CPAT Report No 960

A Potential Axe Factory near Hyssington, Powys

SURVEY AND EXCAVATION 2007-08

THE CLWYD-POWYS ARCHAEOLOGICAL TRUST

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Report for Cadw

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CONTENTS

1 INTRODUCTION

1.1 Group XII Bronze Age battle axes and axe hammers are made from a distinct rock type known as picrite, which has a very limited distribution, with one of the few known outcrops being just to the north-west of the village of Hyssington in eastern Montgomeryshire, now part of Powys (SO 305950; Fig. 1).

1.2 The Hyssington area was first suggested as a potential source for the axes in a study by Shotton, Chitty and Seaby published in the *Proceedings of the Prehistoric Society* in 1951. Although they referred to the hill as Cwm Mawr, a name which has now become synonymous with the site, the majority of the picrite outcrop forms part of Brookhouse Farm and the hill itself is unnamed. They identified a number of likely rock sources around the hill, including a small quarry, and concluded that the site 'clearly calls for excavation'. Since the 1950s, products from the axe factory have been found over a wide area, while a number of other local features such as picrite outcrops, boulders and small quarries have been recorded in the vicinity.

1.3 A programme of topographical survey, geophysical survey and trial excavation was undertaken during 2007 in an attempt to confirm the source of picrite axes and, although a number of small-scale quarries were identified and investigated, no artefactual or other dating evidence was recovered (Jones 2008).

1.4 A second season was undertaken in September-October 2008 as a joint project between CPAT with funding from Cadw, and Amgueddfa Cymru – National Museum Wales, in an attempt to define the extent of potential prehistoric workings and assess their significance, as well as a consideration of their future management.

Plate 1 The small hill near Hyssington thought to be the source of the picrite axes, showing the area of known stone extraction. Photo CPAT 07-c-036

