APPENDIX 2: THE WORKED STONE FROM STAINTON WEST: COARSE-STONE TOOLS, STONE IMPLEMENTS, AND OCHRE

Those elements of the Stainton West worked-stone assemblage that were typologically distinct from the flaked lithics (*Appendices 4* and *5*) comprise coarse-stone tools, near-complete polished-stone axes, and flakes, and ochre, the latter in the main being present as crumbs and small fragments. During the assessment of the worked-stone assemblage, these items were bagged and labelled separately, so that they could be checked by the relevant specialists to identify evidence for utilisation. They were then placed into temporary storage, until after the flaked-lithic assessment, with each context assemblage being recorded onto the CNDR Finds Database using similar methods to those recording the flaked-lithic assemblage (*Appendix 3*). For each ochre assemblage specific to a certain context, the database records were issued with finds numbers starting at 3000, whilst coarse-stone tools were issued with finds numbers starting at 2000. The stone axes and flakes struck from polished-stone implements were issued with the lithic category 'stone implement', so that the complete stone axes and fragments comprised a coherent assemblage of artefacts.

Coarse-stone Tools

A Clarke

The coarse-stone tool assemblage comprises 235 items. All were subjected to detailed typological and technological analysis, and a sample was examined to determine their raw-material types.

Technological characterisation

Cores and core tools

The cores and core tools represent the most numerous identifiable types of coarse-stone tools recovered (Table 44) and they have been grouped together, as most of the cores appear to be incomplete core tools. In many cases, these tools were made, quickly and simply, by striking a flake from one end of an ovoid cobble to create an angled face. Smaller flakes were then detached from the upper end of this face using the inner platform to create an angled cross-section (*eg* 70081.10, 70325.17, 70184.11; Fig 276). Additionally, on several cobbles with a flat cross-section, parts of the perimeter were flaked unifacially or bifacially to provide an acute-edge angle (*eg* 70353.40).

A range of cobble shapes had been selected for the core tools, from rounder, ovoid examples to flat stones, and there was a wide size range, with most of the core tools clustering between 90 mm and 160 mm in length, and 60 mm and 120 mm in width (Fig 277). Differences in thickness determined how the tool was to be flaked, as the flatter cobbles of up to 45 mm in thickness were flaked along an edge, while anything wider tended to be flaked from an end (*above*). There is huge variation in the type of edge created by these two basic flaking patterns. Firstly, the coarseness of the rock determines how fine the flaking can be and, in many cases, it was irregular, with huge flaws and step fractures creating an obtuse-edge angle. The secondary flaking along the inner platform often created a coarse-denticulate edge with the detachment of just a few large, separate flakes. The original shape of the cobble also affected the final edge, since the narrower the cobble, the less of an angled edge there was to shape, and the shorter the available edge.

It is therefore clear that cobbles were being flaked to produce an angled edge, and despite the variation in the final form of the core tools, the similarity in manufacturing technique and the large number of these tools, as well as their concentration in the *Principal palaeochannel* (*pp 662-3*), suggests that they were most probably intended to be used together, or for the same type of work. There is little evidence, however, in the form of visible edge damage, relating to how these core tools may have been used. Seven tools had some rounding along parts of the flaked edge, though this was not heavy, and was most certainly not the result of sustained use. All the rest of the core tools appear quite fresh and, in many cases, the original detachment scars along the core edge were still visible and had clearly not been worn away by the use of the tool. Other damage to the tools was present in the form of flaking or pecking on the opposite end to the flaked edge. In most cases, a small single flake had been detached, or there was a concentration of pecking in one area. This could be interpreted in two ways: either as failed attempts

Location	**Stratigraphic entry/ type**	**Anvil**	**Broad blade**	**Cobble tool**	**Core**	**Core tool**	**Faceted hammerstone**	**Facially pecked**	**Flake tool**	**Flaked cobble**	**Ground stone**	**Heat-cracked**	**Hollowed stone**	**Incised cobble**	**Irregular flake**	**Multi-hollowed**	**Notched stone**	**Plain hammerstone**	***Polissoir***	**Pounder**	**Regular flake**	**Spall**	**Unworn cobble**	***Total***	**% of total**
Grid-square area	*Basal sands and gravels*	2		1				2	2		2							1			1		3	***14***	5.96
	Stabilised land surface	1			3		1	1			3	1						6				1	8	***25***	10.64
	Mesolithic overbank alluvium	1		1			1				1	1	1	2			1						17	***26***	11.06
	Backwater channel	3						1			9		1	1				2			1		6	***24***	10.21
	Colluvium	1			1						3	1		2									8	***16***	6.81
	Archaeological /natural features					1						1							1				4	***7***	2.98
Principal palaeochannel and adjacent features	*Principal palaeochannel*	4	1	2	17	28	2	8	7	1	5	1			1	1		8	2	1	16		6	***111***	47.23
	Burnt mounds									1		1										1		***3***	1.28
Site wide	Indeterminate											3											3	***6***	2.55
	Modern features													1									1	***2***	0.85
Retention pond	Ring ditch ***100031***	1																						***1***	0.43
	Total	***13***	***1***	***4***	***21***	***29***	***4***	***12***	***9***	***2***	***23***	***9***	***2***	***6***	***1***	***1***	***1***	***17***	***3***	***1***	***18***	***2***	***56***	***235***	
	% of total	5.53	0.43	1.70	8.94	12.34	1.70	5.10	3.83	0.85	9.79	3.83	0.85	2.55	0.43	0.43	0.43	7.23	1.27	0.43	7.66	0.85	23.83		

Table 44: The coarse-stone tools by type and stratigraphic entity, or feature/deposit type

Figure 276: Core and core tools from the earlier Neolithic deposits in the Principal palaeochannel

at manufacturing a flaked edge from that particular end; or, perhaps, damage sustained during the use of the tool. It is likely that these core tools were used as wedges, either to split wood, or in structural contexts, to support some sort of building activity. Damage on the opposite end could therefore have been produced by hammering the wedge into position. A further possibility for their use could have been in some kind of heavy-butchering activity.

These types of tools are not, however, unique to Stainton West, as examples of similar manufacture

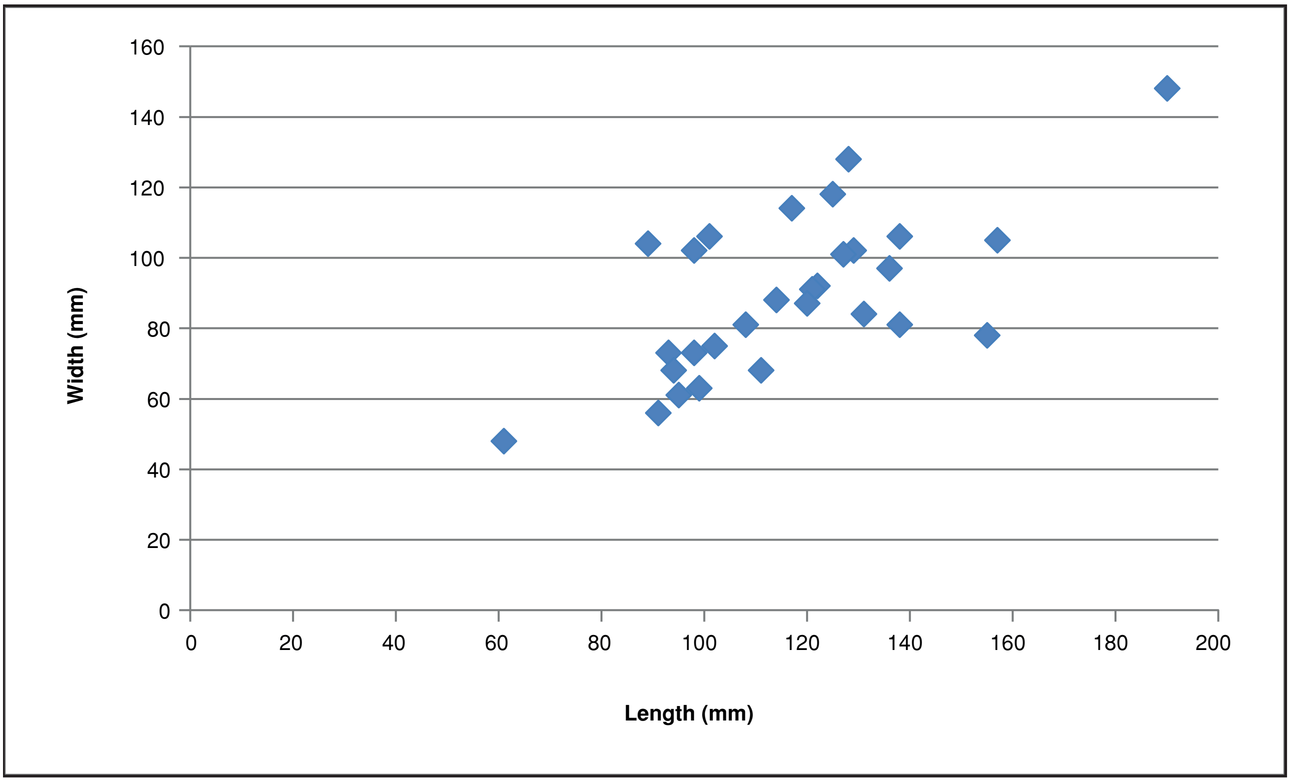

Figure 277: The dimensions of the core tools

are known from the Ness of Brodgar, Orkney (Clarke 2021). Core tools have also been recovered from other Late Neolithic Orcadian sites at the Links of Noltland, Westray, and Crossiecrown, which share some similarities. Specifically, these have been flaked around parts of the circumference to alter the edge, in a similar fashion to those from Stainton West, and some also possess pecking on the unflaked end. They are, however, slightly different in form, as they were broken across the width of the cobble to provide a flat platform, as opposed to an angled platform (Clarke 2006). In addition, flaked cobbles are known from the Early Bronze Age assemblage from Tofts Ness, Orkney (*ibid*), though these are rounder in shape than the Stainton West core tools and have a longer shaped edge. It has been suggested that these were used to split long bones, to extract bone marrow (Dockrill 2007, 22), and it is possible that some of the heavy-butchering activity that may have occurred at Stainton West (*p 651*) also involved the splitting of larger bones.

That the cores were for the most part simply unfinished core tools could be demonstrated by a flake often having been detached from an end, or ends, of a cobble, with no further flaking carried out to form a suitable edge. On some, there were traces of pecking along an edge, which may indicate failed attempts to detach flakes from a particular face. The size range of these cores was slightly different from the core tools, with several being at the shorter end of the range (Fig 278). This most probably reflects the fact that the selected cobble was deemed too small for a core tool, after initial flaking, or that some of the cores were intended as flake cores rather than core tools (*eg* core 70187.11 from *Earlier Neolithic alluvium* ***70135***; *Ch 8, p 260*). The largest core was only a fragment and also quite different from the rest, being formed of two refitting elements, themselves forming a part of a much larger boulder (70407.22 and 70407.23 from *Chalcolithic alluvium* ***70299*** (*Ch 11, p 367*), with dimensions of 335 x 210 mm). Heavy indentations on the cortical surface of one of the fragments (70407.22) indicate that a boulder was most probably dropped or thrown against an anvil to break it. For some pieces classified as cores, it is difficult to differentiate their form from other cobbles, which may have been used as simple plain hammerstones, the wear patterns including flaking and pecking over parts of the surface of the cobble.

Flakes and flake tools

A group of large flakes (Table 44) had been detached from cobbles in material similar to the cores and core tools (*above*). Despite efforts at refitting, none of the flakes matched any of the cores, suggesting that the manufacturing debris from the core tools must have continued as a spread along the palaeochannel, or beyond its banks.

