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ARO20: Activities in the woods: platforms and a lithic scatter, Loch Doilean, Sunart, Lochaber

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ARO20: Activities in the woods: platforms and a lithic scatter, Loch Doilean, Sunart, Lochaber

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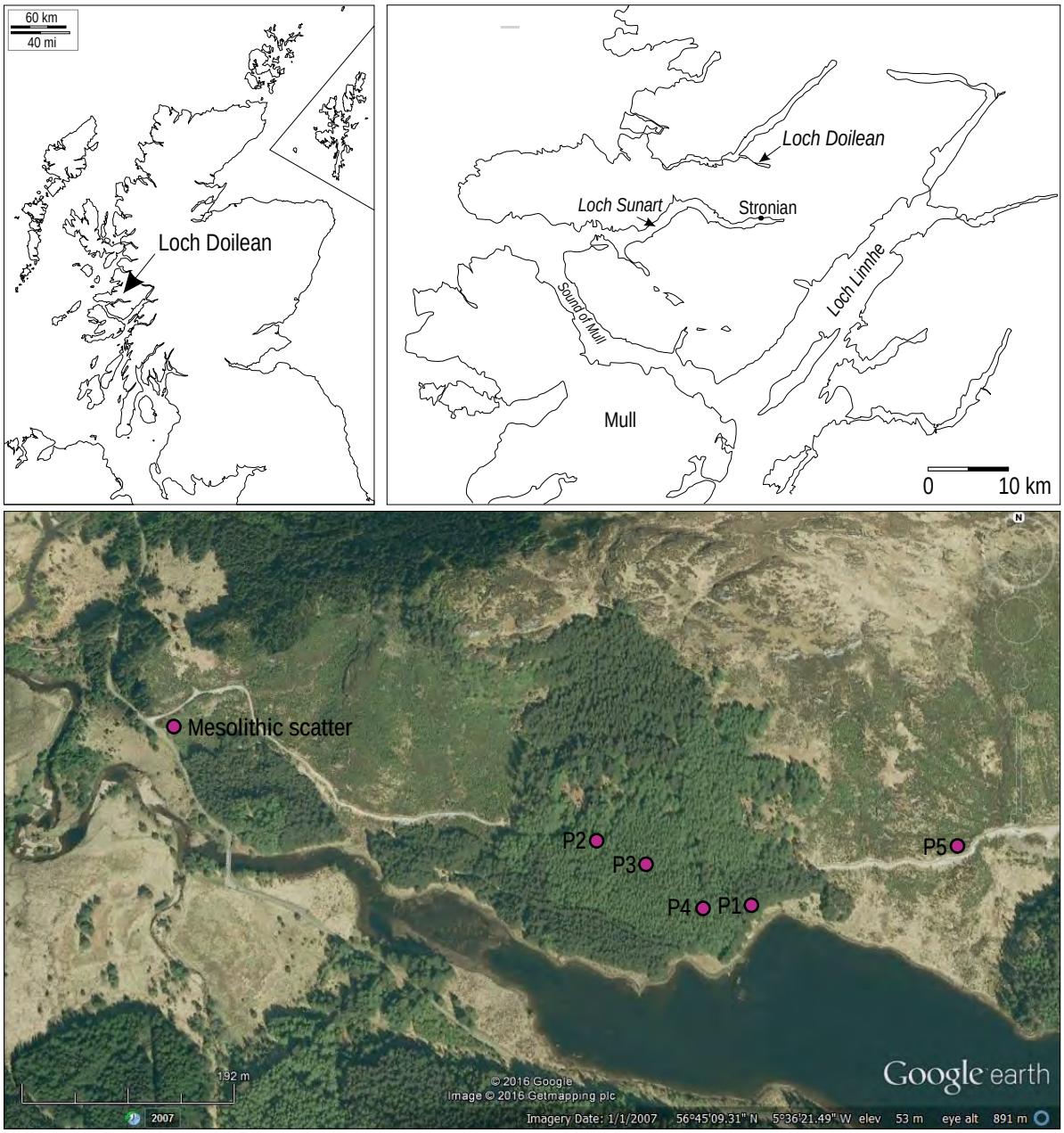


Figure 1: Location map, Loch Doilean, Sunart, Lochaber: the Mesolithic scatter and the platform sites (P1-5).

Summary

A lithic scatter at the western end of Loch Doilean, Sunart, Lochaber, Argyll has been confirmed through evaluation to be late Mesolithic and is one of an increasing corpus of late Mesolithic sites recorded on the west coast of Scotland. Five possible artificial platforms located nearby were also evaluated. Two were shown to have been utilised between the eleventh and twelfth centuries AD, one with a central hearth and the other as a stance for a post-built roundhouse. Two others were built in the late eighteen or early nineteenth century AD specifically for the purpose of producing charcoal. The last platform was in fact a natural terrace and upon which burning had taken place in the late Iron Age.

Introduction and location

An archaeological evaluation of a possible Mesolithic flint scatter and five platforms took place in January 2014, on behalf of Forestry Commission Scotland, and in accordance with CIfA standards and guidance (Ellis 2014). The work was undertaken to ascertain the nature and date of the sites, as all are threatened by disturbance or destruction if a proposed new forest haul road is built.

The sites are located at the west end of Loch Doilean (sometimes referred to by its older name of Loch Doilet) which is some 6.5 km due north of the village of Strontian on the shores of Loch Sunart (Figure 1). The sites lie within Scotland's National Forest Estate and are located within previously felled or mature commercial plantation. The hard rock geology comprises psammite of the Glenfinnan Group and Loch Eil Group and the superficial deposits comprise hummock glacial sands and gravels (NERC 2016). The soil over all the sites was peaty in nature.

Archaeological background

Sometime in the 1970s Argyll Council had used a south-facing terrace located at the far west end of Loch Doilean as a source of gravel for a lay-by which was located on the opposite side of the road (Figure 1). Following the quarrying of the terrace, Mr Kirby (1992) of Forestry Commission Scotland collected 68 lithic artefacts from the eroding section. As a consequence of the presence of a significant number of lithic artefacts the eroding section was recorded in 1993 by University of Glasgow (Pollard 1993a and b). A quantity of flint was also recovered during this operation, though there were no diagnostic tools, leading Pollard to conclude that the site was probably Mesolithic. A sequence of deposits comprising a grey ash layer with charcoal and lithic artefacts and various possible negative features such as stakeholes and one resembling a trough were recorded. The features appeared to have been dug into sand and gravels. The area of archaeological sensitivity was defined as the top of the terrace which originally would have measured 17.5 by 13 m. Subsequently, a forest road was constructed on the west side of the terrace and a large drainage ditch cut across the west end and around the northern edge of it.

In addition, five possible recessed platforms located on the steep south-facing slope of Glen Heurich above Loch Doilean were recorded by Mr Kirby in the 1990s and subsequently all five were recorded more recently by Forestry Commission Scotland as being located along the line of a proposed new and extended forest road (Figure 1).

Loch Dilaid is shown on the Roy Military map (1747-55), where its northern side was shown to be fringed with deciduous woodland in the mid-eighteenth century. The settlement of Dilaid was located on an elevated terrace above the south side of the loch and a relatively extensive settlement at Polloch is shown to the north-west of the loch on either side of a tributary of the River Polloch.

Method of excavation

Raised terrace

Three hand dug trial trenches were excavated across the raised terrace. Natural regeneration of trees had occurred since the felling of a sitka spruce plantation some years ago. The subsequent regeneration formed a dense cover of scrub across the entire surface of the terrace, with bracken, heather and brambles. The vegetation severely restricted the possible positioning of the trial trenches although the principle of covering the entire width of the terrace was adhered to (Figure 2). Trench 1 was located on the southern side of the terrace and measured 1.2 by 2.3 by 2 m. Trench 2 was roughly oriented NE/SW and was

located across the remaining width of the terrace from the edge created by gravel extraction across to the edge of the forestry ditch; it measured 1.5 by 6 m. Trench 3 was located from the edge of the gravel extraction to the top of the slope of the northern edge of the terrace as defined by the forestry road; it was roughly oriented N/S and measured 1.5 by 8 m. Trench 4 was an extant cutting located next to a half buried sitka spruce (and perhaps was one of the sondages excavated by University of Glasgow). For completeness the east-facing section of this trial excavation was cleaned and recorded (Figure 3d).

In Trenches 1, 2 and 3 up to 0.50 m of overburden capped the original topsoil. This material was derived from deposits removed during the extraction of sand and gravel for the construction of the lay-by, including archaeological deposits. Re-deposited lithic artefacts were recovered throughout the overburden.

In Trench 1 the full depth of the archaeological deposits were excavated and was subject to on-site wet sieving through 1 mm and 6 mm sieves. Half of the width of Trench 2 was excavated down through overburden and the underlying buried topsoil, to a mixed grey to black sandy silt which was not excavated. At the northern end of Trench 3 large stones and other rubbish had been dumped on top of the overburden and given its depth a decision was made to restrict hand excavation to the southern half of the trench adjacent to the quarry edge. A rapid topographic survey of the whole terrace, each platform and the location of the three trenches was undertaken utilising a M3 Trimble total station.

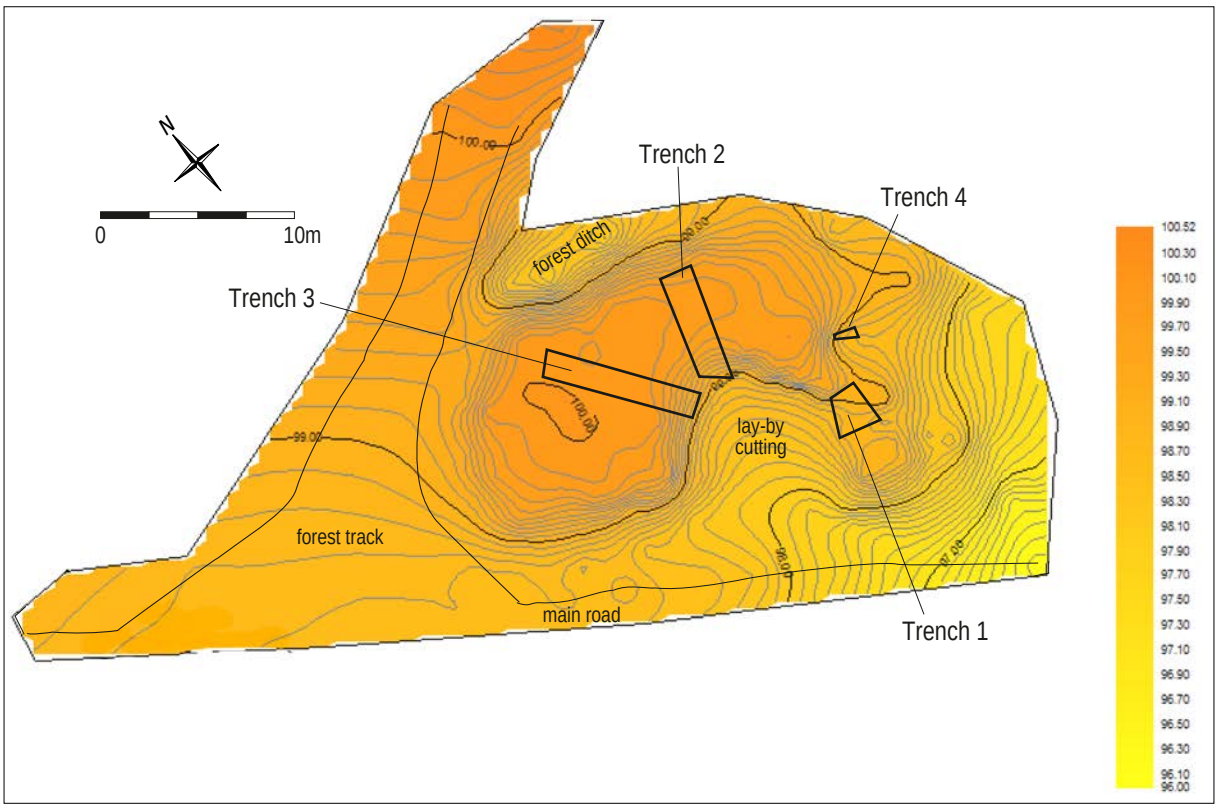


Figure 2: Location of trial trenches 1 to 4 on the Mesolithic terrace.

Platforms

Three trial trenches were hand excavated at each of the five possible platforms. A subsequent phase of fieldwork saw the extension of Trench 1 on Platform 1 and Trench 2 on Platform 4. Sitka spruce had been felled over Platform 1 but a larch plantation grew over Platforms 2, 3, 4, and 5. Vegetation cover, including heather, was particular dense over Platform 5. The original trial trenches measured between 1 by 1 m to 1.6 by 3 m. Excavation was undertaken down to the first significant archaeological deposit or feature, but where appropriate a sondage was dug to determine the presence or absence of underlying stratigraphy and/or methods of construction.

Results

Radiocarbon dates

Twelve radiocarbon dates were obtained: one from the raised terrace and eleven from deposits associated with the platforms (Table 1). Where possible hazel nutshells were dated as these present a single year of growth and are therefore likely to produce a more meaningful date than wood with a longer life-span. However, where they were not present roundwood charcoal was used which also had a relatively short-life span of 12 years or less. There were two exceptions to this sampling strategy. Long-lived carbonised oak was the only fuel used within the hearth (36) on Platform 2 and a large burnt timber on the floor (71) of Platform 4, was also of oak.

The buried soil of the raised terrace has been confirmed as late Mesolithic in date. The spread of dates derived from the various platforms or associated deposits is extraordinary and demonstrates a complex picture of land use and chance survival of deposits from the Mesolithic, through the middle Bronze Age and into the late Iron Age over which medieval house platform stances were constructed, and finally later eighteenth or early nineteenth century charcoal burning platforms were built.

Mesolithic

Trench 1

At the northern corner of Trench 1 and along the west section, which was created by modern gravel extraction, the original topsoil (context 010) had not been capped by overburden, but elsewhere up to 0.35 m of overburden covered it. The original topsoil was up to 0.11 m thick and comprised well humified peat with occasional twigs and branches. More modern roots, including the rotted remains of sitka as well as living roots of birch, hazel and bracken, cut through this layer. Lithic artefacts occurred along the boundary between the original topsoil and the underlying sand (007/013) (Figure 3). The latter was c.0.08 to 0.10 m thick and comprised very compact dark grey, fine sand and silt, whose organic content decreased with depth. The carbonised remains, including rare flecks of charcoal, were dominated by birch, with some hazel (including hazel nutshells), and small quantities of oak and willow (Ramsay, see below). The deposit contained abundant fragments of quartz, flakes of flint (and other lithologies see Ballin below) and a few small cobbles and pebbles. All struck quartz and flint was recovered, as well as other stones that may have been utilised as artefacts. Below 007/013 was a grey, or in places, a black silty-sand (016) with soft, weathered clasts of white and pink sandstone interpreted as its lower portion. It was up to 0.15 m thick in the centre of the terrace but thinned towards and down its edges (Figure 3). Its carbonised organic content was dominated by hazel nutshells followed by birch wood with a slightly smaller proportion of alder (Ramsay, see below). This layer also contained lithic and possible quartz artefacts. Below 016 was a thin, up to 0.02 m, dark brown/black greasy layer of silt loam (015), which was rich in organic matter, extremely compact and contained the occasional lithic and quartz flake. This rested directly upon an undulating gravel surface (003), which was coated in iron pan. It was clear from the sloping section of the original quarry face that below the iron pan and gravel was a thick deposit of orange fluvio-glacial sand. No negative features were present.

Trench 2

Up to 0.50 m of overburden capped the original peat topsoil, which was 0.18 m thick and contained an in situ rotted sitka spruce trunk. Below this, the top of grey-black silty-sand (007/013) was visible although it was very thin at the western end adjacent to the quarry edge, where presumably it had been partially removed during gravel extraction. The archaeological deposits were not excavated due to the depth of overburden and time limitations.