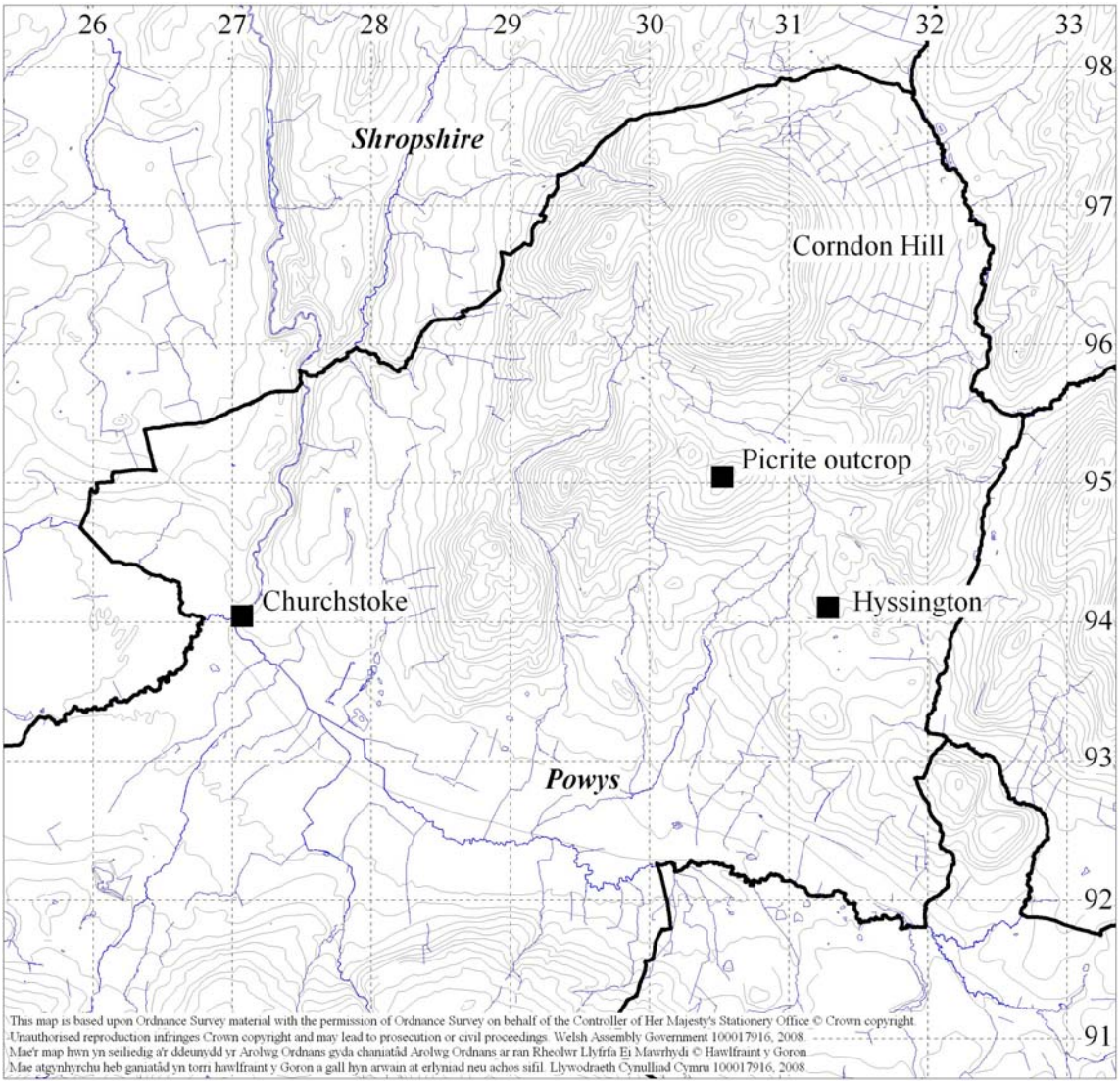

Fig. 1 Location of the Picrite outcrop

2 PETROLOGY, IMPLEMENT TYPES AND DISTRIBUTION

2.1 Macroscopically picrite is a dark, coarse-grained, rough and heavy igneous rock. Microscopically it is a very distinctive ultrabase rock consisting of fresh olivine, augite plates and subordinate amounts of feldspar with a little brown mica (Stone & Wallis 1951, 127). Thin sections of samples collected from Hyssington and taken from a number of picrite axes were compared by Shotton and found to be extremely similar. The picrite is mainly confined to a small hill immediately to the south of Corndon Hill, and although there are other minor sources within the area these are intensely weathered, unlike the material used for axe manufacture (Shotton *et al.* 1951, 159-160).

2.2 Shotton defined the dominant minerals within picrite as: olivine, in sub-rounded grains up to 1mm in diameter, fresh except for narrow bands of pale yellowish serpentine on the outside and along cracks; plagioclase feldspar, occasionally thermically altered, but usually fresh; and pale, almost colourless augite. The proportion of olivine is always high and may be as much as 80%, although in the thin sections of implements it was between 32% and 50%. Although there are other sources of picrite, apart from the one near Hyssington, the products of Group XII have a distinctive feature which closely matches the picrite from that particular outcrop: ‘wherever

olivine was in contact with feldspar (and is now separated by a narrow line of serpentine), there have developed reaction rims of bright apple-green chlorite . . . the patches of bright green coloration in ordinary light is a feature which is most arresting' (Shotton *et al.* 1951, 163).

Plate 2 Group XII axe hammer and battle axe currently on display in the Powysland Museum in Welshpool. Photo CPAT 2485.050

2.3 The products of Group XII are confined to battle axes and axe hammers (Plate 2) which are thought to have been produced from around 2200 to 1500 BC. To date 80 picrite axes have been recorded, of which 44 are axe hammers and 36 battle axes, the distributions of which are depicted in Fig. 2. One Neolithic axe made of picrite has been tentatively identified by Horák (pers comm.), but further analysis is required before this attribution can be confirmed.

2.4 The earliest known battle axes in Britain are associated with Beakers and their form appears to have developed over time, the earlier examples having a convex profile with the greatest depth towards the butt end; early Group XII battle axes in particular are likely to be large and crudely shaped. As the form developed the battle axes became more concave, ultimately achieving a long, slender profile with comparatively widely expanded ends. Group XII picrite was particularly used for the more evolved forms, as illustrated by the example in Plate 2. Group XII battle axes appear to have been much used and widely distributed, but a particular concentration occurs in the West Midlands (Roe 1979, 23-26).

2.5 Axe hammers are altogether larger and more crudely shaped than battle axes and can be divided into two main groups, Class I which are basically convex in profile, and Class II which are concave, although it is possible to define sub-groups depending on the position of greatest

depth. The majority of known Group XII axes may be defined as Class II. Although the chronology of axe hammers is assumed to be similar to battle axes, there is a general lack of associated dateable material. As with battle axes, Group XII axe hammers have a fairly wide distribution, although again there is a concentration in the West Midlands and also in Wales (Roe 1979, 26-30).

2.6 The present-day appearance of the picrite axes is rather different from how they would have looked when they were first fashioned. The weathering of the olivine produces a rather dull, orange-brown surface, whereas the freshly hewn picrite is a vibrant blue-green (see Plate 3).

Plate 3 Comparison between the freshly hewn picrite and the weathered axe-hammer from Powysland Museum, Welshpool. Photo CPAT 2648-157

2.7 Group XII axes were roughly shaped by percussion rather than flaking, possibly using quartzite hammer stones. The surfaces of some examples were then ground using sand and water as the abrasive materials, resulting in a smooth, occasionally slightly polished surface.