The flakes were a mix of primary, secondary, and inner pieces, but most were opening-type; they were also of large dimensions with cortex. Most of them were

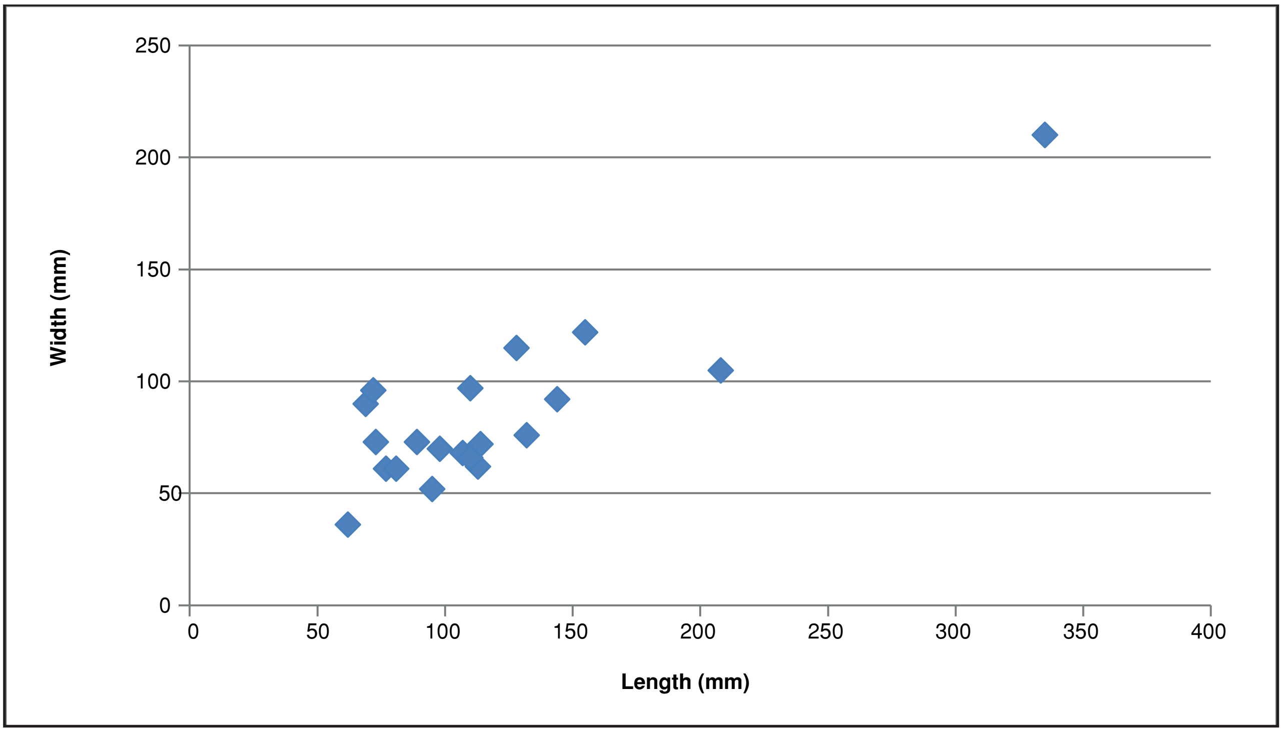

Figure 278: The dimensions of the cores

undoubtedly produced as a result of flaking the larger core tools, although two (70409.6 from *Earlier Neolithic organic deposit* ***70301*** (*Ch 8, p 235*), and 70307.13, from *Later Neolithic organic deposit* ***70300***; Fig 279; *Ch 10, p 328*), were more like thinning flakes, in that they had a fine cross-section with dorsal flake scars across the face, indicating that the cobble had been flaked from more than one platform. These fine flakes may have been a consequence of selecting a particularly homogeneous rock type, which enabled easy shaping. There was no evidence, however, for a flaking industry that produced finely shaped blocks of stone (*eg* axe roughouts). There was also no significant debitage from knapping the cobbles, and this indicates that most of the flake tools were in fact manufactured elsewhere, before being brought onto the site.

Some flake tools, mainly primary flakes, although there were a few secondary examples, along with an inner flake of coarse stone, appeared to have irregular flaking damage around their edges, from utilisation. Three appeared to have been roughly retouched to form an irregular denticulate edge (*eg* 70336.10 from *Bronze Age alluvium* ***70465***), while the rest exhibited rough bifacial-flaking damage around the edge, through use. The majority of these flakes were within the size range of the core tools, though they tended to be narrower. Given their close spatial association with the core tools, it is possible that they were both used in a similar way. For example, one flake (70307.91 from *Later Neolithic organic deposit* ***70300***; *Ch 10, p 328*) was damaged on both ends, as if from use as a wedge. Other flakes may have been used as a form

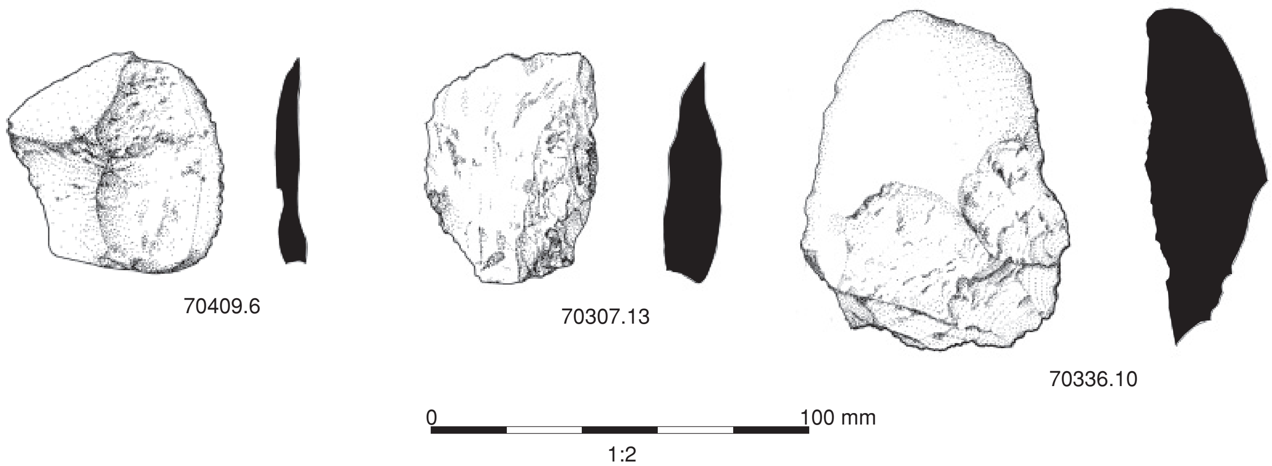

Figure 279: Probable thinning flakes (70409.6 and 70307.13) and a flake (70336.10) with a denticulated edge

of coarse knife, there being precedents for these in the large assemblages of Skaill knives (large primary flakes from beach cobbles) common to Grooved Ware sites in Orkney (Clarke 2006), and those flake (and core) tools from the Ness of Brodgar, also in Orkney (Clarke 2021). These latter items were perhaps used in the butchery of some 400 cattle that were deposited over the ruins of an abandoned Neolithic building in either the twenty-fifth or late twenty-fourth/twenty-third century cal BC (*ibid*).

Cobble tools

A large and interesting range of tools was present (Table 44), which is unusual for a mainland British site. These were all produced on cobbles, which were unmodified before use, and the tasks to which the tools had been put have left distinctive patterns of wear traces on their surfaces. The type and location of wear traces formed the basis of their classification (*cf* Clarke 2006).

The faceted cobbles are an undistinguished tool type with small facets pecked and/or ground on parts of the surface. Faceted hammerstone 87953.2000 (from *Mesolithic overbank alluvium* ***90202***; Fig 280; *Ch 6, p 198*) is of interest, having two facets worn by pecking and grinding, which formed a diagonal ridge across the end of the cobble. The pounder/grinders were larger tools, with more extensive pecked and ground facets, and they also often had a face that had been worn flat and smooth. A large pounder/grinder (70346.10 from *Earlier Neolithic*

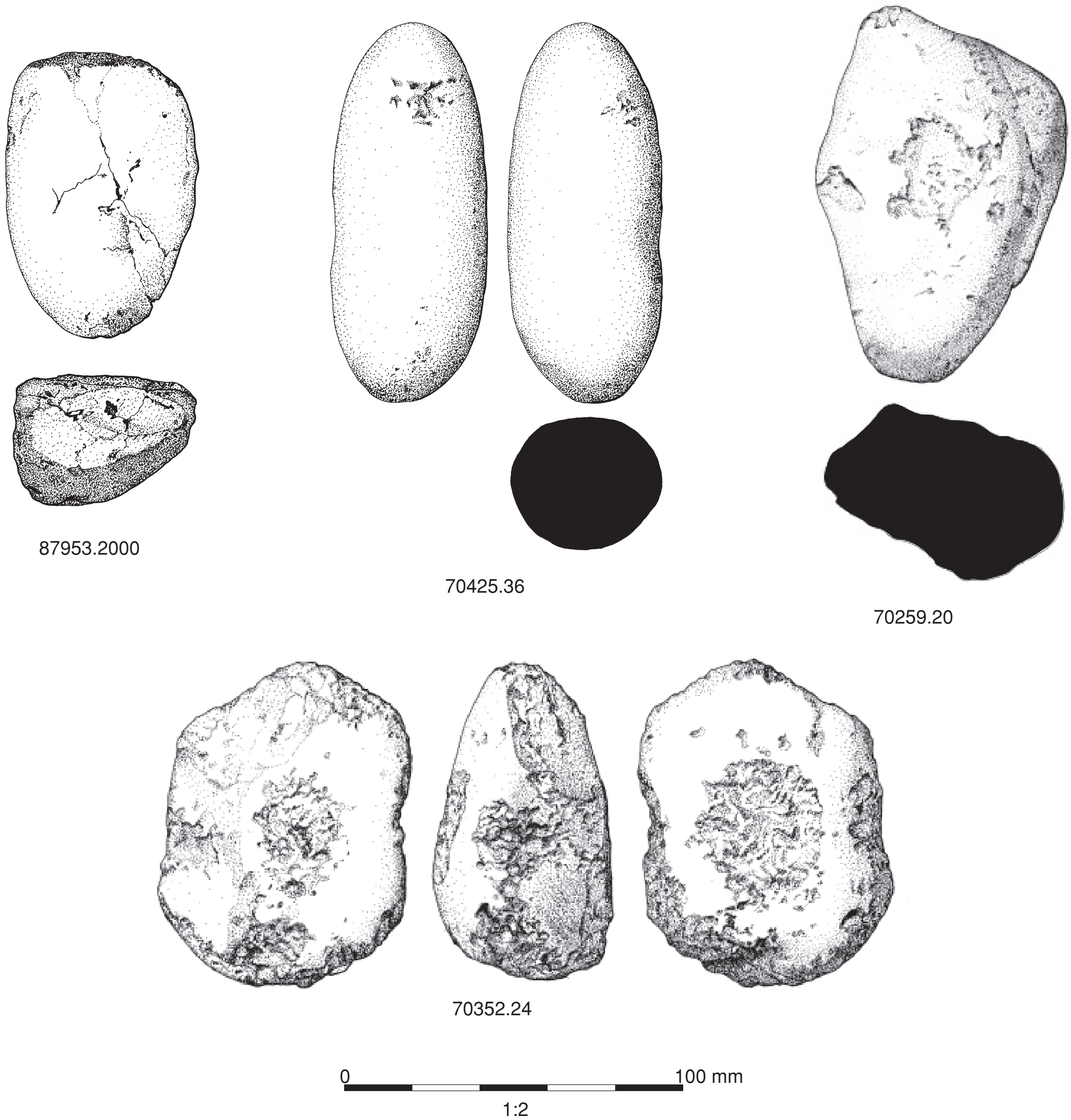

Figure 280: Faceted hammerstone (87953.2000); facially pecked cobbles (70425.36 and 70259.20); and a mutli-hollowed cobble (70352.24)

Figure 281: The pounder/grinder from Earlier Neolithic organic deposit **70346**

organic deposit ***70346***; Fig 281; *Ch 8, p 261*) appears to have been reused as a hammerstone, providing evidence for the reuse of an earlier tool.

The facially pecked hammerstones formed the most interesting group of cobble tools at this site (Fig 282). With a few exceptions, elongated cobbles were selected for a use, which left small amounts of pecking on a face towards one or both ends of the tool (*eg* 70425.36 from *Later Neolithic organic deposit* ***70300***; Fig 280; *Ch 10, p 328*). They could have been used as knapping hammerstones, in which case the lack of fully developed wear patterns could suggest the absence of platform preparation, and intensive flaking during reduction. Moreover, the more lightly worn examples possibly suggest a single phase of use. In this respect, they could have been used to flake the core tools, but the lack of coarse-stone debitage suggests that the production of the core tools was carried out elsewhere. These narrow cobble tools may also have been too weak to flake the coarse stone, and it might be expected that there should have been more breakage if they had been used as heavy hammers, which was not the case.

Another possibility is that these tools were used for knapping lithics. Alternatively, they may have been used

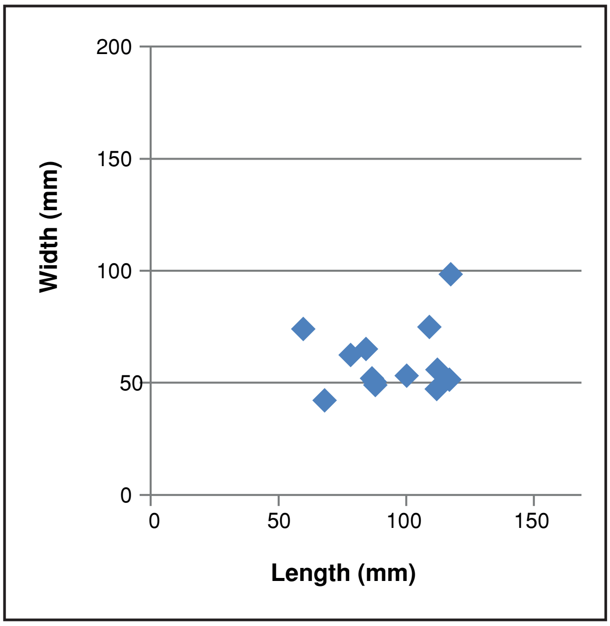

Figure 282: Dimensions of the facially pecked hammerstones

in some processing activity, or have formed detritus. Three of the facially pecked hammerstones had central patches of pecking, and on 70259.20 (from *Mesolithic/Neolithic alluvium* ***70259***; *Ch 6, p 191*) and 70094.10 (from *Basal sands and gravels* ***70098***; *Ch 2, p 48*), it formed a circular pattern on one face. These may be linked with other tool forms, such as hammers and anvils, for lithic working, or some other processing activity.

