RECENT WORK ON GROUP XIX ARTEFACTS FROM NORTH CLIFFS: RECONSIDERING THE USE OF CORNISH GREYWACKE

A.M. Jones[1], H. Quinnell[2] & R.T. Taylor[3]

ABSTRACT

Group XIX represents a type of greywacke, a hard sandstone or gritstone, long thought to have its source in Cornwall. Although Group XIX has never been recognised as a major source of Neolithic axeheads, pieces attributed to it have a fairly wide distribution across southern Britain. Limited work was undertaken on a small group of Mesolithic stone tools from Hudder Field in the 1980s, and North Cliffs on the north Cornish coast was suggested as the probable source of Group XIX.

A recent Historic England funded project was undertaken by the authors between 2016–2018. This catalogued approximately 23,000 lithic finds (flint and worked stone) collected by the late Charles Thomas during systematic fieldwalking over the Mesolithic flint scatters in Hudder Field. Analysis of a sample of approximately 25 percent of the flint and stonework was also undertaken to better characterise and date the scatters. Supplementary to the project, the South West Implement Petrology Group funded thin sectioning and microphotography of five of the Mesolithic worked stones from Hudder Field, which had initially been identified as axes or potential axes.

This article reports on the thin section analysis, which confirmed that four of the stone tools were greywacke of Group XIX. This compliments macro-analysis of the assemblage, which revealed that the tools were made from beach pebbles similar to those found on the beaches below North Cliffs. It also discusses the character of the worked stone assemblage from Hudder Field, its date and the implications for Group XIX artefacts from beyond Cornwall, the majority of which may not be axes or of Neolithic date.

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Keywords: Mesolithic, Neolithic, North Cliffs, bevelled pebbles, stone axeheads.

INTRODUCTION

Despite being far less important than the west Cornish greenstones (Clough 1988; Jones *et al*. 2017), Group XIX greywacke has long been identified as a minor raw material source for the production of axeheads and other prehistoric tool types. Until recently, however, its origin was only broadly attributed to Cornwall (Evens *et al*. 1962) (Figure 1). Petrographic study of a small number of stone tools from Hudder Field, conducted as part of an undergraduate dissertation, led to the suggestion that the North Cliffs was the source of Group XIX (Mitchell 1988). This proposition, however, was not published or followed up further. The distribution of Group XIX artefacts in *Stone Axe Studies II* (Clough 1988, map 16) shows a relatively small number of grouped artefacts that, despite having a concentration in west Cornwall, are rare and quite widely scattered across southern England. This distribution has not altered since that time (Figure 2).

[1]*Cornwall Archaeological Unit, Cornwall Council, Truro*
[2]*Honorary Research Fellow, University of Exeter, Exeter. Email: h.quinnell@exeter.ac.uk*
[3]*49 Clyst Valley Road, Clyst St. Mary, Exeter*

