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ON THE VALIDITY OF *ALCYONIUM SIDERIUM* VERRILL (COELENTERATA: OCTOCORALLIA)

by

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With 4 text-figures and two plates

INTRODUCTION

Verrill (1879: 199-200) described two specimens of *Alcyonium* collected on the Fishing Bank, east of Cape Cod, Massachusetts, in 80 fathoms. According to him "they form low, thick, lobular masses", "the base is somewhat spreading" and "the division into rounded or flattened lobes takes place close to the base". He is of opinion that "if not identical with *A. digitatum* of Europe, it is at least very closely related".

More than forty years later Verrill (1922: 20) returns to this question. This time he gives a drawing of one of these American colonies (his text-figure 3), and he has changed his mind regarding the relation to *A. digitatum*. He now thinks the species is "distinct from the common European species, *A. digitatum*, to which it is nearly allied". He named it *A. siderium*. It is a pity that Verrill omitted an exact study of the spicules and of other characters.

Deichmann (1936: 48-49) described the species more fully on the basis of "twenty-five specimens from nine localities off the coast of New England at depths varying from 8-80 fms". But she also failed to give drawings of the spicules. She found that the differences between Verrill's *A. siderium* and Linné's *A. digitatum* were insignificant, and she therefore abandoned the name *siderium*.

Recently Dr. Arthur G. Humes, Boston University, Massachusetts, sent to me three *Alcyonium* colonies collected by him in the same locality as Verrill's type specimens. A hasty survey of them led me to doubt the correctness of Deichmann's conclusion, and a closer examination and comparison of both species seemed necessary to me.

In addition to Humes' colonies, which are kept in the Rijksmuseum van Natuurlijke Historie, Leiden (RMNH), and to several colonies of *A. digitatum* present in my own collection I could investigate one of Verrill's type specimens of *A. siderium.*

I am indebted to Dr. Meredith L. Jones, curator of the United States National Museum (Smithsonian Institution), Washington D.C. (USNM), for his mediation in obtaining the loan of this specimen.

I thank Mr. W. ter Spill, who was so kind to read the manuscript, and Mr. G. J. Vrijmoeth for making the photographs.

Descriptions

A description of the most important taxonomic characters of the two species follows now.

I. **Alcyonium digitatum** Linné, 1758

Material. — North Sea. Several colonies collected by fishermen. Own collection.

Description. — The full-grown colonies are usually flattened, forming an erect, fleshy, disc-like basal part, which bears along its edge a number of broad, flat lobes. Consequently these lobes are nearly always arranged in one plane (pl. 1; cf. Hickson, 1895, pl. 36 fig. 1). As to other shapes of colonies I refer to Hickson (1895, 1901) and Pax (1936). It is worth noticing that Pax (1936: 220) remarks that the colonies from the coast of Norway south of Bergen are nearly always lump-shaped (his fig. 156). In the Rijksmuseum van Natuurlijke Historie, Leiden, there are several colonies collected near Hambaara (Trondjhemsfjord) and near Bergen. These specimens are not flattened laterally. From the low basal part a number of digitiform lobes arises. Such colonies are not unlike those of *A. siderium*, but the lobes are long and finger-shaped.

When the zooids are retracted within the coenenchyme, the centres are 0.80 to 1.00 mm apart. Semi-expanded anthocodiae are club-shaped, the thickened distal part is 0.70 to 0.80 mm wide (fig. 1a, b; cf. Broch, 1912, fig. 20); more expanded anthocodiae are cylindrical, and up to about 6 mm long. In the distal part there are eight rows of a few, longitudinally arranged, spiny rods (fig. 1c). Proximally they may be arranged en chevron, but a crown is absent. The length of the rods is 0.10 tot 0.20 mm, a few are up to 0.27 mm, the width is 0.012 to 0.017 mm.