The plain hammerstones were a disparate group in terms of size and wear patterns (Fig 283). They had pecking and/or flaking damage, which followed no particular pattern, suggesting that these tools were used in various ways. Finally, one cobble tool (70352.24 from the *Later Neolithic organic deposit* ***70300***; *Ch 10, p 328*) was distinct from the rest because it was heavily worked. On either end of this oval cobble, there were broad, rounded, roughly pecked facets, and on either face central areas of pecking, which formed deep circular depressions. There were also coarsely pecked areas on both sides of the cobble, which formed indentations. The combination of wear patterns, and also the size of the cobble, make this very similar to a particular artefact type, the multi-hollowed cobble, recognised in Grooved ware assemblages in Orkney, particularly at Barnhouse and the Ness of Brodgar (Clarke 2005; 2006; 2021).

***Polissoirs*, ground stones, and anvils**

A significant feature of the coarse-stone assemblage was the presence of grinding traces on a large number of tools. Other stones were selected for use as anvils (Table 44), as demonstrated by the spreads of pecking over the surface of the cobble.

Within this group, the three *polissoirs* possessed smooth, dished, or concave faces, produced by grinding and/or polishing, most likely during the final stages in the production of ground-stone axe blades. All were probably made from similar slabs of sandstone, which is a poorly bedded rock with many internal flaws. Although this would seem an unusual choice for a fine grinding or polishing stone, the worn surfaces were themselves quite homogeneous in texture. All of these objects had also been subject to heat damage, and 70478.2000, from *Later Neolithic organic deposit* ***70300*** (Fig 284; *Ch 10, p 328*), had groups of unilinear striations along the steeper end of the asymmetrical face, and along the length on its very smooth face. *Polissoir* fragment 70130.1, from tree-throw ***70129***, also had a deep linear groove at one end, along with fainter striations running across its smoothed and dished surface. Furthermore, there is a possibility that the latter, and fragment 70069.12, from *Bronze Age/Iron Age alluvium* ***70095*** (*Ch 11, pp 371-2*), were originally part of the same larger block, but the broken edges are now too damaged to attempt any refit. Indeed, the similarity in raw-material type suggests the possibility that originally all three pieces formed a single large grinding slab.

Although the group of ground stones encompasses a variety of artefact types, it was mainly formed of two types: cobbles that had been used as handheld grinders or polishers; and larger slab forms on which stone (or other substances) was ground. There was also a group of seven cobbles, many with a soft outer cortex, which bore multidirectional striations around

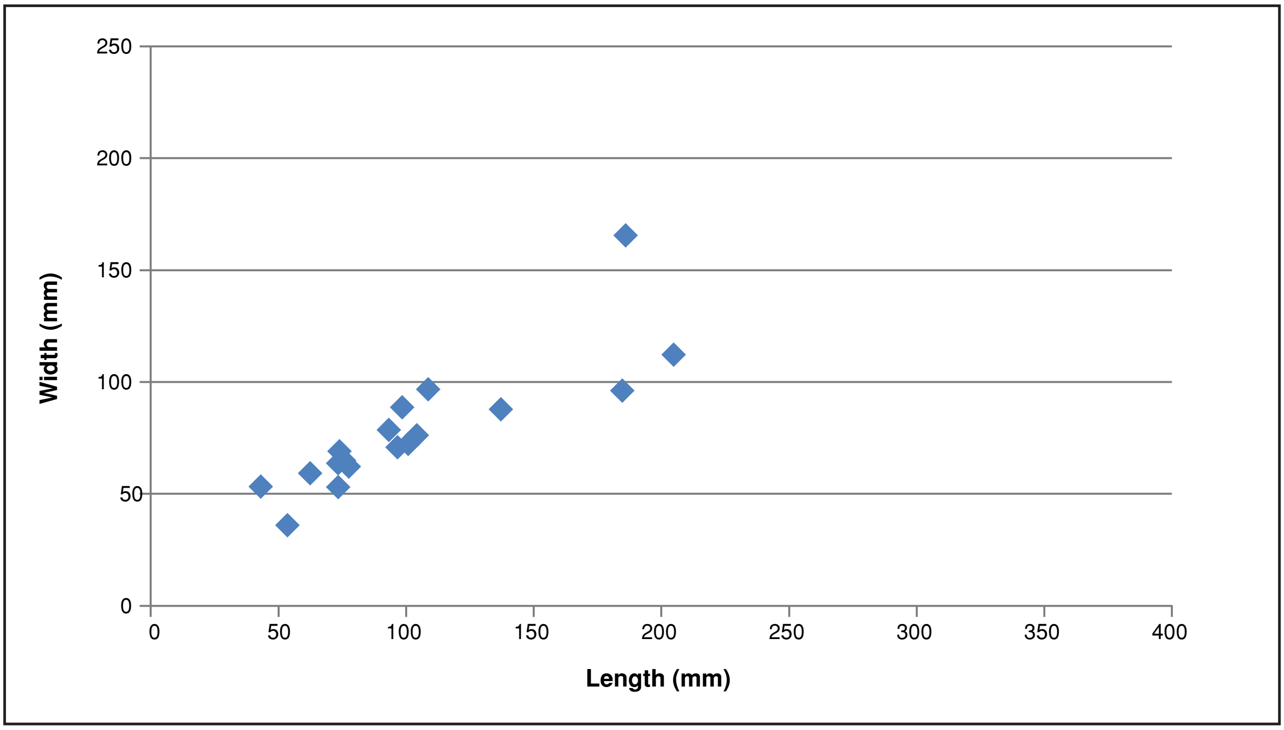

Figure 283: Dimensions of the plain hammerstones

Figure 284: Polissoirs

the surface of the cobble. This wear appeared light and unorganised, and was possibly a product of natural movement within the soils. A large ground stone (88113.2000 from *Colluvium* ***90002***; *Ch 2, p 52*) was a broken slab of coarse grit. It had been worn smooth on the upper face, particularly towards the centre, where it was also worn quite flat.

Two fine handheld grinders both had traces of grinding on the lower faces of the cobbles, indicating that they

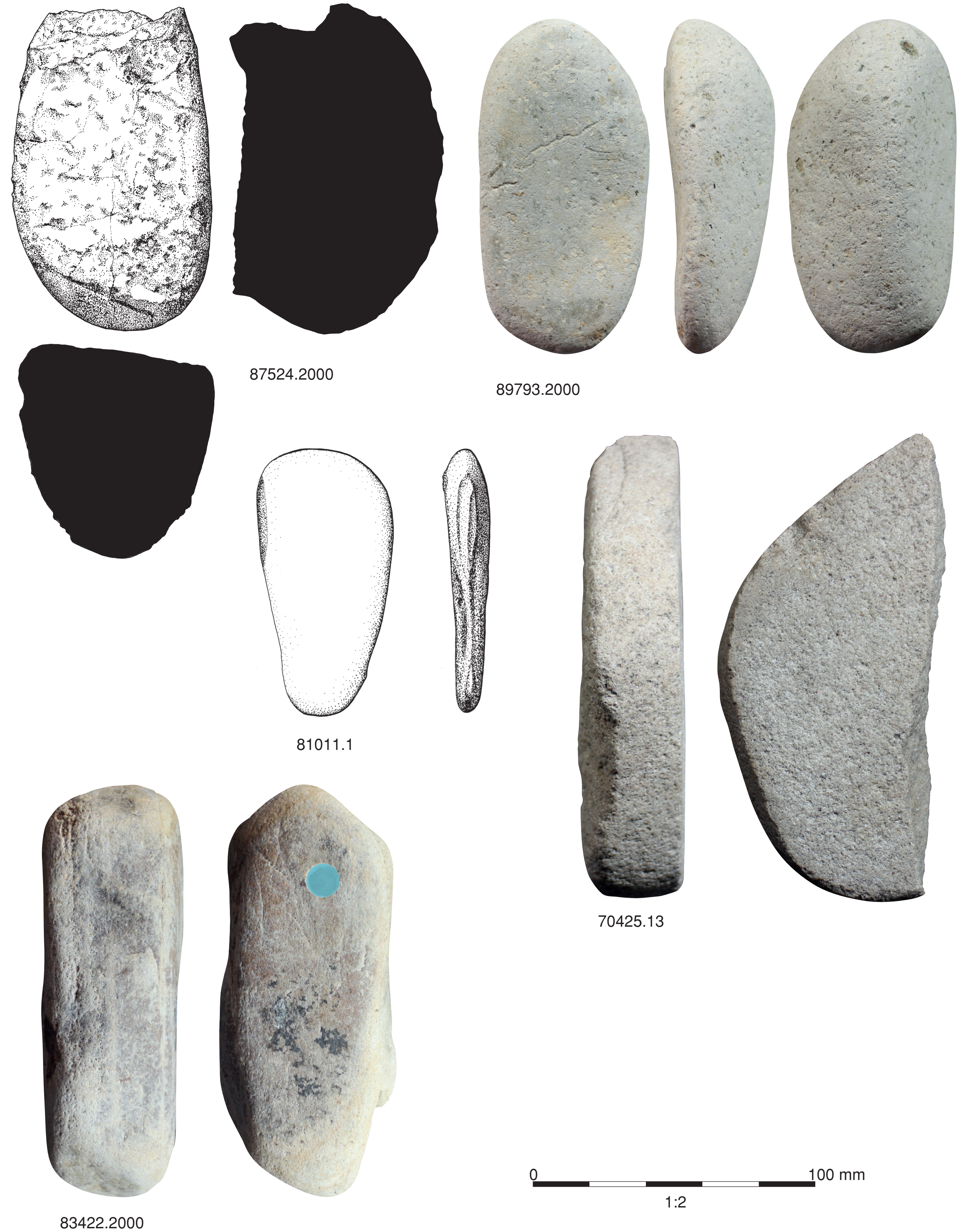

Figure 285: Ground stones (87524.2000, 89793.2000, 81011.1, and 70425.13) and an anvil (83422.2000)

were rubbed back and forth over a surface of some description. Ground-stone 87524.2000 (from *Mesolithic overbank alluvium* ***90181*** within the *Backwater channel*; Fig 285), made on a quartzite cobble, appeared to have remnant areas of polishing, as well as grinding, on its lower faces, while 89793.2000 (from *Mesolithic* *overbank alluvium* ***90181*** within the *Backwater channel*; Fig 285; *Ch 6, p 198*) had been used extensively for rubbing. This left the piece with a skewed cross-section with multidirectional striations, and a smoothed face, particularly around the perimeter, where it was very worn. There was also a ground-stone object (81011.1 from *Stabilised land surface* ***90206***; *Ch 2, pp 49-50*), which was a flat, oval mudstone pebble that had been ground very finely on part of one side to form a bevelled edge. The bevel was formed by narrow linear facets produced by grinding the pebble back and forth, while holding it at either end.

A small collection of ground-stone tools was also present which, with the exception of a fragment of a cobble with a flat-ground face (70216.10 from *Earlier Neolithic alluvium* ***70135***), were rather different from the fine handheld grinders. Of these, grinding-slab