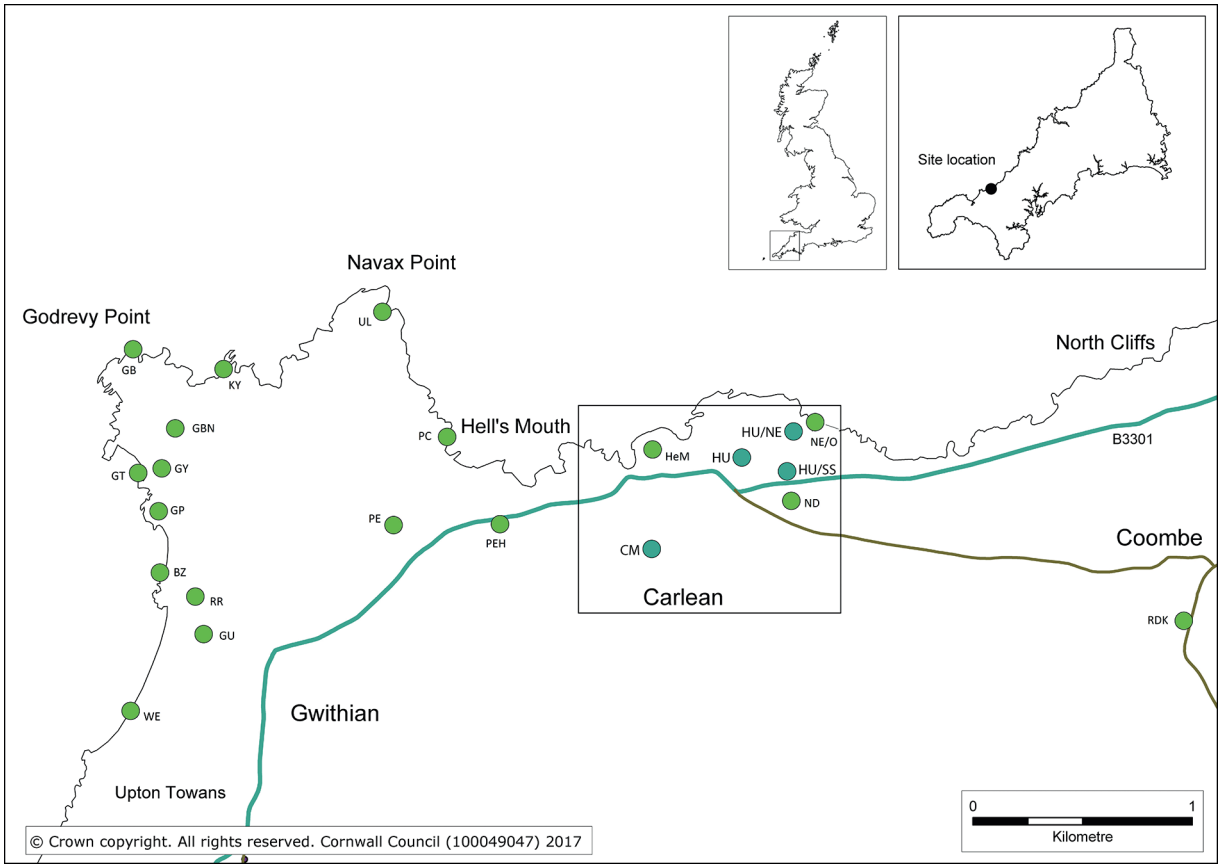

Figure 1. The location of the North Cliffs and Hudder Field and the Wider Gwithian Scatters in West Cornwall.

Figure 2. The distribution of Group XIX tools across Britain (map produced by Mik Markham).

