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HYDROIDS.

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(With Plate LXIX.)

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I.

THREE-AND-TWENTY species of Hydroid Zoophytes were brought back from the Maldivian Islands by Mr Stanley Gardiner's expedition. Such a collection must at least have been worth considering from the faunistic standpoint, but, as it happens, this is not the only way in which the specimens have repaid examination. Some words at the outset on the points of interest in the collection will therefore not be amiss.

1. Two new facts are of some morphological importance as bearing on the relation of the gonotheca to the hydrotheca, and therefore on that of the blastostyle to the ordinary polyp.

There is in the collection a specimen of *Lictorella halecoides* carrying its gonothecae, which have hitherto been unknown. These gonothecae are remarkable by being in every way like the hydrothecae save that they do not take part in the regular arrangement of the latter and are nearly four times their size. Furthermore, though they do not, in the specimen, contain gonophores, there is at the bottom of each of them a hydranth, perfectly formed and to all seeming exactly like those in the hydrothecae except for its greater size¹. Indeed the suggestion arises that they may be giant hydrothecae and no more. But the impression that they make is undoubtedly that of gonothecae, there seems no other reason why giant hydrothecae should be found, and a strong argument for their having a gonidial function is found in the fact that the blastostyles of another Campanularian, *Halecium halecinum*, also carry hydranths at the end (2, p. 58). In that case, it is true, there are two hydranths to the blastostyle, but meristic repetition will probably account for this. The ripe gonotheca of *L. scandens*, though it is less hydrotheca-like than the present structure, is enough so to bridge over the gap towards more specialised gonothecae, and it is particularly interesting to notice that, according to Bale, its blastostyle has an open mouth (8, p. 759).

The meaning of these facts is clear. There can now be no doubt, as indeed there was little before, that the blastostyle is a modified hydranth, and the gonotheca a modified hydrotheca.

But while one species in the collection gives clear information on this point, there is another which would seem to raise the whole question anew. A *Syntheicum* (*S. maldivense*) found in several of the atolls has gonothecae of the kind which characterise the genus. That

¹ The ordinary hydranths are not well preserved.

is to say they arise *from within* perfectly normal hydrothecae, placed in a row with the others, but containing no hydranths. What is the meaning of this? Whether there were ever a hydranth in the hydrotheca or not it is as yet impossible to say, though it is known that hydranths may die and be replaced, but at present the presumption must be that there was, and that its place has been taken by the blastostyle. The question is rather what may be the relation of the latter to the former¹. Two things suggest themselves. Either the blastostyle may be an outshoot of the hydranth comparable to the gonophore-stalk of *Tubularia*, or it may be equivalent to the hydranth, and thus show a normal case of the same process which leads to the occasional replacement of one of the limbs of an arthropod by a limb of a kind found in another part of the body (9). There are, however, some considerations which make the latter of these two cases the more likely. If the blastostyle were an outshoot of the hydranth there would be no more reason for its having a theca than for a tentacle to be so covered. Again, in *Thecocladium* the same replacement of a hydranth by another member of the body takes place, only here it is a branch that grows out of the hydrotheca (6, II. p. 80). But the strongest witness to the unlikelihood of the gonophore-stalk suggestion is borne by the present new species of *Synthecium* in which, besides the gonothecae which arise from within hydrothecae, there are others growing from the stem between and among them. It is far more likely that these are homologous with the scattered gonothecae of other Campanularians, which we have traced through *Halecium* and *Lictorella* to whole hydranths, than that they represent gonophore-stalks borne formerly on the body of hydranths that have now disappeared, or were perhaps never developed when the stalks became scattered outside the hydrothecae.

2. Faunistic conclusions are hard to draw from a collection of Hydroids, and that for two reasons—the tendency in the group towards wide distribution, and the scantiness of our knowledge. At the same time there are undoubtedly strong distinctions between the faunas of certain localities, as for instance between that of the north of Australia and either that of the south of the same continent on the one hand, or that of Britain, for instance, on the other. It is therefore possible to discuss the affinities of any given locality to others, even though general conclusions as to the nature and limits of the regions have not as yet been reached.