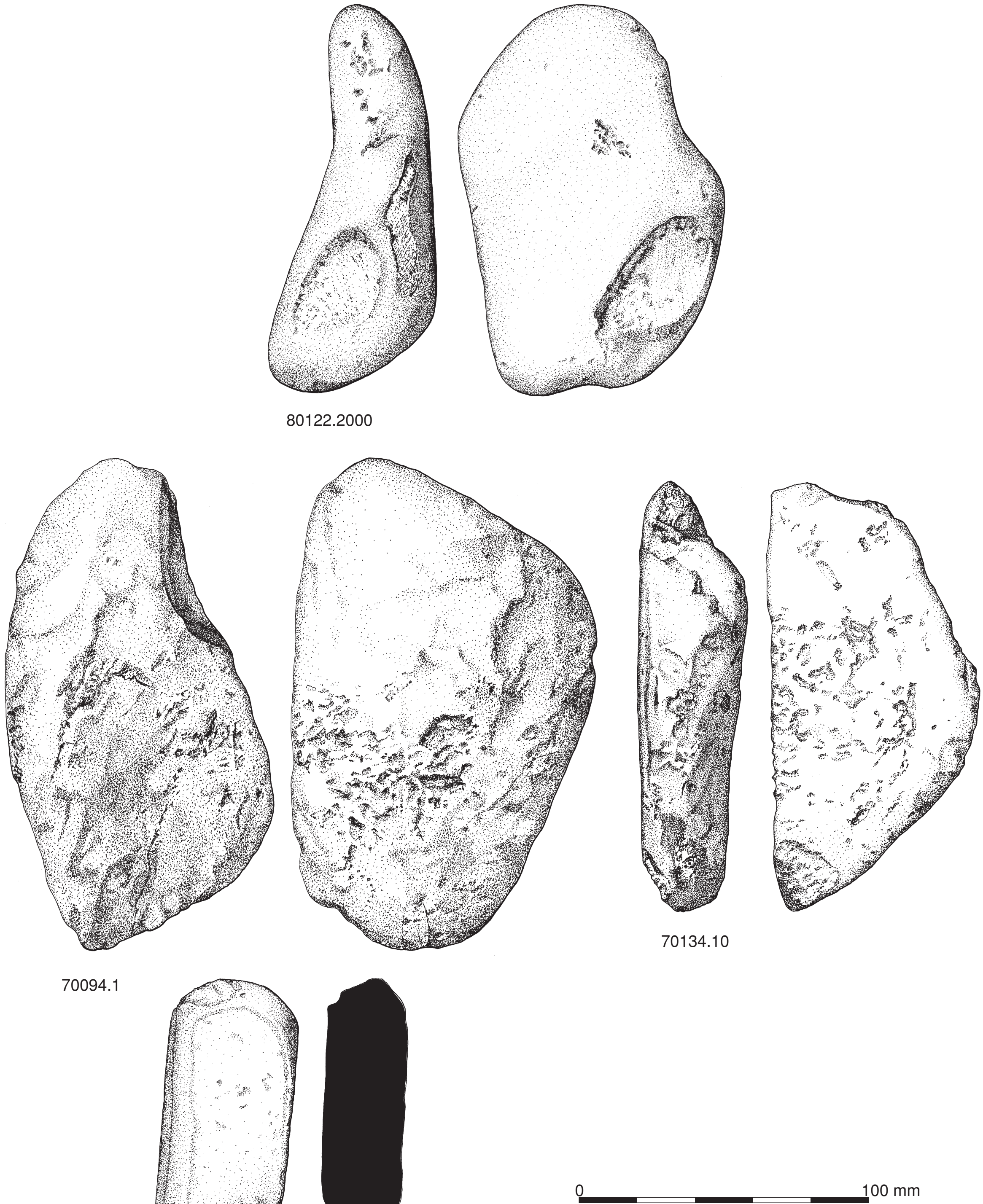

Figure 286: Anvils (80122.2000, 70094.1, and 70134.10) and elongated ground stone (85021.2000)

70425.13 (from *Later Neolithic organic deposit* ***70300***; *Ch 10, p 328*) was made by splitting a large sandstone cobble. Now broken, the face was worn smooth, particularly around the surviving perimeter, where it formed a convex cross-section. The rest of the face was also ground, but it was slightly rougher in the centre. Both faces of a large elongated sub-rectangular cobble (70326.23 from *Later Neolithic organic deposit* ***70300***) had also been used for grinding. These surfaces were slightly concave and had been worn smooth. Visible striations along the length of the stone indicated the direction of the grinding movement. Finally, there was a fragment of a possible grinding slab (70407.2 from *Chalcolithic alluvium* ***70299***; *Ch 11, p 367*). All faces were fractured on this piece of hornfels, except for a smooth, slightly convex face, formed perpendicular to the bedding plane. The smoothing may have been formed through its use as a grinding stone, though it could also have been natural.

The anvils were another group of artefacts that included several different forms. They have been identified on the basis of pecking traces, which were either localised or spread across the flat surface of the cobble. A few appeared to have been unworn, but were included in this group on the basis of size and shape, as possible working slabs or rests, such as the three sub-rectangular sandstone cobbles (82152.2000 from *Stabilised land surface* ***90206*** (*Ch 2, pp 49-50*); 83422.2000 from *Mesolithic overbank alluvium* ***90212*** (*Ch 6, p 198*); and 84014.2000 from *Basal sands and gravels* ***90039*** (*Ch 2, p 48*)), which, though lacking wear traces, were probably brought into the area to be used. One (83422.2000) bore traces of a dark residue on one face, which may have been related to the substance being worked, and was possibly birch-bark tar. Interestingly, this anvil was recovered from lithic-analysis Sample Area 1, in which the flaked lithics were probably associated with a stone-working area (*Appendix 1*), where all stages of the reduction process were undertaken, including the manufacture of implements.

Three other anvils with traces of working (88373.2000, 85572.2000, and 88942.2000, all from *Mesolithic overbank alluvium* ***90181*** within the *Backwater channel*; *Ch 6, p 198*) appeared to have been only lightly used, though one (88373.2000) was a sandstone cobble fragment broken by heavy pecking on one edge. More distinctive was an irregular flat cobble (Fig 286; 80122.2000 from *Colluvium* ***90572***; *Ch 2, p 52*), which bears a small patch of heavy pecking, in the centre of the face, from use as an anvil.

As with the grinders, the anvils from the *Principal palaeochannel* tended to be larger and more heavily worn. Five were recovered from this and three, made of volcaniclastic stone, mudstone, and a cobble that was undifferentiated (Fig 286; 70094.1 from *Basal sands and gravels* ***70098*** (*Ch 2, p 48*); 70134.10 from *Mesolithic alluvium* ***70097*** (Fig 286; *Ch 6, p 188*); and 70403.42 from *Earlier Neolithic organic deposit* ***70301*** (*Ch 8, p 235*)), had extensive spreads of pecking, on one or both faces, indicating heavy use. The two remaining anvils were recovered from the *Earlier Neolithic alluvium* (***70135***; (*Ch 8, p 235*) and the *Mesolithic/Neolithic alluvium* (***70259***; *Ch 6, p 191*). That from the *Earlier Neolithic alluvium* (70154.10) was only lightly worn, whilst the other, an ignimbritic tuff cobble, from the *Mesolithic/Neolithic alluvium* (70259.4) was possibly used as a working rest.

A flat water-worn sandstone slab (100043.2 from ring-gully ***100031***; *Ch 11, p 395*), with large spreads of pecking, emanating from the centre of both faces, came from the retention pond area. This had morphological and technological similarities with several of the anvils from the *Principal palaeochannel*. Finally, two fragments of elongated cobbles (81321.1 and 85021.2000 (Fig 286)) with square cross-sections were recovered, one from the *Stabilised land surface* (***90206***), whilst the other was from a deposit (***90002***) of *Colluvium*.

Hollowed stones

A fragment of small tuff slab (86243.2000; Fig 287), from the *Mesolithic overbank alluvium* (***90202***; *Ch 6, p 191*) in the *Grid-square area*, bore a round-based hollow 29 mm in diameter and 7 mm deep on the upper face. Since

Figure 287: Hollowed stones

most of this surface was obscured by concretions, it is not clear how the hollow was made, and whether, for example, it was pecked or ground. A sub-oval sandstone cobble (86112.2000), from the *Mesolithic overbank alluvium* (***90181***) within the *Backwater channel* (*Ch 6, p 198*), had a small round-based hollow, 23 mm in diameter and 5 mm deep. The hollow had clearly been pecked into the centre of a domed face, and there was a probable similar hollow worked on the opposite face, though this had been damaged.

Notched pebble

A fine-notched pebble (83422.2001; Fig 288), from *Mesolithic overbank alluvium* ***90212*** (*Ch 6, p 198*), was made from dacite tuff. It was elongated, tapering to a narrower end, with two deep notches pecked on either side of a flat face. The opposed notches were made towards the broad end, at the point along the length at which the pebble balanced, and they were probably made with a view to securing the pebble in some way for use. There were no clear wear traces on the tool, and no sign of pecking or grinding, but the profile may suggest that the narrow tip, with its keeled form, would have been suitable for rubbing. Strictly speaking, without the band of bevelled wear across the tip, this cannot be defined as a classic Mesolithic bevelled pebble form, although by its shape and size it would conform to the type. It has been proposed that the banded incisions (Clarke *et al* 2012) on an incised bevelled pebble from Camas Daraich, a Mesolithic site on Skye, represented some form of binding or hafting. In this respect, perhaps the Stainton West example was notched in order to secure twine, in which case the tool may have been used in a haft, or possibly for cordage-manufacturing activities. Another possibility, given the situation of the site adjacent to a watercourse, is that it functioned as a line weight for a fishing net. Whatever the intended function of the Stainton West tool, it is an unusual find from an early prehistoric site.

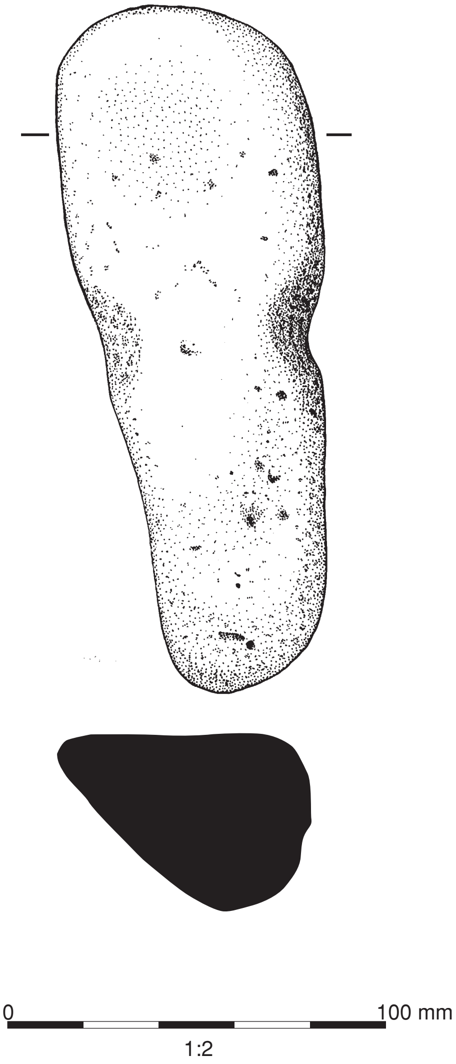

Figure 288: The notched-pebble

Incised cobbles

Most of these tools bore a small number of randomly placed incisions on the surface. These could have been made when preparing the edge of a flake, though the practice clearly was not widespread, judging by the small number of altered pebbles. One cobble (83133.2000 from *Mesolithic overbank alluvium* ***90275***; Fig 289; *Ch 6, p 198*) had a different wear pattern, as three evenly spaced grooves had been made on one flat end. The grooves were very shallow, U-shaped, 3-4 mm wide, and were smooth inside, in contrast to the surface of the stone. The grooves did not appear to be randomly scratched, like the other incised stones, and showed no apparent detail as to how they were made: for example, whether another raw material was deliberately altered by rubbing along the stone (and thus making the groove), or whether the stone was grooved to facilitate the shaping of a raw material. In that respect, the possibility that they were intentionally engraved onto the surface of the stone, to convey a potential symbolic or artistic meaning, should be considered. Similar items of decorated stone are almost unheard of in Mesolithic contexts in the British Isles, but a stone pendant from secure Mesolithic deposits at Star Carr (Milner *et al* 2018b, 466-8), the decoration of which in part comprises groups of incised lines, demonstrates that such items were produced.

Stratigraphic associations

The coarse-stone tools from the site can be broken down into four main elements (Table 44). The first comprises those items (37.21% of the assemblage) derived from the *Grid-square area*, which were associated with the *Basal sands and gravels* (*Ch 2, p 48*); the *Stabilised land surface* (*Ch 2, pp 49-50*); the *Mesolithic overbank alluvium* and other deposits of overbank alluvium (*Ch 2, pp 51-2*); deposits of colluvium (*Ch 2, p 52*); and archaeological and natural features. These items included a range of debitage and tool types, including flakes; cores and core tools; anvils;

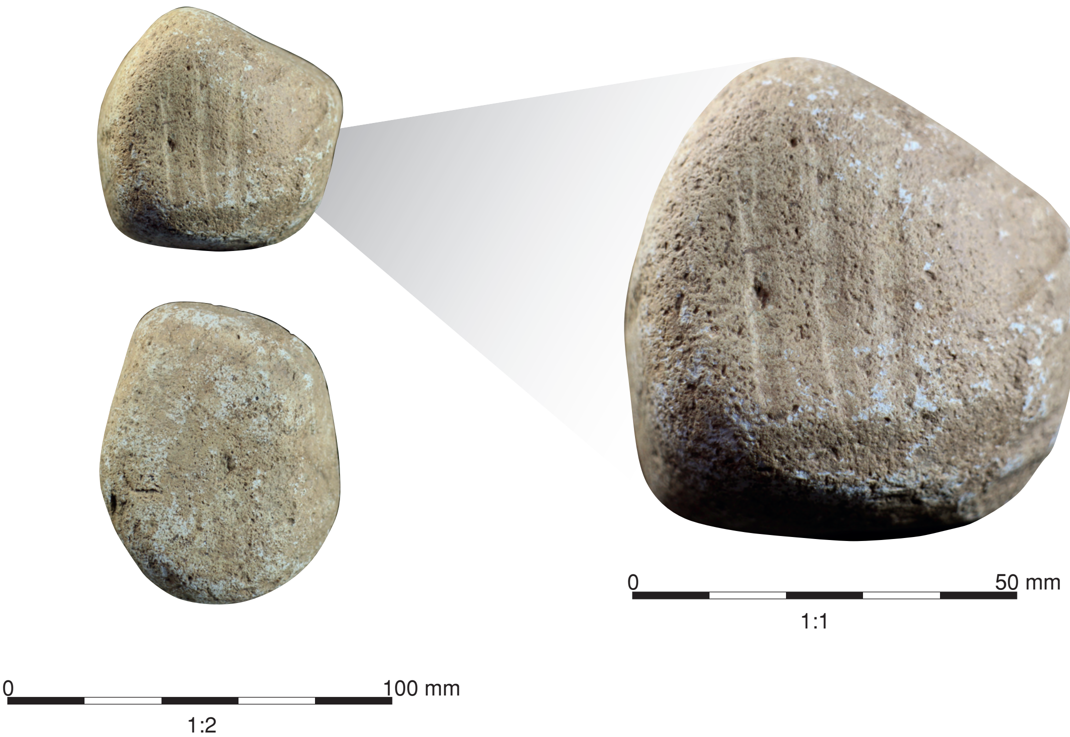

Figure 289: The incised-cobble

hammerstones; pecked and ground tools; notched, hollowed, and heat-cracked cobbles; as well as unworn cobbles. Significantly, given the recovery of those items from the part of the site covered by the Mesolithic encampment (*Chs 3* and *4*), the majority were perhaps a product of Late Mesolithic activity.