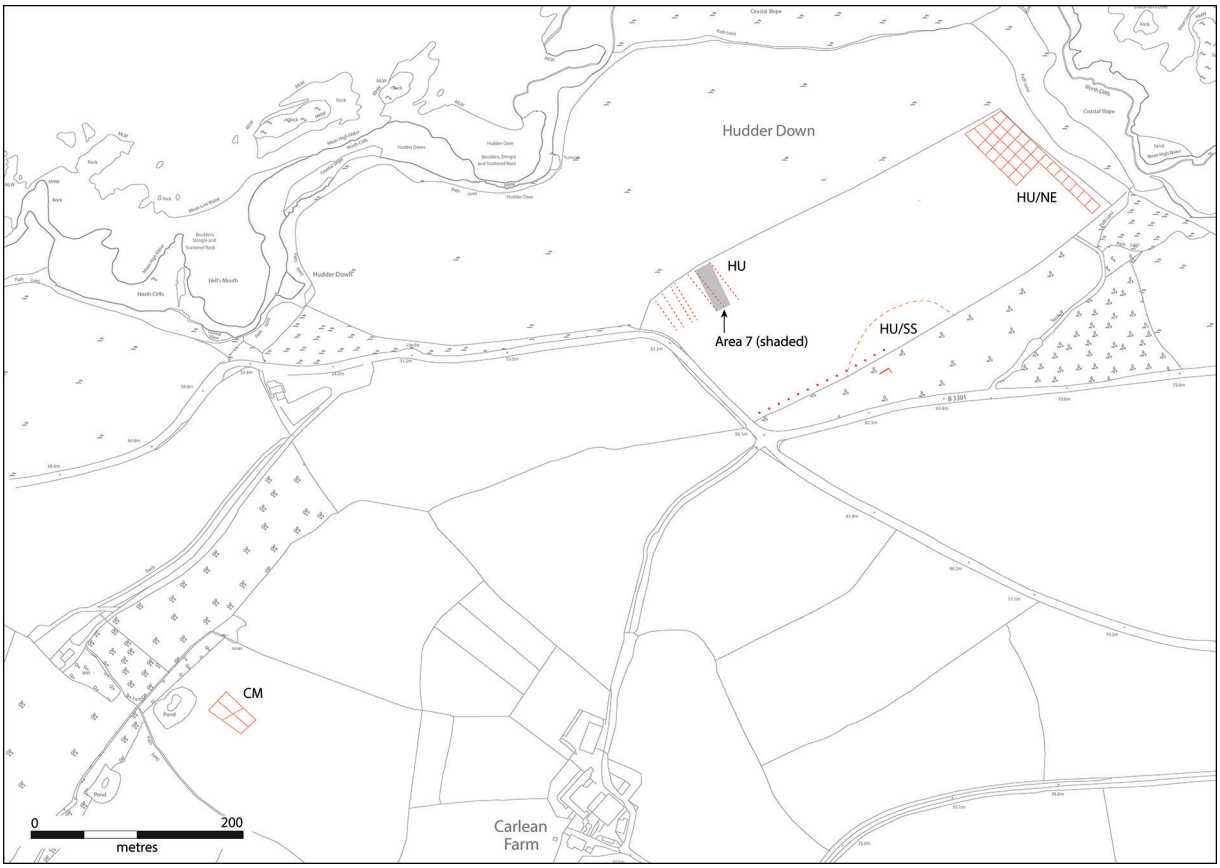

Figure 3. The location of the Hudder Field scatters studied by the North Cliffs project.

More light, however, has been shed on Group XIX as a largely unexpected outcome of a recent Historic England funded project to catalogue and examine an extensive collection of Mesolithic flints and worked stone recovered from lithic scatters at Hudder Field (sites HU/NE, HU and HU/SS; see Figure 3) and nearby Callean Memmoan (site CM) at North Cliffs in west Cornwall (SW 608043022) (Figures 1 & 2). The assemblage was collected by Charles Thomas as a result of more than 50 years of fieldwalking (Jones *et al* 2018, 2019).

The ensuing cataloguing project led to the discovery of a very large assemblage of lithic artefacts, which comprises over 20,000 flints and a stonework assemblage of more than 2000 items, the majority of which macroscopically appeared to be of greywacke. Most of the lithics and stonework were confirmed as of Late Mesolithic date (Jones *et al*. 2018). A small number of the pieces had in the past been described as being 'proto axes' or 'pseudo adzes' (Thomas 2005), which in a Mesolithic context had the potential to be very important.

Given the significance of the assemblage, the South West Implement Petrology Group (SWIPG) agreed to fund thin sectioning and microphotography of five of the stone tools (S101, S102, S103, S104 and S106) from the Hudder Field assemblage that had initially been described as either axes or potential axes to see if they represented a homogenous group and/or could be grouped.

THE NORTH CLIFFS GROUP XIX ARTEFACTS

The worked stone assemblage

Cataloguing of the assemblage revealed that the stonework comprises a total of 2095 pieces. These are attributed to sites as

follows: HU/NE = 1434; HU = 354; HU/SS = 18; and CM = 231. A representative sample comprising approximately 25 percent of the assemblage was studied in further detail (Jones *et al*. 2018).

The analysis of this sample initially recorded that 75 percent of all pieces were greywacke, some with quartz veins, while slate, siltstone, vein quartz and igneous rock make up most of the remainder. With the exception of specimen S104, which was thin sectioned due to its original identification as a potential axe, the non-greywacke pieces are not discussed further. The greywacke assemblage comprised local beach pebble/cobble pieces, a large proportion of which was broken or damaged to various extents.

All pieces were associated with human agency, even if it was only transport from local beaches below to Hudder Field for possible use prior to being discarded. All pieces can therefore be regarded as potential tools. On the grounds of probable modification and use wear, some 85 pieces within the HU/NE sample, approximately a quarter, may be regarded as tools. Extrapolating from this would suggest that the HU/NE stonework assemblage contains some 360 tools. Very little diagnostic Neolithic material was found in Hudder Field and the lithic scatters (flint and worked stone) are almost entirely considered to be of Late Mesolithic date.

Given the extraordinary quantity of Mesolithic greywacke tools and unworked collected pieces from the scatters in Hudder Field, the following description of the assemblage is based on the material collected from the two major field scatters, HU/NE and HU. The remainder of this section provides a brief description of the major tool types, such as bevelled pebbles, with detailed descriptions of the five thin sectioned tools following.

Bevelled pebbles

Bevelled pebbles generally fall within the size range of a small sample recorded by Fletcher (2005): length measured between 64 and 128 mm, width between 27 and 49 mm, and thickness between 12 and 18 mm, although a few are several millimetres thicker. The general character of bevelled pebbles is well known, and they are frequently found in coastal Late Mesolithic tool assemblages from Cornwall, notably those published in detail from Poldowrian on the Lizard (Smith & Harris 1982; Berridge & Roberts 1986) and at Trevose Head in North Cornwall (Johnson & David 1982). Their use is still uncertain, although experimental work by Fletcher (2005, 30) indicates that bevels were formed by abrasive action. This is supported by analysis undertaken during the North Cliffs project (Jones *et al*. 2018). Fletcher further indicated via experimental work that an abraded bevel was far more effective in working hides than unmodified cobble ends.