In the surface layer of the colony we find capstans, 0.06 to 0.08 mm long (processes included) (fig. 2a-d, f), warty ovals, 0.09 mm long, and quadri-

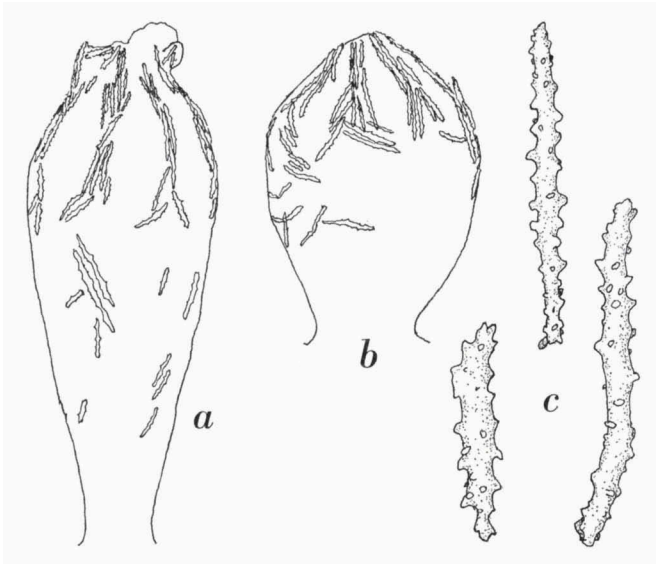

Fig. 1. *Alcyonium digitatum* Linné. a, b, anthocodiae; c, anthocodial spicules. a, b, × 40; c, × 220.

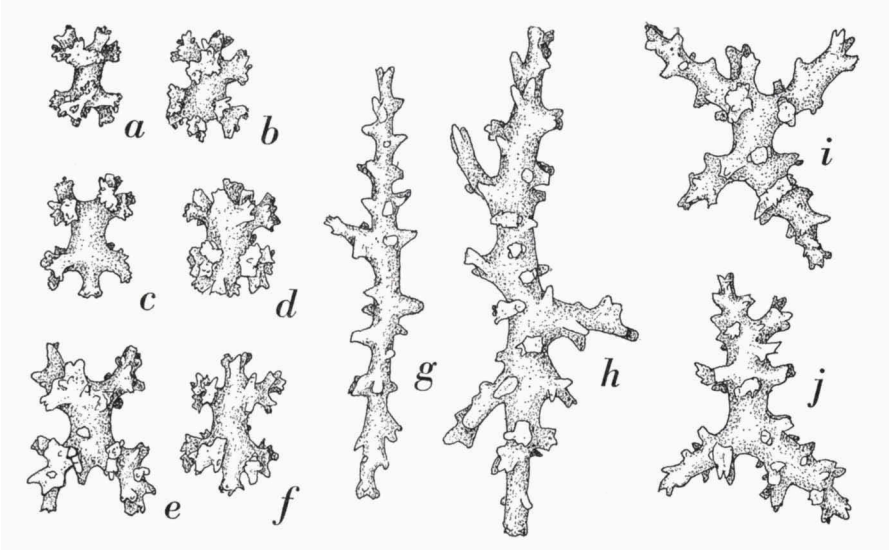

Fig. 2. *Alcyonium digitatum* Linné. a-f, spicules from surface layer; g-j, coenenchymal spicules. × 220.

radiates, 0.09 to 0.12 mm long (fig. 2e). The prominences are stalked warts (cf. Broch, 1912, fig. 18).

The coenenchyme contains thin rods, 0.15 to 0.30 mm long, they are set with numerous high spines or simple warts (fig. 2g). Many spicules are irregularly branched (fig. 2h) or they are tri- or quadriradiates (fig. 2i, j).

II. **Alcyonium siderium** Verrill, 1922

Material. — Off Clarke's Bank, east of Cape Cod, Massachusetts, depth 80 fathoms (= 146 m); collectors Captain Greenwood and crew, 1878. USNM cat. no. 30146. One of Verrill's type specimens.

Eight kms east of Chatham, Cape Cod, Massachusetts, depth 51 m, on rocky gravel; 21 October 1971. A. G. Humes, collector. RMNH Coel. no. 8092. Field-note: "Colour: pale, yellow-orange".