The second collection is larger in size (48.3% of the assemblage), from the *Principal palaeochannel* and features in its immediate vicinity, particularly the burnt mounds. This material included a range of tool types, from the majority of stratigraphic units present within the channel dating to the Mesolithic, Neolithic, and Chalcolithic periods, and the Bronze Age. The *Mesolithic organic deposit* (***71012***, ***71013***, ***71098***, and ***71153***; *Ch 3, p 70*) contained a small collection of coarse-stone tools, including a small core tool representing a chopping implement, two unworn cobbles, and a fragment of a cobble tool, which refits with a fragment from the *Bronze Age alluvium* (*below*), whilst the *Mesolithic alluvium* (***70097***, ***70268***, and ***70345***; *Ch 3, p 94*) produced a larger collection of coarse-stone tools. This comprises an anvil; a hammerstone; a large cobble, which exhibits a pecked and flaked end; unworn cobbles; and five cores that exhibit evidence for being partially flaked, as well as two core tools, which probably represent chopping implements. Other items include a facially pecked cobble and a flake tool, and three flakes that could be further evidence for the partial flaking of cobbles, particularly volcaniclastic rocks. The *Mesolithic/Neolithic alluvium* (***70302***; *Ch 6, p 191*) contained three core tools: a cobble; a ground stone; and a flake.

The *Earlier Neolithic organic deposit* (***70301***; *Ch 8, p 235*) produced the largest assemblage of coarse-stone tools from the *Principal palaeochannel*: an anvil; seven large blades and flakes; a cobble tool; three cores; 12 core tools; four hammerstones, one of which is faceted; two facially pecked cobbles; a pounder; and an unworn cobble. Many of these relate to the production of chopper-like implements, some of which, given the lack of visible wear traces on the flaked edges, appear not to have been used. Others were used as hammers and pounders, while some of the blades and flakes appear to have been the by-products from core-tool production. A smaller assemblage of coarse-stone tools, consisting of two anvils; three cores; three core tools; two facially pecked cobbles; two flake tools; a ground stone; a flake; and an unworn cobble, was recovered from the *Earlier Neolithic alluvium* (***70135***; *Ch 8, p 235*). Some relate to the use of volcaniclastic material and, while there still appears to have been an emphasis on chopper-like tools and/or attempts to produce them, they are not as ubiquitous as those in the *Earlier Neolithic organic deposit*. The *Earlier Neolithic alluvium* assemblage also includes two core tools that appear to have been unused.

The *Later Neolithic organic deposit* (***70300***; *Ch 10, p 328*) yielded a large assemblage of coarse-stone tools: three cores; four core tools; two hammerstones, one of which was faceted; three facially pecked cobbles; one flake tool; two ground stones; a heat-cracked cobble; a multi-hollowed cobble; a *polissoir*; four flakes; and an unworn cobble. The cobble tools represent a variety of heavy-duty choppers, hammers, polishers, and pecked and ground tools, and at least one of the flakes had been used as a wedge.

The other coarse-stone tool from the *Principal palaeochannel*, a cobble, partially flaked as a core to produce a core tool, was recovered from undated alluvial deposit ***70120***, which was in a side channel at the northern end of the palaeochannel. The *Chalcolithic alluvium* (***70299***; *Ch 11, p 367*) produced a relatively small assemblage of coarse-stone tools: two cores; a core tool; a flake tool; and a ground stone. The two cores were fragments of the same boulder, which had been deliberately split by smashing it against another stone or anvil. Very little further flaking of the separate nodules appears to have taken place and it is possible that they were intended as blanks for future use. The ground stone could have been a fragment of a larger grinding slab, while the flake tool had a groove ground into the distal end. The *Bronze Age alluvium* (***70465***; *Ch 11, p 368*) and *Bronze Age/Iron Age alluvium* (***70095***; *Ch 11, p 373*) also contained a relatively small collection of coarse-stone tools: two core tools; two flake tools; three hammerstones; a *polissoir*; and two flakes. The tools consist of choppers, a possible knife, and a fragment of a grinding/polishing stone. It is likely, however, that these coarse-stone tools were residual, being originally associated with earlier phases of occupation. Finally, a *polissoir* was recovered from tree-throw ***70129***, from Bay B within the *Principal palaeochannel* (*Ch 10, p 340*). This tree-throw may date to the Late Neolithic period on the basis of an alder (*Alnus glutinosa*) catkin axis, which was subjected to radiocarbon dating (*see* SUERC-44752; *Appendix 20*).

The third collection is smaller (10.17% of the assemblage) and came from the *Mesolithic overbank alluvium* (***27111*** and ***90181***; *Ch 3, p 97*) contained within the *Backwater channel*. Significantly, this assemblage differs slightly from the others, in that it contains a relatively large number of ground-stone tools, along with several anvils and hollowed, pecked, and incised cobbles (Table 44).

The fourth collection (3.82% of the assemblage) was derived from modern features and indeterminate layers. In addition, deposits associated with the burnt mounds (Burnt Mounds 1 and 2) produced three coarse-stone tools (Table 44). Finally, a single anvil was recovered from ring-ditch ***100031***, in the retention pond area (*Ch 11, p 395*). This feature has been dated to the Middle Bronze Age on the basis of a radiocarbon assay from a central hearth (*see* SUERC-32713; *Appendix 20*); however, it is not clear whether the anvil was associated with the structure or was residual.

Raw materials

Macroscopic examination of the coarse-stone tools has enabled some of the raw-material types to be discerned. Of those items for which the lithology could be determined, these were overwhelmingly of a volcaniclastic rock type, with smaller amounts made on sedimentary and metamorphic rocks (Table 45). It is also worth noting that petrological analysis (*Appendix 6*) was undertaken on six of the coarse-stone tools and this provided evidence for the use of undifferentiated metamorphic rock, dacitic tuff, hornfels, greywacke, and Group VI tuff.

Of those items from the *Principal palaeochannel*, for which lithologies were identified, the majority are volcaniclastic (Table 46), and detailed macroscopic examination of some indicated that they include andesite, ignimbritic tuffs, rhyolite, vesicular tuff, and other undifferentiated tuffs. A smaller group of coarse-stone tools was made on sedimentary and metamorphic rocks, and detailed macroscopic examination of a small sample indicated that these include hornfels, mudstones, quartzite, quartzitic sandstone, sandstone, siltstone, and undifferentiated metamorphic and sedimentary stones. Although the rest had a lithology that was not differentiated, generally these are hard and mainly blue or blue/grey in colour and are, therefore, likely to represent worked volcaniclastic rocks. It is worth noting that, in addition, a large collection of unworked stones was recovered from the *Principal palaeochannel*. Although these did not form elements of the coarse-stone assemblage *per se*, again, based on their colour and physical properties, they are probably unworked volcaniclastic cobbles.

In terms of tool types, undifferentiated and volcaniclastic raw materials were used in the production of anvils, cores, core tools, facially pecked pieces, hammerstones, and simple flakes. The sedimentary and metamorphic rocks were chiefly used for *polissoirs*, whilst ground-stone tools incorporating the use of volcaniclastic raw materials, hornfels, and sandstone are nearly equal in number.

A few coarse-stone tools from the *Grid-square area* have been identified as being produced on volcaniclastic raw materials (Table 47), and detailed macroscopic examination of a sample indicated that these were dacitic tuff, granite, Group VI tuff, rhyolite, and undifferentiated tuffs. Due to the effects of surface chemical weathering in the *Grid-square area*, the majority of the remainder possess a lithology that has not been differentiated, although a few possible igneous, sedimentary, and metamorphic rocks were recorded. However, it is highly probable that many of the undifferentiated items are, in fact, of a volcaniclastic lithology, these commonly including cores, ground stones, incised cobbles, and hammerstones. In addition, a large collection of unworn cobbles (over 55% of the undifferentiated raw material) came from the *Grid-square area*. Although a few of these pieces are less than 50 mm in length and can be classified as pebbles, which possibly derived from natural deposits, the

Type	Andesite	Dacite tuff	Extrusive igneous	Granite	Greywacke	Hornfels	Ignimbritic tuff	Metamorphic	Mudstone	Indeterminate	Quartzite	Quartzitic sandstone	Rhyolite	Rhyolitic tuff	Sandstone	Sedimentary	Siltstone	Tuff	Vesicular tuff	Volcaniclastic	Total
Anvil							1		1	5					5					1	13
Broad blade										1											1
Cobble tool										4											4
Core			1							14	2		1						1	2	21
Core tool	1		1							21	2							1		3	29
Faceted hammerstone										2	1									1	4
Facially pecked										9					2					1	12
Flake tool					1	1				5					1		1				9
Flaked cobble										2											2
Ground stone	1					1		1	1	15	1			1	2						23
Heat-cracked										8								1			9
Hollowed stone															1			1			2
Incised cobble										5			1								6
Irregular flake			1																		1
Multi-hollowed			1																		1
Notched stone		1																			1
Plain hammerstone				1						14					2						17
Polissoir										2					1						3
Pounder										1											1
Regular flake									1	11		1								5	18
Spall										2											2
Unworn cobble										52					1	1				2	56
Total	***2***	***1***	***4***	***1***	***1***	***2***	***1***	***1***	***3***	***173***	***6***	***1***	***2***	***1***	***15***	***1***	***1***	***3***	***1***	***15***	***235***

Table 45: The coarse-stone tool assemblage, by type and raw material

Type	Not differentiated	Volcaniclastic	Sedimentary/metamorphic	*Total*
Anvil	2	1	1	***4***
Broad blade	1			***1***
Cobble tool	2			***2***
Core	11	5	1	***17***
Core tool	21	6	1	***28***
Faceted hammerstone	1	1		***2***
Facially pecked	6	1	1	***8***
Flake tool	4		3	***7***
Flaked cobble	1			***1***
Ground stone	3		2	***5***
Irregular flake		1		***1***
Heat-cracked	1			***1***
Multi-hollowed		1		***1***
Plain hammerstone	7		1	***8***
Polissoir	2*		1	***3***
Pounder	1			***1***
Regular flake	9	5	2	***16***
Unworn cobble	3	2	1	***6***
Total	***75***	***23***	***14***	***112***

*Probable sandstone

Table 46: The coarse-stone tool assemblage from the Principal palaeochannel, *by type and raw material*

Type	Not differentiated	Volcaniclastic	Sedimentary/metamorphic	*Total*
Anvil	1	1	4	***6***
Cobble tool	2			***2***
Core	3		1	***4***
Core tool			1	***1***
Faceted hammerstone	1		1	***2***
Facially pecked	2		1	***3***
Flake tool	1		1	***2***
Flaked cobble	1			***1***
Ground stone	6		3	***9***
Heat-cracked	6	1		***7***
Hollowed stone		1		***1***
Incised cobble	4	1		***5***
Notched stone		1		***1***
Plain hammerstone	5	1	1	***7***
Regular flake	1			***1***
Spall	2			***2***
Unworn cobble	43		1	***44***
Total	***78***	***7***	***14***	***98***

Table 47: The coarse-stone tool assemblage from the Grid-square area, *by type and raw material*

majority are larger and may have been brought onto the site, possibly being unused blanks. Indeed, this was confirmed, in some measure, by spatial analysis (*Appendix 9*). The coarse-stone tools from the *Backwater channel* were nearly all made from raw materials that are undifferentiated (Table 48). The exceptions are two ground stones made from rhyolitic tuff and andesite, a ground stone made on quartzite, a sandstone that had been hollowed, and an anvil. The tools made from undifferentiated raw materials mainly consist of ground stones and anvils.

