

Roger Wotton writes: Sea anemones are primitive animals that capture their food using tentacles. Many of us are familiar with beadlet anemones of the seashore that retract when the tide goes out and then look like red, slimy blobs. When viewed in an aquarium, or rock pool, the tentacles extend and the anemones appear quite different – and some find them attractive.

Philip Henry Gosse was an expert on sea anemones and he published *Actinologia Britannica*<sup>1</sup> in 1860, giving a description of the wide range of species found around the coasts of Great Britain. One of the anemones he described was *Edwardsia carnea* (the name was changed to *Edwardsiella carnea* in the 1880s), of which he made the first description in 1856.<sup>2</sup> It is an unusual sea anemone that often lives in cavities in rocks and Gosse gave it the common name of The Crimson Pufflet. This is what Gosse wrote about a population he found in a sea cave in South Devon:

The roof and sides of this cave are studded with the pretty little Crimson Pufflet ... The tide having receded, they are readily discovered by their crimson columns projecting an eighth of an inch from the dark floccose rock. The limestone is much

# Sea anemones in ice

eroded by *Saxicavae* [burrowing bivalves]; and it is in the old burrows of these Mollusca that the *Edwardsia* dwells.<sup>1</sup>

As Gosse was such a talented artist, he provides us with an illustration of what he saw as part of a larger picture (see painting from Gosse). We know then, that this species lives in burrows created by other animals, but Gosse also describes them as having a covering of mucus, dead cells, diatoms and other matter to form an ‘epidermic tube’ in which the sea anemone lives (see the magnified figure of the two specimens).

Species of *Edwardsiella* are found widely, but the most astonishing habit is that reported from the newly-described *Edwardsiella andrillae*. These

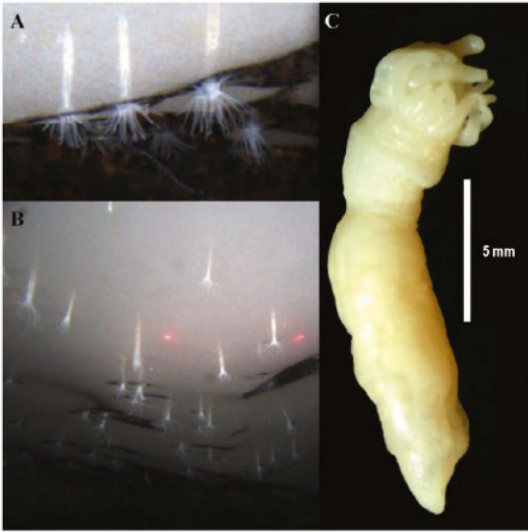
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translucent sea anemones live buried under Antarctic ice and this new species was first described in a research paper by Marymegan Daly, Frank Rack and Robert Zook that was published in *PLOS ONE* in December 2013.<sup>3</sup> Their paper mentions *E. carnea* (Gosse 1856), demonstrating that the great Naturalist’s work is still of value today.

Daly et al. were not searching for this new sea anemone, coming across it after using a hot water drill to penetrate through the Ross Ice Shelf to allow a submersible with imaging equipment to be deployed. They wrote:

This provided an unexpect-





ed and astonishing glimpse into this subsurface world, discovering an unusual and likely unique marine biological community dominated by anemones living inside burrows in the lower surface of the ice shelf.

The anemones feed on passing small animals carried by currents under the ice, but the questions remain of how they arrived there and how they manage to burrow into the ice. As all other species of *Edwardsiella* are found around coasts, the first question provides a puzzle, but that may be because

**External anatomy and habitus of *Edwardsiella andrillae* n. sp. A. Close up of specimens in situ. Image captured by SCINI. B. 'Field' of *Edwardsiella andrillae* n. sp. in situ. Image captured by SCINI. Red dots are 10cm apart**

**Painting by Philip Henry Gosse of *Edwardsia carnea***

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the oceans are so little explored and there is much yet to be discovered. As to the burrowing, we know that *Edwardsiella* characteristically uses a burrow and it is conceivable that they can erode the surface of the ice by movements of the body, but that, too, must remain a mystery for now. However, the production of a mucus envelope will protect the body from freezing, especially as the mucus contains polysaccharides and is likely to have some 'anti-freeze' characteristics.

The discovery of *E. andrillae*, and its location, amazes me and I am sure that Henry Gosse would have been fascinated and excited, having written about life on snow (and with chapters on "The Unknown" and "The Great Unknown") in *The Romance of Natural History*.<sup>4</sup> He would have been very keen to find out more, but would not be faced with the question of how *E. andrillae* came to inhabit the underside of ice sheets. As a

profound creationist he would find this another amazing example of God's design and would marvel at it for that reason.

For those of us that believe in evolution, however, many questions remain as a result of the fascinating discovery of this new sea anemone. Evolution is like that: it fills one with wonder and an eagerness for answers that are difficult to obtain. ©

1 Philip Henry Gosse (1860). *Actinologia Britannica. A history of the British sea-anemones and corals*. London, John Van Voorst.

2 Philip H. Gosse (1856) On *Edwardsia carnea*, a new British Zoophyte. *The Annals and Magazine of Natural History* XVIII: 219–221.

3 Marymegan Daly, Frank Rack and Robert Zook (2013) *Edwardsiella andrillae*, a new species of sea anemone from Antarctic ice. *PLOS ONE* 8: 1–8.

4 Philip Henry Gosse (1860) *The Romance of Natural History*. London, J. Nisbet and Co.

**Close-up of *Edwardsia carnea***