Sample	Material	Context	Description	Depositional context	Uncal	Calibrated 1-sigma	Calibrate 2-sigma	Delta-13C%
Raised terrace								
SUERC-54526	Charcoal	16	Corylus avellana nutshell	Layer	5686±30	4545-4466 cal BC	4596-4456 cal BC	-24.5
Platforms								
SUERC-54528	Charcoal	P2, 36	Quercus	Hearth fill	956±29	1026-1151 cal AD	1022-1155 cal AD	-26.2
SUERC-54529	Charcoal	P3, 44	Corylus avellana nutshell	Layer	1660±29	350-417 cal AD	261-527 cal AD	-25.6
SUERC-56367	Charcoal	P4, 74	Corylus avellana nutshell	Posthole fill	3069±39	1396-1282 cal BC	1420-1226 cal BC	-27
SUERC-56365	Charcoal	P4, 71	Quercus	Whole timber	749±39	1227-1284 cal AD	1209-1378 cal AD	-25.6
SUERC-54530	Charcoal	P4, 51	Corylus avellana	Spread	937±26	1039-1152 cal AD	1030-1157 cal AD	-27.9
Recessed platforms								
SUERC-54805	Charcoal	P1, 32	Corylus avellana nutshell	Spread	6347±36	5373-5299 cal BC	5465-5224 cal BC	-25.5
SUERC-56366	Charcoal	P1, 91	Corylus avellana nutshell	Spread	5442±39	4341-4261 cal BC	4356-4235 cal BC	-20
SUERC-54527	Charcoal	P1, 17	Betula	Spread	158±29	1669-1945 cal AD	1665-1913 cal AD	-26.1
SUERC-55837	Charcoal	P5, 58	Corylus avellana nutshell	Spread	218±29	1648-1942 cal AD	1643-1935 cal AD	-28.3
SUERC-54790	Charcoal	P5, 58	Betula	Spread	113±36	1690-1925 cal AD	1678-1940 cal AD	-26.5
SUERC-55452	Charcoal	P5, 66	Betula	Layer within revetment wall	198±30	1661-1938 cal AD	1647-1925 cal AD	-28

Table 1: Radiocarbon dates

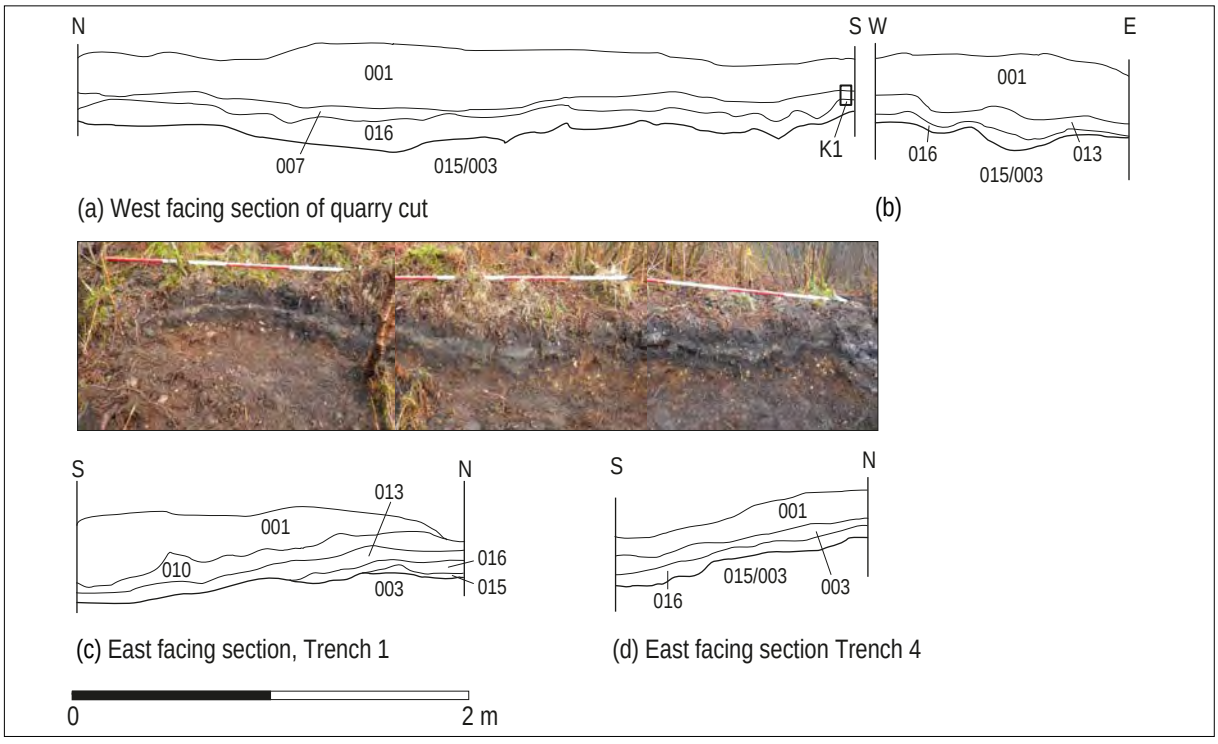


Figure 3: Sections across the Mesolithic terrace: a) and b) the quarry face of the terrace, c) Trench 1 east-facing section and d) Trench 4 east-facing section.

Trench 3

The overburden (001, 005 and 006) at the southern end of Trench 3 was up to 0.46 m depth, which covered the original topsoil (012) that comprised well humified peat up to 0.12 m in depth. This in turn capped a c. 0.14 m depth of mixed grey/black silty-sand (014), equivalent to 007/013/016, which had washed down (illuviated) in between the stones of the gravel terrace (003).

Late Iron Age?

Platform 3

This platform was located roughly 60 m to the east of Platform 2 at roughly the same height (Figure 1). It formed an elongated terrace rather than a clearly definable artificial platform, as in the case of the other four investigated here (Figure 4). Excavation within Trench 1 revealed that the back of the platform was defined by natural boulder scree (043). During excavation it became clear that a black silt (044) layer was sandwiched between the (upper) boulder scree and one below it, demonstrating there were at least two phases of boulder collapse. In addition, there was no apparent cut back-edge to the terrace. The black silt was dominated by dissolved charcoal, comprising birch, oak and a small amount of hazel wood and was up to 0.15 m thick. The mixed nature of the charcoal appears indicative of hearth ash, although it is feasible that this is the remains of a burnt forest litter layer. The dissolved charcoal from the silt had also penetrated between the boulders lying below; the full depth of which was not ascertained as the trench became flooded.

Boulder scree also lay along the northern edge of Trench 2 (Figure 5). A possible posthole, defined by a central area of black silt (040) and possible stone packing (042) was located hard up against a natural glacial erratic. To the south of the possible posthole the surface of the platform comprised grey/white sand with a few stones (041), which resembled the re-deposited crushed psammite that had been used to form Platform 2. It (041) also served to level part of the natural terrace and formed a working/floor surface. However, the surface sloped down towards the back of the platform and therefore may be natural.

In Trench 3, which was located over the outer slope of the terrace, the compact natural C-horizon (048) was covered by a thin, dark-brown peaty soil (047), the B-horizon of a podzol. This in turn was covered by a thin layer of loose grey to brown sand with some stones (046) and which appears to be the equivalent to 041. The sand was capped by well humified peaty topsoil (045).

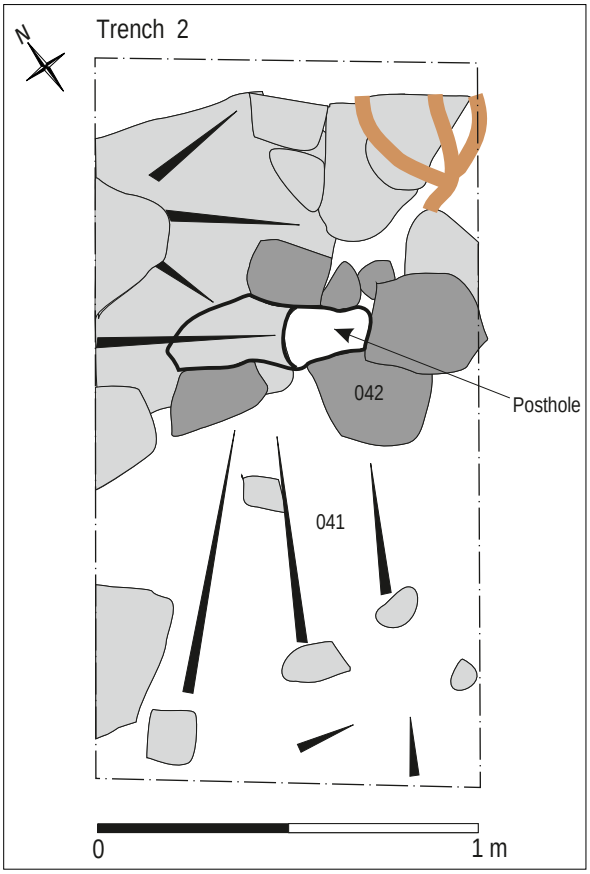


Figure 5: Plan of Trench 2 on Platform 3.

Medieval platforms

Platform 2

This platform measured 7.5 by 7.5 m externally and internally 5.30 m NE/SW by 6.63 m NW/SE (Figures 6, Plate 1). The sloping rear of the platform had been much disturbed by tree roots, and clearance of the surface vegetation revealed a jumble of large boulders and flat slabs. It appears that the back of the platform (Trench 1) had been created by the clearance of some of the natural rubble and not by quarrying, and therefore this is not a technically a recessed platform. A central oval hearth (035) was partially revealed in Trench 2 (Plate 2), with a thin layer of oak charcoal in its base (036). Its upper fill comprised well humified peat (033). As this is the same as the topsoil, it would appear that on abandonment peaty soil

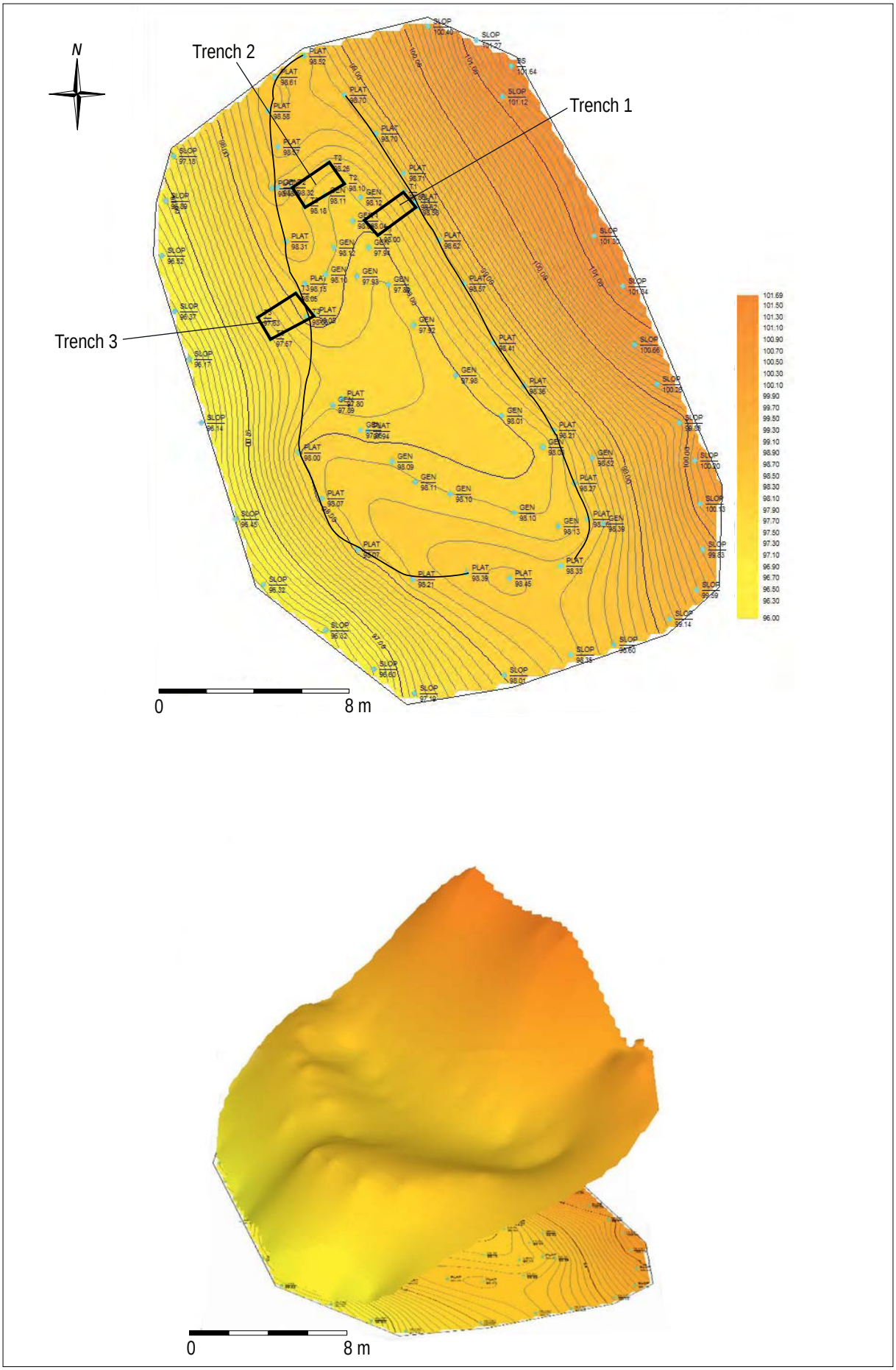


Figure 4: Contour plan (top) of Platform 3, with trench locations superimposed with a 3-dimensional topographic image of the platform (bottom).

developed over the whole site. The hearth was dug into a mixed deposit (034) of small fragments of sandstone and grey sand (psammite) which had been re-deposited in a broad, flat fan-shape to create the artificial platform (Figure 6). In Trench 2 this deposit capped a natural glacial erratic, which would have been utilised to help form a stable foundation for the platform. The same compact re-deposited shattered psammite material was evident in Trench 3, which was located over the outer edge of the platform. The hearth was the only internal feature observed, although it is very possible that postholes around the perimeter may have been masked by 034 in a similar manner to those of Platform 4 (below).

Plate 1: Platform 2 during excavation with Loch Doilean below.

Plate 2: Hearth [035] with oak ash at the base, Platform 2.

Platform 4

Platform 4 measured internally c. 7.6 m N/S by 8.5 m E/W and externally 11.4 m by 13.3 m (Figure 7 and Plate 3). The back of the platform was defined by a natural rock outcrop which does not appear to have been quarried, and so this platform is also not technically recessed. A possible rough floor surface (052/053) comprising stones set within grey sand was revealed in Trench 2 (Figure 8). Over this surface were occasional discreet patches of charcoal (051) which was dominated by oak. Hazel from one of the charcoal patches dates the burning episode to second half of the eleventh or first half of the twelfth century AD (Table 1). Above the floor and also masking the charcoal was a very compact peat that had a distinct green colour and contained the remains of what appeared to be sedge or grass (050). On the eastern side of the trench three of the large stones of the floor (052) had been laid to create a straight edge, later interpreted as the outside edge of post packing (081) (Figure 9). Within the psammite layer (052/053) small patches of peat (050) and charcoal (051) overlay the edges of the posthole.

Plate 3: Platform 4 under excavation, with fallen larch tree and Loch Doilean below.

In the second phase of excavation Trench 2 was re-opened and extended (Figure 9). Below the topsoil/peat was a large, thin spread of oak charcoal (071) which extended across the southern portion of the trench overlying the re-deposited levelling material (053); it is believed that this charcoal is a single piece of carbonised oak (see Ramsay below), and given its thinness possibly a plank. The only indication that there were postholes present was an upright, and solid packing stone of posthole (076), which protruded through the psammite levelling layer. A number of sondages were dug through 053 to reveal six other postholes as well as an underling surface (087) (Figure 9). This uneven surface was rich in what appeared to be dissolved charcoal and directly overlay the bedrock. It is postulated that

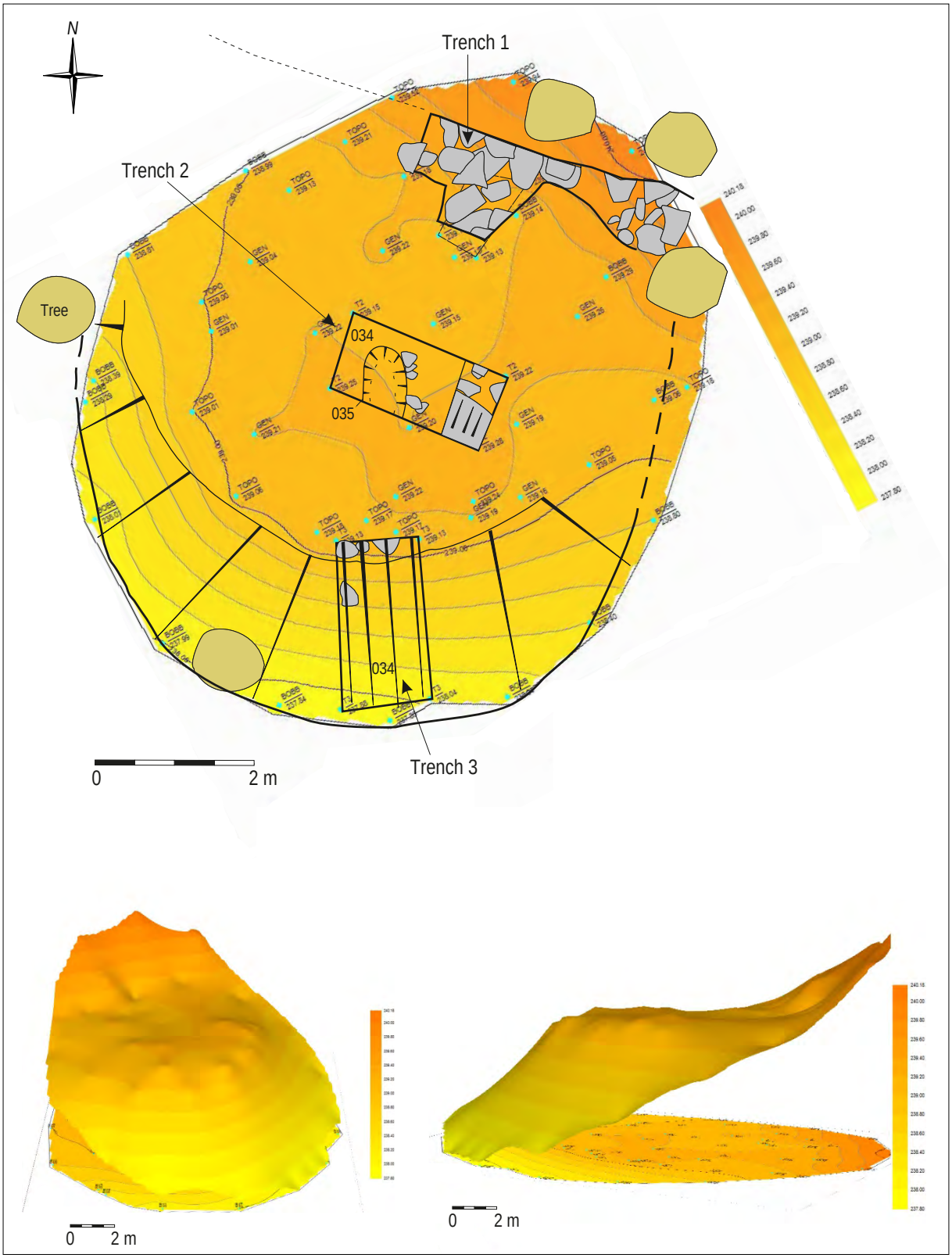


Figure 6: Contour plan (top) of Platform 2, with trench locations superimposed and two 3-dimensional topographic images of the platform (bottom).