No Hydroids were brought back from Minikoi, but the general character of its fauna in that group is, no doubt, well enough shown by the Maldive collection. This contains, as has been said, specimens of 23 species, of which 7 are identical with, or closely related to, North Australian forms, 5 to South Australian, 3 to New British, 3 to West Indian, 2 to North-east Atlantic, and 1 to a Cinghalese species². Thus the greatest likeness, so far as numbers show, is to the North Australian fauna. At the same time, in view of the very much smaller number of species known from New Britain (eight), the fact that as many as three in the far from large Maldive collection are also found in the former locality is very striking, especially as they have not hitherto been recorded elsewhere. Another interesting feature of the collection is that it shows nearly as much kinship to the fauna of the south of Australia as to that of the north, though these are very distinct from one another (6, 7). The finding of North-east Atlantic and of West Indian forms is not so noteworthy as it would be in a group with less tendency to the wide distribution of its species,

¹ Whether it were ever actually present or not.

any already known. Others are recorded from more than

² Some of the species are new and not closely akin to one part of the world.

which bear one to four hydranths each, but sometimes also breaks subdichotomously into stout limbs. The branches and the stalks of the hydranths start with some ill-marked rings. The male gonophores are bithalamic, one or a few springing from the body of a hydranth. The female gonophores are egg-shaped and grow in a cluster on a tentacleless hydranth.

This species is akin to *E. gracile* Allm., from the West-Indian region (5, p. 7).

Dredged in South Nilandu, Kolumadulu, and Mahlos Atolls, in 30, 24, and 22 fathoms respectively.

Order CALYPTOBLASTEAE.

Family **Campanularidae**. Subfamily **Campanularinae**.

Genus *Campanularia*.

3. *Campanularia serrulatella* n. nom. subsp.

Obelia serrulata Thornely (16, p. 453).

My specimens differ from Miss Thornely's only in two small points: (1) The teeth on the rim of the hydrotheca are sharper. (2) The floor is rather nearer the bottom of the cup. Of the two hydrothecae figured by Miss Thornely the right-hand one is more like mine in having slightly curved sides.

I do not regard this species as the *Campanularia serrulata* of Bale (8, p. 757), from which it differs considerably in the shape of the hydrothecae and in the mode of growth, which is tree-like, with irregularly dichotomous branching. It has therefore been necessary for me to give it a new name.

Dredged in Mulaku, Addu, and Suvadiva Atolls in 30, 25, and 42 fathoms respectively.

4. *Campanularia linearis* (Thornely) subsp. (16, p. 453).

My specimens differ from Miss Thornely's in two points only. (1) The longitudinal lines on the hydrothecae, which she found "usually," and thought to be owing to the collapsing of their delicate sides, are in mine always seen at the base of the teeth, from which they reach about one-third of the way down the cup, and are due to ridges. (2) The teeth are very sharp, not "blunted."

Dredged in Suvadiva Atoll in 20 and 37 fathoms, and in N. Male in 27. The N. Male specimens are smaller and more branched than those from Suvadiva.

5. *Campanularia cheloniae* Allm. subsp. (6, II. p. 22).

In my specimens the hydrothecae are somewhat wider than in the type. They were dredged in N. Male Atoll in 25 fathoms, on coral. Allman's were from the back of a turtle in an unknown locality.

6. *Campanularia junceoides* n. sp. (Pl. LXIX. fig. 2.)

Definition: A *Campanularia* whose hydrocaulus consists of strong stems with few branches and rare nodes, arising in a cluster from a branched hydrorhiza, and carrying large, narrow, deep, alternate hydrothecae set on brackets, from which they are not marked off by a joint but by a short, narrow stalk. The height is not more than 5 cm. in any of my specimens.

This species is near to *C. juncea* Allm. from Ceylon (4, p. 260), but differs in the rarity of the nodes, in the absence of a joint between the hydrotheca-stalk and its bracket, and in the smaller height.

