

the section in which Kutzing has placed it (from using an inferior microscope), as the striæ are very conspicuous with a good lens, being as few as 33 or 34 in $\cdot 001$. It differs from the true *A. brevipes* of Agardh, by the elliptic-oblong obtuse valves; from *A. subsessilis* by the usually numerous frustules and the distinct and somewhat elongated stipes; and from both by the much finer striæ.

REMARKS on the GENUS "RHIZOSOLENIA" of EHRENBERG.

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AMONG the remarkable forms lately detected in *Ascidia* and *Noctiluca*, specimens have been found of some which appear to belong to the genus *Rhizosolenia*, of Ehrenberg.

Having had, in this case, as in that of *Chaetoceros*, an opportunity of examining the species in a tolerably perfect state, we hope to be able to exhibit the true character of several more of those fragmentary and unsatisfactory forms which Ehrenberg, in his various works, and particularly his 'Microgeologie,' has, as we conceive, too hastily and injuriously to science, erected into genera and species.

The characters given by him of the genus *Rhizosolenia* are "lorica tubular, with one extremity rounded and closed, while the other is attenuate and multifid, as if terminating in little roots." He describes five species, some of which do not at all agree with the above characters; and the late Professor Bailey added a sixth under the name of *R. hebetata*. The greater part of these supposed species are, as we believe, only fragments of the silicious organisms we are about to describe, or of kindred species, and to enable the reader to judge of the correctness of our views, we have given copies of several of Ehrenberg's published figures, as well as figures of all our newly-discovered perfect forms.

Ehrenberg's five species are*

1. *Rh. Americana*, from Virginian earth. Of this he gives no less than eleven figures, most of them certainly not belonging to this genus.

* These species (and a sixth clearly not belonging to it) are described in Kutzing's 'Species Algarum,' p. 24, where the references to Ehrenberg's works or papers, in which they first appeared, are to be found.

2. *Rh. pileolus*. A doubtful species.

3. *Rh. campana*, Bermuda. No figure is given of this; but from the description it appears to be a terminal section of a Rhizolenia.

4. *Rh. calyptra*, South Sea. This is clearly the calyptriform terminal process of a Rhizolenia, very like our *Rh. styliformis*.

5. *Rh. ornithoglossa*. The terminal process of the same species. Of Bailey's *Rh. hebetata* we were favoured with specimens by the late lamented professor. It is clearly distinct from any of the above, and from any of our species.

We present the following as a synopsis of the species which have come under our observation.

RHIZOLENIA.

Filamentous, frustules subcylindrical, greatly elongated, silicious, marked by transverse lines, extremities calyptriform, pointed with a bristle.

Species.

1. *Rh. styliformis*.—Frustules from six to twenty times longer than broad; transverse lines obvious; terminal process at the base spatulate and bifid; straw colour to chestnut brown.

“Found in the stomach of an *Ascidia* taken from oyster shells, dredged twenty or thirty miles from the Yorkshire coast, at a place a little to the north of the Humber, known as the ‘Silver Pit’” (Mr. Norman, of Hull, in ‘Annals Nat. Hist.’ vol. xx, p. 158). In Noctiluæ, Gorleston, Suffolk. (Col. Baddeley.) In guano, Callao, often in little bundles of fragments. In Salpæ. (Dr. Wallick).

The base of the calyptriform process is carried out into a spatula-formed elongation, bifid at the end; the lines of the bifid division run upward on either side, with a stout nerve, to nearly the apex of the cone. Boiled in acid, the frustules break up, and the calyptriform processes in an isolated but perfect state, and detached imperfect rings are only to be found. (Pl. V, fig. 5.)

2. *Rh. imbricata*.—Frustules four to seven times longer than broad, punctated; terminal process subulate, entire; pale straw colour.

In *Ascidia* with the former. (Mr. Norman.) In Noctiluæ. (Col. Baddeley.)

The direction of the transverse lines and puncta give this species an imbricated appearance. (Pl. V. fig. 6.)

3. *Rh. setigera*.—Frustule five to fifteen times longer than broad; transverse lines obscure; terminal bristle as long as the frustule; colourless, of glassy transparency.

In Ascidiæ with the two former species. (Mr. Norman.)
In Noctiluçæ. (Col. Baddeley.) In Salpæ. (Dr. Wallick.)

This species is distinguished by its extreme delicacy, and by the great length of the terminal bristle. (Pl. V, fig. 7).

4. *Rh. alata*.—Terminal process alate, recurved, blunt; colour chestnut brown.

In Ascidiæ with *Rh. styliiformis*. (Mr. Norman.)

This delicate little species, which bears some resemblance to a pipe fish, and might have been called "sygnathoides" differs from all the others by its blunt, turned-up nose, and its small but conspicuous appendages to the terminal process (Pl. V, fig. 8).

In most of the above species, self-division has been observed. It takes place in or near the centre of the frustule, and has the same indefinite character as in *Rhabdonema* and *Striatella*. The rings of the *Rhizosoleniæ* appear equivalent to the annuli in these genera, but, instead of being perfect and united by flat surfaces, they are united at acute angles, and carry out the frustule to an almost indefinite length. The process of self-division is therefore truly diatomaceous. Two new calyptriform valves are gradually formed within a connecting membrane, as is seen in our Pl. V, figs. 6, 7, *a*, *b*. These eventually separate, when the old frustule becomes two, each division having a new calyptriform end.

In the genus *Isthmia*, the frustules of which are trapezoidal, one valve having a produced angle, we see some resemblance to the *Rhizosoleniæ*, and this would be much increased by supposing an *Isthmia* carried out to ten times its normal length, and self-division taking place in the centre, as seen in the central fig. in pl. *xlvi*ii, 'Smith's Brit. Diatom.'

In specimens of *Rh. setigera* a motion has been observed resembling that of many of the Diatomaceæ, the frustule proceeding forward in a jerking, tremulous manner, and then retrograding.

Large numbers of *Rhizosolenia* have been detected in the stomachs of Salpæ, and they have also been observed floating free in the ocean in warm latitudes, their appearance being that of little confervoid flakes of exquisite delicacy, but of a sufficient aggregation of filaments to be seen by the naked eye. The mass appeared (probably from the endochrome) of a faint, evanescent, ochraceous colour.