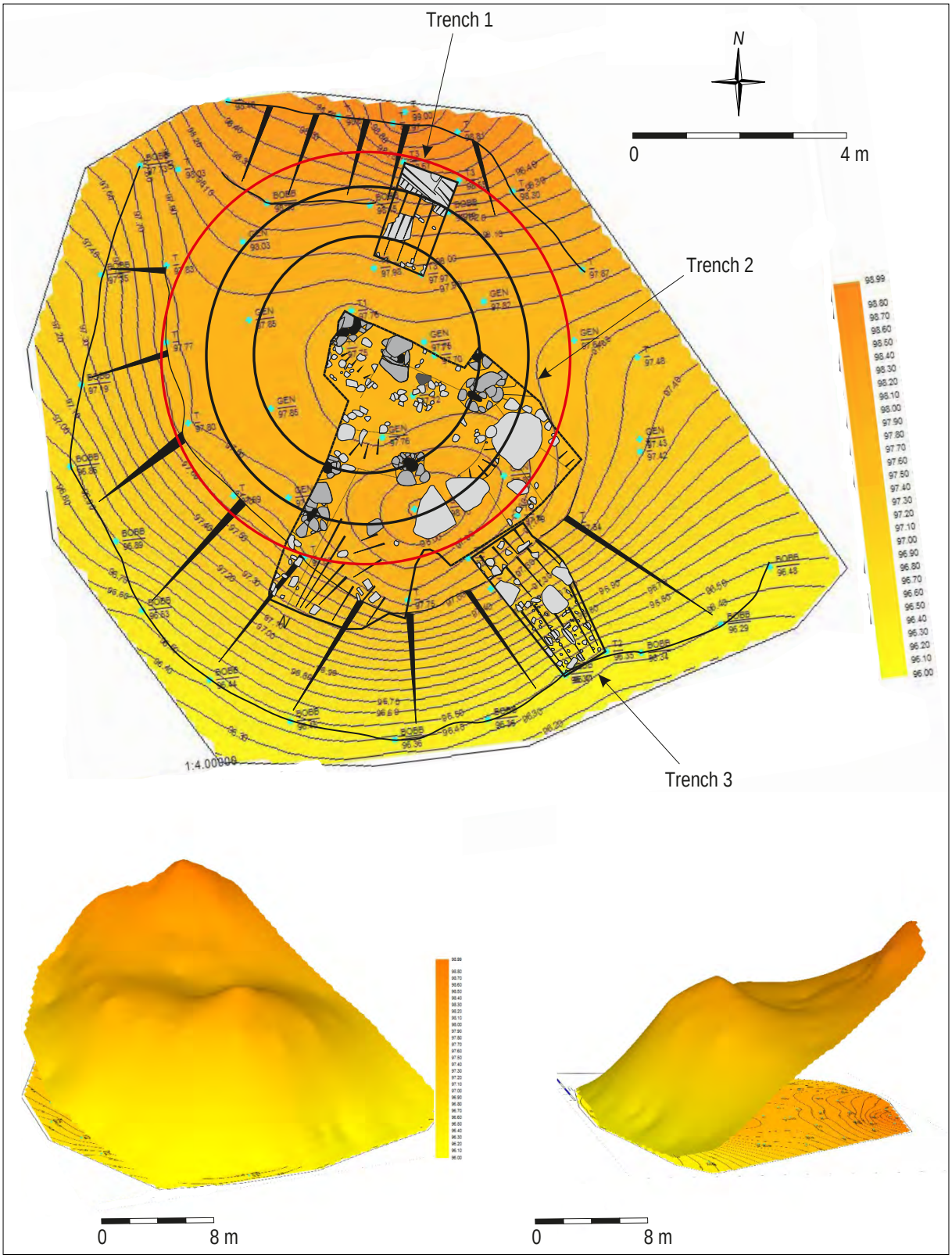


Figure 7: Contour plan (top) of Platform 4, with trench locations superimposed and two 3-dimensional topographic images of the platform (bottom).

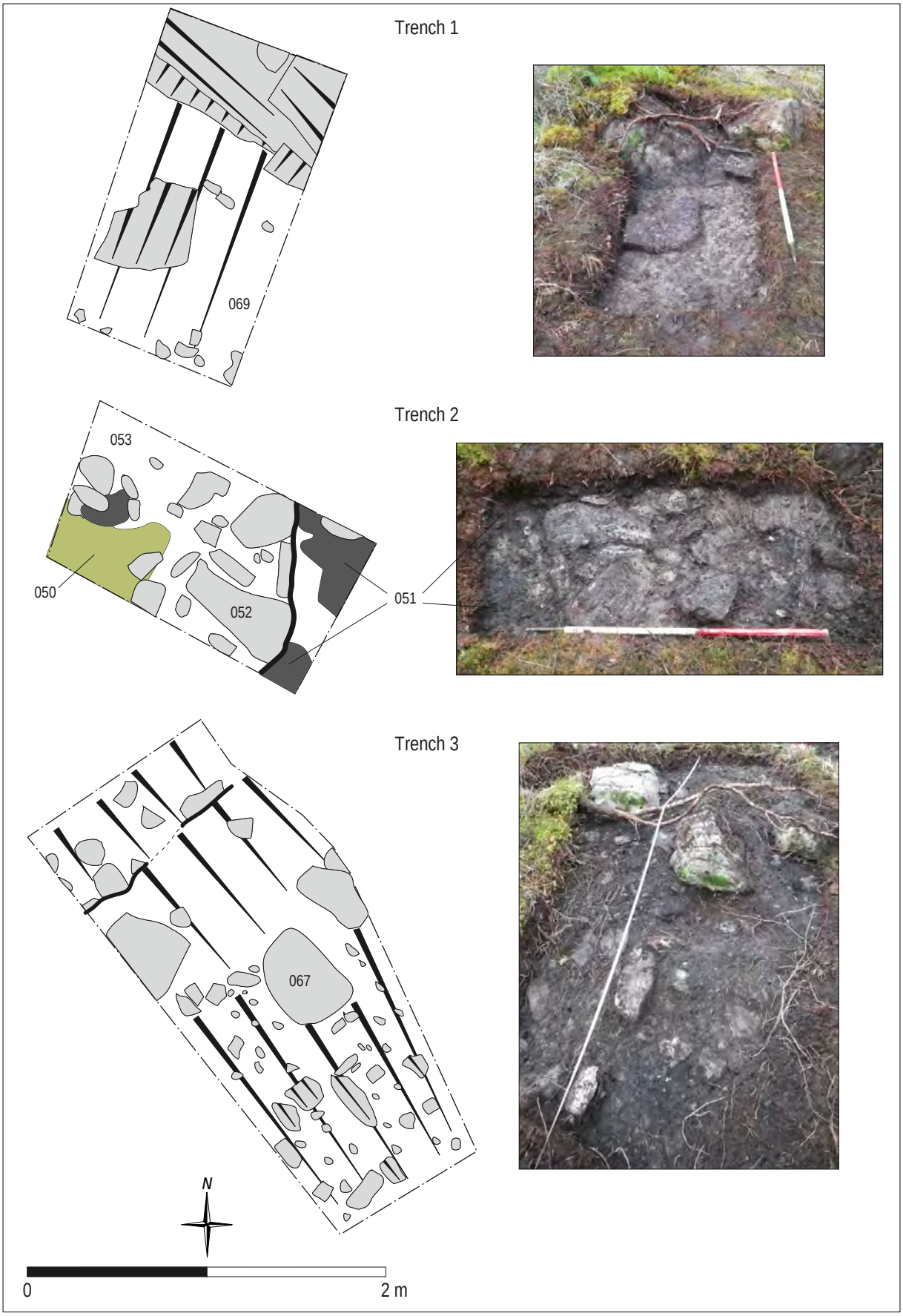


Figure 8: Platform 4, Plan of Trench 1 (top), Trench 2 (middle) and Trench 3 (lower).

Figure 9: Plan of extended Trench 2, Platform 4.

this material may have been the remnants of carbonised vegetation, which had covered the site prior to the construction of the structure and the platform. The postholes all had distinct central post-pipes comprising black silt with small stones and fragments of quartz. The carbonised wood assemblages from the fills of the postholes are dominated by oak, which may indicate that these held oak posts, although the presence other species implies that some of the fills could be secondary in origin. The post-pipes were packed with vertical flat slabs and cobbles.

The outer edge of the platform comprised a relatively thin layer of crushed psammite (067), overlying natural rock, with a number of large boulders that appear to have slipped down from the top edge of the platform. Some of the medium-sized stone had been laid in rough horizontal rows to help stabilised the artificial bank. Three large boulders, two granite and one psammite, appeared to form an inner edge to the platform, and were incorporated into the design of the structure. They may have acted as large post-pads for timber uprights as they are located on the circumference of a postulated circle initially defined by posthole (075) and an adjacent post-pad (Figure 9). This circle may delineate the outer wall or bank of a roundhouse-type structure.

The two radiocarbon dates obtained from the charcoal and oak plank located on top of the psammite levelling layer (053) clearly indicate a phase of activity in the second half of the eleventh or first half of the twelfth century AD (Table 1). During the excavation it appeared that the timber posts were placed directly on the bedrock surface and packing stones were then piled up around them; these were not dug postholes. Crushed psammite and cobbles (053) were then spread over the natural uneven ground surface and around the previously packed timber posts forming a compact and solid level surface, which also held the posts in place. This psammite layer was a few centimetres deep in places, e.g. adjacent to posthole (076) and nearly 0.5 m deep adjacent to posthole (080) where there was a natural gully in the bedrock.

Given the stratigraphic relationships described above it would be logical to conclude that the posthole structure is contemporary with the charred deposits overlying 053. However, the radiocarbon date on a carbonised hazel nutshell derived from one of the posthole fills (074) dates from the middle Bronze Age. Either the hazelnut shell was incorporated into the posthole from the basal deposit (087) during its construction and the posthole structure is medieval, or the posthole structure and the psammite levelling layer date to the middle Bronze Age and the platform was then re-used in the medieval period.

Charcoal-burning platforms

Recessed platform 1

This platform measured approximately 12 m E/W by 12.50 m N/S with an internal flat area roughly 11 m E/W by 8.5m N/S (Figure 10 and Plate 4). Sitka spruce had been planted over the platform and along the top of the outer revetment bank causing considerable physical disturbance (Plate 4). Trench 1 was positioned over the recessed bank at the rear of the platform and measured 2.75 by 1 m. Trench 2 was located roughly in the centre of the platform and measured 2 by 1 m and Trench 3 was positioned over the outer built-up edge of the platform and measured 1 by 3.25 m (Figure 10).

Plate 4: Platform 1 under excavation with Loch Doilean in the background.

On the western side of Trench 1 (Figure 11) the back of the recessed platform appeared to have been cut into the natural grit and weathered rock at a near vertical angle. Over the natural was a thin layer of charcoal (038). On the eastern side of this trench a substantial deposit of oak and hazel charcoal with some carbonised hazel nutshell fragments (091) had been dumped or accumulated within a recess located against the near vertical rock and between and over stones

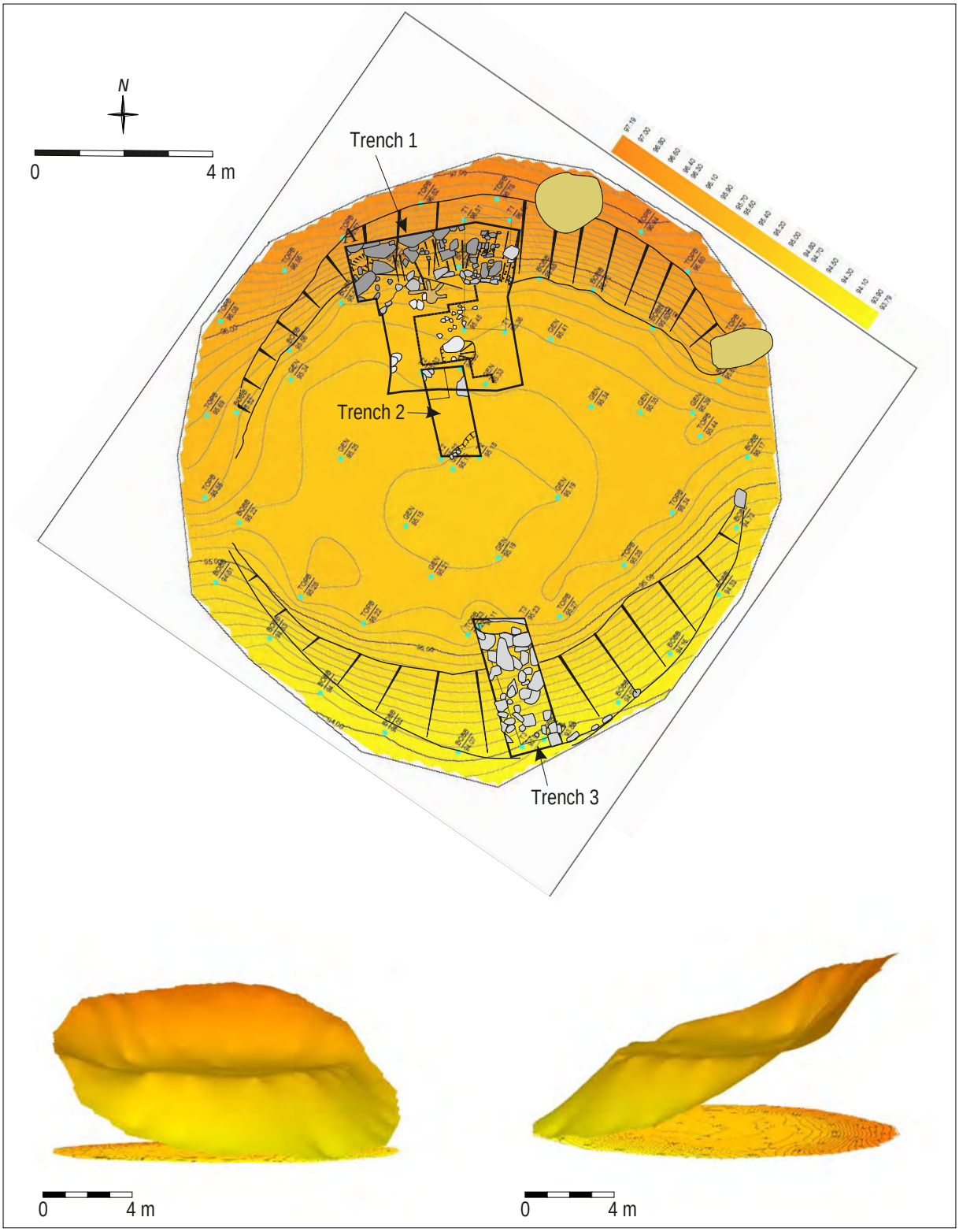


Figure 10: Contour plan (top) of Platform 1, with trench locations superimposed and two 3-dimensional topographic images of the platform.