Description. — Verrill's type specimen (pl. 2 fig. 1) seems to be very much shrivelled up, as the surface is grooved irregularly. It measures 35 mm in maximum breadth and in height. It is flattened, the lobes are rounded and flattened too. The zooids protrude above the surface. They are more or less cone-shaped, the maximum width is about 0.80 mm (fig. 3b). The anthocodial armature and the spicules in the surface layer and in the coenenchyme of the colony are discussed in the following description of the specimens collected by Dr. Humes.

These specimens are not shrivelled at all. The smallest one measures 53 mm in height, but only 28 mm in maximum width, and is slightly branched. The other two colonies are larger (pl. 2 figs. 2, 3), the largest one has a maximum spread of 80 mm; the height is 35 mm. There is a low basal part, from which a number of lobes arise. Some of them are slightly flattened, the terminal lobes and some primary lobes are rounded knobs.

The zooids are evenly distributed all over the lobes, only the most basal part of the colony is free from zooids. Sometimes they are densely placed, the centres being 0.80 to 1.00 mm apart. But in other places they are 1.30 to 3.00 mm apart. Most of the zooids are completely retracted within the coenenchyme, their places are marked by low hillocks with eight-rayed pores in the top. Other zooids are semi-expanded, and protrude above the surface for a distance of 0.80 to 1.70 mm. The anthocodiae are transparent, the shape is more or less cylindrical, the width of the distal part is 1.00 to 1.20 mm (fig. 3a). The armature consists of numerous longitudinally arranged, flattened spicules, 0.15 to 0.27 mm long, the width is 0.015 to 0.037 mm. They are provided with few, cone-shaped spines (fig. 3c-h). At

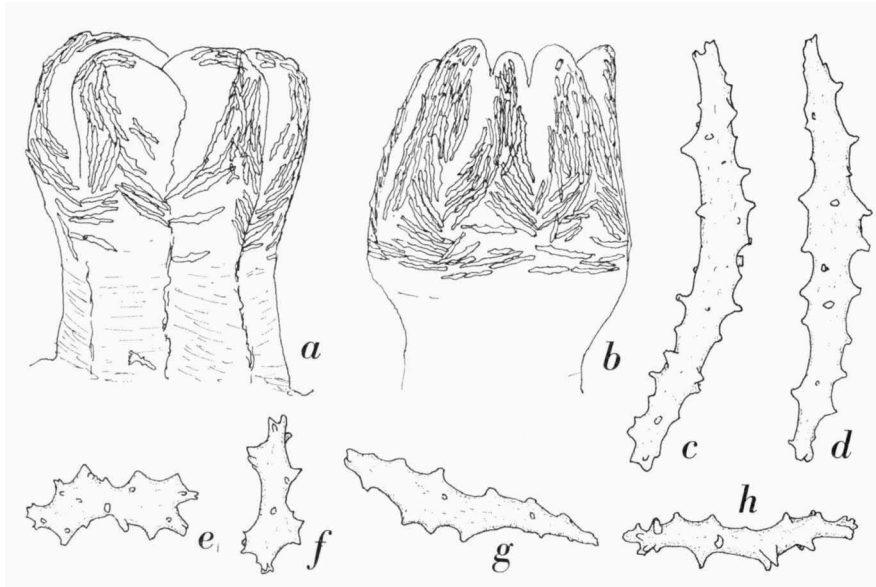

Fig. 3. *Alcyonium siderium* Verrill. a, anthocodia from one of the colonies RMNH Coel. no. 8092; b, anthocodia from Verrill's type specimen; c-h, anthocodial spicules, a, b, × 40; c-h, × 220.