2.8 The Group XII products may have a wide distribution, extending as far as the south-western tip of Cornwall, but the majority of implements are found much closer to the source (Fig. 2). Of the 80 implements so far identified, 27 (34%) were found within 50km of Hyssington, while 50 (63%) came from within 100km and 61 (76%) within 150km. Within Wales Group XII products account for 20 (6.6%) of the 305 petrologically identified stone axes (Houlder 1988, 134), while in the West Midlands they account for 42 (17.8%) of the 237 which have been identified, 23 of which come from Shropshire (Shotton 1988, 50).

2.9 This factory-centred distribution pattern is typical of most petrological groups of stone implements and might be expected if dispersal took place from the axe factory itself, whether by gift exchange, or through itinerant axe pedlars (Cummins 1979, 7).

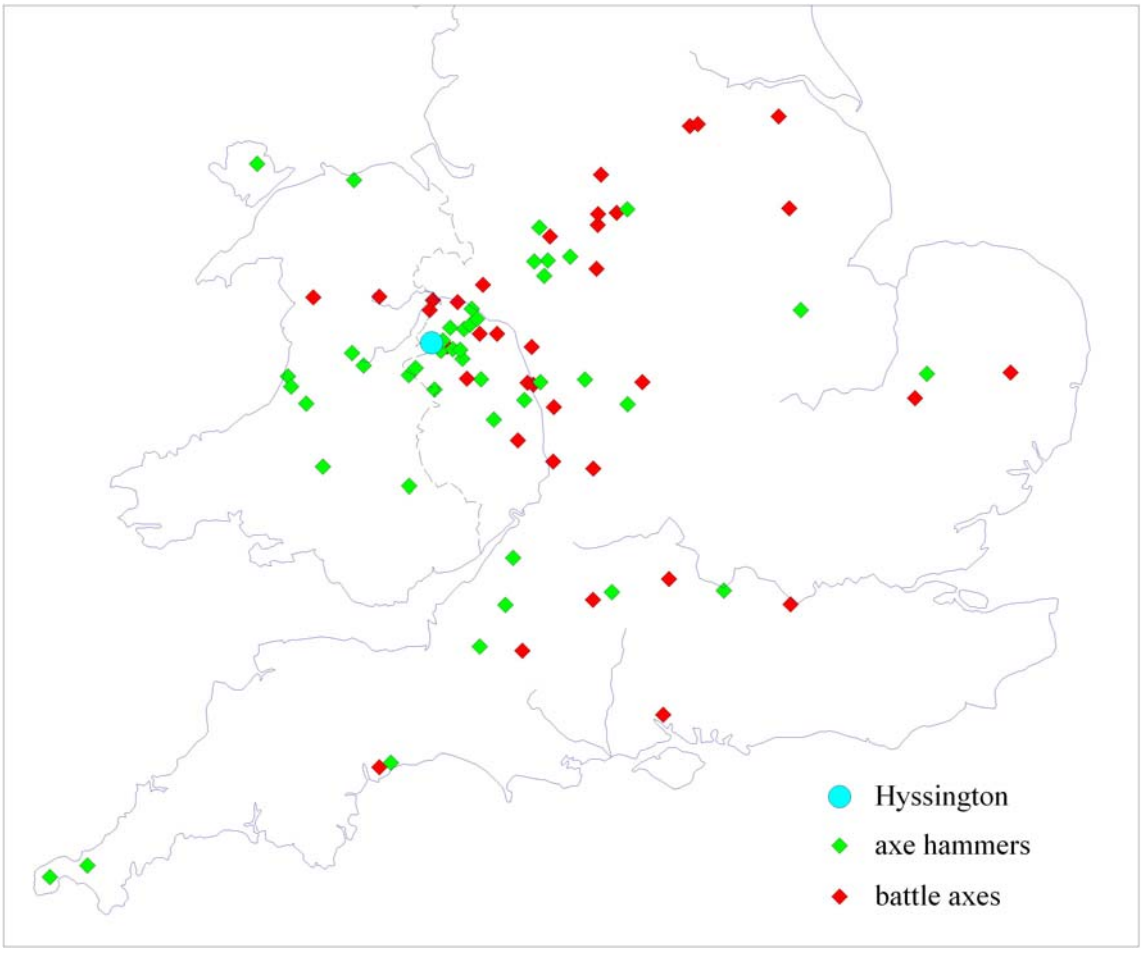

Fig. 2 Distribution of Group XII axe hammers and battle axes (after Roe 1979, with additional information from the regional HER)

2.10 Samples of in-situ picrite were taken from within the excavation trenches, as well as from outcrops on the north-western side of the hill, near Cubbulch and adjacent to Cwm Mawr. Each of the samples has been sub-divided, with sets being deposited with Dr Jana Horák, Amgueddfa Cymru – National Museum Wales, and Dr Rob Ixer, Birmingham University, to await further study.

