



The exploitation of silcretes (sarsen and puddingstone) in England and Normandy since Stonehenge



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ABSTRACT

The use of sarsen and puddingstone in England and Normandy since the Bronze Age is briefly reviewed (for sarsen), and described following fieldwork and museum research (for puddingstone). The rock sources of puddingstone/*poudingue* querns [hand-mills] are located and characterised, and the distribution of the products shown. The current distribution of Hertfordshire Puddingstone is shown, reflecting periglacial movement and human clearance. The production process is outlined for the main agency involved, the Romano-British puddingstone quern industry (AD 50–150). Sarsen-cutting, particularly in Wiltshire and Buckinghamshire between 1850 and 1939, provides a parallel case of clearance of boulders from the landscape. Industrial exploitation is shown to have radically altered the 'natural' distribution of silcretes in England and northern France.

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1. Introduction

The use of silcretes after their megalithic heyday (Parker-Pearson, 2016) appears something of an anticlimax; but while not dramatic, it has been important, and on a scale seldom appreciated. The uses have mainly been (a) the manufacture, usually from puddingstone, of querns (hand mills for grinding flour), and occasionally millstones, in the Late Iron Age and Roman periods (largely first century BC to first century AD); (b) the commercial cutting of sarsen for such items as kerbstones, paving blocks, and gate posts in the nineteenth and twentieth centuries; and (c) the local use of sarsen as a building stone, chiefly from medieval times. In most instances surface, or near-surface material has been used and the landscape cleared of boulders.

Although these are products primarily of interest to the archaeologist or historian, they deserve more geological attention than they have received. Firstly, quern- and millstone production

was one of the most vital aspects of economic geology until around 1900, when the electrically powered steel roller mill became the chief means of flour production in the west. In south and east England and Normandy the silcretes comprised the only suitably hard rocks apart from flint (generally too small, and difficult to work) and boulders from glacial gravels (rarely large enough). Secondly there is the question of distribution. Silcretes have not formed extensive continuous layers, and have broken once weathered out of the parent deposit. (The largest sarsens at Stonehenge are around 10 m after dressing; an in situ lens of Hertfordshire Puddingstone has been recorded at 6 m+ (Hopkinson and Whitaker, 1892) but most concretions are 2 m or less.) In England all but a few have been moved from the point of formation by periglacial action and/or human use. So although they are an interesting feature of the geological record (papers by Lovell and Tubb, 2016), their distribution is largely unrecorded on geological maps and has required collation elsewhere. In the 1970s

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¹ This paper reflects the main conclusions of a study of the substantial Gallo-Roman and Romano-British quern and millstone industries of Normandy and south-east England, undertaken jointly with the late Professor David Peacock (d March 2015) and Dr Lyn Cutler, both of the University of Southampton. It incorporates geological/archaeological fieldwork, and museum visits to study the ancient products. Full publication will be in Green and Peacock (in preparation). While it is conventional to disclaim others' responsibility for the author's paper, in this case the intention is to impart David Peacock's work and ideas on the subject, which illness prevented him from sharing with the May 2014 GA/GLS Conference.

² During revision in June 2015; early in the following month an important further centre of production was discovered in west Hertfordshire, and an interim assessment follows: Green et al. (2016).

³ The quarry is on private land with no public right of access; the location is withheld at the request of the landowner.

the Society of Antiquaries' 'Evolution of the Landscape' research project recorded the distribution of sarsen stones in Wessex as an aspect of megalithic research (Bowen and Smith, 1977), while Morley Davies and Baines (1953) recorded Buckinghamshire occurrences of sarsen, Bradenham, and Hertfordshire Puddingstones. Sarsens in Suffolk were mapped by the Geological Survey (Boswell, 1927, 21–23), and the Sussex group by Ulyott et al. (2000). Hertfordshire Puddingstone, although geologically just a pebbly facies of sarsen, has been received less archaeological study and its distribution is therefore summarised graphically in Fig. 4.

2. Sarsen in later prehistory and classical times

Although massive and very hard, sarsen was never favoured for querns and millstones, as it is difficult/dangerous to work (it has a reputation for 'spitting', quite apart from the longer-term effects on health (below)), and the grinding surfaces tend to become 'glazed' (polished) in use. Sarsen querns and millstones are therefore not abundant even in areas where sarsen abounds, or where there is no hard rock at all, as in Bedfordshire. Saddle querns, where the top stone was rubbed to-and-fro by hand (Peacock, 2013, Chapter 2) were relatively easily made, and sarsen examples probably occur through later prehistory, but they are hard to date unless there is an excavation context. Rotary querns, an invention of the European Middle Iron Age, were much more difficult to make, requiring the first imperfect steel tools, considerable persistence, and very frequent re-sharpening. Iron Age sarsen querns are often conspicuous by their irregularity, where the boulder surface has been left unworked. So sarsen was the material of last resort for querns and millstones, and is invariably rare by comparison with 'Millstone Grit', various Cretaceous greensands (Green, in press) and indeed Hertfordshire Puddingstone. A number were found in Roman Conquest-period deposits at Maiden Castle, Dorset (Wheeler, 1943) but there are few other recorded excavations with more than one or two examples.