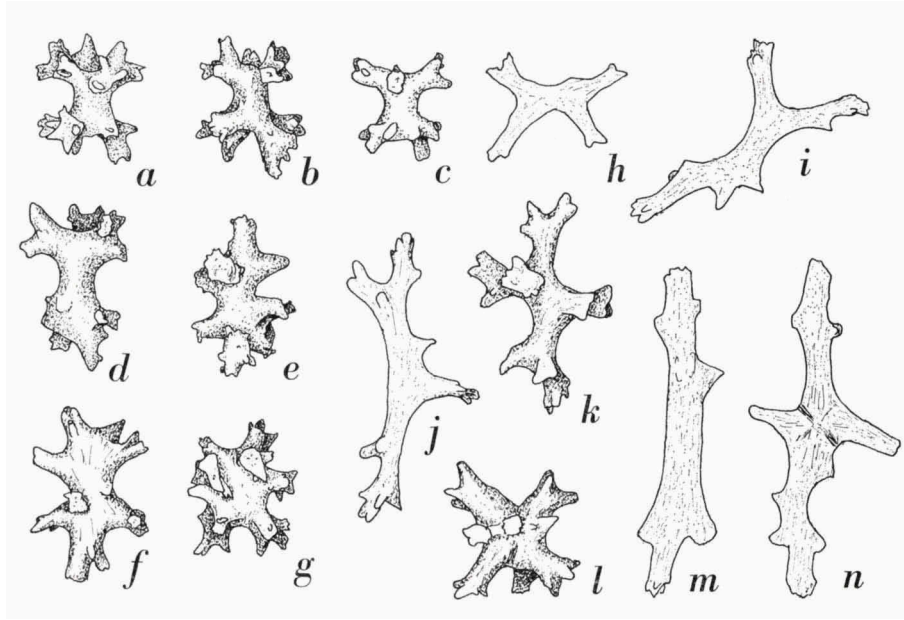

Fig. 4. *Alcyonium siderium* Verrill. a-g, spicules from surface layer; h-n, coenenchymal spicules. × 220.

the base of these point spicules there is often a clear crown, about three rows deep.

The surface layer of the colony contains capstans and spiny bodies, 0.07 to 0.10 mm long (processes included). The prominences are blunt or truncated spines and small, simple warts (fig. 4a-g). In the interior we find some irregularly shaped or four-rayed spicules (fig. 4k, l), but the majority consists of weakly spined, flat, sometimes slightly longitudinally striated spicules, 0.15 to 0.22 mm long; the majority is irregularly branched (fig. 4h-j, m, n).

In the following table I recapitulate the chief characters of both species.

A. digitatum Linné	*A. siderium* Verrill
1. Colony usually flattened laterally.	1. Colony not laterally flattened.
2. Lobes flattened, more or less in one row, or digitiform.	2. Lobes irregularly placed, not in one row, knob-like.
3. Distance zooids: 0.80-1.00 mm.	3. Distance zooids: 0.80-1.00 mm, 1.30-3.00 mm.
4. Semi-expanded anthocodiae club-shaped.	4. Semi-expanded anthocodiae cylindrical or conical.
5. Anthocodial spicules: few in number, thin, spiny roids, 0.10-0.27 × 0.012-0.017 mm.	5. Anthocodial spicules: numerous, flat spicules, 0.10-0.27 × 0.015-0.037 mm.
6. Crown absent.	6. Crown often present.
7. Spicules in surface layer: capstans with stalked, rather coarse warts.	7. Spicules in surface layer: capstans with blunt spines or small, simple warts.
8. Coenenchymal spicules: spiny and warty rods, 0.15-0.30 mm long.	8. Coenenchymal spicules: usually weakly spined, flat spicules, 0.15-0.22 mm long.

Conclusion and Remark

I think these differences clear enough to distinguish the two species, and I consider *A. siderium* a valid species.

Verrill (1922: 20) named his new species *A. siderium,* but in the legend of his fig. 3 I read *Alcyonium sidereum.* Probably the name is derived from sidereus = "of the stars" (Latin *sidus, sideris* = star, constellation), perhaps suggested by the star-shaped pores of the retracted zooids. Should this be so, then the name *sidereum* is to be preferred. But Verrill wrote *siderium,* so this name has to be maintained.