3 FIELD SURVEY

3.1 A programme of systematic field survey was undertaken in 2007, covering the area of the picrite outcrop (*c.* 30ha), to identify and record those sites already thought to be potentially associated with the axe factory, as well as prospecting for further potential sites. This confirmed several small quarries and outcrops within the area where picrite had been identified by the Geological Survey (Fig. 3).

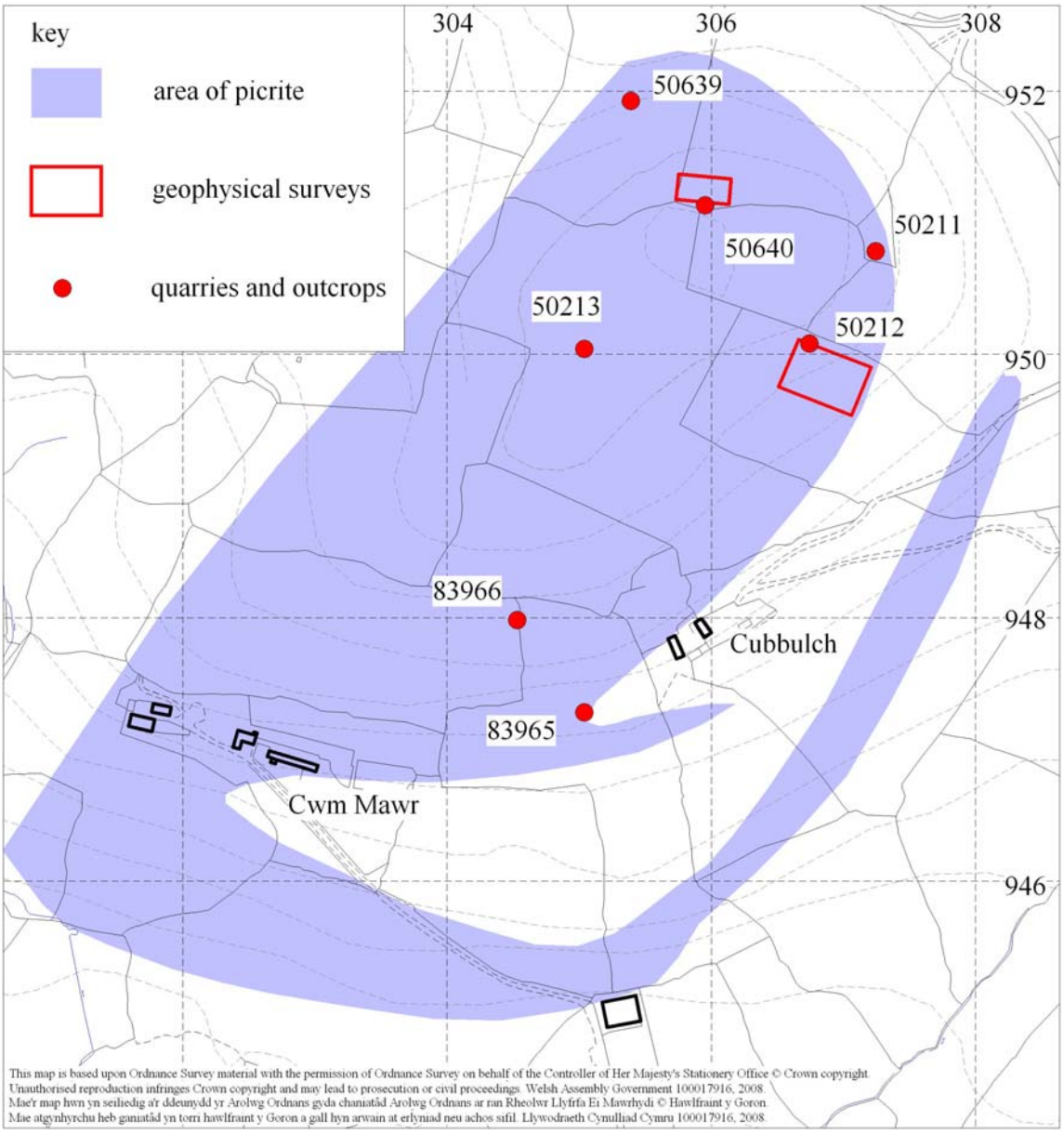

Fig. 3 Outcrops and potential quarry sites within the area of picrite, as defined by the British Geological Survey (1991)

