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Introduction

Processing grain is an activity fundamental to agrarian societies and often imbued not just with economic, but also social and ritual significance. The need to feed a growing population in Britain from the Iron Age onwards resulted in an increase in the production and consumption of cereals and the role of the quern for grain processing grew significantly as a result. Querns saw widespread use and are frequently present on most archaeological sites dating from the Iron Age onwards. Although not entirely ubiquitous after the introduction of mill technology, for a long period of time querns were essential tools in food production. Their use within domestic contexts for small-scale immediate food consumption is evident at archaeological sites, but hand operated milling tools may also have been utilised on a larger scale to feed entire communities or to provide surplus flour for wider regions. Querns were probably used to feed a mobile army during the invasion of Britain and stationary troops in garrisons and forts. The significance of grain to the military diet is well-attested and quern use would have played an important role in the everyday life of the Roman soldier, who literary evidence suggests, was responsible for preparing his own daily food ration (Davies, 1971).

Imported lava was one of the most popular choices for querns and millstones in Roman Britain, but distribution and use of this material in Britain has never been systematically studied. This work will, therefore, focus on a neglected body of material culture to enhance our understanding of Romano-British food production, of the rural economy and of the social, cultural, and religious identities of the people who used them.

1.1. Context of Study

The aim of this research was to investigate what lava quernstones and millstones reveal about life in Roman Britain; their use in food production, involvement in trade and exchange networks, ritual activities, and the role they played in the formation and maintenance of socio-cultural identities. This was completed using a theoretically informed approach, applying the concept of object biography to analyse the various stages of the lava quern or millstone lifecycle (Kopytoff, 1986). For each stage, the interactions between human and object were identified, with consideration given to the possible social and economic implications of these interactions. Case studies were selected to specifically address variation across different site types: military, urban and rural. Overall, 2,707 lava milling tools from 564 sites in Roman Britain were captured in the dataset, alongside 601 sites where milling tools were present, but none of lava: making 1,165 sites in total.

While major advances to our understanding of Roman rural life have recently been made, artefactual evidence has often been ignored. Stone artefacts, such as querns, have largely been neglected. Earlier studies of milling tools have focused mainly on petrology, with little consideration given to other aspects of the artefact life cycle and socio-cultural significance (e.g., Peacock, 1980). However, routine practices, especially those connected with food production, can offer profound insights into ancient societies. For this reason, there has recently been an increased emphasis on contextualising milling tools, for example by distinguishing between querns and millstones and by linking petrology explicitly to trade and consumption (e.g., Shaffrey, 2006; Williams & Peacock, 2011). There has also been an increased recognition of deposition practices, which can have ritual aspects (e.g., Watts, 2014; Buckley & Major 2016, p. 135).

While easily recognised by non-specialists as volcanic, the substantial body of lava milling tools from Roman Britain has never been studied as a group. Until now, even the most fundamental information on typology, chronology, and distribution has been missing from current research. This study presents data that allows for this information to be explored, and from this provides new insights into trade relationships (cf. Morris, 2010) and consumption preferences with consideration of socio-ritual practices. The new data on lava querns has been compared to published data on other types of Romano-British querns (Shaffrey, 2006; Shaffrey & Roe, 2011) to create a holistic picture of the role of lava milling tools in Roman Britain.

1.2. Querns as Artefacts

Archaeologically, the introduction of the quern as a means of food processing is strongly associated with the introduction of agriculture during the Neolithic period (Peacock, 2013, p. 17–21: 26), though the tool itself has precursors dating back to the Palaeolithic (de Beaune, 2004). As European populations became increasingly reliant on grain as a foodstuff, a dependence on the tools used to transform grain into edible food products also developed. Querns may also have been used to crush other materials, such as metal ores and pottery tempers (Watts, 2014, p. 22–23), though interpretations relating to these methods of use are highly contextual and most querns are ordinarily associated with food processing activities. The earliest quern forms in Britain are of the ‘saddle’ type, consisting of a large slightly dished lower stone that can hold the grain, and a smaller hand-held stone that was moved back and forth, crushing the grain between the two stones (Peacock, 2013, p. 18–19) (figure 1.1). This form continued to be used in Britain well into the Iron Age and examples have been recovered in small numbers from Roman contexts, showing a long period of use (for example, see Williams & Zeepvat (1994) and Stead (1976)).