Given the lack of large clasts in the natural deposits, it is unlikely that the raw materials in the coarse-stone tool assemblage were sourced directly from around the site, though some were probably procured from the wider

Type	Not differentiated	Volcaniclastic	Sedimentary/metamorphic	*Total*
Anvil	2		1	***3***
Facially pecked	1			***1***
Ground stone	6	2	1	***9***
Hollowed stone			1	***1***
Incised cobble	1			***1***
Plain hammerstone	2			***2***
Regular flake	1			***1***
Unworn cobble	6			***6***
Total	***19***	***2***	***3***	***24***

Table 48: The coarse-stone tool assemblage from the Backwater channel, *by type and raw material*

locality. The local geology comprises solid deposits of micaceous silty mudstone, which is overlain by glacial till deposits, the lowest of which were derived from the bedrock (Dixon *et al* 1926; Livingstone *et al* 2010). The till also contains a mixture of erratics derived from a complex multi-sourced region of competing ice-flows draining the Scottish Southern Uplands, the Pennines, the Lake District, and the Irish Sea (Livingstone *et al* 2010). Therefore, it is possible that some of the micaceous sedimentary and metamorphic cobbles may have been liberated from local till deposits, which were perhaps exposed along the River Eden or possibly its tributaries, and were then transported to the site.

Similarly, some of the volcaniclastic lithologies, which outcrop in the central Lake District, could have been transported to the Solway Plain by natural processes, making their availability in the area surrounding the site likely. This material might include the tuff, andesite, dacite, rhyolite, and ignimbrite items, all of which outcrop locally as the Borrowdale Volcanic Group (BVG), and have been subject to extensive glaciation (Millward 2004).

Stone Implements

V Davis, A Dickson, and M Edmonds

In total, 22 stone implements were recovered from Stainton West, all being the subject of detailed analysis (Table 49). They comprise four axe blades and an axe/adze blade, which were manufactured using a variety of hammering, pecking, and grinding techniques, and 17 complete and fragmentary blades and flakes with polished surfaces on their dorsal faces. Four of the axes and two fragments with polished surfaces were recovered from the *Principal palaeochannel*, whilst the remainder came from the *Grid-square area*.

Stratigraphic associations

Within the *Grid-square area*, three polished-axe fragments were recovered from the *Stabilised land surface* (***90003*** and ***90206***). All were probably originally part of polished implements such as axeheads and were made from a variety of tuffs, including dacite, andesitic, and Group VI raw materials. The *Mesolithic overbank alluvium* (***90211*** and ***90212***) contained nine polished-axe fragments. Seven were originally associated with polished implements made from Group VI tuff, one from Group XI tuff, and one from a porphyritic tuff. A single polished-axe fragment was also recovered from subsoil ***90571*** and was made from Group VI tuff, whilst the *Mesolithic overbank alluvium* (***90181***) within the *Backwater channel* yielded two polished-axe fragments and an edge-ground stone axe/adze. The two fragments were probably struck from larger implements, made from Group VI tuff and a nondescript tuff, whilst the stone axe/adze is made on a large thick flake struck from an elongated cobble of dacite tuff. A polished-axe fragment, which had been reworked, came from layer ***90574*** (*p* 672). Significantly, this layer appears to have been a component of the *Basal sands and gravels* that, in this instance, lay at the

Stratigraphic entity	Polished-axe fragment	Stone axe	*Total*
Stabilised land surface	3		***3***
Backwater channel	3	1	***4***
Principal palaeochannel	1	4	***5***
Mesolithic overbank alluvium	9		***9***
Subsoil	1		***1***
Total	***17***	***5***	***22***

Table 49: Stone implement types and classifications, by stratigraphic entity

base of the *Backwater channel*, and was sealed by a deposit of *Mesolithic overbank alluvium* (***90181***), which had entered the channel in the late fifth millennium cal BC (*Ch 6, p198*).

Neolithic-age deposits (***70300*** and ***70301***) in the *Principal palaeochannel* contained a polished-axe fragment and four stone axeheads; two of the latter can be classified as large fragments of the original axe. The *Earlier Neolithic organic deposit* (***70301***) produced two complete and one fragmentary stone-axe blades, all of which had been completely ground; the two complete axes were made from Group VI tuff, while the fragment was made from undifferentiated tuff. The *Later Neolithic organic deposit* (***70300***) yielded a complete, pecked and ground axehead made on a quartz dolerite cobble, and a polished-axe fragment. The fragment was struck/detached from an axe originally made from Group XI tuff.

Stone-axe blades

Axe 70326.4

This axe blade (Fig 290) is small and largely complete, being made from a quartz dolerite cobble (*Appendix 6*), and came from *Later Neolithic organic deposit* ***70300*** (*Ch 10, p 328*). The blade comprises a cutting edge, which is effectively symmetrical in both plan and section, with a pronounced curve down to each side. The butt of the piece is also curved, and more or less rounded. There is no significant faceting on either lateral edge, and it is debatable whether the very slight flattening of the tip of the butt can be regarded as a deliberate facet. It may equally be a consequence of hammering and/or pecking.

Two manufacturing techniques are discernible on the blade. As such, it is likely that the piece was roughed out and given form via a process of hammering/pecking, which is evident on the butt end and lower half of the blade. This was followed by grinding, through which the final form was realised and the blade sharpened; this process is most clearly evident on, and back from, the curved cutting edge.

Interestingly, both main faces have a more flattened (and smoother) facet towards the middle of the blade. These could be the product of working, but are more likely to be traces of the original surface of the parent material, indicating that the blade was probably made on a water-worn pebble.

Axe 70353.30

A complete stone-axe blade (Fig 291), from *Early Neolithic organic deposit* ***70301*** (*Ch 8, p 235*), is made from Group VI tuff (*Appendix 6*), the form placing it within the Cumbrian Clubs category (Fell 1964). Like other

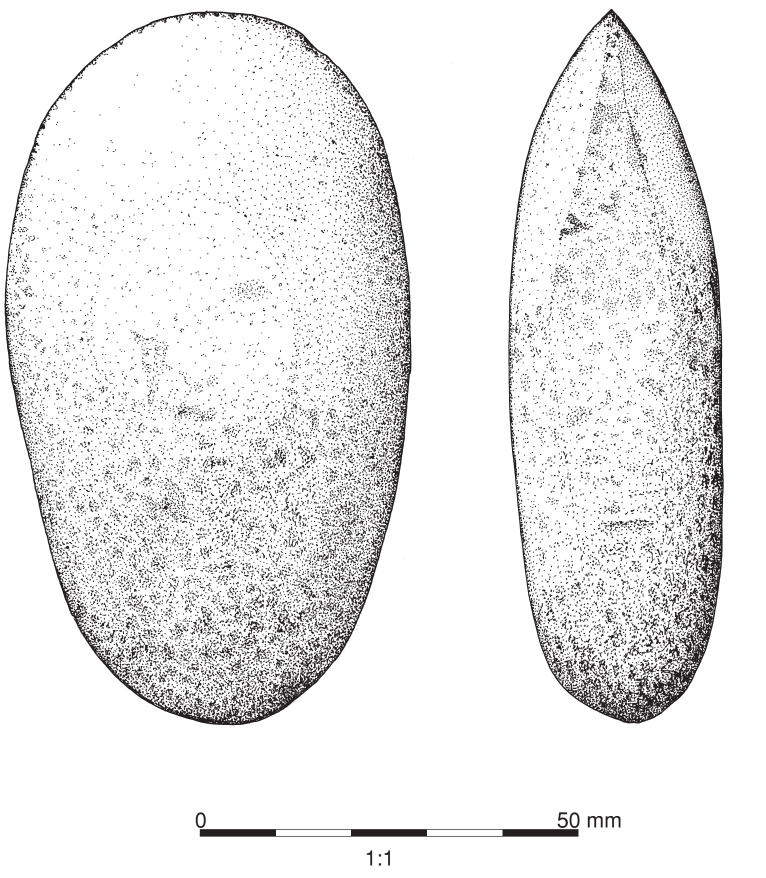

Figure 290: Axe 70326.4

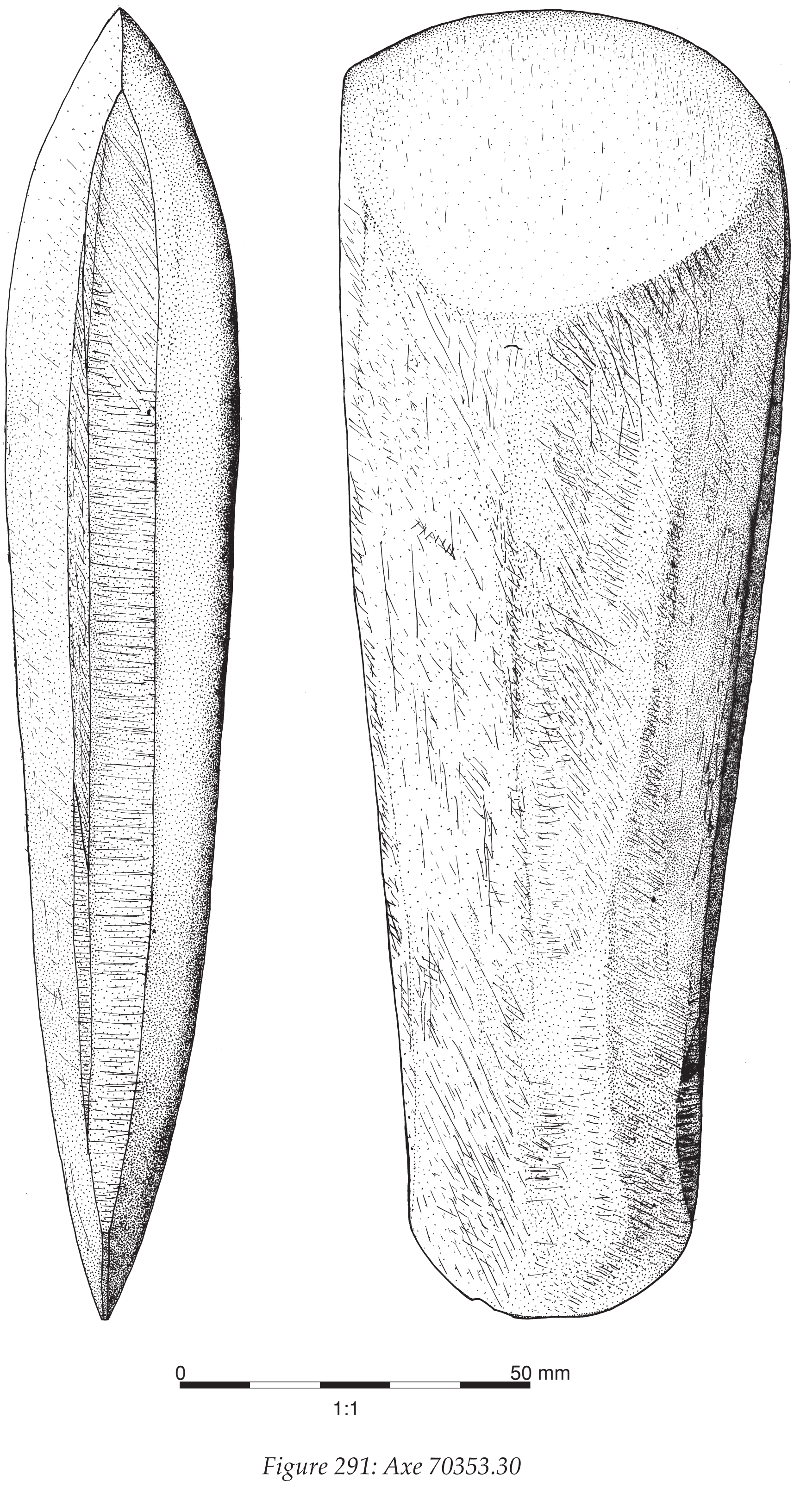

Figure 291: Axe 70353.30

examples, this highly distinctive blade has a profile characterised by almost parallel sides near the cutting edge, and a pronounced waisting towards the butt.

The finish on the blade is very fine; grinding and polishing is extensive enough to have removed almost all traces of the flaking that characterised the earlier roughing out of the blade. The cutting edge is ground to a very fine and shallow curve, and it possesses a slight asymmetry in plan, which is of particular interest. This asymmetry creates a slightly steeper curve on one half of the cutting edge, a more pronounced taper back to the side of the blade. Cutting edges with this characteristic are not uncommon and may well be the result of deliberate manufacture; however, less well-finished examples suggest that this was often a consequence of the resharpening or regrinding of a cutting edge, which had sustained damage at or near one end during use. Such damage patterns are consistent with the use of blades in strokes, which involved a significant downward motion (for instance, lopping or various carpentry tasks), and this appears to be the case with this axe. The tapered end of the cutting edge appears to truncate the pronounced side facet on the blade, and is also associated with at least two small flake scars, both of which have been ground down to varying degrees, these patterns suggesting a measure of reworking.

The blade is also characterised by a number of facets, the butt retaining a small one, probably a consequence of grinding to create the elegantly rounded form of the blade at this end. Presumably, this facet was once larger, but has been all but removed by the grinding/polishing of the principal faces and lateral edges. A small flake scar is also evident on the butt. Both lateral edges have distinct facets, one slightly longer than the other (*above*). Longitudinal facets can also be seen on both principal faces of the blade. These are very faint, but entirely consistent with patterns seen on other Cumbrian Clubs, many of which appear to have been shaped by sustained, and perhaps supported, grinding on the long axis of the blade, as a distinct stage in manufacturing (Fell 1964).

