

CHAPTER 34

Stones

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Introduction

Coarse stones are frequently overlooked on archaeological sites, often because they are considered to be ‘natural’. However, on a site like Star Carr, within the peat deposits, all stones which are present must have been transported there by some process: they do not occur there naturally. The archaeological and ethnographic record reveals a broad spectrum of activities that stones can be used for. For instance, stones are often used in food processing for pounding and grinding of plant foods, breaking open bones for marrow, and in a variety of cooking practices such as potboilers, grilling stones for cooking meat, or placed within pit ovens for cooking or steaming (Fretheim 2009; Little 2014). They can also be used for making artefacts and may be associated with grinding pigments such as ochre, softening hides and the knapping and polishing of objects made from flint, bone, wood and antler. They may also have been used for other functions such as tent weights. Some of these activities will produce obvious traces of use, some only microscopic traces of use, and some will have been used for such a short duration of time or in such a way that no signs of use have developed even at a microscopic level.

Given this diversity of uses in everyday life, it should come as no surprise that many coarse stones were found at Star Carr. During the recent excavation seasons, 584 pieces of coarse stone were recovered. They were recorded in 3D using a Total Station, regardless of whether they showed any obvious signs of modification (Figure 34.1). The stones collected in 2013 and 2014 (n=295) have been analysed and the results are presented in this chapter.

Previous research

During the original excavations, stones were found in the archaeological layer, which Clark interpreted as an attempt to stabilise the living surface (Clark 1954, 175). He also noted that some showed ‘definite signs of use by man’, 12 of which were described and seven of which were illustrated. These stones were of greywacke, siltstone, sandstone, quartz and quartzite and were thought to have been obtained from the local glacial sediments.

How to cite this book chapter:

Webb, J., Little, A., Conneller, C., Milner, N. and Pomstra, D. 2018. Stones. In: Milner, N., Conneller, C. and Taylor, B. (eds.) *Star Carr Volume 2: Studies in Technology, Subsistence and Environment*, pp. 479–491. York: White Rose University Press. DOI: <https://doi.org/10.22599/book2.t>. Licence: CC BY-NC 4.0