There are 36 complete bevelled pebbles within the HU/NE sample, of which four are slate and the remainder greywacke, a few of the latter with quartz veins. Seven are double ended: five have single bevels at both ends, while the remaining two have a single bevel at one end, and a double bevel at the other. None have double bevels at both ends. Twenty-nine are single ended: 23 have a single bevel and six a double bevel. Fourteen display damage to the bevels at one or both ends. There are also 31 broken bevelled pebbles, of which three are slate. Twenty-three of these have single bevels and nine double bevels. Twenty-seven display some chipping or other damage on one or both bevels. A few examples from both complete and broken bevelled pebbles, generally at the wider side of the size range, have a marked curve to one or both bevels. A few pieces also bear incised marks, which are likely to be intentional. Mesolithic art is rare, although linear lines have been

recorded on pebbles and other materials (Jones 2014; Milner *et al*. 2016) and incised bevelled pebbles are known from other sites in Cornwall and elsewhere (Clarke *et al*. 2012; Jones 2015). Extrapolating the sample to the collected assemblage, there may be 145 bevelled tools in the assemblage.

Specialised hammer use

Specialised use of the end of some elongated cobbles as a hammer is indicated on a number of examples; sometimes the end is further flattened by intensive impact use. A large number of other broken elongated cobbles with some damage or spalling may have also seen use as end-hammers. Previous work by Fletcher (2005, 31) suggested that greywacke was not suitable as a knapping tool. However, the durability of this rock is very variable depending upon minor differences in texture and component size (Jones *et al*. 2018). Comparable hammer use can be seen in examples from Poldowrian (Smith & Harris 1982, fig. 61, nos 80 & 82) and Trevose Head (Johnson & David 1982, fig. 7, nos 2, 5 & 6). Further afield, they bear comparison with the pebbles with spalled ends from Ferriter's Cove in County Kerry (Woodman *et al*. 1999, 58–59).

Grooved hammer?

This thin sectioned 'greenstone' piece (S104) may have been abandoned during the earliest stages of grooved hammer manufacture (Figure 4).

Pieces with pitting

A number of pieces have small areas of pitting, which appear to have been made either directly by a small, pointed hammer or indirectly from use as an anvil. Similar use wear was noted at Poldowrian (Smith & Harris 1982, 45, fig. 17, no 82a) where it is described as 'light pecking'.

Edge damaged tools

A number of bladed cobbles of greywacke or slate have damage to their sides, and some have additional marks, such as pitting.

Figure 4. Greenstone fragment S104 prior to thin sectioning.

Flaked knives

There are two fragments of bifacially worked slate or greywacke, which probably functioned as knives. No comparable pieces have been recorded from other south-western sites, although the fine greywacke should flake adequately (Jones *et al*. 2018). The general working is similar to that on possible potential axes specimens S101 and S106, both provisionally identified as greywacke (see below).

Pebble hammers and cupped pebbles

Pebble hammers, which have hourglass perforations (Roe 1979, 36), and cupped pebbles, which have two usually circular depressions on opposite faces (Roe in Christie 1985, 56–59), are closely linked typologically; the latter can be viewed as unfinished versions of the former. The two linked types have a long potential date range, from the Late Mesolithic until the Early Bronze Age (ibid.). One complete cupped pebble from HU/NE has long been published (Palmer 1977, 174; Berridge & Roberts 1986, fig. 6, no 4). In addition, a broken cupped pebble has been identified from HU/NE and a complete cupped pebble comes from HU/SS. An additional complete example produced on an irregular

Figure 5. Greywacke tool S102 prior to thin sectioning.

cobble has also been found more generally within Hudder Field (Jones *et al*. 1988). Another broken irregular cobble with opposed cup marks comes from HU/SS. All depressions show signs of pecking and gouging rather than drilling, and all bar one use greywacke cobbles. The examples from Hudder Field represent the largest and densest concentration of the types in south-west Britain and the only group in probable association with Mesolithic lithics.

