



# The sarsen stones of Stonehenge



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## ABSTRACT

Around 4500 years ago, some 80 large blocks of silcrete or 'sarsen' were erected at Stonehenge during its second stage of construction. Stonehenge is the only prehistoric stone circle to have its stones dressed, and debris from this stone-dressing has been found on the north side of the monument. Numerous locations have been proposed for the origin of these sarsens, from the immediate locality to more distant areas of east Somerset and north Wiltshire about 30 km (18 miles) away, but geological provenancing of Stonehenge's silcrete monoliths has so far been largely unsuccessful. The suspected sources are, however, much closer than those of Stonehenge's 'bluestones', over 200 km (125 miles) away in west Wales. That said, the sarsens are much heavier than the 1–2 tonne bluestones. For more than 300 years, researchers have suspected that the main sources of Stonehenge's sarsens were deposits of silcrete on the highest points of the Marlborough Downs, 30 km (18 miles) north of Stonehenge. Antiquarian records of a group of sarsens at Clatford Bottom, at the foot of the Downs, suggest that these may have been abandoned in transit to Stonehenge.

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## 1. Introduction

Most of Stonehenge's surviving stones are of silcrete, known as 'sarsen'. Sarsen in southern England is thought to have formed through as-yet poorly understood processes of groundwater silification of host sands during uplift and dissection of Tertiary deposits at various times especially within the Paleogene period of the Cenozoic era, 65–23 million years ago (Ullyott et al., 1998, 2004; Ullyott and Nash, 2006). Dates of formation appear to have varied considerably, with the sarsens of the eastern South Downs in Sussex forming as late as the Neogene and Pleistocene (Ullyott et al., 2004). Instead of constituting a widespread duricrust, sarsen is thought to have formed in isolated patches associated with groundwater outflow into deepening valleys, leaving localised spreads of dislocated boulders. Relatively little is known about the original thickness and extent of these sarsen deposits though the largest standing stones within the prehistoric monuments of Stonehenge and Avebury reveal that such deposits could attain thicknesses of 1.5 m or more. Clay-with-flints and other sedimentary deposits of the Neogene and later are found stratified over sarsens, notably in solution hollows and valley bottoms across the Chalk of southern England.

The huge sarsen blocks erected at Stonehenge, up to 9 m long, were manoeuvred into position as uprights and lintels during the

Late Neolithic, around 4500 years ago (Fig. 1). Recent research has completely revised Stonehenge's chronology and sequence to reveal that it was built in five constructional stages (Darvill et al., 2012).

## 2. The sarsens at Stonehenge

The first constructional event took place shortly after the beginning of the Late Neolithic, within the period 2990–2755 cal BC, and consisted of the raising of a circle of stone pillars, probably 'bluestones' from Wales, set within a circular ditched enclosure. Dating to this period are other stone-holes, of greater size than the holes for bluestones, that are likely to have once held sarsen standing stones: a line of three such stone-holes leads to the Heel Stone beyond Stonehenge's northeast entrance, and one or more upright sarsen stones once stood among timber structures of this date within the centre of the monument.

In Stonehenge's Stage 2 (2580–2475 BC), at the end of the Late Neolithic, the monument took the basic form in which it has survived to this day: a central horseshoe-shaped array of five sarsen trilithons (two uprights supporting a lintel) set within a circle of sarsen uprights crowned with lintels that originally topped the entire ring or most of it. At this date the Welsh bluestones were re-arranged between the trilithons and outer circle in a double arc or a circle; this bluestone arrangement survives only as stone-holes, known as the Q and R Holes (Atkinson, 1956). Probably at this time various sarsen stones were also arranged around the enclosure's perimeter: four Station Stones, and the Slaughter Stone and two other stones in the northeast entrance.

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**Fig. 1.** Stonehenge's large stones are sarsens (silcrete) whilst its smaller monoliths (not visible in this photograph) are 'bluestones' from Wales (photograph by Adam Stanford of Aerial-Cam Ltd.).