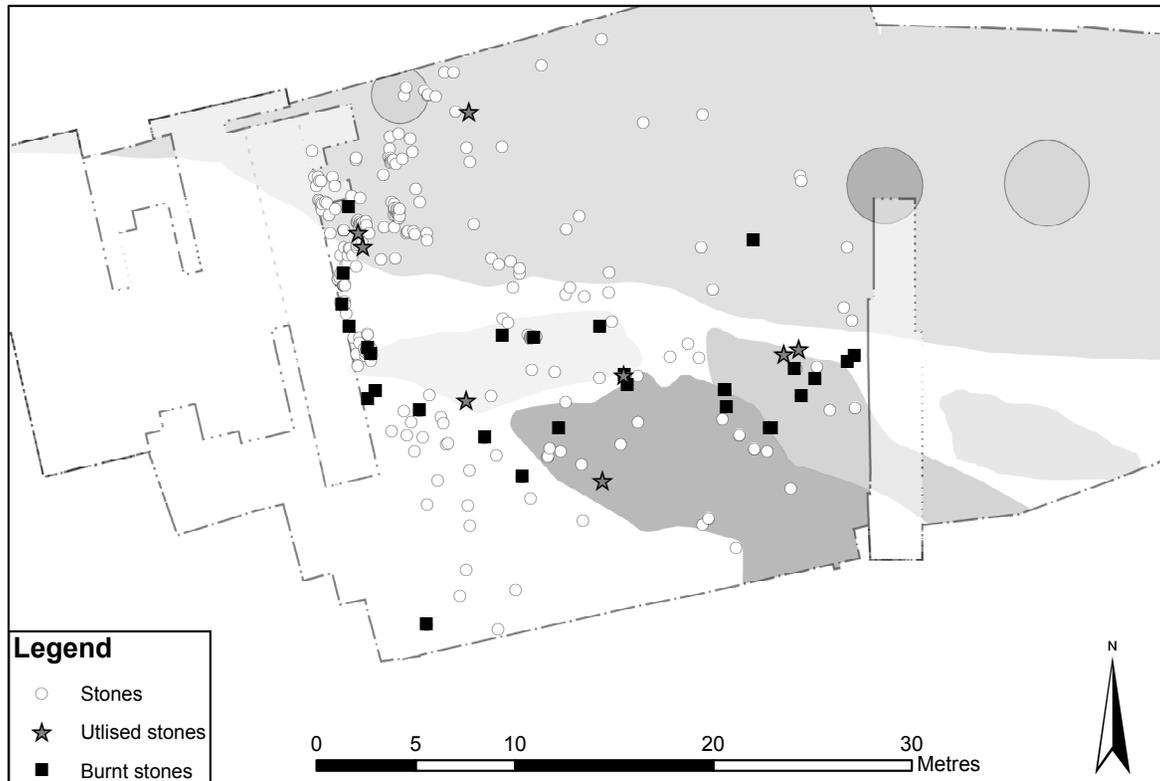


Figure 34.1: Spatial plot of the stones, burnt stones and utilised stones (Copyright Star Carr Project, CC BY-NC 4.0).

Five types of modification were identified on these stones: 1) abrasion of one or both ends; 2) flaking or cut marks on a portion of one edge; 3) irregular pitting on one face perhaps indicating the use as an anvil; 4) finely engraved lines on both faces; 5) staining with a tar-like substance. In addition, one stone (S11) was selected because although it showed no signs of working, it was extremely regular and was considered likely 'that it was selected by man' (Clark 1954, 177).

There are some notable features to two of the stones collected by Clark which stood out from his written descriptions and illustrations. These have both been examined by CC in the Cambridge Museum of Archaeology and Anthropology, and are figured in Clark 1949 (plate XX). Stone S1 (Clark 1954, plate XX, G) is broken but has flaking along one edge. Both ends are discoloured by what Clark describes as a tar-like substance, and which may be resin but might also represent peat-staining or burning. Stone S2 (Clark 1954, plate XX, F) is of an unusual black material probably exotic to the site, which has been smoothed or polished on both sides. A series of parallel lines may derive from the process of smoothing the surface. The ends are bevelled and not smoothed, and may have been used for abrasion. These were found together and are probably the two plotted by Clark (1949, plate VIII) in squares N–O. This is the area immediately adjacent to Clark's baulk, excavated by us. Both these stones would repay further study.

Methods

The majority of the stones were carefully hand washed in water only. Others were too degraded to be cleaned in water, so an attempt was made to remove as much dirt as possible. Measurements of depth, width and length were recorded, using digital callipers. Each stone was carefully inspected for signs of modification or use. Once morphological and wear patterns started to emerge, other stones of a similar size, shape and weight were examined again, to ensure that no signs of modification or use had been overlooked during the first inspection.

The typology created was developed from those constructed for Howick (Waddington 2007) and the Southern Hebrides Mesolithic Project (Mithen 2000).

A representative sample of 30 stones was selected and taken to the geology department of The Yorkshire Museum for identification by Dr Sarah King and Mr Stuart Ogilvy, and these were then used to categorise the rest of the assemblage.

Some stones had been collected on site for residue analysis; however, all of these proved too degraded to analyse for residues. However, preliminary microwear analysis on the stones showed the most potential for microwear traces. Analysis was carried out with a low-power ($\times 5$ – $\times 10$) stereoscope; some were further selected for preliminary high-power analysis using a high-power metallurgical microscope ($\times 20$ – $\times 50$). This study was in no way conclusive but was carried out to assess the potential for future work, and from this assessment, a more extensive and integrated programme of microwear and experimentation will be undertaken in the future.

Results

Geology and morphology

The majority of stones examined at The Yorkshire Museum vary from very fine- to coarse-grained sandstones. In addition, one was siltstone and one could not be identified. Many of the sandstones demonstrate poor cementation within the structure of the stone, which is believed to have been caused by the wet, acidic conditions of the soil (Chapter 22) washing away the cementing material and leaving behind the more robust elements of the stones. According to the geologists, the sandstone most likely comes from a very similar, if not the same source. Some of the pieces are waterworn, with one example being almost completely round, and it is likely that these all came from a nearby water source: perhaps the lake, the river or even the coast, though this would have been much farther away. The stones vary in size (Figure 34.2); there were two outliers, one of which was particularly large in both width and length <108947> and which had been found in reed peat (317).