3. Puddingstone querns and millstones in the Late Iron Age and Roman periods

In Britain in the first century BC and the early years of Roman rule (c AD 50–150) it was usual to prepare bread flour on a domestic or small communal scale using a rotary hand mill, or *quern* made of stone. (Grain keeps well but flour does not; it was milled for short term use.) The upper stone, hemispherical to discoid in shape and of 20–50 kg mass when new, was rotated above a paired lower stone, and grain fed in through a central perforation; it passed centrifugally between the stones, emerging at the edge in the form of flour, or at least a *semolina*. Querns were used in parts of Europe into the twentieth century, and from ethnographic study it is believed that grain was generally lightly cooked, or 'parched' before milling, greatly speeding the process and improving the taste. If a finer flour was needed, it was simply milled twice. After c AD 100 in Roman Britain, but perhaps earlier in continental provinces, and especially in larger towns, the use of mechanical mills and altogether larger millstones became general; but does not concern us here.

3.1. Rock sources

The geologically contemporary or near-contemporary silcrete-conglomerate 'puddingstones' of Normandy and the Chilterns held a great advantage over sarsen in grinding flour: the Tertiary flint pebbles embedded in the sarsen matrix could be roughened (by light hammering) to form a surface with myriad sharp cutting edges. Together with these stones' great hardness (they are among the hardest of rocks), the effect may have been almost perfect for

milling: fast cutting, but slow wear (and hence much less silica in the flour than a sandstone might produce). Puddingstone is also an attractive rock; but it is difficult to work and the products must have been expensive.

The known sources are briefly described below but there must have been many more; it is significant that all but one is now wooded, and hence protected from agricultural operations. The exception (Avrilly) proves the rule: it was found through the pre-construction excavation of a housing estate site.

3.2. Normandy

The early Eocene '*poudingue*' of the Seine Maritime region of Normandy is far less well-known in Britain than Hertfordshire Puddingstone, but there is no doubt that it gave rise to the earlier industry, greater production, with probably a longer duration (perhaps as late as AD 300–400). The archaeological literature is very slight (Rudge, 1965; Remy-Watté, 1980; Rogeret, 1997; Green and Peacock, in preparation), as is the geological, since the surviving deposits are few and very local – they are marked in Fig. 1. Three occurrences of Tertiary-pebble conglomerates, and one of flint breccia are firmly associated with quern production:

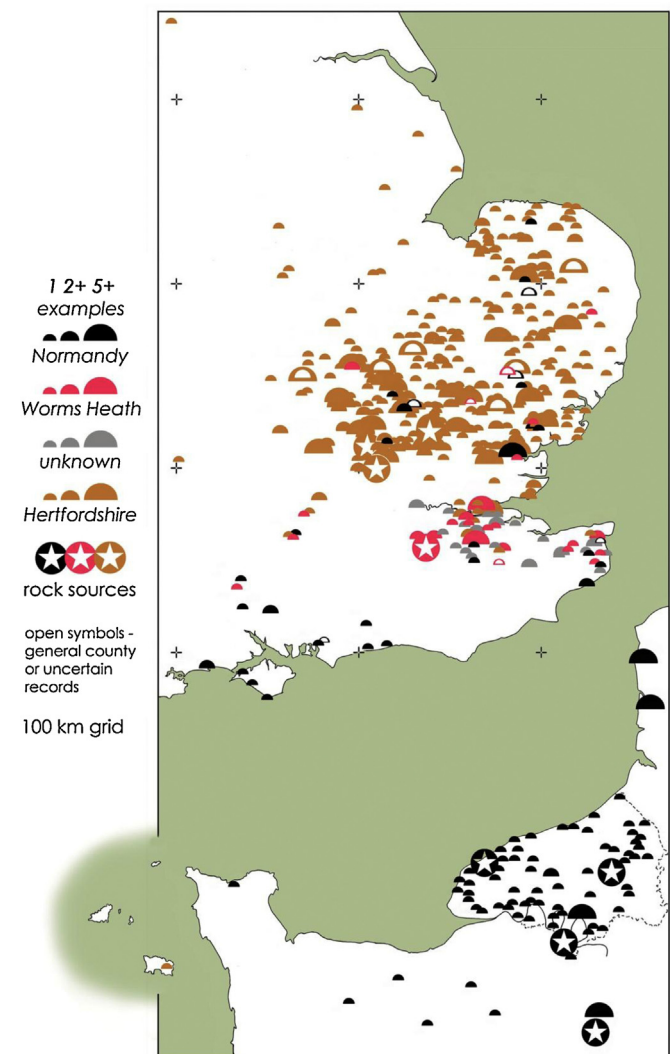


Fig. 1. The distribution of puddingstone querns, by source, in England and northern France (author, after Peacock, 2013); most French information is for the Seine-Maritime (pecked line).

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