Australian Museum. Proc. Linn. Soc. N.S. Wales, 1889, p. 748.
4. W. B. SPENCER.—On the structure of *Ceratella fusca*. Trans. Royal Soc. of Victoria, 1892, p. 8.

#### EXPLANATION OF PLATE XIII.

- Fig. 1. Drawing of the whole colony of *Ceratella minima* (specimen A) twice the natural size. The base of attachment is covered by an encrusting polyceon.
- Fig. 2. A portion of a large branch and smaller branchlet taken from the region marked \* in fig. 1, more highly magnified, showing the polyps P partially extended, bearing an irregular number of knobbed tentacles, *t.t.* At *h.h.* are seen the rudimentary hydrophores. The figures show the general arrangement of the fibres of the horny skeleton. In the large branch they are closely crowded together. In the smaller branches the principal fibres are separated by considerable spaces but maintain a parallel arrangement.
- Fig. 3. A still smaller branch more highly magnified, in which there is only one primary longitudinal fibre.
- Fig. 4. One of the nematocysts of the tentacles. The diameter of the cyst is about 0·01 mm.



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Bale & Danielsson L<sup>td</sup> lith

GERATELLA MINIMA