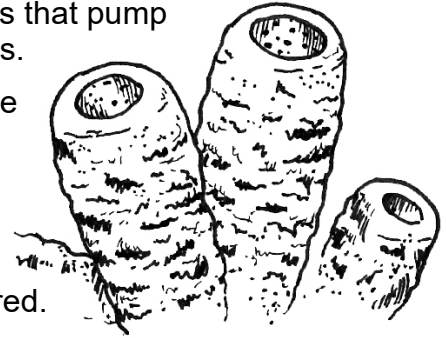


Geology fact sheet: SPONGES

Sponges are also known as Poriferans from the Latin *porus* 'pore' and *ferre* 'to bear'. They are primitive animals that are mostly stationary water-dwellers that pump water through their porous skeletons to filter out food particles.

Sponges are among the simplest of animals. They don't have muscles, nerves or internal organs. In some ways, they're closer to being colonies of individual cells than multicellular organisms.

There are over 5,000 known modern species of sponges, although species new to science are regularly being discovered.



A living sponge

The structure of sponges is simple: they're shaped like tubes, with one end stuck to a rock or other object. The open end is called the 'osculum', and the interior is the 'spongocoel'. The walls contain tiny pores which allow water to flow through the spongocoel.

It is thought that the earliest multicelled life on Earth was a sponge-like creature. Certainly the earliest known multicelled animal fossils are sponges from China that are roughly 600 million years old.

Sponges have not been as extensively studied as some other groups of animals, and there may be some surprises still left to be found about them. For example, it has recently been shown that some sponges are not stationary and can move to more favourable locations as rapidly as a few centimetres a day.

Cross-section through a sponge

Modern sponges are mostly marine – ranging from the inter-tidal zone, to depths in excess of 8,500 metres. A few species have adapted to freshwater environments. They are worldwide in their distribution, and range from polar waters to the tropics. However, they are most abundant (both as individuals and numbers of species) in warmer waters.

Adult sponges live attached to surfaces (such as rocky seabeds) and mostly remain stationary. Some kinds of sponges are able to attach themselves to soft sediment by means of a root-like base. Because the pores of sponges are easily blocked by sediment, they tend to live in quiet, clear waters.

Commonly the term sponge is applied to just the skeletons of these creatures. Commercial sponges are derived from various species, and come in a variety of grades, from fine soft 'lamb's wool' sponges, to the coarse grades used for washing cars. Marine sponges come from fisheries in the Mediterranean and West Indies. The manufacture of rubber, plastic and cellulose-based synthetic sponges has significantly reduced the commercial sponge-fishing industry over recent years. Loofahs, which are often confused with sponges, are actually the dried fruit of plants of the genus *Luffa*.



A bathroom loofah – not a sponge at all!

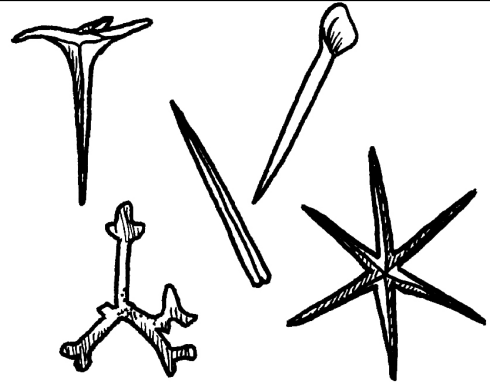


Natural bathroom sponge skeleton

The fossil record of sponges dates back to the Precambrian (600 million years ago). Some fossil sponges have worldwide distribution, while others are restricted to certain areas.

In Europe, the Jurassic limestone of the Swabian Alps is composed largely of sponge remains, some of which is well preserved. Many sponges are found in the Cretaceous Lower Greensand and Chalk Formations of England, and in rocks from the upper part of the Cretaceous period in France. A famous locality for fossil sponges is the Cretaceous Faringdon Sponge Gravels in Faringdon, Oxfordshire.

Although sponges are common fossils within the Chalk of East Anglia, they remain little studied (with major works dating from the 1840s, 1880s and then in the 1950s and 1960s). Part of the reason why sponges are so difficult to study is because the way to tell different species apart for certain, is by dissolving the fossils in acid and thin-sectioning the tiny spicules (skeletal elements made of silica). However, with a little know-how most fossil sponges can be identified to some degree.



Some different types of fossil sponge spicule

Fossil sponges vary in size from one centimetre to more than one metre. They also vary greatly in shape, from vase-shaped (such as *Ventriculites*), spherical (such as *Porosphaera*), pear-shaped (such as *Siphonia*) and branching (such as *Doryderma*).

Ventriculites



Porosphaera



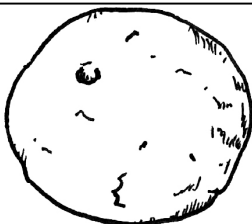
Siphonia



Doryderma



Common genera of fossil sponge found in the Chalk of East Anglia



'Cannon-shot' flints often have a dimple on their surface – giving away that there is a fossil sponge inside

The spherical 'cannon-shot' flints that can be found across Norfolk are actually naturally formed flints that have been weathered and rolled in water. Many of these flints were vaguely spherical to start with, as they formed around sponges such as *Porosphaera*.

Without sponges, we wouldn't have flint! The mineral silica (which is mainly what flint is made of) comes from the spicules of billions and billions of ancient sponges. Unusual chemistry in the ocean that covered East Anglia 70 to 90 million years ago, led to the silica from sponges being dissolved in seawater. This silica then solidified out of the water to form flint.



NORTH NORFOLK
DEEP HISTORY
COAST



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