3.2 Shotton *et al.* had already identified two potential sites on the hill, Site 1, a small outcrop on the east side (PRN 50211), and Site 2, a small quarry to the south-east (PRN 50212). The former is located in a small plantation, but shows no obvious sign of having been worked. The small quarry appeared to be a much more promising location, measuring 11m by 8m overall and at least 1.2m deep, the base littered with picrite boulders and field clearance material. The slopes

to either side of the quarry contain a series of small terraces backed by outcropping picrite which give the impression of small-scale extraction. A further outcrop (PRN 50639) was noted on the north-west side of the hill, although with no clear evidence of working, and a second quarry (PRN 50640) was identified on the northern side of the hill, sited in the corner of a field, possibly suggesting a more recent origin. On the south side of the hill the field survey recorded a third quarry (PRN 83966) and a levelled platform (PRN 83965), although both may be associated with the now deserted farmstead at Cubbulch. In addition, the HER also records a picrite boulder on the surface of a field (PRN 50213), although there is now no trace of it at the given location, possibly suggesting that it has been cleared.

3.3 As well as the small quarries and outcrops the field survey also noted that field clearance had been responsible for the deposition of surface rocks and small boulders along field boundaries, and also notably for the construction of a now tumbled field wall separating the two ownerships on the hill. Although some of the clearance stone consisted of picrite, the majority was composed of other igneous rocks, together with sedimentary rocks, typical of the area to the north-west, suggesting that they were likely to have been the result of glacial deposition. The nature of the field clearance is significant as it suggests that there may have been very little picrite which was readily accessible, other than from a quarried source.

4 GEOPHYSICAL AND TOPOGRAPHICAL SURVEYS

4.1 A limited programme of magnetometer survey was undertaken in 2007 adjacent to two small quarries, one on the north side of the hill (PRN 50640), and the other on the south-east side (PRN 50212). It had been hoped that the surveys might provide some indication of occupation and activity, possibly identifying hearths or areas where the rock had been quarried using a technique known as 'fire-setting', in which an outcrop is heated and then rapidly cooled with water, causing cracking. However, neither of the surveys produced any evidence which could help to target trial trenching, the results largely reflecting the underlying geology and the accumulation of recent debris within the two quarries.

4.2 A programme of detailed topographical survey was undertaken at the same time to record the earthworks and setting of those features on the south-east side of the hill that might be related to the axe factory (Fig. 4).

