Sedgwick Museum
*of Earth Sciences*

## Serpulid Limestone Identification

*Serpulid Limestone – found by David Hope of Orwell and identified by Douglas Palmer and colleagues at the Sedgwick Museum April 2020*

The bulk of the slab is comprised of a mass of broken serpulid worm tubes along with moulds and shells of some other fossils, mostly small bivalves and a few bullet-shaped belemnites. So it is a shelly limestone, what is technically known as a bioclastic limestone. Overall, the rock looks like a shallow marine shoal deposit accumulated by wave and current

activity. But the dominant serpulid tubes have probably not travelled very far from where these tube-worms lived. The tubes have not been broken up all that much and many are still retain quite a length of their original curvature. They would be more highly fragmented as a beach or storm deposit.

The age of the limestone is probably Jurassic but could also be Cretaceous because of the presence of the belemnites but see below for some extra information.

Occurrence: as far as I know and in consultation with colleagues, this is not a local rock but like many exotic slabs found in the fields around Cambridge was probably carried into the region by the glaciers and postglacial rivers during the recent ice ages. At Wimpole there is another possibility. Because of the extensive landscaping and radical alteration of the grounds during the 18$^{th}$ century, including the construction of the folly from pre-existing buildings, it is possible that the slab was brought in during that work.

Serpulid dominated rocks are not common and in the England, the best known example is Bognor rock from the Sussex coast. But that contains a very distinctive serpulid species (*Rotularia bognoriensis*) with a tightly coiled tube and is Eocene (London Clay) in age. And, as far as I know is restricted to the London Clay outcrop in the south of England.

However, in Jurassic times warm sub-tropical shallow seas extended across much of Europe with lots of reefs whose biological makeup varied depending upon the water depth. Some of

the shallower reefs from Germany are known to have been colonized by abundant developments of serpulids.

From the evolutionary point of view serpulid worm tubes are well documented as an important part of some marine reef communities dating back to Permian times or earlier. Today, serpulid worms are still common around our shores

Spectacular developments of tubeworms are also found in the deep ocean especially associated with hydrothermal vents on spreading ridges where new ocean floor volcanic rocks are deposited – but you may already know this.

Biologically serpulids belong to the diverse (some 10,000 species) and group of polychaete bristleworms widely distributed mainly throughout the marine realm globally but also extending into freshwaters. Lugworms used as bait by seafishermen are polychaetes but they do not build a protective dwelling tube. Polychaetes are related to the more familiar terrestrial annelid earthworms have a long evolutionary history, which may extend back to Cambrian times. Their fossil record depends to a considerable extent on those groups which secrete protective tubes but even those without calcareous tubes can leave a record in ancient sediments in the form of distinctive burrows.

Many but not all tube secreting serpulids need a hard surface to grow on. They can be a rock surface or the shell of some other animal living or dead. And, once established other serpulids attach to one another to build colony like structures which can become quite substantial over time, hence their role in the development of reefs.

**Belemnites**

In amongst the tubular serpulid fossils there are a few bullet shaped belemnites. These are part of the internal calcareous skeleton of this extinct group of marine cephalopods related to the squid and cuttlefish. Indeed the belemnite is the anatomical equivalent of the cuttlefish so-called 'bone', which occasionally gets washed up on our seashores and people used to feed to their budgies.

***Oxytoma***

The other good fossil indicator is the presence of a few small shells of a bivalve called *Oxytoma,* which you focused upon in image p1030011, and has a distinctive shell with widely spaced fine ribs (see attachment or look up *Oxytoma* on Wikipedia).

Douglas Palmer April 2020

Image credit David Hope