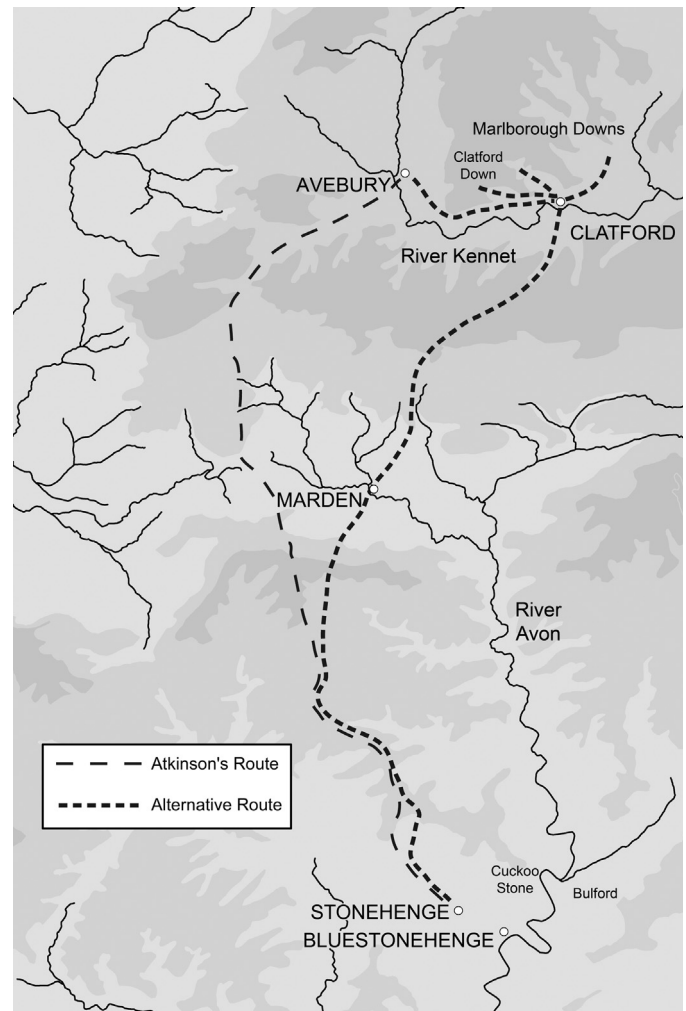
The next two stages (2480–2280 BC and 2280–2020 BC) were constructed within the Copper Age and the Early Bronze Age respectively and, in terms of stone-moving, consisted of rearrangements of the bluestone arrays. The only sarsens to be moved were two that were taken down from the entrance in stage 3. The fifth stage of construction (finishing around 1500 BC) consisted only of digging two concentric rings of pits (the Y and Z Holes) that were never filled with standing stones.

### 3. Sarsen stone sources for Stonehenge

Stonehenge lies on the chalk of Salisbury Plain, in a region where silcretes are common, or certainly were before prehistoric and later stone-workers utilised them for prehistoric monuments, Roman villas, Mediaeval churches and a wide range of early modern urban and rural features from kerbstones to field walls. The modern distribution of sarsens across the Wessex chalklands was first mapped by [Bowen and Smith \(1977\)](#), although the Rev. A.C. Smith plotted the distribution of sarsens across north Wiltshire in 1885. Even in his day, it was evident that their distribution was not representative of their original extent.

While [Bowen and Smith \(1977\)](#) recognised that sarsens could be found across southern England—from Kent and Essex to the West Country, and from Buckinghamshire and Oxfordshire to Dorset—their focal point was in Wessex and especially the Marlborough Downs of north Wiltshire, in particular in the area around Avebury, where sarsens are most plentiful today ([Fig. 2](#)). These silcrete-rich areas surround the Avebury circles and monuments,<sup>1</sup> and lie about 30 km (18 miles) north of Stonehenge. The sizes and weights of the Stonehenge sarsens, generally 3 m–11 m long and weighing between 4 and 35 tonnes, are so great that any such long-distance movement would have required a huge labour force and relatively sophisticated stone-moving techniques. Experiments in the 1990s demonstrated that sliding of stones on wooden cradles along lubricated wooden 'rails' is the easiest and most efficient mode of transport ([Richards and Whitby, 1997](#)).

Recently some researchers have questioned the notion that Stonehenge's sarsens necessarily came from distant sources (*i.e.* the Marlborough Downs). There are indeed sarsen stones in the Stonehenge area. Two of these were excavated as part of the



**Fig. 2.** Different options for routes along which the sarsens may have been taken to Stonehenge from the Marlborough Downs (drawing by Irene de Luis).

Stonehenge Riverside Project (SRP): the Cuckoo Stone near Durrington Walls, and the Tor Stone at Bulford ([Parker Pearson, 2012: 147–55](#)). Both are former standing stones but, in contrast to the Stonehenge sarsens, not stone-dressed. Excavation around the present locations of these recumbent stones revealed the stone-holes in which they were once erected. In addition, the excavators discovered stone-shaped solution hollows where the two sarsens had presumably lain for the last 55 million years. In the case of the Cuckoo Stone, the stone-hole had been dug into this wider, natural feature. In the case of the Tor Stone, the solution hollow was a nearby, separate feature, not cut by the stone-hole.

Other sarsen stones in the Stonehenge environs include one on MoD land north of the Bustard public house, and another revealed within a Neolithic long barrow (burial mound), vandalised in the last century, east of Robin Hood's Ball causewayed enclosure.<sup>2</sup> Discovery of a 'working floor' northwest of Stonehenge beside the now-defunct A344 ([Pitts, 1982](#)) revealed that sarsen stone-breaking was being carried out in the immediate vicinity of

<sup>1</sup> Avebury is a stone circle of undressed sarsens, with two long avenues of sarsens leading to it. It is probably slightly older than Stonehenge's Stage 2 ([Pollard and Cleal, 2004](#)).

<sup>2</sup> Causewayed enclosures are ditch-and-bank earthen enclosures, with the ditch being crossed by many 'causeways'. They were not defensive but were probably meeting places. Long barrows are communal tombs, with the burial chamber being covered by a long, high earth mound. Both types of monument date to the Early Neolithic (4000–3400 BC).

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