Figure 1.1. Bronze Age milling stone and saddle quern (Todd, G., 2016: CC0 1.0).

The introduction of the rotary quern brought huge change to an everyday activity, reducing the amount of work needed to process the same volume of grain (Peacock, 2013, p. 120–130). Despite the name, there is a high possibility that rotary querns were oscillated to imitate the movement of a saddle quern, and not rotated (Heslop, 2008, p. 55; Watts, 2014, p. 21). The precise chronology relating to the introduction of the rotary quern in Britain is not known and is likely to have been regionally different (Shaffrey, pers. comm.), but is thought to have occurred sometime between the middle to Late Iron Age (Watts, 2002, pp. 27–29; Peacock, 2013, pp. 54–58).

Rotary querns take the form of a pair of stones of relatively equal sizes (figure 1.2). Different quern forms or types exist, and these can be regionally or chronologically distinct (Watts, 2002, pp. 31–38; Peacock, 2013, pp. 63–76), but all tend to have circular grinding surfaces; one on the upper (*catillus*) and one on the lower stone (*meta*). The lower stone remains stationary, while the upper stone is either rotated or oscillated via a spindle fitted into the lower stone that is pivoted on a 'rynd', usually of iron, fixed into the upper stone (figure 1.3). Grain is fed into the quern via an opening in the upper stone, sometimes widened at the top to form a hopper. Various handle fittings exist across different rotary quern types, used to move the upper stone. Querns are typically made from sandstone, conglomerate, limestone, or lava, though any suitable geology can be utilised. In regions with access to suitable stone types, these were locally sourced, while good stone for querns was often moved many miles to supply regions without (Parkhouse, 1997; Moore, 2007, pp. 84–85; Morris, 2010, p. 78; 107). The stone needed to be hard enough to withstand the friction of movement associated with grinding without excessive breakdown of the material, while remaining suitably rough to maintain the friction needed to cut or crush the grain (Watts, 2002, p. 29; Peacock, 2013, p. 2).

Most modern interpretations of ancient quern use tend to focus on utilitarian aspects of function, form, and mode of operation as well as the relationship between querns and the economy of the stone trade and food production. However, the social significance of these objects has come increasingly to the forefront of investigations. The important and diverse role that querns held in past cultures is well recognised in prehistory (Hill, 1995, p. 108; Hamilton, 2002, p. 40; Brück, 2006; Moore, 2007, pp. 90–91; Watts, 2014, pp. 5–12;), and these ideas are supported by anthropological studies involving quern use in modern-day traditional societies (Watts, 2014, p. 31; 33–35). Less focus has been given to such relationships between people and querns in the Roman period, which might relate to the fact that there is such a large volume and variety of material culture available for study. This makes it much harder to establish patterns in deposition or use. However, the socio-cultural significance of these objects appears to span time and space and it is highly likely that querns in Roman Britain also held more value than that of their function alone.

Figure 1.2. Rotary quern in use in Tibet (Beger, B., 1938: CC BY-SA 3.0 DE via Wikimedia Commons).

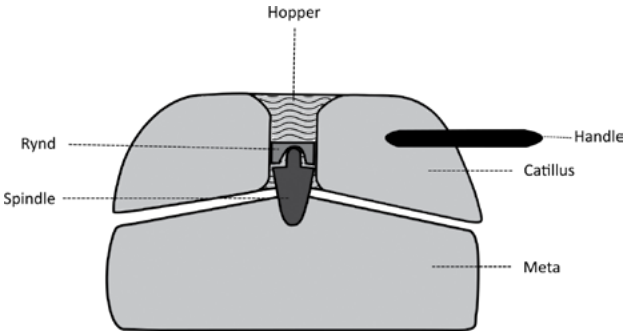

Figure 1.3. Diagram of general components of a quern of indigenous British form.