Axes and potential axes of Neolithic type

The recent work on axe roughouts of Group I and Group XVI demonstrated that, in West Cornwall, many axes were produced from cobbles (Jones *et al*. 2013, 2015). Group XIX axes made from greywacke were defined as a group in 1962 and suggested to be Cornish (Evens *et al*. 1962, 226–27). Subsequent work by Mitchell (1988, 52) confirmed the general location as North Cliffs. Mitchell commented that all the pieces he viewed appeared to be 'pebbles'. Thin sectioned artefact S101 from HU/NE is recorded as a potential axe. It was produced from a greywacke cobble that has been flaked around its perimeter to provide an axe shape. It is, however, thin for an axe and could perhaps be better interpreted as a chopper or knife. Likewise, specimen S102 can only be regarded as a possible potential axe (Figure 5). Few of the other studied pieces were considered to be either suitable as axes or potential axes (Jones *et al*. 2018).

The evidence for the production of Mesolithic axes on the North Cliff sites is therefore slim. Indeed, few of the items listed in the corpus within Stone Axe Studies II need be axes or necessarily of Neolithic date (Clough & Cummins 1988) (Table 1), and this will be discussed further below.

RESULTS FROM THE THIN SECTIONING

North Cliffs samples

The partial cobbles, S101, 102, 103, and S106, when looked at as a group, appear to have been originally recorded as potential axes, as they have broadly axe shapes and varying amounts of shaping or damage.

S104 is part of a greenstone cobble, which, although not axe shaped, is a type of rock extensively used in axe production. Of the four greywacke pieces, S101 and S106 are best considered attempts at ad hoc choppers or knives, while S102 and S103 have some abrasion and/or damage but defy categorisation.

The five thin sections were examined and are described below. Descriptions are based on features of the complete slide and are accompanied by microphotographs (Figure 6). Petrological identifications were made by Roger Taylor.

S101 HU/NE A8 Box 32 Bag 4. 21.2.03 IPG 1996 COR 479 (Figure 7)