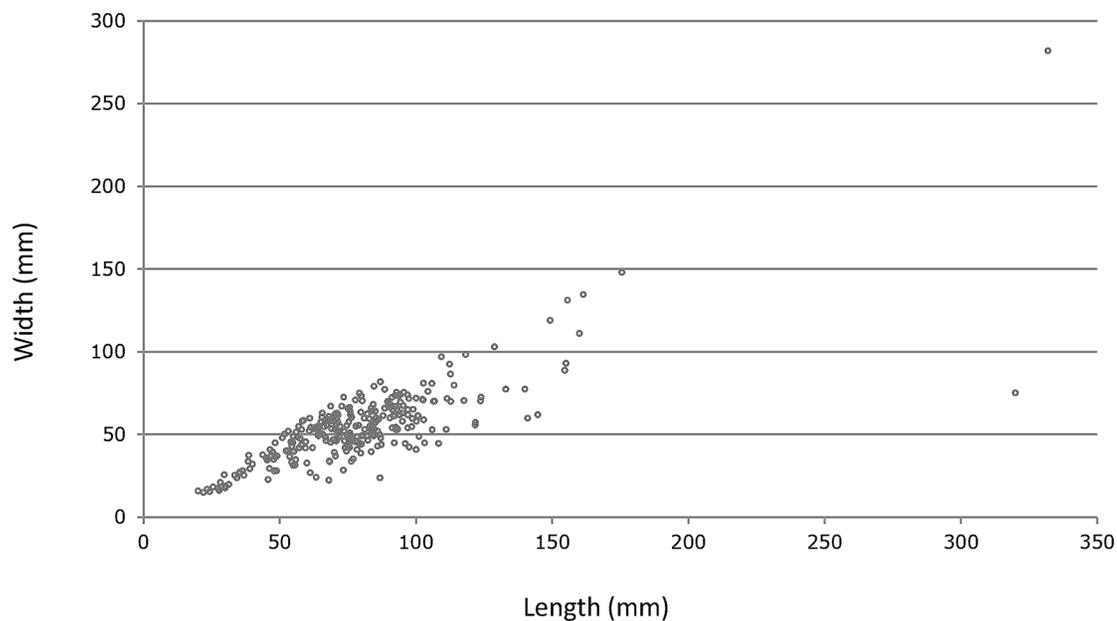


Figure 34.2: Plot of length against width showing the range of sizes, including two outliers (Copyright Star Carr Project, CC BY-NC 4.0).

Burning

A total of 28 (9.5%) stones show indications of being burnt and seem to occur mainly in the wetland area (Figure 34.1). The stones were not identified as burnt until they had been cleaned twice, at which point any patches of blue/grey discolouration that remained was taken as evidence of burning (Figure 34.3). In addition to the sandstone, two pieces of fractured quartz and two discoloured stones of unknown geology displayed the most obvious signs of burning. A small number of stones may have been heat fractured but displayed no signs of burning. These were not catalogued as burnt/heat fractured as there was a possibility they had disintegrated due to the acidic conditions of the soil. The stones with evidence for burning range in morphology from sub-angular to rounded, the majority being medium coarse- to fine-grained sandstone. Most are similar in size, the largest being 103 mm in length and 1.2 kg in weight.

An experiment was undertaken to assess the types of burning and heat fracturing which are visible within the coarse stone assemblage. Two pieces of quartz and two pieces of sandstone were collected from Cayton Bay beach near Star Carr. The four pieces were placed within an open hearth and heated to a maximum of 350°C. Before removing them from the ashes, the surface temperature of the stones was recorded as 300°C. They were immediately lifted onto a metal shovel and dropped into a metal bucket containing approximately two litres of lake water. Initially, the water boiled and produced water vapour; however, it appeared to quickly drop in temperature and within 15 minutes, the water measured 25°C.



Figure 34.3: Coarse stone cobble with blue/grey signs of burning remaining after washing (Copyright Aimée Little, CC BY-NC 4.0).

Upon inspection, the two quartz stones had fractured; one to such a degree that it fell apart upon handling. Stone <99556> was similarly fragile, although no visible signs of discolouration were present. The two pieces of experimentally heated sandstone were intact. These pieces were then washed to remove charcoal and ash. Once dry, they both clearly displayed small patches of grey-blue discolouration which could not be washed away by hand without removing the surface of the stone. This discolouration bore close resemblance to the burnt sandstone from the assemblage.