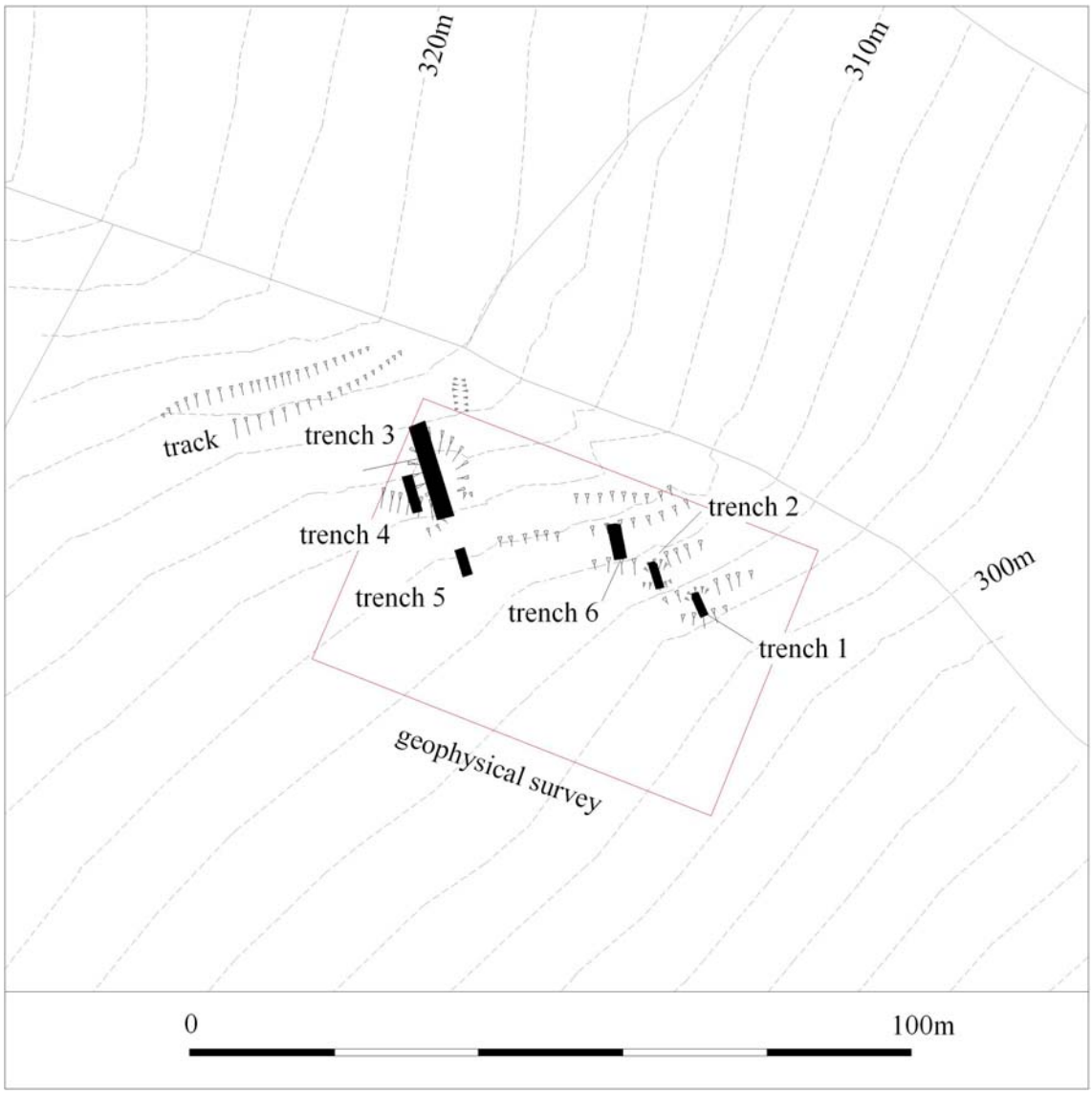

Fig. 4 Topographical survey showing the areas of potential quarrying and the trench locations

5 EXCAVATION

5.1 A programme of small-scale, hand-excavated trial trenching was carried out in September 2007 to investigate three sites on the south-eastern side of the hill, including the small quarry which had been highlighted in the 1950s as a potential stone source (Trench 3). The remaining trenches (Trenches 1-2) investigated two potential quarry scoops further to the south-east, in both cases confirming that blocks of picrite had been removed, but providing no evidence for dating.

5.2 The second season of excavation focused on the obvious quarry, reopening and expanding Trench 3. The quarry measures 11m by 8m overall and has a number of picrite boulders visible in the base, possibly resulting from later field clearance. The new trench extended across the full length of the quarry, measuring 13.5 by 2.5m and taking in almost half of the visible earthwork.

Plate 4 Exposed picrite along the south-eastern face of the quarry in Trench 3.
Photo CPAT 2638.092

5.3 The quarry, which was sited on sloping ground, had removed a depth of up to 2m of bedrock, the base having been exposed by the excavation against the upper and lower faces. The central section was not excavated fully due to the presence of a large boulder. An examination of the exposed quarry face clearly demonstrated that individual blocks of picrite had been removed, presumably using levers and wedges, without having to resort to breaking the rock (see Plate 4). The base of the quarry was infilled with a deposit of yellow-brown clay silt (19), up to 0.4m thick, within which was a large boulder. A possible iron knife blade was recovered from the layer.

5.4 At the south-eastern end of the quarry this deposit was sealed beneath a significant quantity of loose, freshly-broken picrite (18), from which a number of iron objects were recovered. It is perhaps most likely that this material resulted from roughly dressing stone before it was removed from the quarry, although its stratigraphical relationship suggests that this must have

been associated with a later phase of activity, rather than the primary working of the quarry. It was also notable that two of the large boulders lying within the quarry showed signs of significant fracturing around the edges, possibly indicating attempts to reduce their size (see Plate 5).

Plate 5. The base and south-eastern face of the quarry. Note the large, partly fractured, boulder and the layer of fractured picrite (18) visible in the section. Photo CPAT 2648.094

5.5 In the central section of the quarry the fractured picrite layer was sealed by a greyish-yellow, fine clay silt (17), which had accumulated around two iron shovels (Plate 6), and against a dump of large boulders (15).

Plate 6 One of the iron shovels recovered from within the quarry. Photo CPAT 2648.019

5.6 The upper fill of the quarry consisted mainly of a clay loam (13), up to 0.25m thick, which produced fragments of clay pipe and post-medieval pottery, with two further thin deposits (21

and 22) at the north-western end, and a thin deposit of topsoil (11), which had developed around a dump of picrite boulders (16), that had the appearance of later field clearance. One block of picrite which protruded through the topsoil near the northern end of the trench had numerous linear markings, which were later identified as potentially prehistoric carvings (see section 6 and plate 11).

Plate 7 North-western end of the quarry in Trench 3 showing the intrusive dyke (below the scale) and a band of decayed picrite. Photo CPAT 2648.112

5.7 The excavations gave the opportunity to examine a large expanse of picrite bedrock, which was examined by Dr Rob Ixer, from Birmingham University. The north-western end of the quarry revealed a particularly interesting geological feature which may explain why quarrying stopped at this point. The near-vertical face of the quarry followed the line of an intrusive dyke running north-east to south-west, where molten rock had been forced along a fault in the bedrock (Plate 7), resulting in the weathering and decomposition of the picrite on either side. This process would have been partly the result of the ingress of water along the dyke, with the picrite weathering to form grits and eventually clays. Unlike the opposing quarry face, which was solid picrite, the edge of the quarry at this point was largely composed of clay and decayed rock.