Axe 70403.14

A small, and largely complete, stone-axe blade (Fig 292), again from *Early Neolithic organic deposit **70301*** (*Ch 8, p 235*), is made from Group VI tuff (*Appendix 6*). The blade has a distinctive form, the cutting edge being characterised by a very shallow curve, while the overall form is tapered down to a more or less pointed butt. Limited faceting is present on the butt, and on both lateral edges; however, this is relatively irregular in character, and may indicate that the blade sustained a certain amount of

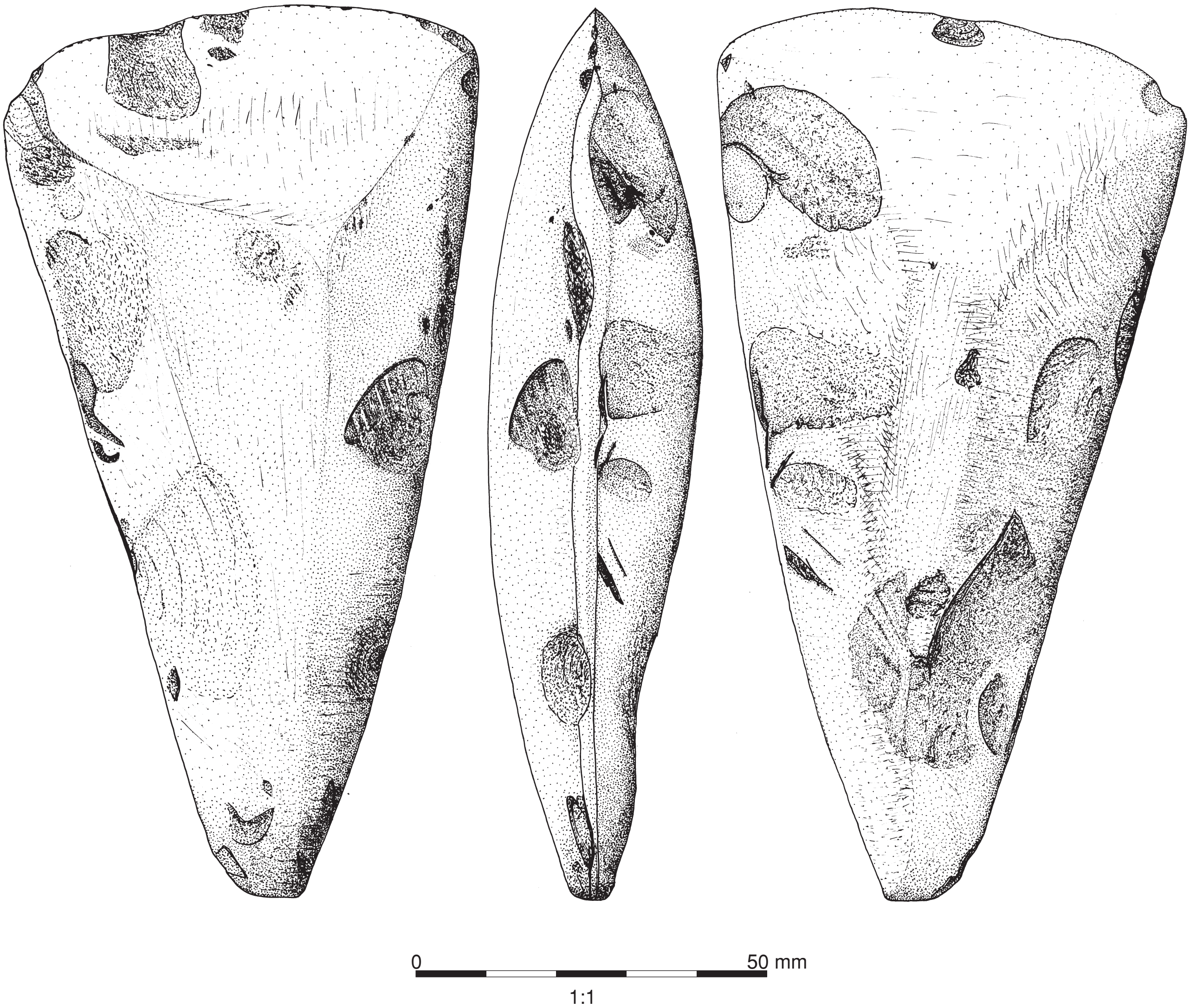

Figure 292: Axe 70403.14

reworking over the course of its active life. Although it has been extensively ground, in places to a high degree, flake scars are still visible on both principal faces, and the thickness of the axe decreases sharply from the blade edge to the butt. The greatest mass is *c* 35 mm from the cutting edge. From this point on, one face in particular drops down to the butt in a sharp and slightly stepped manner. Such a profile could have been created from the outset, although such irregularities might also be expected where a blade has been refashioned or trimmed.

Axe 70325.41

A piece of broken stone-axe blade (Fig 293), again from *Early Neolithic organic deposit **70301*** (*Ch 8, p 235*), is made from tuff (*Appendix 6*). The piece possesses effective symmetry in both section and plan, though there is a slightly more pronounced curve down and away from the cutting edge on one principal face. Though medium-grained, and thus not conducive to really fine flaking, the raw material does possess the property of conchoidal fracture, evidenced on both principal faces and on the cutting edge, where two small scars are consistent with the kinds of damage that blades often sustained during use (*cf* Davis 1987). Flake scars can also be seen emanating from either lateral edge, some of them with partially smoothed edges consistent with their having been struck prior to the grinding of the blade surface. The simplest explanation for this is that the blade was roughed out by flaking before being ground down in the realisation of the final form.

Significant facets can also be seen on both lateral edges of the blade. Both appear to have been subsequently modified by flaking and, in one case, by flaking and

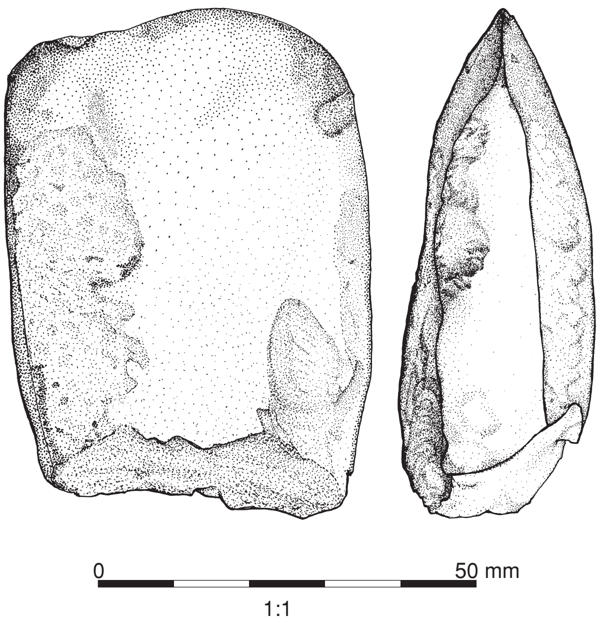

Figure 293: Axe 70325.41

partial regrinding, making the longitudinal line of the facets a little irregular. The blade was evidently modified on at least one occasion during its use-life.

It is impossible to determine the length of the original blade, as the opposite end to the cutting edge takes the form of an abrupt end-shock fracture, typical of the kinds of snapping that often happened to blades during use. Of note is the platform, caused by this transverse break, which has itself been struck on at least two occasions. This may have been done for many reasons, but could suggest the removal of flakes for rehafting after the original blade had snapped (*ibid*).

Axe/adze 88102.2000

This artefact is an axe or adze (Fig 294), made from dacite tuff with a probable source in the Langdales (*Appendix 6*). This item is interesting because it came from *Mesolithic overbank alluvium **90181*** within the *Backwater channel* (*Ch 4, p 110; p 133*), and is likely to have been a large flake, or split cobble, rather than a complete cobble, though this is difficult to interpret, as it appears much abraded from chemical weathering. In plan, the implement has a pointed butt; splayed edges, with one being thicker and with more of an acute angle; and an asymmetrical blade edge, which is also slightly concave. In profile, one face (ventral?) is flat with a slight longitudinal curve, whilst the opposite (dorsal?) is convex. It bears clear traces of grinding on the inwardly curved face, and the blade end appears to have been ground to shape on the dorsal face. The butt has also been flaked on both faces, after the piece was ground, and the blade end may also have sustained damage from use, hence the concavity in plan. The thicker edge of the piece also has pecking/edge damage. This can be seen clearly at the middle and blade end of the implement, but has been obscured at the butt end by chemical weathering. This would, to all intents and purposes, appear to be a ground-stone axe, though one whose manufacture did not require a great amount of time and energy, compared with the axes from the *Principal palaeochannel*. Furthermore, the piece also displays some technological similarities with Mesolithic axe blades recorded from Ireland (Woodman 2015; Little *et al* 2016), and another possible Mesolithic axe/adze blade from Holbeck Park, Cumbria (*Ch 4, p 111*).

Polished-axe fragments

The 17 polished-axe fragments are all derived from ground-stone implements, which were made from volcanic tuffs, and represent either the deliberate reworking of ground-stone tools, or pieces that had detached from implements during use, some of which were in turn reworked into tools. The pieces are mainly of a flake morphology, with only two pieces with blade-like proportions. The flakes include six complete pieces, two distal fragments,

Figure 294: Axe 88102.2000

and six indeterminate fragments. The blades consist of a complete piece and the distal end of another, and a blade-like fragment struck from the edge of an axe blade. Both of the latter are of broad-blade dimensions. It is of note that many of the pieces, including the indeterminate fragments, are of large dimensions, and all of the fragments have evidence for grinding and polishing on their dorsal faces. In the majority of cases, the polished surfaces are accompanied by striations, which are often criss-crossing, and relate to the polishing process; one example (81781.1013 from *Mesolithic overbank alluvium **90212***) has a partially polished-out flake scar.

Polished-axe fragment 89371.1053 (from *Stabilised land surface **90003***) is part of knapping group 113 (*Appendix 3*), and also has a side facet. This object was found in the northern part of the *Grid-square area*, where there was a concentration of tuff, which also includes knapping group 112. It is probable that the knapping groups, and some of the tuff debitage from the wider spread of material, relate to the reworking of ground-stone implements. Another fragment (89381.1022 from *Stabilised land surface* ***90003***) came from the *Grid-square area* adjacent to that from knapping group 113, and is made from an andesitic tuff, while the piece from knapping group 113 is made from a dacite tuff. This implies that two possible ground-stone tools may have been reworked. The latter fragment may also have been utilised, as the distal end is rounded and worn on the ventral face, suggesting the flake may have been used as a rubbing tool, utilising the bevelled edge created by the polished surface. Two deep flake scars on either lateral side may have been struck intentionally to haft the tool. Furthermore, fragment 88673.1019, from the *Mesolithic overbank alluvium* (***90181***) within the *Backwater channel*, had been reworked as a core; flake removals are visible on the ventral face and, to a lesser extent, on the dorsal face. The edges of this piece are rounded, indicating that it may have been abraded from secondary and/or post-depositional processes. Fragment 84552.1049 (from *Mesolithic overbank alluvium* ***90212***) has possible irregular retouch on an edge, although the flake scars comprising this modification are quite large, deep, and irregularly spaced, so they may have originated as edge damage from use, rather than secondary reworking.

One of the indeterminate flake fragments (70307.11 from *Later Neolithic organic deposit* ***70300***) is burnt, though it is unlikely that this occurred when it was still part of the original implement. One of the pieces with broad-blade dimensions (83682.1006 from *Stabilised land surface* ***90206***) has remnants of a polished side facet on a lateral edge, while a flake (88213.1012 from *Mesolithic overbank alluvium* ***90211***) also has the possible remnants of a side facet, but in this instance the evidence is less clear. A second flake (89871.1006 from subsoil ***90571***) also has possible remnants of a side facet; however, this specimen has clear evidence for being used as a rubber, and the faceting could be a result of this.

A fragment with blade-like proportions, made from Group VI tuff (*Appendix 6*), forms an unusual artefact type (89853.2000 from layer ***90574***; Fig 295). It is sub-rectangular in plan, with a sub-trapezoidal cross-section, and was probably removed from the edge of a ground-stone axe blade. Two faces have convincing evidence for having been ground and polished, and it is possible that they represent the main face of the axe blade and the remnants of a lateral facet, a characteristic of Cumbrian blades (Fell 1964, 40). The opposite edge of the facet has been damaged, however, and is characterised by a negative flake scar. Together the three faces form the dorsal face of the removal, while the remaining long curving face is likely to represent the ventral, or internal, face, created when the piece was struck from the original ground-stone tool. This ventral face has a smooth appearance and it is possible that it has been worn from use, although the evidence for this is not as clear as that on the two dorsal ground surfaces. Both ends of the piece have been altered intentionally, so no evidence for a platform remains. The reworking of the ends has truncated the ground faces on the dorsal face, but not the curved lower face.

In addition to this fragment (*above*), probable remnants of side facets were observed on Group VI flakes 89871.1006 (from *Stabilised land surface* ***90206***) and 88213.1012 (from *Mesolithic overbank alluvium* ***90211***) during the technological analysis. On both flakes, however, these facets were damaged during the removal of thin sections for petrological thin-section analysis.