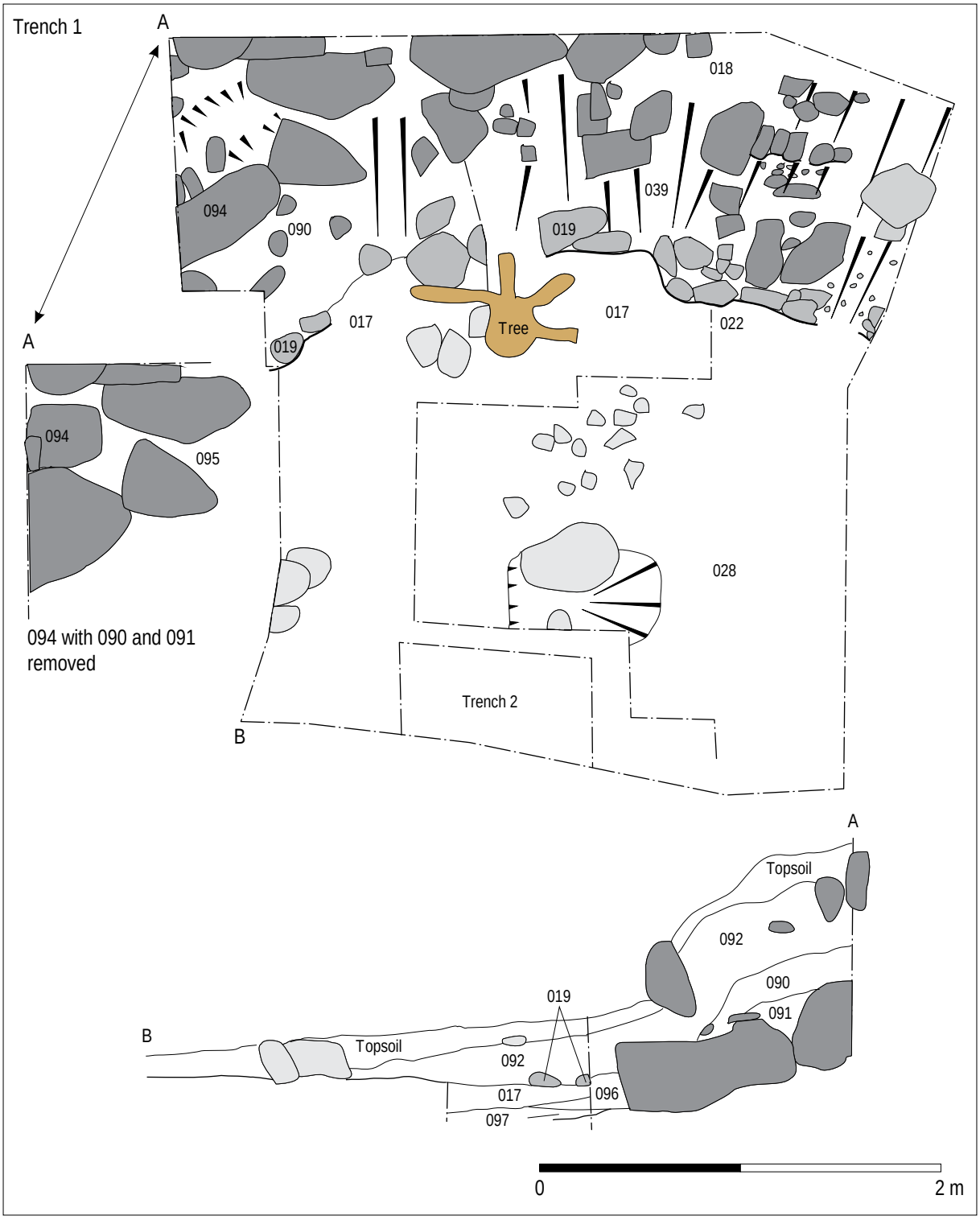


Figure 11: Platform 1, plan of extended Trench 1 (top) and associated section (bottom).

(094). The radiocarbon date on a carbonised hazel nutshell from 091 (Table 1) revealed that this deposit was late Mesolithic, the implication being that this was either a dump of hearth waste or the remnants of in situ burnt forest floor. What the radiocarbon date demonstrates is that the lower stones (094) are not a deliberate constructional element of the platform revetment, as surmised during excavation, but are undisturbed boulders which must have originally been derived from the sheer rock face above. Adjacent to the stones (094) was a thin layer of mixed grit which had some discrete large charcoal inclusions (095). It is not clear whether this charcoal is derived from 017, a layer of birch charcoal, having been incorporated during later disturbance of the rear revetment bank, or whether it occurred within the deposit prior to the construction and use of the platform.

A thick layer of turf (090) accumulated over the charcoal deposit (091) and much of the stone (094). Due to its location within a hollow of the hillside, the turf escaped truncation by the later nineteenth century charcoal platform builders. It is possible that the thin charcoal layer (038) on the eastern side of the trench is also a remnant of an old ground surface that was largely truncated before the construction of the revetment wall (019). A considerable time later a soft, silt colluvium (092), indicative of a dramatic reduction in vegetation cover higher up the slope, accumulated over the turf (090).

Further down slope the depth of natural stone with red silt (037) in Trench 2, in the centre of the platform, was not ascertained (Figure 12). On top of this was a layer of black silt (032) which was rich in birch charcoal, but which diminished southwards. The recovery of carbonised hazel nutshells from within this deposit indicates that it may be the remains of occupation debris; radiocarbon dating places this material within the Mesolithic, but representing activity at this location some thousand years before deposit 091 a few metres away. Cut into this layer (032) was a possible shallow posthole (031) which held crushed rock that may have acted as a post-pad.

The rear and eastern side of the charcoal-burning platform was initially cut back, with the material extracted presumably used in the construction of the platform e.g. probably represented in deposits of gravel (024) and stony red silt silts (028). The latter, was the solid floor utilised for the late eighteenth or early nineteenth century production of charcoal.

The natural deposits were deeper on the western back edge of Trench 1. The colluvium (092) was cut into and a large stone, along with others further to the west, were placed to form a stone revetment to the back of the platform. A central base (029) for the kiln mound was shallowly dug into the red silt floor (028) and filled with charcoal (030). The floor was sealed by a layer of predominantly birch charcoal (017), which has been dated to between the seventeenth to nineteenth centuries, but probably represents late eighteenth or early nineteenth century activity (Table 1).

Trench 3 revealed that the outer revetment bank of the platform had been defined by a 2.30 m wide rubble wall (025) (Figure 13). This appears to have been built adjacent to natural boulders that sat upon yellow silt (026/092) that would have been present on the slope prior to the construction of the platform. Layers of gravel and grit (024) were then thrown behind and over the rubble wall to create the level platform. Sometime after the completion of the platform and its use as a charcoal production site, a small revetment wall (019) was constructed against the rear of the platform (Figure 11). On the eastern side, core material (039) comprising a mixture of gravel and rubble was dumped behind the low stone revetment. Larger stone within the core material was positioned horizontally to provide a level base (Figure 11). The core material was capped with compact silt loam (018), probably re-deposited turf, which provided surface cohesion to the rear bank. On the western side a compact layer of white to yellow silt (096) placed behind the revetment wall. Eroded material derived from the silt extended over the revetment wall and also over the northern edge of the thick layer of charcoal (017), indicating that the rear bank was subject to erosion. This deposit probably accumulated after the abandonment of the platform as no charcoal was present within or over it.

Recessed platform 5

This platform measured internally 7.8 m by 10.5 m and externally c. 11.5 m by 13 m (Figure 14).

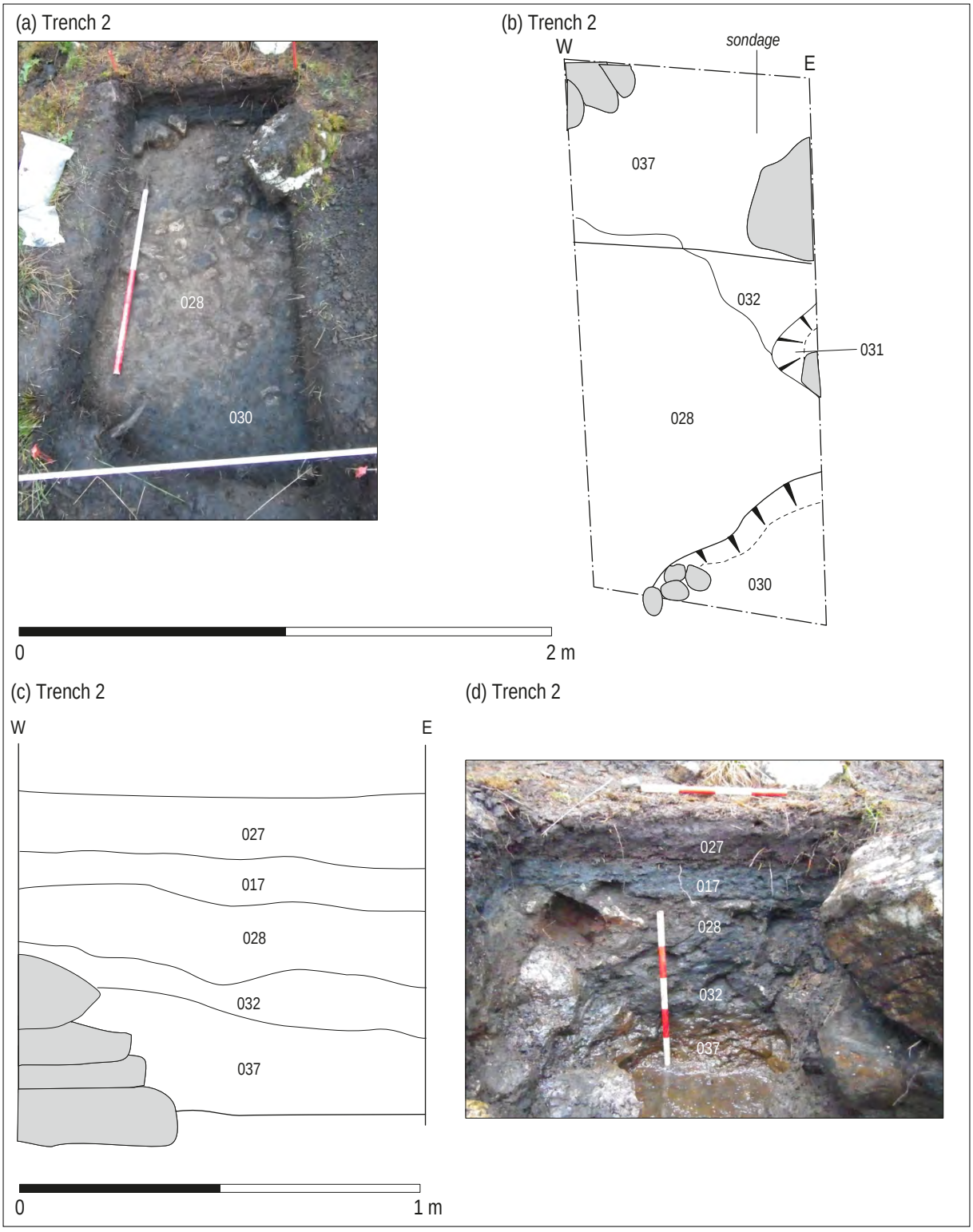


Figure 12: Platform 1, a) and b) plan and c) and d) section of Trench 2.

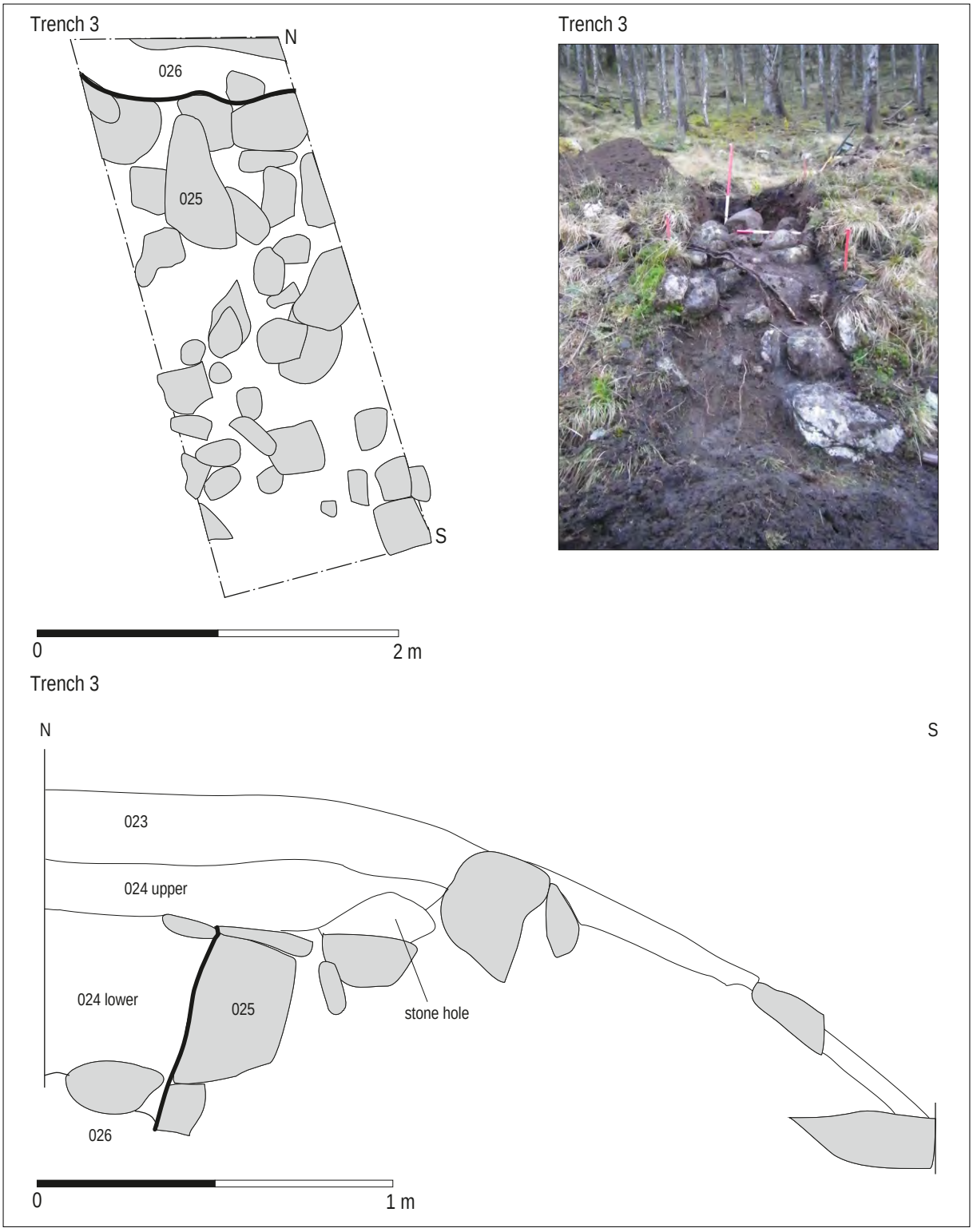


Figure 13: Platform 1, plan and section of Trench 3.