Plate. 8 Final view of the excavated quarry in Trench 3. Photo CPAT 2648.126

5.8 Another trench (Trench 4) was excavated immediately to the south-west of Trench 3 to investigate a levelled area which it was thought might have resulted from the deposition of spoil excavated from the quarry. The results, however, gave no indication for the deposition of spoil and instead revealed that the picrite bedrock was again relatively close to the surface, with a large, split boulder possibly being responsible for the build-up of soil creating the level area. This boulder had a number of linear marks similar to those identified on a stone towards the top of Trench 3 (see Plate 12). The trench also included a continuation of the intrusive dyke noted in Trench 3.

5.9 The line of the south-west-facing section of Trench 3 was extended to the south-east to include a prominent break of slope, which was the subject of further excavation (Trench 5). The trench was excavated to a depth of around 1m, revealing the picrite bedrock, the extent of which coincided with the break of slope visible on the surface (Plate 9). It was evident that blocks of picrite had been removed from the bedrock, which was sealed beneath a layer of firm, yellow silty clay (25). Again no datable material was recovered. To the south-east the bedrock was overlain by a deposit of stiff yellow-grey clay (27), which was not excavated fully.

Plate 9 South-west-facing section of Trench 5. Photo CPAT 2648.150

5.10 A prominent layer containing numerous small fragments of relatively freshly broken picrite (24) sealed layer 26 and also infilled a possible gully, the position of which suggests that it may be associated with a former field boundary following the break of slope. The nature of the picrite within this deposit was very similar to that observed in the backfill (18) of the quarry in Trench 3, possibly suggesting that this material was derived from post-medieval quarrying.

Plate 10 Exposed picrite bedrock in Trench 6. Photo CPAT 2648.136

5.11 A final trench (Trench 6) was excavated to investigate another small quarry scoop in the same area as Trenches 1 and 2 in 2007. As before, this revealed that the bedrock was close to the surface and it was evident that blocks of picrite had been removed, although again there was no evidence to date this activity.

6 CARVED STONES

6.1 The excavations revealed several stones bearing numerous carved lines. In three cases the stones in question were picrite, including a large block from Trench 3, a split boulder in Trench 4 and a loose block in Trench 6. A fourth example was found on a smaller piece of sandstone (290 by 160 by 75mm) which was recovered from Trench 5. Unfortunately, none of the examples were well stratified.

6.2 The designs, chiefly cross-hatched, resemble those found at Neolithic sites such as Ness of Brodgar, Quoyness and Skara Brae on Orkney and at Millin Bay, Co Down in Ireland (Shepherd 2004, Figs 12.5 – 12.10; O'Connor, pers comm. 2008). Although the designs on the stones at Hyssington cannot be directly dated, detailed study of those on the sandstone example show that they were made by pecking rather than incising, suggesting a prehistoric rather than a later date. Parallels have been sought from later periods, but without success.

Plate 11. Incised lines on a block of picrite towards the north-west end of Trench 3. Photo Amgueddfa Cymru – National Museum Wales.

Plate 12 Incised lines on picrite boulder in Trench 4. Photo Amgueddfa Cymru – National Museum Wales.

7 FINDS

7.1 The excavations produced a small collection of artefacts which have been deposited with Amgueddfa Cymru – National Museum Wales.

7.2 Apart from a flint flake from the topsoil overlying the quarry all of the finds are likely to be 18th- or 19th-century in date and were recovered from the layers of infill within the quarry. The most notable finds were two iron shovels from context 17, with other iron artefacts including a possible knife blade, a nail, and several small rusted lumps. A fragment of clay pipe bowl was also recovered, together with a sherd of mottled ware, both from context 13.

8 CONCLUSIONS

8.1 The work undertaken by Shotton *et al.* in the 1950s appears to leave little doubt that the small hill near Hyssington is the most likely source of the picrite used to produce the Group XII battle axes and axe hammers. The recent investigations have confirmed a number of potentially prehistoric extraction sites on the hill, consisting of small-scale workings on the south-east side of the hill, an area which was also favoured by Shotton and his colleagues as worthy of further study.