Raw materials and provenance

The majority of the stone implements were subjected to petrological and geochemical study (*Appendix 6*). This has indicated that they were made from several different kinds of tuff and other types of stone, with the majority of the tuff items being sourced to the central Cumbrian fells. For instance, it is apparent that four of the complete or near-complete axe blades were made on material that can be sourced to the axe factories there. The fifth blade was, however, made on a probable glacial erratic, and could have been manufactured elsewhere, before being brought onto the site. Of the flakes and fragments with polished

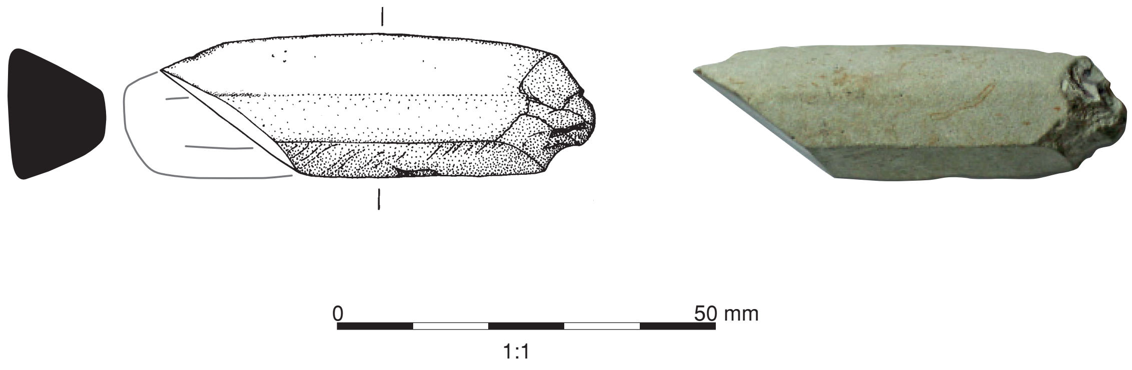

Figure 295: Reworked-axe 89853.2000

surfaces, nearly all were made on various types of tuff, which can again be sourced to outcrops at the axe factories in the central Cumbrian fells. The sourcing analysis also identified five new sub-groups of tuff, some of which can be sourced to the same area.

In view of this, it can be postulated that the tuff used in the manufacture of the ground-stone tools, whether for complete, partial, or fragmented implements, is not likely to have originated as glacial-erratic debris in the till at the site. The raw material was originally procured at various outcrops in the Langdale, Scafell, and Glaramara area, amongst others, and probably roughed out at locations near to the source outcrops (Bradley and Edmonds 1993); there is no evidence within the flaked-tuff assemblage to indicate that this phase of the reduction process was undertaken on site (*p 655*). Given the presence of *polissoirs* at Stainton West (*p 656*), the final grinding and polishing of roughouts can be inferred, while the presence of reworked implements suggests that some may have enjoyed a long use-life before ending up at the site. Worked wood from the palaeochannel, bearing axe cut-marks, indicates that implements were used on-site, and this may have resulted in some specimens becoming damaged, and, possibly, reground. Finally, some axe blades were deposited in the palaeochannel, without their hafts, while others were intentionally reworked, perhaps as a source of raw material for use in other activities at Stainton, and sites in the wider landscape.

Additionally, there is limited, but significant, evidence to suggest that Group VI tuff from sources in the central Cumbrian fells was accessed and made into coarse-stone tools in the Late Mesolithic period. Indeed, one item of particular significance is the reworked polished-axe fragment from deposit ***90574***. Petrological analysis matched the polished thin-section (PTS) of this item with one from a polished tuff axe-blade from Carlisle, contained in the Implement Petrology Group (IPG) reference collection, whilst geochemical analysis indicated that its parentage was comparable to several roughout tuff implements from known sources in the Langdale/Scafell Group VI source area in the central Cumbrian fells (*Appendix 6*). Moreover, this came from a deposit of leached sand, below deposits filling the *Backwater channel*. These deposits date to the Late Mesolithic period (*Ch 4*), so it is highly probable that this coarse-stone tool is also Late Mesolithic in date. Within this context, it is perhaps worth noting that, although, to date, no diagnostic Mesolithic artefacts have been recovered from the central fells (Dickson and Cherry in prep), in terms of the Langdale axe factories, the potential for early activity in the central uplands has been acknowledged (Bradley and Edmonds 1993, 138-41). Indeed, the evidence for pre-Elm Decline vegetation disturbance in the vicinity of Langdale, at Blea Tarn, has been suggested as dating from the Mesolithic period (*ibid*). Some confirmation for this came from Harrison Combe, Great Langdale (Site 123), where burnt crowberry seeds suggest a Late Mesolithic presence, dating to the late sixth millennium cal BC (5970-5730 cal BC; 6965±30 BP; KIA23485), in an open vegetation environment at 690 m aOD (OA North 2004). Furthermore, evidence has now emerged for the Late Mesolithic/Early Neolithic procurement of banded rhyolite from a source in Ennerdale (Cherry and Davis 2014), which is *c* 6 km from Seathwaite Fell and Scafell, with the Langdales beyond.

Ochre

A Clarke

Ochre is a mixture of fine clay and iron oxide and it often occurs in conjunction with iron ores such as haematite (Smith 1999). It appears to have been used as a mineral pigment by numerous prehistoric hunter-gatherers, including the Mesolithic peoples in the Vale of Pickering, North Yorkshire (Needham *et al* 2018). The ochre at Stainton West is fine-grained, red to red-brown in colour, and ranges in consistency from soft to hard, with the harder material most likely to be haematite. Much of the ochre is homogeneous in texture and, when broken, exhibits a conchoidal fracture. The harder ochre, or haematite, can be brittle and appears to break readily into chunks. Some pieces of ochre are less homogeneous than others, as a result of irregular sedimentation, or the presence of inclusions.

In total, 610 pieces of ochre/haematite were recovered from Stainton West, all of which was subjected to detailed analysis (Table 50). The analysis included the classification of each piece to a specific type; the recording of dimensions when relevant; and a descriptive account of salient features, including reference to any evidence for utilisation, and, when present, technological attributes. A small number of pieces exhibited residues adhering to surfaces, this

Type	***Total***
Fragment	***42***
Narrow blade	***1***
Ochre lump	***1***
Rounded crumb	***375***
Rounded lump	***46***
Small fragment	***93***
Worked lump	***52***
Total	***610***

Table 50: Ochre and haematite classifications by entity

occurrence being noted and the material analysed. All these details were entered into the CNDR Finds Database (*Ch 1*, *p 35*).

The ochre survives in various forms, the most numerous of which are small crumbs and fragments less than 10 mm in dimension and less than 1 g in weight; these form 66.73% of the total collection. Pieces larger than this were recorded in three categories: worked lumps that exhibited visible traces of utilisation, usually in the form of striations or concave faces; angular fragments, representing broken pieces, of usually hard ochre/haematite; and rounded lumps, defined by rounded faces and edges. The ochre assigned to the latter two groups did not bear visible wear traces.

Technological characterisation

Although 52 pieces of ochre and haematite were recorded as worked lumps, conclusive evidence for wear traces, identified with a hand lens, was present on 47 pieces (7.7% of the total assemblage). Wear traces are present as striations, gouge marks, grooves, and worn faces, and combinations of these often occur together on the larger or complete pieces. The remainder exhibited potential evidence for utilisation.

The most common marks, which are present on most of the worn pieces, are fine striations that form unilinear, multi-linear, or criss-cross patterns on parts of the surfaces. On many of these pieces, the wear traces are very fine, or else appear to have been partially worn away by post-depositional conditions. A particularly good example (82431.3000; Fig 296) was recovered from the *Mesolithic overbank alluvium* (***90212***; *Ch 6, p 198*), on which fine striations run along the length of the faces and sides. These are wavy and slightly criss-cross each other, and are formed on concave and convex faces. A similar piece (87913.3000), also from the *Mesolithic overbank alluvium* (***90202***), bears longitudinal striations all over its principal surfaces, and the faces are worn in such a manner as to converge at one end in a rounded point. On other pieces, the striations appear to be banded, that is to say, they occur within parallel grooves of various widths. These marks were most probably produced by scraping or rubbing with a sharp object of a similar width to the band.

Distinctive gouging marks, comprising deep, short, V-shaped grooves randomly placed within the centre of large pieces, which often create a very irregular surface, are recorded on several lumps (*eg* 84832.3001) from *Mesolithic overbank alluvium* ***90212***. The presence of much larger grooves was noted on just three pieces, but these were all rather wide and irregular in depth, cross-section, and plan, and were most definitely not produced by rubbing with an object with a regular U-shaped cross-section (for instance, a bone or wooden shaft). It is most likely that these grooves were actually a product of the deep gouging, or localised rubbing.

In most cases, the presence of conchoidal fractures on some of the ochre pieces was visible through the breakage of the piece. One (85453.3000) from the *Basal sands and gravels* (***90039***; *Ch 2, p 48*) had also been deliberately flaked to produce a narrow blade with a pointed distal end. Despite the intentional manufacture of this blade, there is no other material that could remotely be associated with knapping ochre.

An adhering white substance was also present on the surface of seven pieces (*eg* 83493.3000 from *Stabilised land surface* ***90206*** and 84343.3000 from *Mesolithic overbank alluvium* ***90212***). One (84343.3000) was examined with a scanning electron microscope (SEM), and this revealed the white substance to be an aluminium silicate, most likely kaolin (Clarke 2014). Kaolin (also known as china clay) is a product of weathered granite and there are several references to its occurrence in the region. For instance, kaolinite has been found at Asby, near Shap in Cumbria, where it appears as mixed clay in solution hollows on the limestone outcrops (Stone *et al* 2010). In the Caldbeck Fells of the northern Lake District, umber and china clay were mined at Roughton Gill and Hare Stones (*ibid*), which suggests that brown pigments can be found together with the white kaolin. It is not known how kaolin might have been extracted in the Mesolithic period: for instance, whether it was mined or collected from the surface; but it is possible that ochre and kaolin were found and exploited together. Kaolin has many properties: it has a soft, non-abrasive texture; it increases opacity; it is chemically inert; and the clay can be moulded and retains its shape. Medicinally, it can be used as an external emollient and drying agent, and internally it controls stomach problems by retaining water. It can be used as a pigment in its own right, and also mixed with others, such as ochre, to lighten the shade.

Stratigraphic associations

Deposits associated with the *Basal sands and gravels* (***90183*** and ***90039***; *Ch 2, p 48*) yielded a relatively large assemblage of ochre. Most of this is small fragments, along with a small number of pieces that show clear evidence for having been worked, most notably the perfectly knapped ochre narrow blade (Table 50; *above*). Similarly, the assemblage from the *Stabilised land surface* (***90003*** and ***90206***; *Ch 2, pp 49-50*) is also dominated by small fragments, along with a small collection of worked pieces. The *Mesolithic overbank alluvium* (***90202***, ***90211***, ***90212***, ***90275***, and ***90288***; *Ch 6, p 198*) produced the largest assemblage, including 28 worked pieces, suggesting that there was a focus for utilising this within the confines of the area covered

Figure 296: Used and worked ochre

by this deposit. A small collection of mainly small fragments was recovered from *Mesolithic overbank alluvium* **90181** (*Ch 6, p 198*), within the *Backwater channel*, and *Colluvium* **90002** (*Ch 2, p 52*). The nature of this material (small and fragmented pieces) indicates that its use was negligible in these parts of the site.

The archaeological and natural features within the *Grid-square area* also produced small collections, derived from hollow ***90314*** (Structure 2; *Ch 3, p 69*), pit/hollow ***90245*** (*Ch 4, p 125*), hearth/cooking pit ***90434*** (*Ch 4, p 116*), and tree-throws ***90262*** (*Ch 4, p 125*) and ***90526*** (*Ch 8, p 283*), as did deposits (***70005*** and ***70455***) associated with Burnt Mound 1 (*Ch 11, p 388*). Further small assemblages were recovered from post-medieval ditch ***90599*** and an overlying trackway (*Ch 14, p 522*), indeterminate layers and subsoil, or were unstratified.

Provenance

Ochre and haematite are commonly found in limestone formations, where they were formed by the metasomatic replacement of limestone with iron ore (Slater and Highley 1976). Significantly, Carboniferous limestone formations surround Stainton West, fringing the southern Solway Plain and Eden Valley. Indeed, these formations appear to contain such material, as evidenced during fieldwalking in the Eden Valley, which recovered small nodules of haematite (Clarke *et al* 2008). Apart from these potential sources, ochre and haematite are also recorded from the Scottish Southern Uplands where, historically, they were mined at the Wanlockhead lead mines (Groome 1885). It is likely, then, that ochre and haematite were available from a wide area around the site, and they may either have been actively searched for, or were procured with other raw materials, such as chert, and possibly tuff. However, during the prehistoric period, ochre/haematite was probably only accessible from seams that had been exposed following the removal of the overlying glacial till through the erosive action of streams and rivers.