Utilised stones

Nine stones had clearly been used. One of the stones was found in trench 35 (Chapter 3) (Figure 34.4). The majority of utilised stones were found in the wood peat (310), suggesting activity took place in this area once it had become fen carr. The majority were naturally rounded or oval stones with flat 'upper' and 'lower' surfaces. In profile they appear to have been modified intentionally, almost faceted, as if the natural form of the cobble had been enhanced. However, similar-shaped coarse stone cobbles used extensively as hammerstones for a range of tasks, including house construction, have the same faceted and pecked appearance, making it likely that such modification has resulted incidentally from use. Two archaeological examples of cobbles displaying different morphological form, <96759> and <107884>, suggest alternative functions, and are discussed below.

In some cases it is clear from the morphology of the stone and the visible macro damage that they have been used as hammerstones. In most instances, coarse stone tools are used for more than one purpose, displaying smoothed surfaces from use as polishers as well as peck marks from percussion. Coarse stone tools were likely to have been used for a range of tasks, such as polishers for hide, burnishers for other materials, anvils and hammerstones.

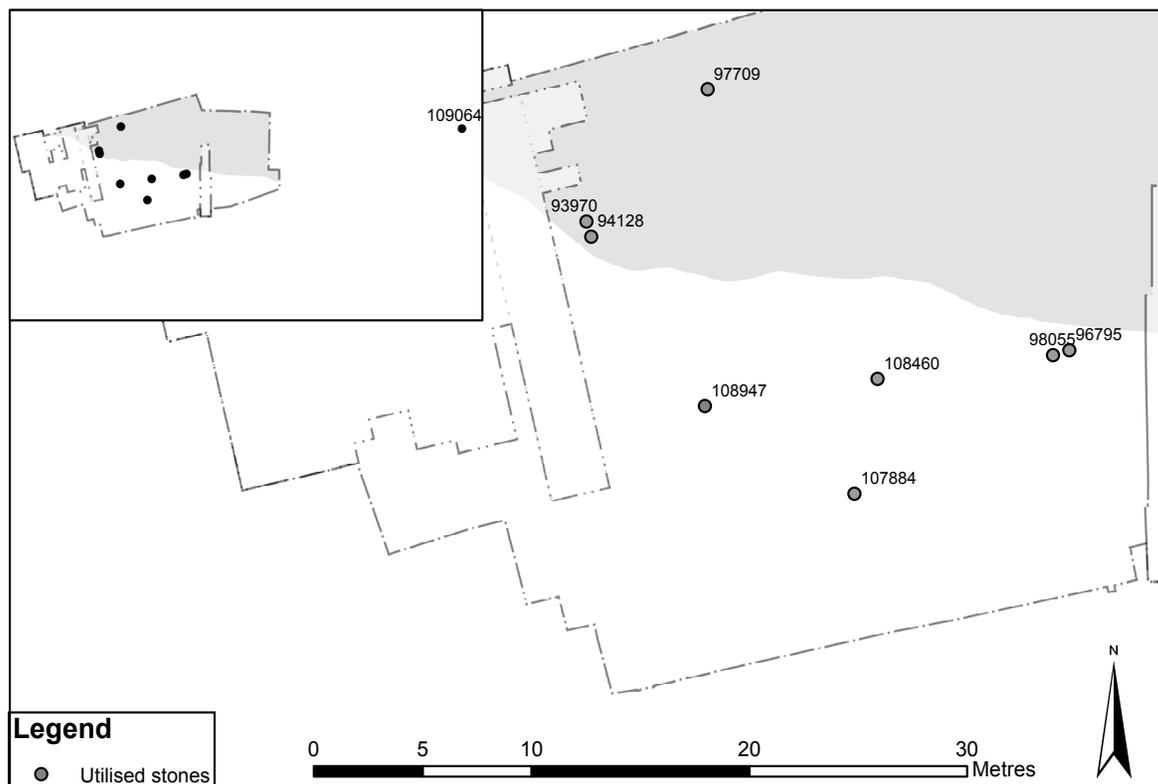


Figure 34.4: Plot of utilised stones. Stone <109064> was found in trench 35 (located within the top frame). Stone <94259> was not 3D located so it not plotted here (Copyright Star Carr Project, CC BY-NC 4.0).