8.2 Although the investigations have yet to confirm the site of prehistoric stone extraction, the results from the trial excavations have clearly demonstrated that picrite was being quarried across an area of around 65 by 20m. Although the field evidence suggests that working was restricted to small-scale extraction sites, possibly suggesting a rather piece-meal approach, there is no doubt that a significant quantity of picrite could have been removed. It is not possible, however, to determine the level of the original land surface, although it may be presumed that outcrops of picrite were perhaps rather more visible than at present. Unfortunately, the excavations failed to recover any artefactual evidence or other dateable material to indicate the likely date of these workings.

8.3 Despite the lack of any direct evidence, the area of the excavations on the south-eastern side of the hill, still represents the most likely source of stone for the picrite axes. The lack of artefactual evidence in part is due to the nature of the picrite, which is likely to have been extracted using no more than wooden wedges and worked using a percussive technique which would not result in the working flakes typical of other axe factories. In addition, it is quite conceivable that the stone may have been worked at a separate location which would only come to light through the chance discovery of rough-outs and wasters.

8.4 The unexpected discovery of a number of stone carvings in close proximity to the areas of extraction has given new significance to site. The decoration, which consists of numerous parallel and crossing lines, is similar to examples found in Neolithic contexts in Scotland and Ireland. Although none of the discoveries were from well-stratified contexts, and cannot therefore be confidently associated with quarrying activities, their presence does appear to confirm significant prehistoric activity on the south-east side of the hill, even if their meaning is lost to us.

8.5 No further fieldwork is envisaged as part of the present project and is must therefore be hoped that future discoveries will eventually confirm the site of prehistoric workings.

9 ACKNOWLEDGEMENTS

9.1 The writers would like to thank the following people for their assistance during the project: Wendy Owen, Ian Grant, Richard Hankinson and Rob Blackburn, CPAT; Ken Brassil and Jana Horák, Amgueddfa Cymru – National Museum Wales; Eva Bredsdorff, Powysland Museum, Welshpool; Rob Ixer, Birmingham University; Dylan Adams; and the respective landowners, Mr Price, Mr Corfield, and Mr Holden.

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Cartographic sources

1991 The Shelve Ordovician Inlier, and adjacent areas, scale 1:25,000. British Geological Survey

APPENDIX 1

PROJECT ARCHIVE

Site archive
8 A4 site plans
1 A1 site plan
Digital images - CPAT films 2380 (41 images) and 2485 (55 images) 2648 (167 images)
27 context record forms
photographic catalogue
context register

Topographical surveys – cwmmawr2.pmw and cwm08.pmw (Penmap survey software)

Geophysical survey

Contexts Register

Context	Type	Comment
1	Layer	Topsoil in trench 1
2	Layer	Brown humic layer beneath 1
3	Layer	Spread of loose stone below 1 and 2 in trench 1
4	Layer	Picrite bedrock in trench 1
5	Layer	Clay-silt with decayed and broken picrite below 2
6	Layer	Gritty silt with decayed picrite in base of trench 1
7	Layer	Topsoil in trench 2
8	Layer	Humic layer below 7
9	Layer	Spread of stone in trench 2
10	Layer	Bedrock in trench 2
11	Layer	Topsoil in trench 3
12	Layer	Layer of small stone below topsoil in trench 3
13	Layer	Yellow-brown clay loam below 11 and 12
14	Layer	Deposit of mixed clay infilling quarry in trench 3
15	Layer	Dump of voided stone infilling quarry in trench 3
16	Layer	Late stone dump within quarry in trench 3
17	Layer	Grey silt among stones 15 in trench 3
18	Layer	Dump of shattered picrite infilling quarry in trench 3
19	Layer	Basal fill of quarry in trench 3
20	Bedrock	Picrite bedrock underlying all trenches
21	Layer	Soil layer below topsoil at N end of quarry in trench 3
22	Layer	Clay layer below 21
23	Layer	Weathered picrite – gritty orange clay
24	Layer	Deposit with numerous small picrite fragments in trench 5
25	Layer	Iron-panned clay deposit below 24
26	Layer	Silty loam below topsoil at S end of trench 5
27	Layer	Stiff grey-yellow clay below 25 in trench 5

Drawings Register

No	Plan size	Scale	Comment
1	A4	1:20	Trench 1 initial plan
2	A4	1:20	Trench 2 plan and section
3	A4	1:20	Trench 3 plan
4	A4	1:20	Trench 1 plan and section
5	A4	1:20	Trench 3 section
6	A4	1:20	Trench 5 plan and section
7	A4	1:20	Trench 6 section
8	A4	1:20	Trench 3 cross-section
9	A1	1:20	Trenches 3 and 4, plan and sections

Finds catalogue

Context	Material	Number	Comment
11	Flint	1	Flint flake
13	Clay pipe	1	Bowl fragment
13	Pottery	1	Post medieval mottled ware
17	Iron	2	Shovels
17	Iron	1	Nail
18	Iron	4	Objects
19	Iron	1	Possible knife blade