Taken on the reef at Hulule, Male Atoll, and Goidu, Goifurfehendu Atoll, and dredged in Kolumadulu, N. Male, and S. Nilandu Atolls in 20—25 fathoms.

7. *Campanularia* sp.

The body of a black and white sea snake from Male is covered in the middle half of its length with a thick growth of a hydroid. Unfortunately the preservation of this hydroid is very bad, perhaps because it was already dead when the snake was caught. There is a branched, creeping hydrorhiza on the scales of the snake, which were being shed and bringing the growth away with them. **From this arise many hydrocaulus stems.** Primary branches come off irregularly on all sides of the main stem, and themselves bear secondary branches. On the stem and on the branches of both orders are shorter twigs with wavy walls. These twigs bear the hydranths, but the latter are in such a state of preservation that nothing can be certainly made out in them. There are, however, some indications of a delicate hydrotheca, and on this account I have placed the specimen here. Both branches and twigs are directed upwards at a sharp angle with the stem.

This partnership recalls the case of a small fish found by Alcock to be covered by a *Stylactis* (1). In the present instance, however, it would seem that the advantage must be all on the side of the hydroid, if indeed either party derive any benefit from the association. It is at least difficult to imagine a sea snake wanting any weapon but its own fangs.

Subfamily *Lafoeinae*. Genus *Lictorella*.

Schneider is, I think, wrong in uniting this genus with *Lafoea*. It differs not only in having a floor to the hydrotheca but in far more important points connected with the gonothecae, which arise from the same tube of the hydrocaulus as the hydrothecae, are like the latter in shape, and are scattered, and not clustered into a *coppinia* or *scapus*.

8. *Lictorella halecoides* (Allm.) subsp. (3, p. 472; 6, II. p. 35). (Pl. LXIX. fig. 3.)

The specimens differ from Allman's in two ways: (1) the side branches are not themselves branched. This, however, may depend on the smaller size of the colony. (2) The ends of the branches are divided into internodes, but only some of the hydrothecae have jointed stalks. The branches are pinnately arranged as in *L. cyathifera* Allm. and the Shetland specimens of *L. halecoides*, and not irregularly as in the Cape York specimens. The shape of the hydrothecae, though it is not so constant as in Allman's figures, is in some cases absolutely the same as in that author's specimens. I much doubt the distinctness of this species from *L. cyathifera* (6, II. p. 36).

The gonothecae have already been described in this paper (p. 836).

Dredged in Kolumadulu and N. Male Atolls in 24 and 20 fathoms respectively.

9. *Lictorella scandens* (Bale) subsp. (3, p. 758).

This species must be removed from *Lafoea*, where Bale placed it, and stand here on account of the characters which I have mentioned above. The present specimen differs from Bale's type in having no joint in the stalk of the hydrotheca. It was found as an overgrowth on *Synthecium tubiger* dredged in N. Male Atoll from a depth of 20 fathoms.

14. *Thuiaria attenuata* (Hincks) subsp. (14, p. 247).

Unlike that of Hincks' type, the hydrocaulus of this form is unbranched, consisting of simple stems without pinnae arising from a branched, creeping hydrorhiza. In all other respects it is exactly like the type.

Schneider puts this species in *Dynamena* (= *Sertularia*), but it agrees better with his definition of *Thuiaria*.

Dredged in 25 fathoms in N. Male Atoll.

15. *Thuiaria maldivensis* n. sp. (Pl. LXIX. fig. 6.)

Definition: A *Thuiaria* whose hydrocaulus is not pinnate, the stems, which may reach a height of 1 cm. and have no hydrothecae on the lower part and no nodes except one just below the hydrothecae, arising separately from a creeping hydrorhiza; while the hydrothecae are set at moderately wide intervals, opposite, and turned sharply outwards with a crease, a short free part, and a point on each side of the opening.

Dredged in Suvadiva Atoll in 31 fathoms.

Genus *Sertularia*.

Sertularia has priority over *Dynamena* as a generic name for this group of species.

16. *Sertularia digitalis* Busk (12, p. 393; 7, p. 101).