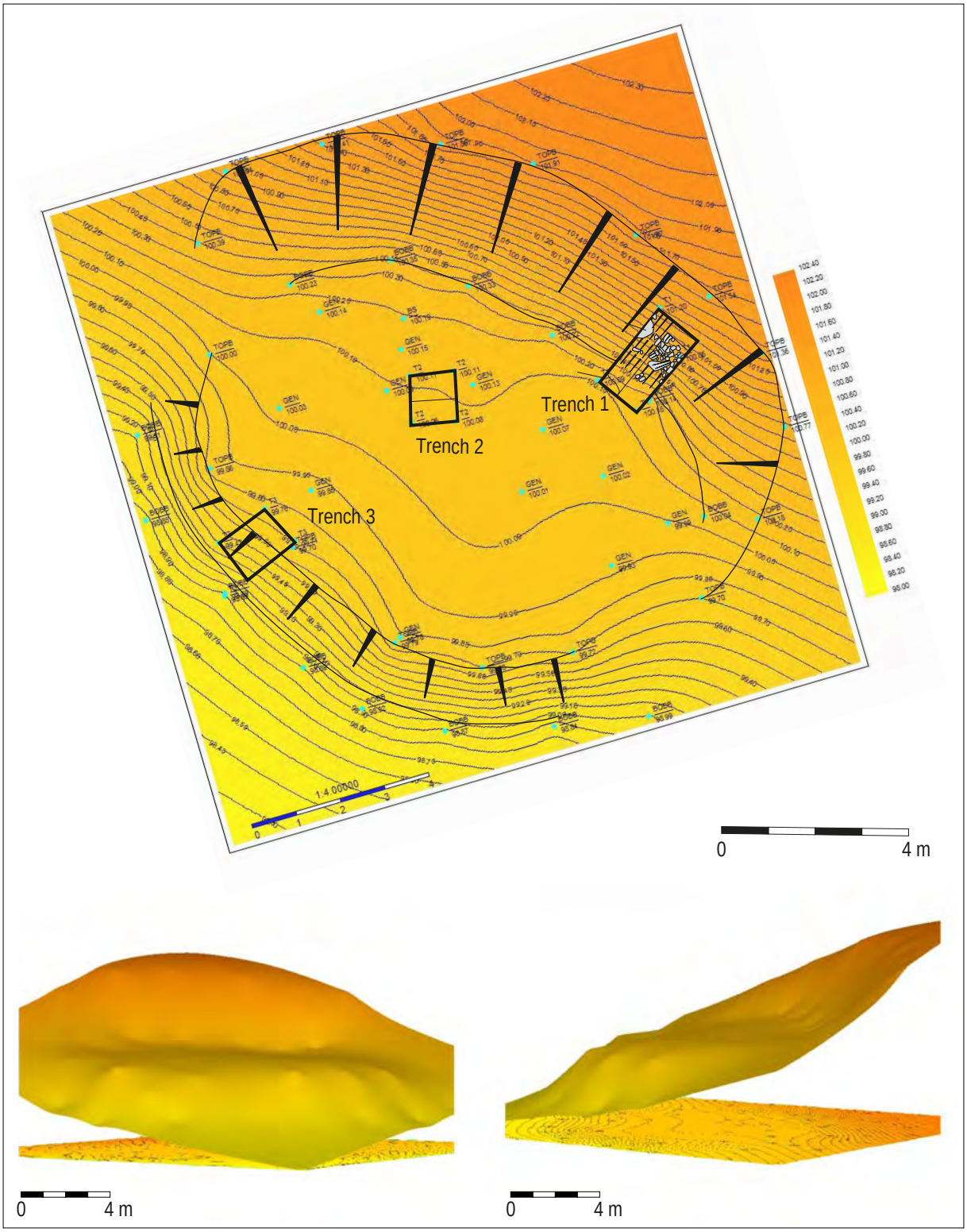
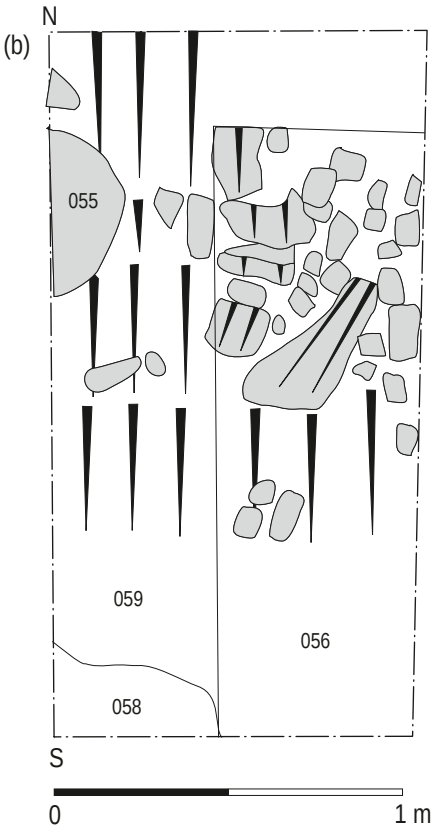


Figure 14: Contour plan (top) of Platform 5, with trench locations superimposed and two 3-dimensional topographic images of the platform.

(a) Platform 5. Trench 1, revetment bank in plan.



(c)

Figure 15: Platform 5, a) and b) plan and c) and d) section of Trench 1.

The rock at the back of the recessed platform had been quarried to a steep slope (059); however, the full height of this was not revealed (Figure 15). A thin organic layer (057) accumulated against the quarry face, which in turn was sealed by a large boulder of a stone revetment (055) and its core material (065). Within the latter was a layer of charcoal (066) which was entirely composed of birch; this has been radiocarbon dated to the latter half of the eighteenth century (Table 1). The core material comprised a lower compact cream sand (065) and an upper layer (056) of grey, loose sand and silt. Within this material was a horizontal line of parallel stones which formed a step to enhance the stability of the bank. Collapsed bank material occurred in front of the stone revetment and sealed a thin layer of charcoal (058). Two radiocarbon dates were obtained from it and demonstrate that this deposit is the remnants of charcoal from the latter part of the eighteenth or early nineteenth century (Table 1).

In Trench 2 the peaty topsoil sealed a very thin layer of charcoal (10 mm thick); this may be the equivalent to 058 recorded in Trench 1. This sealed re-deposited sands and gravels, which were excavated to a depth of 0.20 m.

In Trench 3, a rubble wall (064) had been constructed and this defined the extent of the artificial platform. It was probably lined with a drystone wall (062) as a section of vertical drystone wall survived on the south side of the platform (Plate 5). Gravel and grit (063) were thrown over the top and inner part of the rubble wall to create a level platform. A thin layer of grey sand and grit (061) sealed the platform structure.

Plate 5: Platform 5, reviving revetment wall at the front of the platform.

Specialist reports

The full reports from the specialists can be found in the site archive.

The lithic artefacts

by Torben Bjarke Ballin

Introduction

The 68 lithics recovered from the eroding quarry face during the 1970s by Mr Kirby of Dahl House and deposited with National Museums Scotland and the Hunterian Museum could not be located during the present study. Similarly the flint recovered by the University of Glasgow during their initial recording of the site (Pollard 1993a) could not be located. However, Mr Kirby's collection from Dahl House, Polloch (Kirby 1983), as well as that from Allt Lochan na Ceardaich were examined, as typo-technological elements suggested that these assemblages were of approximately the same age as that of Loch Doilean.

The lithic assemblage from the recent excavation amounts to 1,463 pieces and the purpose of the present report is to characterize the lithic artefacts in detail, with special reference to raw-materials, typological composition and technology. From this characterization, the date of the finds is discussed, as well as their affinities. As all three assemblages were recovered from sites at the shores of the Loch Shiel system, they could potentially have been left by the same hunting band as it moved through its annual territory (cf. Ballin 2013a). The three sites also all include finds of Rhum bloodstone and therefore inform on the exchange network of this raw material in Mesolithic times (Ballin forthcoming c).

The assemblage

The recent excavation recovered 1,463 lithic artefacts (Table 2) comprising 97% debitage, 2% cores and 1% tools.

The definitions of the main lithic categories are as follows:

Chips: All flakes and indeterminate pieces the greatest dimension (GD) of which is ≤ 10 mm.

Flakes: All lithic artefacts with one identifiable

ventral (positive or convex) surface, GD > 10 mm and L < 2W (L = length; W = width).

Indeterminate pieces: Lithic artefacts which cannot be unequivocally identified as either flakes or cores. Generally the problem of identification is due to irregular breaks, frost-shattering or fire-crazing. *Chunks* are larger indeterminate pieces, and in, for example, the case of quartz, the problem of identification usually originates from a piece flaking along natural planes of weakness rather than flaking in the usual conchoidal way.

Blades and microblades: Flakes where L ≥ 2W. In the case of blades W > 8 mm, in the case of microblades W ≤ 8 mm.

Cores: Artefacts with only dorsal (negative or concave) surfaces – if three or more flakes have been detached, the piece is a core, if fewer than three flakes have been detached, the piece is a split or flaked pebble.

Tools: Artefacts with secondary retouch (modification).

Raw materials – types, sources and condition

Although the assemblage is heavily dominated by quartz (863 pieces or 59%), it also includes notable proportions of flint (539 pieces or 36.8%) and compared to other bloodstone-bearing assemblages on the Scottish mainland, a relatively large number of bloodstone artefacts (50 pieces or 3.4%). Eleven pieces, or 0.8%, are based on other raw materials.

Although the quartz includes some fine-grained material, most is white milky quartz. The latter seems to be a form of 'reconstituted' quartz, consisting of compressed grains of quartz of considerable size, frequently measuring several millimetres across. Although these pieces have been packed so tightly together that they generally appear to form a massive entity, it is possible on close inspection to identify the fine fault-lines between the individual grains. These fault-lines, in conjunction with the frequent occurrence of thin sheets of mica, make this type of quartz flake in an irregular manner when struck. However, 20 pieces of quartz are transparent, defining them as rock crystal. Only 7% of the quartz has cortex (Table 3) indicating that most of the quartz may have been procured from vein sources.

	Quartz	Flint	Blood-stone	Other	Total
Debitage					
Chips	282	325	24	1	632
Flakes	467	149	16	9	641
Blades	20	4		-	24
Microblades	14	15	2	-	31
Indeterminate pieces	69	11	4	-	84
Crested pieces	-	5	-	-	5
Platform rejuvenation flakes	-	1	-	-	1
Total debitage	852	510	46	10	1,418
Cores					
Single-platform core	-	1	-	-	1
Handle-core	1	-	-	-	1
Flaked flake	-	1	-	-	1
Irregular core	3		1	1	5
Bipolar core	5	17	2		24
Total cores	9	19	3	1	32
Tools					
Crescent (microlith)	-	2	-	-	2
Meche de foret	-	1	-	-	1
Short end-scraper	-	2	-	-	2
End-/side-scraper	2	-	-	-	2
Truncated pieces	-	2	-	-	2
Pieces w edge-retouch	-	3	1	-	4
Total tools	2	10	1		13
TOTAL	863	539	50	11	1,463

Table 2: Lithic artefacts list.

The flint is generally fine-grained, and a relatively pure material with good flaking properties. Some of the flint is fossil-free, but a considerable number of pieces are highly fossiliferous. The fossils are mostly in the form of tiny angular or elongated specks, but it is also possible to identify larger examples, such as sea-shells and fragments of coral. In contrast to the quartz, approximately 30% of the flint has abraded cortex (Table 3), indicating that this material was procured from a pebble source.

	Quantity				Per cent			
	Quartz	Flint	Bloodstone	Indet.	Quartz	Flint	Bloodstone	Indet.
Primary pieces	13	10	1	-	2.3	5.2	4.3	-
Secondary pieces	28	47	-	-	4.9	24.2	-	-
Tertiary pieces	532	137	22	9	92.8	70.6	95.7	100
TOTAL	573	194	23	9	100	100	100	100

Table 3: Reduction sequence of all lithic artefacts, less chips and one chalcedony piece, by raw material.

The identification of the bloodstone pieces was difficult, as practically all of it has been discoloured, either by weathering or by exposure to fire (nine of the 50 pieces). Fresh bloodstone, which is a form of jasper, is either light or dark green, and most bloodstone is characterized by the presence of small perfectly round globules, which tend to be red or rust-coloured, in some cases accompanied by red filaments (Hall 2000, 93; Ballin forthcoming c). Some of the Loch Doilean bloodstone flakes and cores are clearly green, or have a green tinge, but in most cases discoloured pieces were defined as bloodstone on the basis of 1) the presence of perfectly round globules (irregular inclusions are more likely to be small chalk inclusions), 2) a slightly 'greasy' lustre akin to that characterizing the chalcedony group in general and/or 3) mottled patterning or banding not unlike the patterns characterizing agate. It is quite likely that more of the collection's discoloured pieces are bloodstone, and the 50 pieces included in Table 2 should be considered a 'safe minimum number'. The bloodstone was procured from the Isle of Rhum 60 km north-west of the site (as the crow flies), the only source of knappable bloodstone in the region (Wickham-Jones 1990; Ballin forthcoming c). Although it is possible to collect pebbles of bloodstone from Guirdil Bay on Rhum, the fact that several of the bloodstone artefacts from Loch Doilean have rough, rather than abraded, cortex (e.g. core CAT 143) indicates that pebbles may on occasion have been collected from primary sources on Bloodstone Hill, Rhum.

'Other' raw materials include one irregular core in chalcedony (CAT 142) and ten hard percussion flakes in an indeterminate material. The chalcedony core is bluish-grey chalcedony *sensu stricto*, with the chalcedony family *sensu largo* also including agate, jasper and bloodstone (Pellant 1992, 88). This group of raw materials are mostly found in igneous rocks and it is quite likely that the chalcedony was procured from Rhum in connection with procurement trips to that island or as part of exchange with hunter-gatherer groups there. However, it could probably also have been obtained from other parts of the Scottish Tertiary Volcanic Province (Emeleus and Bell 2005), or it may have been found in connection with 'beach combing' for flint pebbles, shellfish, etc.

Ten lightly discoloured hard percussion flakes (indeterminate raw material) are characterized by mottling and light greyish-brown colours. They appear to be entirely absent of fossils and it is possible that these pieces were also procured from igneous formations. The patterning of these pieces suggests that, although refitting was not possible, they may derive from only one or two reduced nodules.

A total of 63 pieces (4.3%) were defined as burnt (either discoloured or crazed or both), indicating that knapping of lithic raw materials took place in the vicinity of a hearth. Most of these are flint (46 pieces), with seven being quartz, nine in bloodstone and one burnt piece belongs to the group of 'indeterminate raw materials'. As explained in Ballin (2008, 51), it is more difficult to identify burnt quartz than for example burnt flint. This fact is reflected in the 'burnt piece ratio' of the different raw materials, where that of quartz is as low as 1%, with the ratio of the other raw material groups varying between 9% and 15%.

Debitage

In total, 1,418 pieces of debitage were recovered from the site. They include 632 chips, 641 flakes, 24 blades, 31 microblades, 84 indeterminate pieces and six core preparation flakes (five crested pieces and one core). Table 3 shows the distribution of the raw material categories across the main debitage categories. Chips have been excluded from the table, as some of these may relate to quartz artefacts grinding against each other in the find bags and producing 'post excavation chips'. Specialized debitage, such as crested pieces and core tablets, has also been excluded from the table. The bloodstone and indeterminate categories are too numerically small to be statistically representative.

	Quantity				Per cent			
	Quartz	Flint	Bloodstone	Indet.	Quartz	Flint	Bloodstone	Indet.
Flakes	467	149	16	-	81.9	83.2	72.7	-
Blades	20	4	-	9	3.5	2.2	-	100
Microblades	14	15	2		2.5	8.4	9.1	-
Indeterminate pieces	69	11	4	-	12.1	6.2	18.2	-
TOTAL	570	179	22	9	100	100	100	100

Table 4: The distribution of the different raw materials across debitage categories (less chips and core preparation flakes).

	Quantity				Per cent			
	Quartz	Flint	Bloodstone	Indet.	Quartz	Flint	Bloodstone	Indet.
Soft percussion	2	13	1	-	0.8	11.3	10	-
Hard percussion	95	35	4	9	39.3	30.4	40	100
Indeterminate platform technique	4	4	2	-	1.6	3.5	20	-
Platform collapse	13	8	1	-	5.4	7	10	-
Bipolar technique	128	55	2	-	52.9	47.8	20	-
TOTAL	242	115	10	9	100	100	100	100

Table 5: Applied percussion techniques: definable unmodified and modified flakes and blades, by raw material.

Table 4, the quartz and flint assemblages are both dominated by flakes, followed by indeterminate pieces. Both categories only include c. 6-11% blades/microblades (when chips are excluded), and the average dimensions of this category are 21 by 8 by 5 mm. As indicated by Table 5, the quartz blanks were produced by the combined application of hard percussion (c. 40%) and bipolar technique (c. 50%), with little use of soft percussion (c. 1%), whereas the flint blanks were produced by the combined application of soft percussion (c. 10%), hard percussion (c. 30%) and bipolar technique (c. 50%).

There are twice as many indeterminate quartz pieces as flint, which may be a reflection of the different properties of the two raw materials, the quality of the quartz being relatively poor with irregular flaking, whereas the flint is generally fairly homogeneous with good flaking properties (see raw material section). The low number of blades and microblades is likely to reflect the choice of percussion technique: both quartz and flint assemblages were predominantly reduced by the application of bipolar technique (see technology section). Most of the quartz and flint 'blades' are basically elongated bipolar spalls ('metric blades') rather than 'proper' blades ('qualitative blades').

According to Bordes and Gaussen (1970), a blade ratio of 20% is required to classify an assemblage as the product of a blade industry, suggesting that the Loch Doilean finds do not represent such an industry. In the authors' view, the approach of Bordes and Gaussen is too mechanistic and the classification of an industry as a flake or blade industry should not be based entirely on a ratio. Instead, it should be based on whether it could be argued that blades are intentional products of that industry or not (that is, a fuller understanding of the operational schema in question), whatever the collection's blade ratio. The regularity of the soft percussion non-quartz blades (i.e. their parallel lateral sides and dorsal arrises) clearly define these as intentional (i.e. non-random) blades, and thereby the Loch Doilean assemblage as the product of an industry focusing on specialised blade production, despite its exceedingly low blade ratio (Table 5).