Cobble with irregular oval cross section, measuring 113 x 51 x 25 mm. Roughly

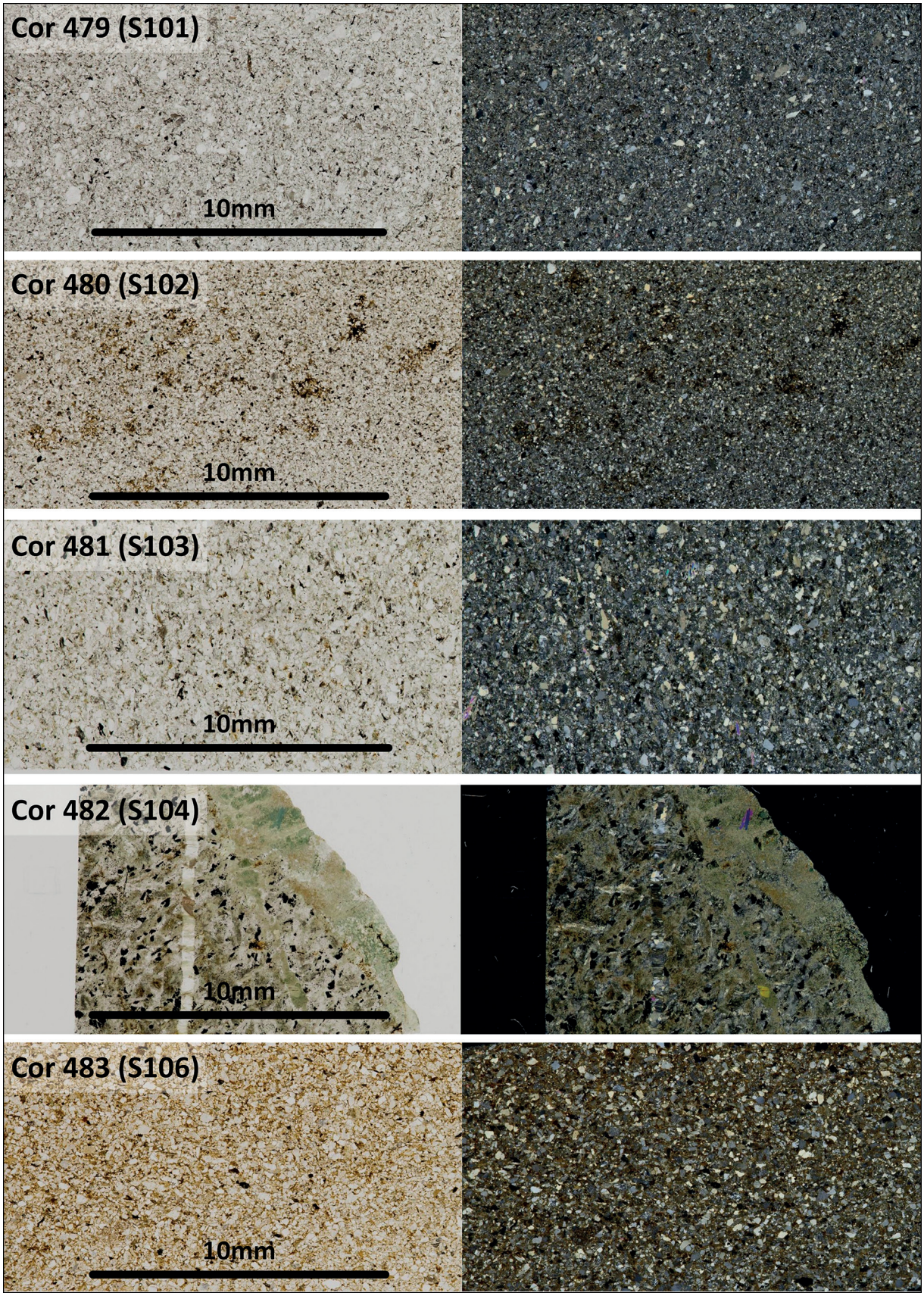

Figure 6. Microphotograph of greywacke thin sections from S101, S102, S103, S104, and S106 in reflected (left) and cross polarised light (right).

Table 1. Details of Group XIX artefacts by type and county. Basic typological and geographical data on the 28 Group XIX artefacts are based on Clough & Cummins (1988) and on data in Evens et al. (1962), Clough & Green (1972), Mitchell (1988) and Mik Markham (pers. comm.). ? = possible fragments

Tool	***Cornwall***	***Devon***	***Dorset***	***Wilts***	***Hants***	***Kent***	***Sussex***	***Cambs***	***Norfolk***
Bevelled pebble	7	-	-	-	-	-	-	-	-
Pounder	1	-	-	-	-	-	-	-	-
Pestle ?	1	-	-	-	-	-	-	-	-
Axe	-	-	-	1	1	-	1	-	1?
Axe, part or ?	5	1	-	-	-	-	-	-	-
Cupped pebble, part of	1	-	-	-	-	-	-	-	-
Pebble hammer	1	-	-	-	-	-	-	1	-
Mace head	-	-	-	-	1	-	-	-	-
Shaft-hole adze	-	-	1, part	1	-	-	1	-	-
Axe hammer	-	-	-	-	-	1?	-	-	1 near
Totals	***16***	***1***	***1***	***2***	***2***	***1***	***2***	***1***	***2***

flaked to a point around >50 percent of perimeter: most flaking from one side, a little from both sides. Short, incised line on one face: other lines appear casual scratches. It is possible that the flaking was intended as the first stage in axe production.

Petrology (Figure 6)

Quartz: angular to sub-angular grains, approximately 40%. Feldspar: plagioclase, a scatter of angular grains, probably albite, approximately 5%. Untwinned feldspar, often sericitized, approximately 6%. Rock fragments: quartzite 0.4 mm, foliated quartzite 0.4 mm, rare chert, micaceous slate, approximately 10%. Mica: biotite, sparse small flakes and laths, pleochroic from light brown to strong reddish brown, approximately 2%. Muscovite laths and flakes, approximately 2%. Opaque ore: irregular grains and dust throughout the rock, approximately 10%. Matrix: indeterminate chlorite/sericite with very fine-grained quartz approximately 25%. Comment: The rock lies within the general compositional range of greywacke. It has a general grain size 0.05–0.5 mm.

Figure 7. Greywacke tool S101 prior to thin sectioning.

Figure 8. Greywacke tool S103 prior to thin sectioning.

S102 HU/NE B2 Box 32 Bag 6 24.1.2003 IPG 1997 CO 480 (Figure 5)
Long, tapering cobble with flat oval cross section, now measuring 100 x 59 x 30 mm. Break across broader end has possible signs of abrasion; break across narrower end fresher and irregular. Two long incised lines and one short one on one face; lots of scratches. It is possible that the slight abrasion was intended as the first stage in axe production.

Petrology (Figure 6)
Quartz: angular to sub-angular grains 0.02–0.1 mm, rarely 0.25 mm. Feldspar: plagioclase. Rare sub-angular grains, 0.05–0.1 mm, one grain 0–2 mm. Mica: biotite, rare flakes 0.05–0.1 mm; muscovite, rare flakes 0.05 mm. Matrix: mainly a sericitic mica aggregate. Comment: a fine-grained rock lying on the boundary between very fine sandstone and siltstone.