Waterlogged deposits

1) <108947> (detrital mud: context 317) a large flat 'flagstone' of sandstone was found in the wetland deposits, likely to have been underwater at the time of deposition (Figure 34.5). As previously stated, stones do not occur naturally in this context; therefore this object must have been placed there intentionally. No evidence for grinding was observed; however, the surface was in very poor condition with areas of it appearing weathered, probably due to the acidity of the surrounding wetland deposits. A number of pitted areas were observed and may have resulted from its use as an anvil; unfortunately, its poor condition precluded more detailed microscopic analysis. Alternative reasons for its placement in a watery context include the possibility that it was used to weigh something down which has long since perished, or it may have created a stable standing surface whilst fishing, fowling or similar.

Wood peat

2) <108460>: (context 310) is a piece of sub-oval shaped, fine-grained sandstone (Figure 34.6). The upper and lower surfaces are smooth, contrasting with the edges which are rougher and display flaking and peck marks from percussion. It is possible that the surfaces were used for polishing/burnishing activities, and the edges, principally at either end, were employed for hammering. Interestingly, one pronounced edge with peck marks has started to 'flatten' through use, acquiring the 'faceted' appearance of the other sub-oval hammerstones.

3) <107884>: (context 310) is a piece of fine-grained sandstone (Figure 34.7). It tapers to a point at one end, which has percussion damage, probably from use as a hammerstone. The most noticeable feature of this coarse stone tool is the well-defined facet visible on one surface. Microwear analysis of the faceted surface revealed a polish which did not display any clear directionality, possibly resulting from multidirectional movement. The polish was pitted in places, but also bright. Though requiring more detailed analysis, this may be the result of





Figure 34.6: (left) stone <108460>; (right) detail of peck marks (Photographs taken by Paul Shields. Copyright University of York, CC BY-NC 4.0).



Figure 34.7: (left) oblique view of sandstone artefact <107884>, which has clear signs of modification: pecking at one end and a smoothed facet on one surface, probably resulting from use; (right) red stain deep within the stone matrix of <107884>, visible only microscopically ($\times 20$) (Left photograph taken by Paul Shields. Copyright University of York, CC BY-NC 4.0. Right photograph Copyright Aimée Little, CC BY-NC 4.0).

contact with hide and a mineral component such as ochre. Interestingly, a red residue was identified microscopically, embedded deep into the matrix of the stone (Figure 34.7); further analyses are required to identify this definitively as ochre.

4) <98055>: (context 310) is a piece of medium-grained sandstone (Figure 34.8). Both long edges show clear signs of damage from percussion, which has created a flattened surface. The surfaces of the stone are less smooth than the other stones of this type. Future microwear analysis may help determine whether they have in fact been used as polishers. Both ends of this stone have broken off and exhibit no further signs of use post-breakage.

5) <96795>: (context 310) is a medium-grained sandstone. It is sub-oval in shape, with very smooth upper and lower surfaces, which may have been utilised for polishing. However, the most notable feature on this artefact is a series of parallel grooves worn into one of the edges. These grooves were not immediately visible, only

Figure 34.5 (page 484): Stone <108947>, a large flat stone found within detrital mud (317) (Copyright Star Carr Project, CC BY-NC 4.0).

becoming visible in certain light, clearly captured with macrophotography (Figure 34.9). Microwear analysis of the grooves revealed wood and/or antler polish. A tool like this would have been useful for a number of things, including shaping antler for barbed points or polishing the shafts of arrows. Arrow shaft polishers or 'straighteners' are known from other Mesolithic sites, for example the Bjørnsholm kitchen midden (Andersen and Rasmussen 1991, 85). More commonly, grooves on coarse stone tools interpreted as arrow straighteners are present on the long axis of the cobble to achieve maximum contact between the shaft and the stone. In contrast, the grooves are on the shortest axis, the edge, suggesting use as a polisher for a shorter object.



Figure 34.8: (left) stone <98055>; (right) close up of damage which has created a flattened surface (Photographs taken by Paul Shields. Copyright University of York, CC BY-NC 4.0).



6) <94128>: (context 310) is an ovoid, medium-grained sandstone (Figure 34.10). Modification of this stone through percussion damage is visible on one surface and both edges. This has resulted in a regular 'egg-shaped' profile. As well as this, one face has three large flakes removed from it, although at least one of these is most likely post-depositional in nature as it is fresher in appearance than the other two.

7) <93970>: (context 310) the geology could not be determined without using destructive methods, although it is possibly chert (Figure 34.11). It shares similar features to many of the other cobbles in that it has percussion



Figure 34.10: (left) stone <94128>; (right) detail of percussion damage (Photographs taken by Paul Shields. Copyright University of York, CC BY-NC 4.0).