The dimensions of the blanks in the four main raw materials differ notably, reflecting the size of the collected nodules or, in the case of quartz, quarried blocks (Figure 16). Almost all flint, bloodstone and indeterminate flakes and blades are shorter than 25 mm, whereas many quartz blanks are as long as 40 mm. The application of different percussion techniques also affected the size and shape of the produced blanks, with soft percussion and bipolar blanks generally being considerably narrower than hard percussion blanks (Figure 17). The six crested pieces (e.g. CAT 139, 263, 745; Plate 6) are evenly distributed across flakes, blades and microblades (average dimensions 21 by 10 by 5 mm). They are generally somewhat irregular. Platform rejuvenation flake CAT 769 (17 by 23 by 6 mm) is an almost complete core tablet struck off a relatively large single-platform core.

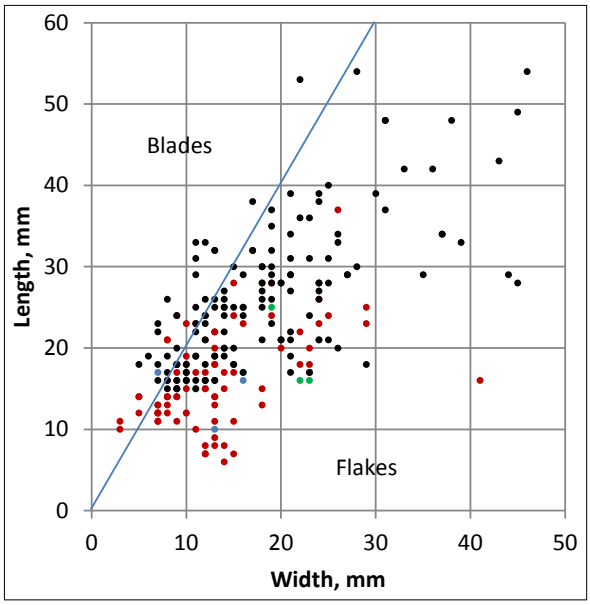


Figure 16: The dimensions of all intact flakes and blades/ microblades in quartz (black), flint (red), bloodstone (blue) and indeterminate raw materials (green). A line has been inserted to separate metric flakes and blades. Quartz flakes smaller than 15 mm were not measured.

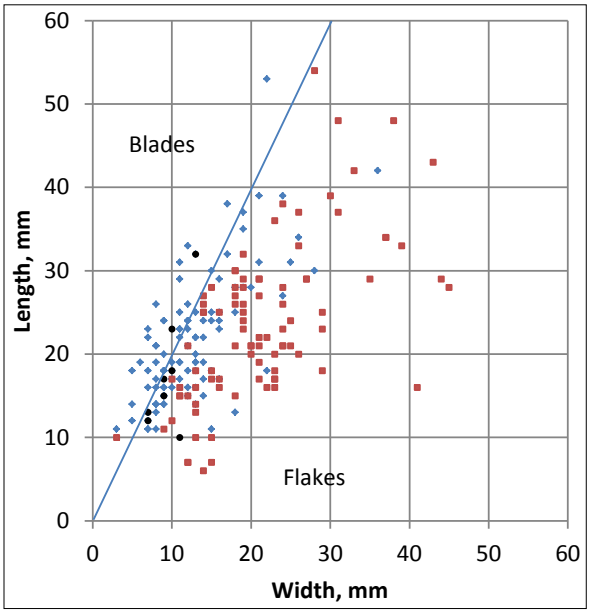


Figure 17: The dimensions of all intact soft percussion (black), hard percussion (red), and bipolar (blue) flakes and blades/microblades. A line has been inserted to separate metric flakes and blades. Quartz flakes smaller than 15 mm were not measured.

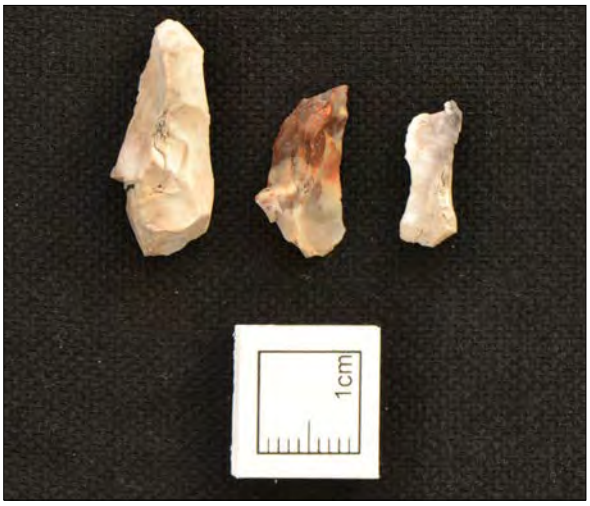


Plate 6: Crested pieces in flint, CAT 139, 263, 745.

Cores

32 cores were recovered including one single-platform core, one handle-core, one flaked flake, five irregular cores, and 24 bipolar cores. Nine cores are in quartz, 19 in flint, three in bloodstone, with one being in an indeterminate raw material.

The dimensions of all intact cores are described by type and raw material (Figure 18a and b). In terms of size, there are two trends. The first is that the bipolar cores tend to be fairly small (generally smaller than c. 30 mm), whereas irregular cores are considerably larger (generally larger than c. 25 mm), and secondly the flint cores tend to be small (mostly smaller than c. 20 mm), whereas quartz cores are evenly distributed within the size range 10-70 mm. The solitary flint *single-platform core* (CAT 37; Plate 7) measures 18 by 14 by 10 mm. It has a cortical 'back-side' and remains of a trimmed platform-edge, but the core's flaking-front and its apex were removed by an overshot flake, which must have shortened the piece considerably. *Handle-cores* are single-platform cores with an elongated striking-platform, where flakes or blades were detached from one end of this platform. One handle-core in quartz (CAT 262; Plate 8) was recovered measuring 69 by 40 by 71 mm. '*Flaked flakes*' are a core type based on the reduction of large flakes by removing smaller flakes from their ventral faces (Ashton et al. 1991). In some lithic industries this form of flake production was developed into a sophisticated operational schema (the Kombewa technique; Inizan et al. 1992, 57), whereas in other lithic industries 'flaked flakes' represent an expedient approach. CAT 35 from the present site is an expedient piece in flint, where three small flakes were detached from the ventral face of a larger and thicker waste flake (29 by 17 by 8 mm).

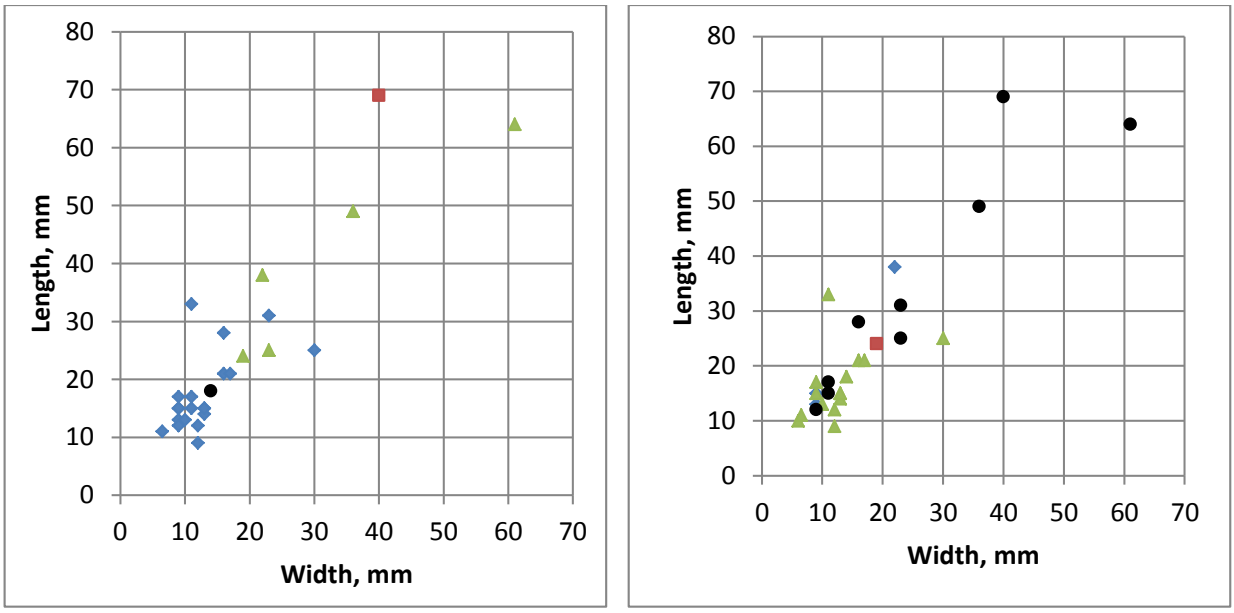


Figure 18: The dimensions of all intact cores by type: a) single-platform cores = black; handle-cores = red; irregular cores = green; and bipolar cores = blue. b) The dimensions of all intact cores by raw material – quartz = black; flint = green; chalcedony = red; and indeterminate = blue.

Plate 7: Single-platform core in flint, CAT 37.

Plate 8: Handled core in quartz, CAT 262.

The five *irregular cores* form a heterogeneous group of cores flaked from three or more directions, including three pieces in quartz (CAT 738, Plate 9; CAT 740 and 1005), one in bloodstone (CAT 143, Plate 10) and one in chalcedony (CAT 142). They differ considerably in size, with the smallest (CAT 142) measuring 24 by 19 by 11 mm and the largest 64 by 61 by 45 mm. The bloodstone core and the smallest quartz core are only slightly larger than the chalcedony core, whereas quartz core CAT 1005 is of intermediate size (GD 49 mm).

Plate 9: Irregular core in quartz, CAT 738.

Plate 10: Irregular core in bloodstone, CAT 143.

The 24 *bipolar cores* are mostly based on flint (17 pieces; e.g. CAT 267, 556, 770, 780; Plate 11), although the category also includes five specimens in quartz (e.g. CAT 553, 1004; Plate 11) and two in bloodstone (CAT 144, 1002; Plate 12). As shown in Figure 18a) and b), most of these pieces are fairly small (GD < 30 mm), but these diagrams also show that the bipolar cores form two sub-groups, one consisting of cores smaller than 20 mm (most), and one of pieces with GD c. 25-30 mm (four pieces). CAT 558 has a flat platform at one end and a crushed bipolar terminal at the other, indicating that this is a platform-core exhausted completely by the application of bipolar technique. All bipolar cores are bifacial, and only three pieces have traces of surviving cortex. Almost half (40%) of these cores, either in flint or bloodstone, have two reduction axes (two sets of opposed terminals), indicating that they were re-orientated during the production process. At Loch Doilean, bipolar cores in quartz only have one reduction axis.

Plate 11: Bipolar cores, in flint (top row), CAT 267, 556, 770 and 780, in quartz (bottom row), CAT 553 and 1004.

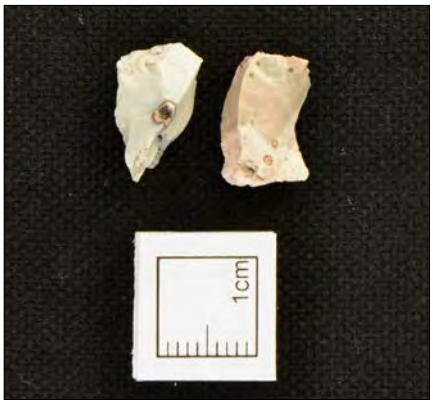


Plate 12: Two bipolar cores in bloodstone, CAT 144 and 1002.

Tools

The assemblage includes 11 tools: two microliths, one *meche de foret*, four scrapers, two truncated pieces, and four pieces with simple edge-retouch. Eight tools are in flint, with two scrapers being in quartz (CAT 551, Plate 13; and CAT 552), and one piece with edge-retouch is in bloodstone (CAT 560, Plate 14). Only two *microliths* (CAT 744 and 1462, Plate 15) were recovered from the site, with microliths being defined in the following manner (following Ballin forthcoming a):

> *Microliths are small lithic artefacts manufactured to form part of composite tools, either as tips or as edges/barbs, and which conform to a restricted number of well-known forms, which have had their (usually) proximal ends removed (Clark 1934, 55). This definition secures the microlith as a diagnostic (Mesolithic) type.*

CAT 744 is a very small flint crescent, the width of which was probably halved by modification of one lateral side (13.1 by 27.0 by 2.4 mm). The regularly convex retouch covers one entire lateral side, and the outermost tip of one end has broken off. The piece was retouched *sur enclume*, and it has been exposed to fire. CAT 1462 is an even smaller crescent in flint, measuring only 6.7 by 2.0 by 1.3 mm. One lateral side is regularly convex, whereas the other is straight. The convex edge is fully blunted, whereas the straight edge has a short piece of sharp unretouched edge at one end.

One flint implement (CAT 561, Plate 16) was defined as a *meche de foret* (14.9 by 4.9 by 2.9 mm). *Mèches de foret* used to be functionally associated with the microliths (frequently

referred to as 'needle points'; e.g. Finlayson et al. 1996, table 16.2), but Jacobi's (1978) research into the type and its use-wear indicated that these pieces are actually small piercers or drill bits. CAT 561, which has lost the distal end of its microblade blank, has an acutely pointed tip at the proximal end, and two fully retouched, convex, lateral sides. Most likely, the piece had a second tip at the now missing distal end.

Plate 13: End-/side-scraper in quartz, CAT 551.

Plate 14: Piece with retouch in bloodstone, CAT 560.

Plate 15: Two crescents in flint, CAT 744 and 1462.

Plate 16: Meche de foret in flint, CAT 561.

The four scrapers include two short end-scrapers in flint and two end-/side-scrapers in quartz. The two *short end-scrapers* (CAT 743 and 748, Plate 17) are both so small that the term button-scrapers may cover better than thumbnail-scrapers (although neither term has ever been defined precisely). They are of roughly the same size, measuring on average 13 by 12 by 5 mm. They are based on flakes, one of which was defined as a hard percussion blank, whereas the blank of the other remains unidentified. Button-scrapers and thumbnail-scrapers are commonly associated with the early Bronze Age period (cf. Saville 2005, figure 81), but as the illustrations of artefacts from Mercer's many excavations of Jura's Mesolithic sites show (e.g. Lussa River; Mercer 1971, figure. 9), small scrapers also characterize the Scottish Mesolithic period, not least on the Scottish west-coast and in the Hebridean area, where flint is scarce. However, where the small early Bronze Age scrapers tend to be highly regular with somewhat acute working-edges, their Mesolithic equivalents tend to have more uneven, steep working-edges, like those of CAT 743 and CAT 748. The two quartz *end-/side-scrapers* (CAT 551, Plate 13; and CAT 552) are considerably larger, measuring 28 by 25 by 17 mm and 54 by 46 by 23 mm, respectively. They are both based on indeterminate flake blanks, and they have a slightly convex, steep scraper-edge at one end and along one lateral side.

Two *truncated pieces* (CAT 141, Plate 18; and CAT 562) are both blade fragments (average dimensions 13 by 12 by 4 mm) with a straight truncation at one end. The former has its truncation at the distal end, and the latter at the proximal end. Four modified flake fragments were defined simply as *pieces with edge-retouch*. Three are flint (CAT 749 and 771), whereas one (CAT 560, Plate 14) is bloodstone. These pieces

differ considerably in shape and size (greatest dimension 5-23 mm), and it is thought that this tool group includes artefacts, or fragments of artefacts, with different functions.

Plate 17: Two end-scrapers in flint, CAT 743 and 748.

Plate 18: Truncation in flint, CAT 141.

Technological summary

This technological summary is based on information presented in the raw material, debitage (tool blanks), core and tool sections above. As shown in Table 2, the settlers at Loch Doilean exploited a number of different raw materials. Quartz amounts to three-fifths of the assemblage, whereas flint amounts to one-third. These raw materials were supplemented by small amounts of bloodstone, an indeterminate lithic material, and chalcedony. Although some quartz was collected from shore deposits, most appears to have been procured from local veins. Flint was collected from pebble deposits, either in the local area or from sources further afield, depending on whether the 'flint' is flint 'proper' (from Cretaceous deposits) or a form of flint-like chert (non-Cretaceous). The site's minority raw materials were probably all collected from primary or secondary deposits in parts of Scotland's Tertiary Volcanic Province (Bell and Emeleus 2005), the bloodstone certainly deriving from the Isle of Rhum (Wickham-Jones 1990; Ballin forthcoming c).