I can find no difference between my specimens and the type of this species as defined by Bale. As this author points out, there is a very great likeness between it and the *Desmoscyphus longithecus* of Allman from the West Indian region (5, p. 24).

Dredged in 20 fathoms in N. Male Atoll.

Genus *Idia*.

17. *Idia pristis* Lamouroux (15, p. 200; 7, p. 113).

The hydrothecae of my specimens are directed more sharply outwards than those of Allman's and have a more pointed outline than Bale's.

Dredged in Suvadiva and N. Male Atolls in 38 and 25 fathoms respectively.

Family **Plumularidae**. Genus *Aglaophenia*.

18. *Aglaophenia phoenicea* (Busk) subsp. (12, p. 398; 7, p. 159).

My specimens differ from Busk's, as figured by Bale, in the following ways: (1) the middle nematotheca is rather shorter and stouter, (2) the side nematothecae are more upright, (3) the sides of the hydrothecae are less deeply notched.

Dredged in Male, Addu, S. Nilandu, and Mahlos Atolls in 20—30 fathoms.

19. *Aglaophenia sinuosa* Bale subsp. (8, p. 790).

The middle nematotheca in the Maldive specimens has a wide, swollen end, unlike that figured by Bale.

Dredged in Male, Suvadiva, and N. Male Atolls in 25—38 fathoms.

20. *Aglaophenia delicatula* (Busk) sub.-sp. (12, p. 396; 7, p. 167).

This Maldive form differs from the type in that the side nematothecae are shorter and stouter and the side teeth of the hydrothecae rather better marked.

The corbulae of this species have hitherto been unknown. They are present in the specimen and are "open," consisting of hydrocladia bearing gonophores arched over by long alternate branches, each bearing a double row of nematophores.

Dredged in S. Nilandu Atoll in 25 fathoms.

21. *Aglaophenia maldivensis* n. sp. (Pl. LXIX. fig. 8.)

Definition: An *Aglaophenia* which has an irregularly branched stem and hydrocladia on all the branches but not on the stem below the branches; the hydrothecae with a wide mouth opening forwards, in the middle of the free side a strong, curved tooth and above this on each side three lower, wider teeth; the middle nematotheca falling far short of the mouth of the hydrotheca, free for about a third of its length, and having a rather narrow opening; the intrathecal septum nearly transverse to the hollow of the hydrotheca at its point of origin, which is about at the level at which the middle nematotheca becomes free; the side nematotheca flask-shaped; and the corbula egg-shaped, made up of six broad, alternate plates with openings between their notched edges.

Taken on the reef at Hulule, Male Atoll.

22. *Aglaophenia schneideri* n. sp. (Pl. LXIX. fig. 9.)

Definition: An *Aglaophenia* with the stem unbranched (?); the hydrothecae opening somewhat forwards, the opening of each with a strong, curved, crested tooth in the middle, and two shorter, weaker teeth at each side, the first of these being sundered by a wide, deep gap from the middle tooth; the intrathecal septum slanting; the middle nematotheca not nearly reaching the mouth of the hydrotheca, wide mouthed, free for a short distance only.

I have called this species after Prof. C. Schneider, in gratitude for his masterly handling of the problem of the simplification of the classification of Hydroids.

Dredged in Miladumadulu Atoll, in 24 fathoms.

23. *Aglaophenia gracillima* n. sp. (Pl. LXIX. fig. 10.)

Definition: An *Aglaophenia* with the hydrocaulus very slender and delicate; the hydrothecae far apart, their openings slightly expanded, looking towards the end of the hydrocladium, and guarded by nine, equal, rather narrow teeth; the middle nematotheca reaching at its end to within about a quarter of the length of the hydrotheca from the opening of the latter, adnate to the hydrotheca for the greater part of its length and widely open at the end; the side nematophores short, broad, and directed somewhat forwards; and the intrathecal septum nearly transverse.

The shape of the hydrothecae somewhat recalls those of *A. acacia* and *A. calamus* Allm. (6, i. pp. 38, 39).

The collection contains only some fragments, dredged in 28 fathoms in Miladumadulu Atoll.

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