S103 HU/-. B3 2003 IPG 1998 COR 481 (Figure 8)*
Cobble, flat oval cross section, now measuring 177 x 53 x 26 mm. The narrower end has sloping patch of abrasion with single rough flake removed from the tip on the other side. Broader end is a fairly recent break with a very recent removal adjacent. Some scratching. The long flat thin shape of the cobble makes this an improbable candidate for a potential axe.

Petrology (Figure 6)
Quartz: angular with some smaller rounded grains, 0.02–0.3 mm, occasionally up to 0.7 mm. Feldspar: plagioclase, a scatter of angular to sub-angular variably sericitised grains, 0.03–0.3 mm. A composition in the albite range is indicated by extinction angle and refractive index. Untwinned feldspar: variably sericitised sub-angular grains, 0.1–0.3 mm. Rock fragments: predominantly fine-grained micaceous slate and chert and rare siltstone, generally sub-angular fragments, 0.15–0.8 mm. Opaque ore: a scatter of opaque dust with some larger grains up to 0.1 mm. Some grains have traces of square outlines indicating pyrite. Mica: biotite, rare shreds, 0.1–0.2 mm, muscovite, sparse flakes and shreds, 0.05–0.5 mm. Zircon: crystals, 0.06 and 0.1 mm long. Matrix: silty quartz and sericitic mica with sparse chlorite laths and flakes up to 0.1 mm. Comment: The rock lies within the general compositional range of greywacke.

S106 HU/NE 24/03 C3 IPG 2000 COR 483 (Figure 9)
Broken cobble, measuring 80 x 47 x 19 mm. Abraded flaking around most of perimeter on one or both sides. Original break abraded and partly obscured by a more recent break. Impact fracture on one face. Two incised grooves at an angle on the other. A potential axe, although very small.

Petrology (Figure 6)
Quartz: angular to sub-rounded grains, 0.05–0.3 mm, approximately 60%. Rock fragments: including fine-grained quartz schist and chert, 0.22–0.5 mm, approximately 20%. Feldspar: sodic plagioclase (albite), approximately 5%. Untwinned feldspar: approximately 10%. Muscovite: rare lathes. Opaque ore: a scatter of fine irregular grains, approximately 0.05 mm. Matrix: sparse interstitial chloritic aggregates and flakes, 5%. Comment: the rock approximates to a lithic greywacke with a very low matrix content. Mineral percentages are approximate. General grains size 0.1–0.3 mm.

S104 HU/NE 1970 IPG 1999 COR 482 (Figure 4)
Part of cobble, now measuring 68 x 59 x 37 mm. Original cobble surface accounts for less than 50 percent of the present piece and has a line of pecking across it. The remainder is made up of different facets, two at approximate right angles that probably relate to splits along stress lines in the rock. These facets have been removed by two breaks, one apparently weathered; the other is much fresher and possibly caused by a deliberate blow. The line of pecking suggests the start of a groove of the type found around prehistoric hammers. Grooved hammerstones, a feature of Bronze Age mining in parts of the British Isles, are rarely found in Cornwall (e.g. Lawson-Jones 2013). It is difficult to see how this object can be considered a potential axe.

Figure 9. Greywacke tool S106 prior to thin sectioning.

Petrology (Figure 6)
Amphibole: an irregular aggregate of buff amphibole with some later growth and replacement by blue green amphibole. Feldspar: small irregular areas of untwinned clear feldspar. Opaque ore: irregular grains, aggregates and dust throughout the rock. Comment: a much recrystallised ‘greenstone’ with no trace of original igneous texture.

General comments

Aside from S104, the specimens correspond quite well to the designation of greywacke, although at the finer end of the possible range of grain size. Greywackes form in a process of sediment movement and deposition that results in the grain size of the sandstone bed being coarse at the base and progressively finer towards the top.

It appears that the selected rock derived

from the finer grain size, possibly because this had a greater degree of toughness. The occurrence of traces of biotite relate to the position of North Cliffs at the edge of the Carnmenellis granite thermal aureole. This slight degree of metamorphism may also have enhanced the toughness of the rock.

DISCUSSION

The results from the thin sectioning of the North Cliffs greywacke tools, considered together with the wider studies from the region, has led to several key findings.

Thin sectioning of S101, S102, S103 and S106 confirms that these are greywacke and broadly belong to what has been defined as Group XIX. Minor differences in their petrology probably relate to their not being extracted from the parent rock in a specific locale. Instead, they had been collected from secondary sources as unmodified pebbles derived from cliffs over a long stretch of the coastline. Indeed, visual comparison of the tools from Hudder Field with naturally occurring beach cobbles reveals that that they are identical to material readily available on the beach under the cliffs to the north, and there was no apparent need for quarrying stone.