Due to different pebble/nodule sizes, general flaking properties, and the flint knappers' intentions (i.e. did they aim to produce flakes, blades or microblades), a number of different reduction techniques and operational schemas were employed. *Hard percussion* was applied mostly to produce robust flake blanks for tools like scrapers, but also to prepare (shape) the site's cores (decortication, cresting, rejuvenation). *Soft percussion* was used predominantly to produce small elongated blanks for delicate implements like microliths and *meches de foret*. Finally *bipolar technique* was employed for a number of purposes, such as splitting large quartz nodules (Ballin 2008b, 69), reducing small pebbles which were too small to shape (e.g. decorticate) (cf. Finlayson 2000, 105) and exhaust the raw material of small abandoned platform cores (e.g. CAT 558). Examination of contemporary sites from the Scottish west-coast (e.g. Lealt Bay; Lussa River; Shieldaig; Ballin 2001, 2002b, 2002c) shows that in this area it was common to use tiny bipolar spalls as blanks for microliths and not only soft percussion microblades (cf. the microliths from Nethermills Farm in eastern Scotland; Ballin 2013b).

Table 2 does not give an accurate impression of the extent to which the various reduction techniques were applied, as approximately three-quarters of all cores are bipolar cores, but only about half of all blanks and waste flakes are bipolar (Table 5). Most of the operational schemas involved a transformation process where, over time, cores were transformed into cores of lower rank: blade cores were transformed into flake cores, which were subsequently transformed into cores for the production of bipolar blanks. This process is demonstrated by, for example, bipolar core CAT 558, which must originally have been a platform core, most likely a single-platform microblade core.

A number of attributes also inform on the way the different raw materials were perceived by the knappers. Quartz cores were frequently abandoned at a relatively early stage of the reduction process instead of being reduced to the same small dimensions as the flint cores. They were also frequently abandoned in the form of irregular cores, rather than, in contrast to the flint, being exhausted completely by the application of bipolar technique. When they were reduced by the use of bipolar technique, they were generally

not re-orientated, whereas almost half of all bipolar cores in flint were re-orientated in an attempt to exhaust the raw material completely. These differences probably indicate that quartz was more abundantly available than flint, but also that flint was valued for its better flaking properties.

The differences between the way quartz and various non-quartz resources were perceived in prehistoric Scotland were tested in connection with the Quartz Project (Ballin 2008b, Table 27) and although the numbers are likely to have been affected by difficulties associated with the identification of tools in quartz (due to the reflective nature of this raw material), more flint was clearly being transformed into tools (Table 6). At Loch Doilean the quartz assemblage has a tool ratio of only 0.3%, whereas the flint assemblage has a tool ratio of almost 3% - ten times higher. As the bloodstone has flaking properties akin to those of flint, this raw material is likely to have been favoured (in functional terms) in the same way as flint. Moreover, bloodstone is an exotic raw material, which the settlers of Loch Doilean obtained through exchange with groups on the Isle of Rhum and it is likely to have had an added non-functional value (cf. the author's discussion of how Arran pitchstone may have been perceived in Scottish prehistory; Ballin 2009).

Site	Quartz	Flint	Mylonite	'Greasy' quartz
Calanais, Lewis	5%	20%	27%	-
Dalmore, Lewis	1%	8%	5%	-
Rosinish, Benbecula	1%	62%	-	-
Kilmelfort Cave, Argyll	2%	26%	-	-
Shieldaig, Wester Ross	1%	13%	-	2%
FERG, Aberdeenshire	4%	12%	-	-

Table 6: The tool ratios of a number of quartz-bearing 'multi-material' assemblages.

Dating

Due to Argyll Council's activity at the site in the 1970s, much of the site has been disturbed, affecting *c*. 20% of the finds (Table 7). The undisturbed 80% of the assemblage is dated by a small number of diagnostic elements, such as typo-technological attributes. Some 'proper' blades with parallel lateral sides and dorsal arrises are present and the fact that these pieces (CAT 129, 130, 160, 263) are all based on the application of soft percussion indicates a date in the Mesolithic or early Neolithic periods (e.g. Ballin 2013b; forthcoming b). In Scotland, and Britain in general, blade production was generally phased out prior to the beginning of the Bronze Age and middle and late Neolithic blades were generally produced by the application of hard percussion (Ballin 2002a; 2011a; Suddaby and Ballin 2011). The fact that most of the soft percussion blades are fairly narrow (average width c. 8 mm) supports a general date within the late Mesolithic-early Neolithic framework (c. 8500-3500 cal BC; Saville and Wickham-Jones 2012; Brophy and Sheridan 2012).

The only two diagnostic tool forms, however, both indicate a date in the later Mesolithic period (c. 8500-4000 cal BC; Saville 2008). They are two crescent-shaped narrow-blade microliths (CAT 744, 1462, Plate 15) and one *meche de foret* (CAT 561, Plate 16), a drill-bit based on a microblade blank (Ballin 2013b; Jacobi 1978). Although bloodstone is best known as a raw material used in the Mesolithic period (e.g. Wickham-Jones 1990), other finds from the region such as a bloodstone thumbnail-scraper from Home Farm on Skye (Ballin 2008a) indicate that this material was used throughout the Mesolithic to the early Bronze Age period and that the use of bloodstone is not diagnostic (also see Ballin forthcoming c). However, on balance, the assemblage as a whole would fit into a later Mesolithic framework.

Discussion

Due to the fact that parts of the site have been disturbed by recent activity and the fact that the lithic assemblage includes relatively few tools (only 13 pieces), little can be said about activities at Loch Doilean in the earlier prehistoric period. It is only possible to conclude that the assemblage (or the bulk of it) most likely dates to the later Mesolithic period (*c*. 8500-4000 cal BC); it is based on the exploitation of quartz and flint, supplemented by some bloodstone and other raw materials; technologically, flakes and blades were produced predominantly by the application of hard percussion and bipolar technique, although some regular microblades were produced in soft percussion; and the composition of the small tool assemblage suggests broad-spectred activities to have taken place at the site, including functions such as hunting (microliths), drilling (*meche de foret*), scraping (scrapers) and cutting (truncated pieces/knives).

Context	Trench	Context description	Quantity	Diagnostic artefactual content	Blood-stone	Indet.
1		Topsoil	37	-	1	1
2	1	Redeposited	2	-	-	-
4	2	Redeposited	6	-	-	-
5	3	Redeposited	4	-	-	-
6	3	Redeposited	14	-	-	-
7	1	Grey silt - in situ soil	173	Soft perc. microblades	9	4
8	2	Redeposited	16	-	1	-
9	1	Redeposited	123	Soft perc. blade	1	-
10	1	Buried orig. topsoil	15	-	-	-
11	2	Buried orig. topsoil	5	-	-	-
13	1	Dark grey silt - in situ soil	563	Crescent, meche de foret, soft perc. microblade	23	5
14	3	Grey/black silt - in situ soil	211	-	1	-
15	1	"Dirty" natural - in situ soil	2	-	1	-
16	1	Lower grey silt - in situ soil	292	Crescent	13	-
TOTAL	-		1,463	-	50	10

Table 7: The lithic finds and their contexts. Undisturbed contexts are highlighted.

The most interesting aspect of this small assemblage is its inclusion of relatively large numbers of bloodstone artefacts (50 pieces). Although the largest assemblages of Rhum bloodstone are known from the Isle of Rhum itself (Wickham-Jones 1990), assemblages have also been recovered from mostly Mesolithic sites (see dating section above) up to c. 90 km from Rhum. It is thought that the area around Rhum, with its bloodstone-bearing early prehistoric sites, may define a Mesolithic social territory and its associated exchange network, with the northernmost sites being those at Loch Torridon and the southernmost those in Ardnamurchan, Morvern and on Mull (although a small number of 'outsiders' are also known, such as Barabhas in northern Lewis, 150km from Rhum; Ballin forthcoming c). At the periphery of this exchange network, sites may include up to c. 70 pieces of bloodstone (Shieldaig in the north, and Risga in the south; Ballin 2002c; Pollard et al. 1994). Nearer Rhum, some sites have yielded up to 1,000-1,600 pieces of bloodstone, such as Sand in the Inner Sound east of Skye and Camas Daraich on Skye itself, just on the other side of the sound between Rhum and Skye (Hardy and Wickham-Jones 2009; Wickham-Jones and Hardy 2004). With its 50 pieces, the assemblage from Loch Doilean has a bloodstone ratio (3.4%) higher than those of the numerically larger assemblages from Shieldaig (1.3%) and Risga (0.5%), although re-examination of these assemblages would most likely increase the number of bloodstone pieces present.

The group of Mesolithic sites defining the southern end of the territory and exchange network surrounding Rhum includes inter alia Sanna Sands at the western tip of Ardnamurchan; Cul na Croise, Drymen Sands, Kentra, Arivegaig and Bruach na Maorach at the north-eastern corner of Ardnamurchan; Allt Lochan na Ceardaich, Polloch (Dahl House), and Loch Doilean at the shores of the Loch Shiel system (Loch Doilean may at some stage have been an arm of Loch Shiel); Risga in Loch Sunart; Acharn on Morvern; and Fascadale on Mull (Kirby 1983; Wickham-Jones 1990, table 29; Donnelly and Macfadyen 2004).

Several of these assemblages were recovered by Kirby in connection with forestry work in the region and he donated most of them to National Museums Scotland (Kirby 1983). It was decided to re-examine Kirby's collections from Dahl House, Polloch, as well as that from Allt Lochan na Ceardaich, as typo-technological elements suggested that these assemblages were of approximately the same age as that of Loch Doilean. As all three assemblages were recovered from sites at the shores of the Loch Shiel system, they could potentially have been left by the same hunter-gatherer band as it moved through its annual territory.

The Dahl House site was situated at the western mouth of Loch Doilean, where it meets the larger Loch Shiel. The finds were recovered at Dahl House, a few hundred metres from the present site, in connection with the digging of drains, as well as garden work, and all finds are unstratified.

Although the general size and character of the individual artefacts suggest that most of the assemblage is late Mesolithic, some pieces are clearly later. A pitchstone microblade core is likely to date to the early Neolithic (Ballin 2009), Yorkshire flint and one oblique arrowhead date to the middle or late Neolithic periods (Ballin 2011b) and a fragment of a shale bangle is either later Neolithic or early Bronze Age (Shepherd 1985).

The lithic assemblage from Dahl House includes 125 pieces (Table 8), most of which is debitage (90%). Six pieces are diminutive platform cores, with two cores being bipolar. In addition, two small scrapers were also recovered. Four pieces of debitage are based on Rhum bloodstone.

	Flint	Blood-stone	Pitch-stone	Shale	Total
Chips, flakes and chunks	108	4	-	-	112
Flakes, Yorkshire flint	1	-	-	-	1
Small platform cores	5	-	1	-	6
Small bipolar cores	2	-	-	-	2
Scrapers	2	-		-	2
Oblique arrowheads, Yorkshire flint	1	-	-	-	1
Frags of bangles	-	-	-	1	1
TOTAL	119	4	1	1	125

Table 8: The lithic assemblage from Dahl House, Polloch, Ardnamurchan.

Allt Lochan na Ceardaich is a promontory on the southern coast of Loch Shiel, approximately 3 km west of the Polloch river (slightly confusingly referred to as Allt Lochan na Cairdaich in Kirby's *Discovery and Excavation in Scotland* entry; Kirby 1983) and Loch Doilean. The assemblage from the site (Table 9) was recovered in connection with forestry ploughing, and diagnostic Mesolithic elements include one microlith, one microlith or *meche de foret*, as well as the character of the assemblage as a whole. Seven pieces of debitage are based on Rhum bloodstone.

However, further research into the distribution of worked bloodstone across the Hebrides and western Scotland is needed to allow the role in prehistoric society of this interesting lithic raw material to be fully understood (cf. Ballin forthcoming c). This work should include simple plotting of old and new bloodstone-bearing sites in the region to show the precise extent of the network, but also the production of fall-off curves, to define whether bloodstone was mainly perceived in a functional or a symbolic light, and to allow the perceived value in prehistoric time of this raw material to be assessed (the author has discussed prehistoric territories and exchange networks, as well as the methodologies employed to investigate them, in a number of papers, e.g. Ballin 2007; 2009; 2012; 2013a).

	Flint	Bloodstone	Total
Chips, flakes and chunks	80	7	87
Broad microliths	1	-	1
Narrow microliths or meches de foret	1	-	1
TOTAL	82	7	89

Table 9: The lithic assemblage from Allt Lochan na Ceardaich, Loch Shiel, Ardnamurchan.

As the distribution of Staffin baked mudstone from Skye (cf. Saville et al. 2012) corresponds roughly to that of Rhum bloodstone it is quite possible that the baked mudstone distribution and the bloodstone distribution define the same exchange network and the same social territory. Most likely, the analysis of one of these two raw materials would benefit from the analysis of the other.

Carbonised botanical remains

by Susan Ramsay

Methodology

All charcoal fragments >4mm, carbonised seeds and other plant macrofossils present within the samples were removed and identified. The internal anatomical features of all charcoal fragments were further identified at x200 magnification using the reflected light of a metallurgical microscope. Reference was made to Schweingruber (1990) to aid identifications and vascular plant nomenclature follows Stace (1997).

Results

A total of 16 contexts were analysed for the presence of carbonised botanical remains and the results of the botanical analysis can be found in the site archive.

Raised Terrace

A grey layer (007/013), interpreted as a podsol, showed a bleached E horizon. These contexts produced charcoal of birch, hazel, oak and willow, together with numerous fragments of hazel nutshell. These assemblages suggest the presence of hearth waste and the types of charcoal present are consistent with those that would be expected from a Mesolithic site. A further podsol layer (016), which did not show any bleached E horizon, produced charcoal of alder, birch and numerous fragments of hazel nutshell. Again, this would be consistent with Mesolithic hearth waste.

Platforms

Platform 1

A large deposit of charcoal (091) was located in a recess at the back of the platform. The assemblage comprised a large quantity of oak charcoal, with smaller amounts of hazel and hazel nutshell fragments also present. The presence of hazel nutshell suggests hearth waste.

From the centre of the platform a black silt (032) that contained charcoal and was interpreted as occupation debris. The carbonised assemblage was relatively sparse with birch charcoal and a few fragments of hazel nutshell. It is difficult to say what this carbonised material represents, but the presence of carbonised hazelnut shell again is indicative of domestic hearth waste.

A later charcoal layer (017) was thought to represent a period during which the platform was used for the production of charcoal. The assemblage was dominated by birch, with only a single fragment of oak.

Platform 2

A central hearth was excavated on Platform 2, which had a thin layer of charcoal (036) at its base. The assemblage identified was entirely oak, which might suggest something other than a simple domestic hearth since mixed assemblages are usually more common in a domestic setting, whereas a pure oak fire will produce more heat than is necessarily required for just cooking.

Platform 3

A layer of black silt (044) was located between two episodes of boulder scree accumulation. The charcoal assemblage from this context comprised mainly birch and oak, with traces of hazel and hazel nutshell. This suggests the presence of general hearth waste.

Platform 4

The charcoal from discrete patches (051) was poorly preserved and comprised what was probably oak with small amounts of hazel. However, there were several fragments of indeterminate charcoal and indeterminate semi-charred wood present.

Beneath the topsoil was a large, thin deposit of charcoal (071) that extended across the southern part of the trench and overlay surface (053). It was thought during exaction that this sample might represent a single piece of burnt wood, perhaps a roof timber. Analysis of the charcoal revealed that it was all oak and probably part of a larger branch or trunk wood. It is impossible to say for certain that it was once a plank since the fragments of charcoal were small and no cut marks or shaping was visible.

Below surface (053) were a number of postholes, all showing distinct post-pipes. The fills of the postholes contained mixed charcoal assemblages but all the fills were dominated by oak. It is not clear whether this material represents oak posts that had burnt in situ, with some additional hearth waste used as packing material, or whether the material is hearth waste used to backfill voids left after the removal of posts.

Platform 5

A thin layer of birch charcoal (066) was located within the core material (065) of a bank. The charcoal (058) assemblage, which abutted the stone revetment (055) was dominated by birch charcoal, with small amounts of hazel and oak also present.

Discussion

The mixed charcoal assemblages from the Mesolithic are typical of this period and may be the remnants of hearth ash.

The charcoal assemblages from the late eighteenth and early nineteenth century deposits on the charcoal burning platforms were similar in composition, being dominated by birch charcoal

with only traces of other charcoal types present. The use of the birch is consistent with Lines (1984) who states that birch wood is favoured in the production of high quality charcoal.

The hearth ash within Platform 2 produced only oak charcoal, which may suggest an origin other than domestic hearth fuel, although it is not clear what this might be. Domestic hearths often have a diverse mix of charcoal types present because the inhabitants collected fallen wood from surrounding woodlands, with little or no thought to selecting certain types. Platform 4 also produced an ash assemblage (051) dominated by oak with a trace of hazel. In addition there were several pieces of only lightly charred wood that were not identifiable to type. The posthole fills from Platform 4 may also provide evidence for hearth waste dominated by oak, but it is possible that some of the oak represents the original posts from these postholes. Both Platform 2 and 4 are medieval in date (see Table 1).