Figure 34.11: (left) pecking marks on terminus of <93970>; (right) stone <93970>; note the very smooth surface (Left photograph Copyright Aimée Little, CC BY-NC 4.0. Right photograph taken by Paul Shields. Copyright University of York, CC BY-NC 4.0).

Figure 34.9 (page 486): Macrophotography of the parallel grooves clearly visible on the edge of sandstone cobble <96795>, as well as percussion damage probably from use as a hammerstone. Microwear of the grooves revealed wood or/and antler polish. This object has been interpreted as a possible tool for barbed point production, arrow or other type of shaft polisher (scale: 80 mm in length) (Copyright Matthew Von Tersch, CC BY-NC 4.0).



Figure 34.12: Stone <94259> which may have been used as a hammerstone (Photograph taken by Paul Shields. Copyright University of York, CC BY-NC 4.0).

damage; however, its morphology is different: it is sub-triangular in profile and sub-oval in plan view, with the percussion marks located at both ends of the flat sub-oval surface. On this sub-oval surface linear marks can be seen running along its length probably resulting from the stone being used in a backwards and forwards motion, to polish or similar.

8) <94259>: (context 310) is medium- to fine-grained sandstone (Figure 34.12). It is almost twice as long as it is wide and has a circular cross section. Percussion damage at one end suggests it has been used as a hammerstone. There is a very small amount of percussion damage on two other surfaces. The other end was probably broken off in antiquity and shows no signs of post-breakage use.

Western structure

9) <97709>: (context 303) is a fine-grained sandstone which was probably originally sub-oval in shape but has broken in antiquity (Figure 34.13). The widest edge in profile displays the most percussion damage, although a small quantity of percussion marks are visible on the opposing edge; it is likely that this was well utilised for various hammering activities. Both the upper and lower surfaces of the cobble are very smooth, and it is possible to see a difference between the natural, more rough/textured surface, to the very smooth surface which appears to have resulted from use as a polisher or similar.



Figure 34.13: (left) stone <97709>; (right) detail of percussion marks (Photographs taken by Paul Shields. Copyright University of York, CC BY-NC 4.0).



Figure 34.14: (left) stone <109064>; (right) detail of percussion damage (Photographs taken by Paul Shields. Copyright University of York, CC BY-NC 4.0).

Trench 35

10 <109064>: (context 327) is a piece of fine-grained sandstone, sub-oval in shape (Figure 34.14). This stone has two relatively smooth, flat surfaces, one of which is particularly smooth, perhaps having been used for polishing. The widest side in profile displays extensive pitting from percussion, ostensibly removing the majority of material from all of the sides. This has resulted in a rounded profile, with flattened edges and rounded corners.

British Early Mesolithic context

In general, coarse stone has been neglected in the British Mesolithic. There are some exceptions: bevel-ended stone tools have seen some study (e.g. Clarke and Waddington 2007), as have pebble mace heads, though the chronological range and attribution of these remains uncertain. The presence of hammerstones is frequently noted in site reports but these are paid little more attention than simply noting their presence. However, even a cursory examination of the literature reveals that imported and utilised stones are ubiquitous. Rankine (1949) was the last individual to undertake a broad survey of imported and utilised stones on a broad scale, and a new synthesis is needed.

In the context of northern England, sandstone hammerstones, likely of local glacial origin, are common across Early Mesolithic sites in the Vale of Pickering. The use of sandstone is also mentioned on the Pennine Star Carr site of Turnpike (Stonehouse 1992, 9), though in this case it is a type that is not of local origin. It appeared to be used for polishing and rubbing. Two pieces of red ochre were also found at the site. The fullest discussion of exotic stone use for a Deepcar site comes from Deepcar itself, where Radley and Mellars (1964) note the presence of rounded gritstone blocks, quartzite pebbles and local flag. The former two had been imported from the River Don, below the site, the latter pulled up from the underlying bedrock. All were considered to be structural in nature. Two stones, a battered piece of basalt and a shaped piece of sandstone, appear to have been artefacts.

