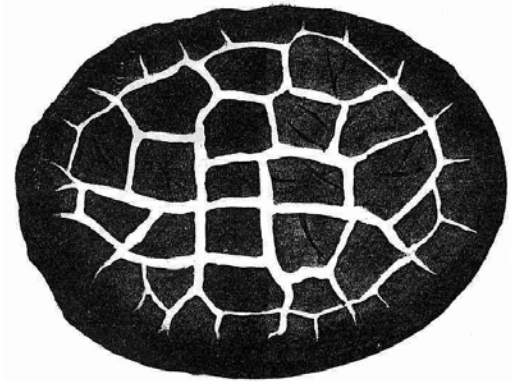




## Septarian nodules

Some of the most curious objects in the natural world are the nodules, or concretions, that are found in clay strata that was originally mud laid down on the sea floor millions of years ago, and of these, septarian nodules are perhaps the most attractive and bizarre. In Essex, septarian nodules occur in the London Clay which dates from the Eocene period but nodules of Jurassic age occur in the till, or boulder clay, having been brought south to Essex by the ice sheet from the Midlands.

Exactly how septarian nodules, or septarian concretions, were formed remains a mystery. Over millions of years they were entombed in the clay and gradually dried out. As they did so they would shrink from the centre outwards, forming a network of internal cracks, which filled with crystals of calcite and sometimes other minerals such as barite. No traces of the cracks are visible on the surface of the nodule. The cracks are called 'septa' from the Latin word *septum* or 'partition', which gives the nodules their name. The most famous septarian nodules in the world are the Moeraki boulders on New Zealand's Otago coast. These two metre diameter spherical boulders are a popular tourist attraction. Research on these boulders, which occur in Palaeocene marine mudstones, suggest that the cracks formed as the concretions grew and the whole process took several million years.



*A cross section through a septarian nodule showing the network of calcite-filled cracks or septa. From Sowerby's British Mineralogy (1804)*

Smaller septarian nodules from British Jurassic clays such as the Kimmeridge Clay are capable of being cut in half and polished to reveal the colourful network of cracks. Those from the London Clay usually break open readily and sometimes reveal beautiful groups of barite crystals.

The septarian nodules from the London Clay are generally referred to as 'septaria' and at certain horizons in the clay they are free of internal cracks or cavities and have been collected from the Essex coast for use in building construction. Notable examples are Colchester Castle and Roman wall and countless churches on the coast. Septaria are also called 'cement stones' as they were formerly collected at Harwich for use in making 'Roman cement' before the invention of Portland cement.

Concretions were eroded from the clay and subjected to weathering often revealing the honeycomb-like pattern of infilled cracks, sometimes with the calcite 'veins' standing proud of the surface. Some septarian nodules can be very large; a specimen probably weighing at least a tonne is on display in the grounds of Saffron Walden Museum (complete with scratches obtained while it was trapped in the ice sheet). Attractive polished sections of septaria have also been used for the fire surround in the

museum's Ceramics and Glass Gallery on the first floor. They can also be seen elsewhere in the area, for example in the Stable Block in the grounds of Audley End House where there is a large specimen that has been sliced in half to make an unusual table. Because they were formed in the mud on the sea floor, the local septaria sometimes have traces of fossils on their surfaces, particularly ammonites that lived in the Jurassic seas.

## Further reading

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*On display in the Stable Block of Audley End House is a splendid septarian nodule cut in half to display the internal cracks lined with calcite crystals. It is 1.65 metres x 1.15 metres (5'6"x4'0") in size. The photograph was taken before it was moved from its previous position on the Tea House Bridge in 2003. Photo: G.Lucy*



*Described as looking like a giant cheeseburger, this two metre (six foot) diameter septarian nodule can be seen in the grounds of Saffron Walden Museum. It was transported south from Cambridgeshire by the Anglian ice sheet about 450,000 years ago and its surface is covered with striations received when it was trapped beneath the great weight of moving ice. It was discovered in the 1960s during building excavations on the edge of the town. Photo: G.Lucy*



*A fragment of a septarian nodule from the London Clay cliffs at Southend-on-Sea, containing a fine group of white barite crystals on yellow calcite. This specimen is on permanent display in the 'British Minerals' section of the Mineral Gallery in the Natural History Museum, London. Photo: G.Lucy*