The charcoal assemblage from platform 3 was dominated by oak and birch charcoal, with both taxa used to produce charcoal commercially in the past. However, the fact that the types are mixed together and that hazel charcoal and nutshell are also present, may suggest a domestic hearth component is present in this assemblage.

Discussion

Mesolithic raised terrace

The raised terrace has undergone considerable modification in the recent past which has severely compromised the archaeological heritage. Firstly, the whole terrace was ploughed and then planted with sitka spruce. Then, over one third of it was removed by quarrying to provide stone for the lay-by on the opposite side of the road. During this work topsoil and finer sediment (sands and gravels) was dumped on the top of the terrace to a depth of 0.50 m and spread across it covering the stumps of the previously felled sitka spruce as well as the original ground surface. A forestry road and ditch was subsequently cut into the northern and eastern sides of the terrace resulting in physical disturbance although it was technically outside the area of archaeology defined by the University of Glasgow. More recent natural tree regeneration and root penetration has led to further disturbance of the surviving archaeological deposits.

The grey horizon (007/013) recorded by the University of Glasgow was interpreted as a layer of ash (Pollard 1993) but has subsequently been identified as a podsol horizon. A podsol typically has a bleached E horizon which is commonly 40 to 80 mm thick and is low in iron and aluminium oxides as well as organic matter. Podsols occur below decomposing organic matter typically derived from heather or conifers. On the raised terrace at Loch Doilean the oxides and organic matter have been leached out of the E horizon, equating to (007/013), leaving just the mineral grains (mainly quartz) behind. The iron and fine organic matter has been re-deposited in the lower B-horizon (015) in the form of a horizontal band rich in organic matter and as a layer of iron pan, as noted at the top of the natural gravel making up the terrace. Where there is no bleached E horizon i.e. (014)/(016), this may be due to physical disturbance or as a consequence of development of the profile on a slope where there was a continuous supply of iron; such soils are known as brown podzolic soils.

Lithic artefacts occur throughout the thickness of the original soil (007/013 and 016) that formed over the fluvio-glacial sands and gravels of the terrace. This soil subsequently developed into a podsol (E and B horizons) beneath heather moorland and the more recent coniferous plantation. Charcoal was disseminated throughout the buried soil but there were no concentrations of it or any evidence for in situ burning in either Trench 1 or Trench 3, although it is very possible that a hearth or hearths occurred, or occur elsewhere on the terrace. The possible stakeholes/postholes noted in the section recorded by the University of Glasgow (Pollard 1993b) could not be seen in the current quarry section, although undulations in the natural gravel were apparent. The excavation in Trench 1 demonstrated that the surface of the gravel was indeed uneven but there were no negative features cut into it or through the overlying buried soil. The limited diagnostic flint artefacts recovered from the buried soil, as well as a single radiocarbon date, indicate that the material is late Mesolithic (Table 1 and see Ballin above). The lack of structural remains, the relatively small size of the assemblage and the small number of tools may indicate that the terrace was utilised for very short period of times, probably during hunting/gathering expeditions when a few new

tools were fashioned and existing ones repaired in preparation for a number of different activities including hunting, drilling, scraping and cutting (Ballin see above). It is probably no coincidence that the site is located near to Loch Doilean and next to the River Pollach into which the loch runs and up which salmon still run to spawn.

Further east, located on the steep south-facing slope of the glen and above Loch Doilean were two deposits rich in charcoal. The ashy deposit, located beneath buried turf behind the late eighteenth or early nineteenth century revetment wall of the charcoal burning platform (Platform 1), may have been the remains of hearth ash, or alternatively, it may have been a chance survival of a burnt forest floor. The deposit occurred between and over large stones that were natural boulders that had been caught on a slight levelling out of what in general is an exceptionally steep slope. The lack of lithic artefacts from this deposit indicates that if it was a camp fire it probably represents a single, overnight event. The alternative explanation is that it is the remnants of a forest fire (accidental or deliberately set cf. Tipping 2004), with the litter layer being dominated by oak branches with some hazel: a composition which fits with the dominant woodland type at this period (ibid). The date of this deposit differs from the activity on the raised terrace by 100 to 200 years and hints at the potential of a tradition of sporadic exploitation of the natural resources of the glen. Furthermore, some 1000 years or so earlier, human activity and/or a forest fire occurred just below, an indication perhaps of the longer term exploitation of this sheltered glen. As discussed by Ballin (see above) the Mesolithic activity at Loch Doilean is located on the eastern edge of a large territory which may have covered the southern Inner Hebrides. Within this territory a relatively small iterant population probably revisited specific 'task sites' at certain times of the year to exploit a specific food or natural resource, or in some cases such as Risga to exploit shell-fish as well as terrestrial animals such as red deer (Mithen 2010; Pollard et al. 1996). Structures at Risga indicate a longer lived, if sporadic settlement also dating to the late Mesolithic period and in fact the dates are not distinguishable (OxA- 4910-4550 cal BC and OxA-2023 5250-4600 cal BC) (Ashmore 2004) from those obtained from the buried soil or the charcoal below Platform 1 from Loch Doilean (Table 1).

Platforms

The five evaluated platforms fall into one of three distinct types (Table 10).

Type	Characterisation	Platform Number
1	A natural terrace with minor surface modifications	3
2	A level fan-shaped platform of re-deposited subsoil of weathered stone and sand	2 and 4
3 (Recessed platforms)	The rear hillside cut into the natural with exposed face stabilised with a stone and earthen bank, with a rubble outer revetment wall against which gravel and grit is built up in layers to form a level platform	1 and 5

Table 10: The types and characterisation of Platforms 1 to 5.

Based on information from Mr Kirby (1997, 108) Rennie (1997) described the North Loch Doilet group of recessed platforms. The western end of the group comprised five stone built platforms, ranging in size from 9.5 by 8.5 m to 11 by 10 m and it is likely that these platforms coincide with those reported on here. A further 12 platforms are described as occurring on the hill side at the east end of the loch and a further single platform was located at the water edge.

Type 1

Platform 3 was significantly larger than any of the other evaluated platforms, being 24 by 10 m. In contrast to the others the interior was sunken rather than level. There was no apparent cut to the back edge, although only a small evaluation trench against it was excavated and the outer edge of the terrace had not been artificially built up or levelled. However, a significant deposit of charcoal was recorded in Trench 1 and a possible posthole infilled with charcoal in Trench 2. The tentative interpretation of the limited data is that this was a natural terrace which may have been slightly modified, i.e. stones cleared, and then at least part of it utilised. The undated posthole may have been part of a structure, but without further excavation it is not possible to tell. The radiocarbon date obtained from charcoal within Trench 1 appears to place much of the burning within a late fourth century AD context. In common with the various Mesolithic deposits it is not clear from the excavation results whether the extensive charcoal deposits at the north-western end of the terrace are a consequence of human activities and/or natural forest fires. Further

excavation would be required to fully appreciate the nature of the archaeological resource on this platform.

Type 2

The mode of construction of *Platforms 2 and 4* appears to be very similar. Firstly, there is no evidence that the rear of either platform was cut into the hillside as re-deposited psammite was built out from a natural break in slope to form a level fan-shaped platform. The interior levelling layer or 'floor' of both platforms comprised re-deposited psammite and this surface, although very compact, was fairly uneven but relatively clean. It is possible that some form of sedge or grass matting was used to cover the interior. Platform 2 had a central hearth scooped out of the levelling layer but the lack of evidence of heating or burning of the latter indicates that the fires were of a relatively low temperature, despite the use of oak as the fuel. On Platform 2 recoverable charcoal was limited to the hearth, whereas on Platform 4 there were odd 'spills' of charcoal on top of the levelling layer but no definite hearth was identified.

An inner ring of postholes was revealed on Platform 4, all packed by large stones, indicating they must have held upright timbers for a ring beam would have supported rafters. A second outer ring comprised at least one posthole, one post-pad and three natural boulders which may have also been used as post-pads. An outcrop of bedrock at the rear of the platform may also have served as a base for one or more posts. This outer ring may have served as a secondary support to the rafters. The outer wall of the structure was probably located beyond the outer ring on the edge of the platform which was slightly raised above the interior level. The outer wall may have largely been constructed from turf as there was no significant stone rubble on or around the structure. It would have incorporated the rear outcrop of bedrock and thus would have reduced the amount of water running off the hillside and entering into the structure; a similar arrangement was apparent at Lephinchapel (S) 45 (Rennie 1997, 167).

No postholes were observed on Platform 2, as the psammite levelling layer was not removed during the evaluation, but as all but one of the postholes on Platform 4 were hidden by this deposit, it is entirely possible that they survived below it. Of the 10 platforms excavated in Argyll by Rennie (1997) nine had evidence of a roofed and post-built structure and the tenth, Dippen had a single outer post-ring which Rennie thought could not have supported a roof (Rennie 1997, 164).

A radiocarbon date, 1030-1157 cal AD, places the use of Platform 4 to between the latter half of the eleventh and the mid-twelfth centuries. However, the burnt oak timber lying on the psammite 'floor' is at least fifty years younger (SUERC-56365, 1209-1378 cal AD at 2 sigma, Table 1) implying that the structure may have been repaired and had a considerably longer life-span than that previously predicted for roundhouses of 15 to 30 years (e.g. Cook and Dunbar 2008). Four other recessed platforms in Argyll have yielded eleventh to thirteenth century AD radiocarbon dates: Platform 9 Dunloskin at Ardnadam, Platform 2 Baremore Wood on Bute, Platform 28 Ardentraive at Colintraive and finally a platform at Feorline (Rennie 1997, 169). Two radiocarbon dates were also obtained from Platform 12 at Dippen, Carradale: one had an extremely large associated error but appeared to indicate a medieval date and the other indicated activity in the seventeenth century, which was before the onset of industrial scale charcoal production.

The presence of a burnt oak timber on top of the psammite levelling layer on Platform 4 and the odd 'spills' of charcoal, also dominated by oak, are the only indications that the post-built roundhouse may have been damaged by fire; there is no evidence that the structure was re-used after the large oak timber was burnt. However, the amount of charcoal overlying the psammite 'floor' is insufficient to imply the total destruction of the structure by fire. Rather, the recovery of some semi-charred wood (051) suggests that if the roundhouse had witnessed a destructive fire, a collapsed thatched roof structure may have smothered the flames. This fire was probably the result of a deliberate act as there were no finds from the 'floor' level, implying that all useful and precious items had been removed.

Superficially it would appear that the posts of both the inner and outer ring were burnt in situ, as all the posthole fills were dominated by oak. However, all the fills also contained other wood species. One explanation is that hearth ash was used as a packing material (Ramsay see above).

An alternatively explanation is that the structural posts were removed on the abandonment/ destruction of the roundhouse and charcoal derived from the burnt roof structure, i.e. oak rafters with hazel, birch and alder battens, fell back into the posthole voids.

The above version of events does not explain the middle Bronze Age date obtained from a hazelnut shell recovered from one of the postholes (Table 1, SUERC-56367). It is feasible that the nut was accidentally incorporated during the construction of the structure, being derived from the lowest layer of charcoal that capped the undulating bedrock. This deposit is interpreted as the remains of the original forest floor that was cleared by fire prior to the construction of the platform. Alternatively, the post-built structure may actually be middle Bronze Age in date, eight slightly larger timber built roundhouses have recently been excavated in Argyll near Oban (Ellis 2011, 2012 and forthcoming) and two middle Bronze Age post-built roundhouses on Skye (Suddaby 2013), demonstrating that this was a well-established building technique in the west coast of Scotland during this period. The only known Bronze Age site in the locality is the burial cairn with cist (Scheduled Monument No. 6275) located just to the south of the Mesolithic lithic scatter on the northern side of the road bridge crossing. If the post-built structure is Bronze Age it is clear that the platform was re-used in the medieval period, though no structural remains, other than the burnt oak timber, appear to have survived.

Type 3

The two recessed charcoal production platforms, *Platforms 1 and 5,* share many physical characteristics. The rear of each of the platforms had been cut into the red or yellow grit and weathered bedrock, and the material was subsequently used to build up the platform in a series of horizontal dumps. The outer, downslope side of the platform was defined by a rubble bank, comprising both rounded cobbles and angular stone, which served to contain the re-deposited material. On the southern side of Platform 5 a small portion of drystone wall survived, forming a vertical face to the rubble bank. It is likely that this wall originally extended around the entire extent of the outer revetment bank. No such drystone wall was present on Platform 1, although a considerable amount of stone was observed downslope of the platform and it seems probable that this too once had a drystone façade. The two platforms are of a similar size and shape and it would appear that the same basic design was followed in their construction.

The 'floor' surface within the interior of Platform 5 comprised beaten and levelled grit upon which was a very thin layer of charcoal. The relatively small amount of charcoal is surprising given that the platform was specifically built and designed for the production of charcoal. Similarly, at the back of Platform 1 a layer of charcoal sealed a compact silt and stone 'floor'. Cut into this was a central scoop which contained charcoal which may have been the centre of the mound kiln, which would have measured about 4.5 m in diameter at its base (Evans and Evans 2005, 60). The logs would have been arranged around a central stake and the whole mound covered in turf. The stake was then removed and the void left served as a flue as well as a means of introducing the starter fire (ibid, 60; McDermott et al. 2012). The mound kiln would have been monitored for 2 to 10 days depending upon the type and dampness of wood. Charcoal from the charcoal layer of Platform 1 (017) yielded a late seventeenth to early twentieth century date, but it is probable that the platform was used in the late eighteenth or early nineteenth century.

Some considerable effort went into constructing these platforms, perhaps because of the volume of anticipated charcoal to be processed and the belief that they would be reused once the coppiced woodland had regenerated in 20 to 30 years (Evans and Evans 2005, 60; Wordsworth 2014). The location of the two platforms at Loch Doilean some 223 m apart, may have been to aid staggered charcoal production with the same team of colliers in attendance at both sites. However, in Kinlochmoidart Woods and at Rahoy the charcoal platforms are on average only 50 m apart (Evans and Evans 2005; Lowe and Wordsworth 1996; Wordsworth 2014) which represents an extraordinary investment of time and labour on platform construction, but which was clearly outweighed by the intensity and scale of charcoal production this allowed. The domination of birch charcoal on the two platforms at Loch Doilean demonstrates that the forest had already been subject to clearance (birch is a

pioneer species) and very little oak, the favoured species for charcoal production (McDermott et al. 2012), was available for the last firings of the kiln mounds. These late eighteenth-early nineteenth century charcoal burning platforms are a relic of the production of charcoal for the Lorne Furnace Company (1753-1856), which bought the rights to deciduous woodland across Lochaber and Argyll, specifically for their iron works at Bonawe and Furnace.

Conclusions

Neither of the medieval platforms at Loch Doilean was re-used as charcoal production platforms, but in contrast, five of the similar structures excavated by Rennie (1997) were re-used for the making of charcoal, although this phase of activity was not radiocarbon dated.

Of the four platforms evaluated at Loch Doilean the follow generalised comments can be made. The medieval roundhouse platforms were proportionately smaller than the late eighteenth or early nineteenth century charcoal production platforms. The former platforms were not recessed, and they were built from a levelled fan of crushed psammite and their fronts had very little associated stone work. The source of the crushed psammite was not the rear of the platform, but must have been brought in from elsewhere. In contrast, the two charcoal burning platforms were recessed and their floors constructed from material excavated from the rear, which was then spread out and thrown up and against an outer drystone rubble wall. These generalisations may be reflected elsewhere in Argyll and Lochaber. The survey by Evans and Evans (2005, 63) of the Kinlochmoidart woodland, located a relatively short distance to the west of Loch Doilean, revealed that the majority of the identified 71 recessed platforms had a stone retaining wall at the front and an arc cut into the hillside at the back, which was not retained. However, two platforms, Taynish 40 and Lephinchapel S (45) excavated by Rennie (1997, 164) were revetted with stone. Although neither of these platforms was dated, Rennie argues that the revetted stone front of Lephinchapel had been destroyed prior to the use of the platform to produce charcoal and by implication the original platform is probably medieval (Rennie 1997, 155).

It is clear from the results of the evaluation of the five purported charcoal burning platforms at the west end of Loch Doilean that neither the contention by Rennie (1997, 177) that the majority of the platforms recorded in Argyll and Lochaber were originally constructed as stances for roundhouses, nor the more recent assertion of many professional archaeologists that the majority were constructed specifically for the production of charcoal (e.g. Wordsworth 2014) can be accepted without additional research centred on the excavation and evaluation of many more of these monuments. A final example, which serves to caution any surface determination of the function and age of any of the purported charcoal burning platforms, wherever they may be, is the excavation at Llanelen, Gower, Wales, a late medieval (1413-1669 cal AD) charcoal burning platform (Kissock and Wright 2001, 148).

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The site archive will be deposited with Historic Environment Scotland and the finds will be declared to the Treasure Trove Unit.

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