More is understood about the movement of stone in Southern England thanks to Rankine's work. Rankine had a long-standing interest in this issue and noted a persistent presence of stones from the southwest across Southern England (Rankine 1949). Rankine's recording of the movement of stone used for the production of chipped stone artefacts is perhaps the best-known part of this work, thanks to further study by Care (1979). The movement of Portland chert appears to have started in the Early Mesolithic, as indicated by its presence at Frensham Great Pond, Surrey, and Oakhanger VII (Jacobi 1981). Rankine also records the transfer of slate artefacts, though these appear to be a late Mesolithic phenomena (Jacobi 1981) and fine-grained elongated pebbles which derive from the Palaeozoic of southwest England (Rankine 1949; 1956, 55). These latter were moved during the early as well as the late Mesolithic, as demonstrated by finds from Oakhanger V/VII, where five siltstone pebbles were recovered. Petrographic analysis indicated a Cornish origin, though they are likely to have been collected as beach pebbles; Rankine (1956, 56) suggests Chesil beach is a possible source. Similar pebbles, with a Devon or Cornish origin were recovered from the mixed Mesolithic site at Farnham (Rankine 1956). Similar types were recovered from the Early Mesolithic site of Kingsley Common, R4 (Jacobi 1981, 20). Sandstone grinding slabs are also known from Oakhanger with possible sources in Kent and Sussex as well as sandstone and quartzite pebbles with likely exotic sources.

Since Rankine's 1949 synthesis further examples have been uncovered, for example sarsen stone was used to line a pit at Thatcham I, Berkshire, and a piece of abraded sandstone and quartzite pebble flaked into a disk were recovered from the same site (Wymer 1962, 333). Two pieces of Devon Sandstone, used as rubbers, come from Hengistbury Head, as well as a more immediately local sarsen block (Barton 1991). However, it is likely that exotic as well as utilised stones are often missed, particularly on sites with complex taphonomic histories.

Conclusions

From a study of morphology and macroscopic traces we have been able to determine that <96759> was likely to have been used to work antler, possibly barbed points, or polish wood, possibly shafts for arrows. Microwear analysis supports this theory with wood and/or antler polish identified within the linear grooves. Other stones, for example <98055> were clearly used as hammerstones. It is interesting that so many hammerstones come from the wood peat (310). This, coupled with the evidence for in situ knapping in the wood peat, for example at the axe factory (Chapter 8), indicates the transformation of a once-wet area into fen, which in turn became a working surface.

When selecting cobbles for use as a hammerstone, there is a preference for sub-oval cobbles with two flat surfaces. It is the profile of the cobble which displays the most percussion traces. Future work on these stones aims to conduct a more detailed functional study integrating microwear with experimental research, although given that these stones were likely to have been employed in a variety of activities, teasing apart discrete episodes of

use through microwear research could prove challenging. From macroscopic analysis it is clear that many of these stones had extensive and varied use lives, probably picked up and reused time and again. As seen in many chapters of this book, coarse stone tools have played a fundamental role in many of our experiments, including tapping out a shale bead blank followed by polishing of the bead's surface, use as an anvil for drilling amber, striking a flint nodule to produce blade and flake blanks, crushing bone to remove marrow, polishing wood to make it smooth, removing the unwanted burnt and brittle part of a deer crania to produce an antler frontlet (e.g. see Chapter 10). One coarse stone could have been used for all of these tasks.

When working with coarse stone, one quickly becomes accustomed to its form and properties, gaining a preference for one stone over another. It is not difficult to imagine how these objects were not only curated and used in a diverse range of tasks, but perhaps became part of one's personal toolkit. Coarse stone is robust, and even when broken, which we have seen on a number of the modified pieces analysed in our study, can continue to be utilised, if not for exactly the same task for other similar activities. We also know that some stones were burnt, possibly as part of cooking activities; although more research is required, coarse stone tools which had come to the end of their use life as hammers, polishers and so forth may have then have been re-used as heat retainers.

Rarely in accounts of material culture from Star Carr, since Clark's publication, has coarse stone technology been mentioned. We are very familiar with the abundance of flint, worked into numerous tool forms, used for an extensive range of activities (Chapters 8 and 35). In comparison, coarse stone technology has been a neglected dimension to our understanding of the material world of Star Carr's inhabitants. Although we have not been able to conclusively identify the function of every coarse stone tool from the site, it is clear that the role of these enigmatic artefacts in daily life was varied. This, combined with evidence for their importation to the site, their curation and extensive reuse, suggests that these seemingly banal and often overlooked objects were an intrinsic part of people's material repertoire.