The association of tools with a well-dated lithic assemblage strongly suggests that collection of unworked greywacke cobbles/pebbles occurred during the Mesolithic. This dating is also confirmed by the diagnostic tools within the Hudder Field greywacke stonework assemblage, all of which are Mesolithic forms—bevelled pebbles, pebble hammers and, most probably, cupped pebbles.

Site HU/NE stands out because it has a far higher proportion of greywacke to flint tools than is found in other studied Cornish Mesolithic flint scatters. Even within the wider Gwithian area, the numbers of greywacke pieces diminished with distance from the HU/NE scatter. The sizable number of stone tools, together with the large number of unworked cobbles/pebbles, is especially noteworthy at HU/NE, as comparable lithic assemblages in the south-west region tend to comprise few finished tools, as opposed to discarded unmodified pieces. This unusual ratio is even apparent within the studied North Cliffs scatters: more than half the greywacke pieces in HU/NE are unmodified, while at nearby site CM (see Figures 1 & 3) there are markedly fewer unworked cobbles/pebbles (Jones *et al*. 2018). Another unusual feature of HU/NE is the number of cupped pebbles that may have been discarded unfinished pebble hammers. A larger number of finished pebble hammers have been recorded from Hudder Field than anywhere else in the region. The inference from the character of the Group XIX assemblage is that cobbles/pebbles were collected from nearby beaches during the Mesolithic and brought to Hudder Field where some pieces were, either before or during manufacture, discarded. Many of the finished tools may then have been circulated into the wider landscape, where they formed a much smaller component of Mesolithic lithic scatters.

Significantly, however, unlike Ferriters Cove (Woodman *et al*. 1999), none of the examined pieces (including greenstone piece S104) were found to be axes or potential axes, and there is little evidence for either the manufacturing of axes, or, from the study of the associated flints, for the continuity of the Hudder Field lithic scatters into the Neolithic. There are no greywacke axes from secure Neolithic contexts, such as Carn Brea or Helman Tor (Mercer 1981, 1997); only three recorded greywacke items, not specifically attributed to Group XIX, were among the artefacts from the neighbourhood of the Carn Brea tor enclosure (Mercer 1981, 160; Clough & Cummins 1988, 147). Given that the source for Group XIX lies only a few kilometres

to the north of Carn Brea, the absence of greywacke tools is noteworthy. Instead, large numbers of Cornish axes were found that were produced from greenstones, which predominantly came from the distant Penwith peninsula. Significantly, the West Cornish greenstones do not seem to have been used in the Mesolithic to make tools (Jones *et al*. 2017), suggesting that there was a major shift in preferred sources. This perhaps indicates that greywacke was material that could not produce socially valorised axes associated with Neolithic identity, and which were not worthy of exchange (e.g. Walker 2018). Indeed, no complete and undisputed axes of Group XIX occur either in Cornwall or Devon (Table 1). The three that Mitchell (1988, 49) was able to illustrate appear too thin to have been axes and the single example from Devon has, from the published illustration (Evens *et al*. 1962, fig. 6, no. 542), a profile more generally found in ethnographic axes.

The distribution map shows a marked drop off in Group XIX artefacts found beyond Cornwall (Figure 2), and nationally the number of artefacts is small. Just 28 artefacts are recorded as Group XIX in the most recent published list (Clough & Cummins 1988, 141–264). None of the 91 items thin sectioned by SWIPG since 1988 are Group XIX, according to the last updated list held in SWIPG records, and the current Implement Petrology Group database only includes one additional entry (Mik Markham, pers. comm.). Recent detailed study of large lithic assemblages, as from the Stonehenge landscape (Ixer & Bevins 2018; Rob Ixer pers. comm.), for example, has not identified a single Group XIX artefact; this is despite Cornish axes of Groups I–IV and the rarer Group XVI being identified. The latter is, like Group XIX, a comparatively minor source, located in the Polstrong Valley, not far inland from Group XIX (Jones *et al*. 2018). The current data therefore indicates little use of Group XIX rock continuing on from the Mesolithic period. However, it is notable that the Group XIX artefacts from outside Cornwall and Devon includes shaft-hole adzes and axe hammers (Table 1) which should not date before the third millennium cal BC (Roe 1979). There was, therefore probably a very long gap between the initial use of Group XIX in the Late Mesolithic, and a secondary phase during the later Neolithic/Early Bronze Age periods, when the possibility exists that greywacke may again have been used to make perforated stone tools but on a small scale with no examples so far found in Cornwall.

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