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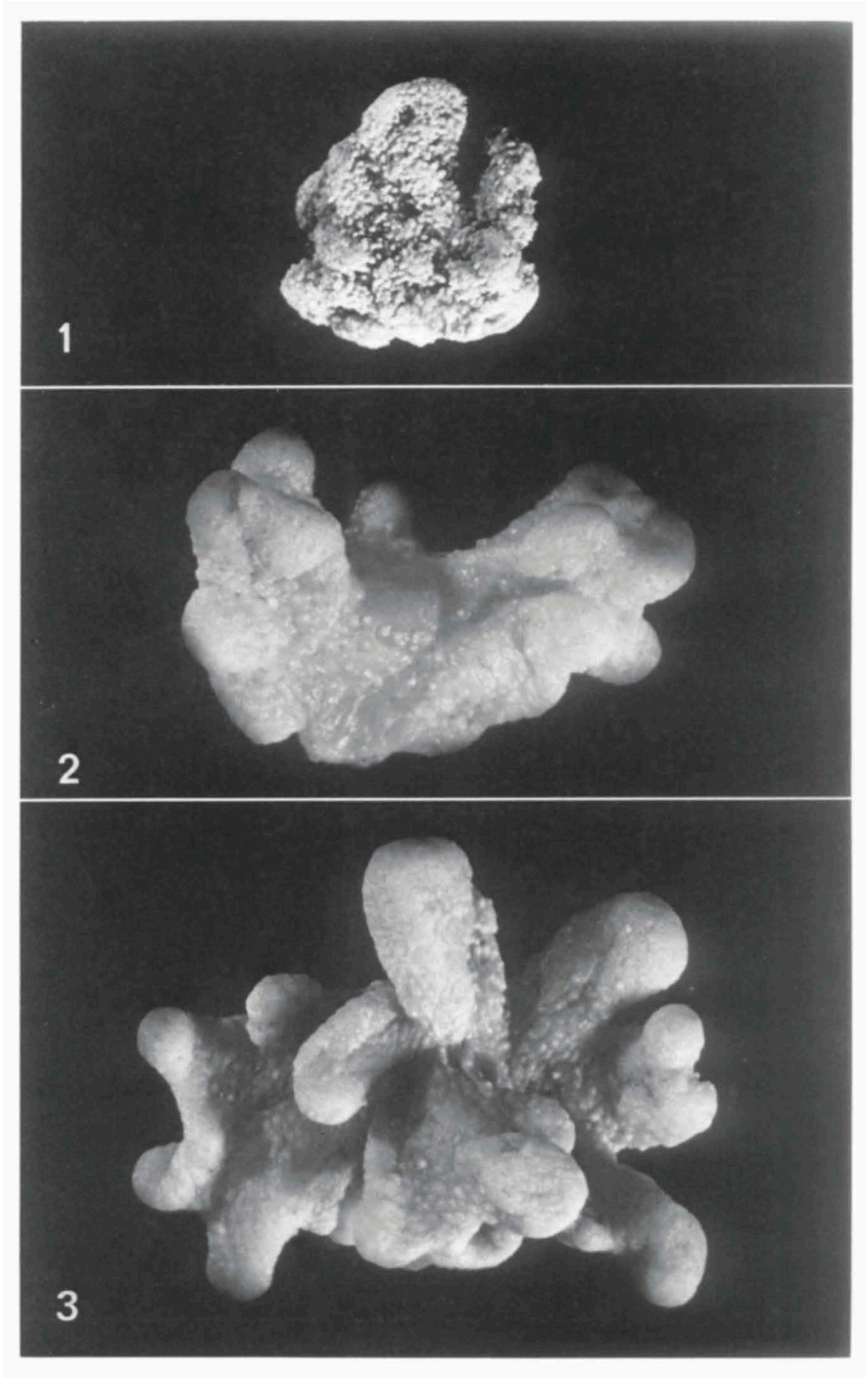
EXPLANATION OF THE PLATES

Plate 1

Alcyonium digitatum Linné, from the North Sea, attached to an oyster-shell. × 0.75.

Plate 2

Fig. 1. *Alcyonium siderium* Verrill, syntype, USNM cat. no. 30146. × 1.
Figs. 2 and 3. *Alcyonium siderium* Verrill, RMNH Coel. no. 8092. × 1.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