Fact sheet No. 1

Sarsen stones

By the roadside in many parts of north and central Essex are very large sandstone boulders. Although difficult to move they have usually been placed here by farmers over the years, having been found in the fields and regarded as an inconvenience and liable to break agricultural machinery. These boulders are known as **sarsen stones** or **sarsens**. The word sarsen originates in Wiltshire, where these stones also occur, and may be derived from the word 'saracen', which means stranger. They must have been regarded as a strange sight in the landscape, especially on the grassy chalk downs where their pale colour would have made them conspicuous. An old name for sarsen stones is 'greywethers', so-called because of their resemblance, from a distance, to a flock of sheep.

The story of how sarsens were formed, and how they came to be here in Essex, starts in the Palaeocene epoch, about 55 million years ago, just after the extinction of the dinosaurs. At this time a thick layer of sand and gravel known as the Reading Beds was laid down over much of southern England on top of the Chalk, and after it was deposited it was raised above sea level. This was around the end of the Palaeocene and the beginning of the Eocene epochs, which was a time of great warmth on planet Earth. During this time ground water containing dissolved silica (quartz) cemented patches of the sand into a tough layer of sandstone called a '**silcrete**'. This layer was extremely resistant to erosion but it eventually broke up into boulders. As the sands were washed away the silcrete boulders remained on surface of the ground and these are known as sarsens.

The current interest in sarsen formation started when geologists compared them with silcretes formed very recently in Australia and South Africa which led to the view that they could only be formed in arid climates. More recent research has established that a hot climate with alternating wet and dry phases is the most favourable environment for sarsen formation.

Some sarsens, particularly those in Thurrock (see below), are often completely unworn and have remarkable surfaces of rounded mounds and bumps. These 'mammilated' surfaces are called 'growth structures' which were formed as the quartz slowly crystallised between the sand grains (see photo on page 2). Crystallisation must have started at numerous points and from these centres small concretions grew larger until they coalesced into one continuous layer.

About 450,000 years ago, during the Anglian stage of the Ice Age, a giant ice sheet spread south over what is now the chalk hills of Cambridgeshire and Suffolk bringing sarsens into north Essex. When the ice melted it left behind a considerable thickness of boulder clay, or till, and subsequent erosion of this till sheet has left the sarsens and other boulders (known as glacial erratics) as isolated boulders in river valleys. Sarsens are therefore fairly common in north Essex, particularly in the Cam, Stort and Stour valleys. There is also a concentration of sarsens around Chipping Ongar and Chelmsford and these may have been brought here earlier in the gravels of the early River Thames when this river flowed much further north than it does now.

A sarsen at Fordham, near Colchester.
Photo: G.Lucy

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On Chalk downland that hasn't been glaciated, such as Wiltshire, sarsens are found in virtually their original position on the Chalk surface. For example on the Marlborough Downs sarsens can be seen in great numbers in valley bottoms, having slowly moved downhill during the coldest periods of the Ice Age. This process, known as 'solifluction' occurs when the top layer of the ground thaws out during each brief summer and slowly moves downhill under gravity bringing the sarsens with it. These Wiltshire valleys were a rich source of building material for prehistoric man and sarsens were extensively used for the construction of megalithic monuments, such as Avebury and Stonehenge (all the giant stones of Stonehenge are sarsens). A similar unglaciated Chalk landscape can also be found in Thurrock and sarsens can be found here too (see below), as well as on the North and South Downs of Kent and Sussex. Sarsens from the North Downs are almost certainly the source of a scatter of sarsens in the Rayleigh/Hadleigh area which must have been brought here by the River Medway when it flowed north across east Essex before the Thames was diverted to its present course. Although many of these stones were reported by nineteenth century geologists to be seen at roadside locations only one or two have survived the subsequent redevelopment of this part of Essex.

The sarsens of Thurrock require a special mention because they are usually unworn and have fine mammilated surfaces. Examples of stones that are publicly accessible are those in front of Thurrock College in Woodview and adjacent to Thurrock Museum in Orsett Road. There are also several fine examples in the undergrowth around the rim of Grays Gorge (TQ 609789) in Chafford Gorges Nature Park. However, probably the best example of all is situated in Davy Down Riverside Park by the pumping station (TQ 592800).

Sarsen stones around the rim of Grays Chalk Pit (now Grays Gorge in Chafford Gorges Nature Park), Thurrock. This delightful photograph was taken in 1910 during a field trip to the area by the Geologists' Association.
Photo: courtesy of the Geologists' Association.

Uses of Sarsens in Essex

Sarsens have been employed as way markers for centuries but they have had other uses. In Dedham churchyard there is an inscribed sarsen grave stone which dates back to 1690. Many north Essex churches have sarsens in their foundations but the most remarkable site is at Alphamstone where at least 11 large sarsens in and around the churchyard provide strong evidence that the church may have been built on a pagan site, possibly a stone circle. Adjacent to the crossroads at Takeley is a sarsen with a very unusual history. This stone was discovered in 2000 by archaeologists in a pit which was part of a complex of Bronze Age dwellings at Stansted Airport. It had clearly been placed in this pit by Bronze Age Man, some 3,500 years ago, although for what purpose has yet to be established.

Further reading

GOUDIE, A. and GARDNER, R. 1985. **Discovering Landscape in England and Wales**. George Allen and Unwin. Pages 121-123.

LUCY, G. 2003. **Essex erratic boulders: A gazetteer**. *Essex Naturalist (New Series).* Volume 20. Pages 115-134.

SUMMERFIELD, M.A. 1979. **Origin and palaeoenvironmental interpretation of sarsens**. *Nature*. Volume 281. Pages 137-139.

ULLYOTT, J.S., NASH, D.J. AND SHAW, P.A. 1998. **Recent advances in silcrete research and their implications for the origin and palaeoenvironmental significance of sarsens**. *Proceedings of the Geologists' Association*. Volume 109. Pages 255-270.