1.3. Mills and Millstones

Roman period mills in Britain existed in two main forms: disc or 'Pompeian' types (figure 1.4) (see Chapter 2). Both could be powered by humans or animals, while disc types could also be turned using water. Structural evidence for mills within the province is a rare occurrence (figure 1.5), though it is highly likely that a greater number of mills were in use than have currently been recorded. Shaffrey (2015) has named known Roman period mills at Fullerton, Ickham, Stanwick and Silchester, with possible mill structures at Darenth, Kenchester and Dickets Mead. The Rural settlement of Roman Britain Project has identified a further 13 possible mill structures (Allen, et al., 2018), while two probable watermills are known at military sites at Chesters and Haltwhistle Burn on the northern frontier (Simpson, 1976, p. 26–49). Current distribution of identified mill structures suggests that there was a greater number in the south of the province, which might relate to population, but may also be indicative of more modern-day development in these areas.

Utilisation of mills can also be identified by the presence of millstones, which have a much better survival rate than other evidence types, meaning they have a higher probability of recovery than timber mill structures.

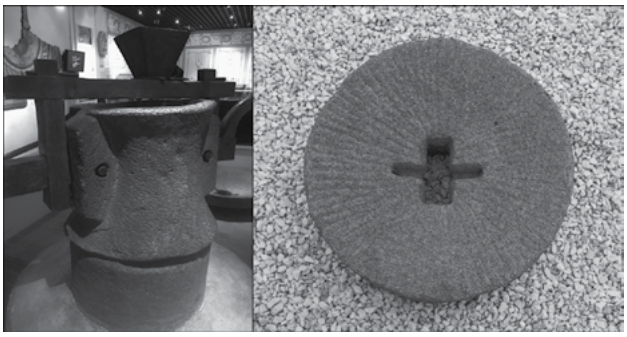

Figure 1.4. Disc-type Roman millstone (right) (Bjoertvedt, CC BY-SA 4.0 via Wikimedia Commons) and reconstruction of a Pompeian style mill (left) from millstone fragments recovered from Princess Street, London (photo by author reproduced with kind permission of the Museum of London).

Despite there being some debate about whether millstone presence constitutes the existence of a mill (Dawson, 2019, p. 239–240), the occurrence of millstones, especially those with clear signs of wear, can and should be connected to a probable mill in the area; even if this is not necessarily within the immediate vicinity (Shaffrey, pers. comm.). Sometimes, these provide the only means for identifying

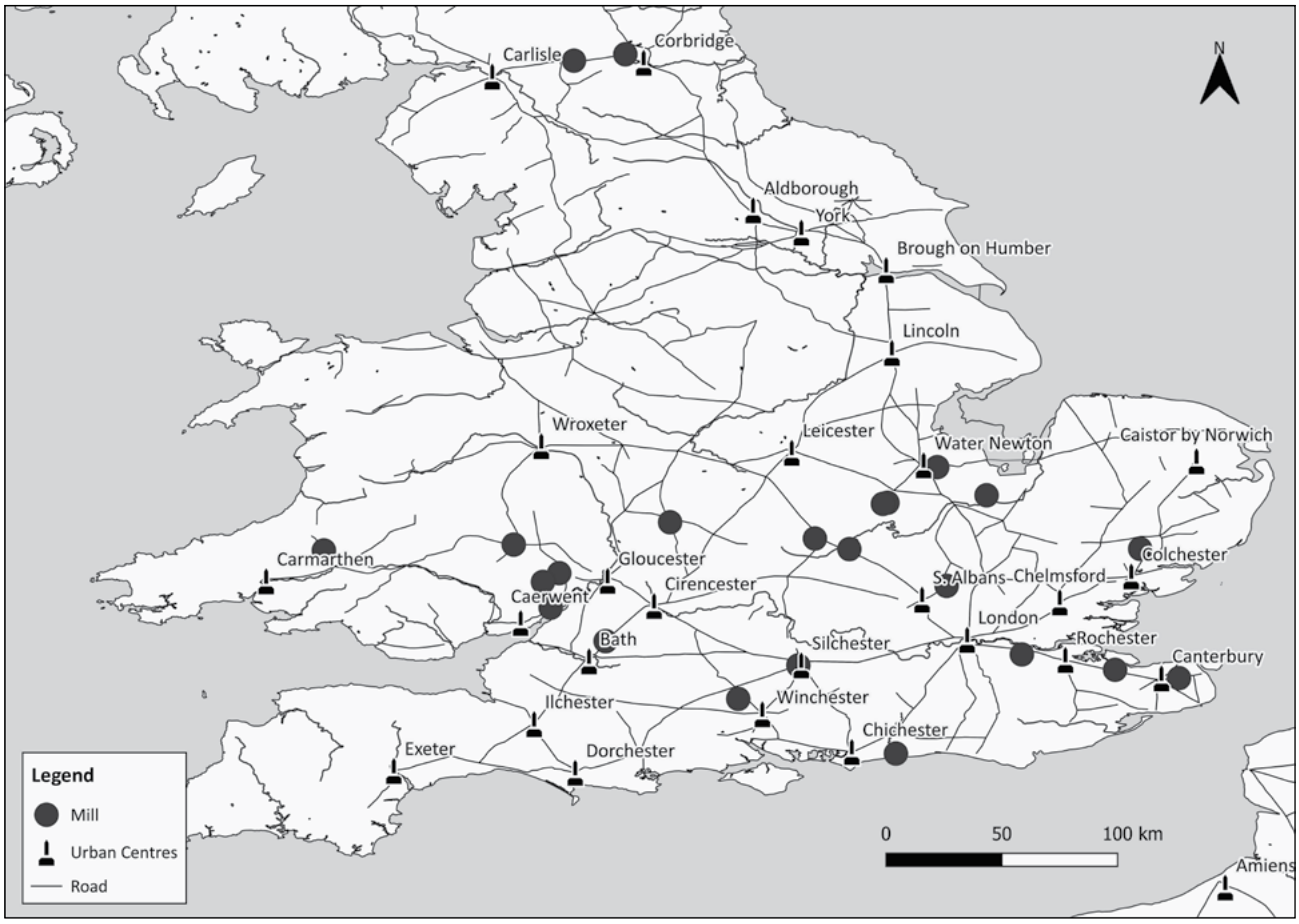

Figure 1.5. Location of identified and possible mill structures from structural evidence in Roman Britain, also showing the main urban centres (Background GIS data courtesy of the Ancient World Mapping Center).

the existence and extent of centralised grain processing within specific regions and chronologies; they act as an important indicator of population, status, organisation of labour, centralised food production, and access to technology and innovation.

1.4. Differentiating Between Mills and Querns

The ability to turn or oscillate a quern comfortably and use it efficiently as a hand-operated tool is highly dependant on ergonomics. The mechanics of grinding influence tool design heavily, whilst human requirements such as physical range of movement and the impact or stress on muscular and skeletal systems are also an important factor (Sefryn, 2013, p. 692). Similarly, the concept of 'affordance', as taken from design theory, has been applied to archaeological material to help interpret how form might be related to function using evidence of actual use (Swift, 2014, p. 203–204). Although this approach also considers the design of an object as being conducive to its intended use, it actively examines differential use and adaptation of purpose through alterations in the material and signs of use-wear. This is something that should be applied to quern and millstone identification too.

As millstones are not constrained by size, there can be a much wider variation in stone diameter than for querns, and it is generally assumed that millstones would be larger and more productive than querns to justify the extra investment in the mechanics of the device and any associated expense of running them. As querns or millstones may have been used differently to that of the intended design, there could be some 'blurring' between these definitions. Shaffrey (2015) has determined that anything larger than 570mm should be defined as a millstone, while Peacock (2013) suggests a slightly larger size of 600mm. However, these definitions encompass milling tools of all stone types and more specific divisions may exist for particular types or classes of millstone/quern. Where this separation exists for lava milling tools will be discussed further in Chapter 2.