Topographic and geophysical survey at the stone settings of Tom’s Hill and East Pinford, Exmoor

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Introduction
The earliest archaeological monuments to be identified on Exmoor are settings of local sandstone and slate, taking the form of circles, rows, solitary/paired stones, and geometric and semi-geometric arrangements ((Riley & Wilson-North 2001: 23-31). The latter, of which over 50 examples are known, appear unique to Exmoor. They take a variety of forms, from rectangular settings and quincunxes, to apparently random arrangements of stones. Many are concentrated around the headwaters of valleys, in areas of moorland which lie beyond the limits of medieval and later cultivation (ibid.: 24). Two features of these settings are worthy of note: their diminutive size, with individual stones rarely exceeding 0.5m, leading to their being termed ‘minilithic’; and the lack of basic archaeological knowledge beyond suggested morphology and general distribution. Despite being noted as early as the 17th century, only one has witnessed any modern excavation, the setting at Westermill Farm, Exford (Somerset HER No. 33602), where an area encompassing three of the four stones making up this setting was excavated (Burrow & McDonnell 1982). Although the surface upon which the stones were erected was identified, along with the original socket for a fallen stone, no buried soils, further structural or artefactual evidence was recovered. Until very recently (see below), there has been no geophysical survey at any of the recorded stone settings. Their assumed late Neolithic/early Bronze Age date is based on loose analogy (i.e. that they are comparable to features such as stone circles and rows), and their physical proximity to round barrows and cairns (Grinsell 1970: 38-51; Riley & Wilson-North 2001: 31). Poorly dated and without immediate analogy, it is unsurprising that their ‘function’ remains unknown.

The survey
The survey work reported on here represents the first stage in a research project seeking to investigate in detail these unique monuments in their contemporary landscape context. This will involve both survey and excavation in an attempt to shed light upon the precise dating and morphology of the structures, as well as the activities that attended them. Work will focus not only upon the settings themselves but their immediate and broader landscape contexts, exploring relations between settings and other foci of activity (e.g. cairns and fieldsystems). A central concern is to ‘place’ these structures within current debates regarding processes of prehistoric monumentality. The latter stress factors such as the forging of social identities through group participation and labour, the processes and materialities of construction, performance and choreographies of encounter, and the frequently blurred relationships between the ‘natural’ and ‘artificial’ (e.g. Bradley 1998, Thomas 1999, Harding 2003, Tilley 2004). Yet what of monuments of a scale best measured in centimetres, which are virtually invisible within the landscape? A key aim is therefore to identify and build upon any tensions that arise from this exercise and through this to rethink our approaches to the phenomenon of monumentality in the Neolithic and Bronze Age.
Initial study of the overall distribution of stone settings has suggested a focus around valley headwaters (Riley & Wilson-North 2001: 24) and for this first stage of research the decision has been made to focus upon a particularly dense complex of stone settings around the upper reaches of Badgworthy Water, an area that had previously been singled out for detailed study (ibid:31). Here a complex of 16 stone settings has been identified alongside solitary stones, cairns, possible prehistoric enclosures, field systems, a hut-circle and several stretches of bank have been identified.

Detailed surveys of the morphology and condition of the stone settings was undertaken by the RCHME between 1988 and 1992 (Quinnell & Dunn 1992). The present work seeks to build upon this in the following ways.

1. Provide a detailed topographical survey of the immediate environs of the settings
2. Using Magnetometry and Resistance survey undertake the first geophysical investigations of the stone settings
3. Provide a detailed drawn record of the elevations of the component stones

With the exception of the scaled elevation drawings the datasets generated by the above were geo-referenced using a single GPS receiver with data differentially post-processed using Ordnance Survey Active RINEX data. This yielded a horizontal positional accuracy of 2m. All spatial data were integrated into a GIS-based spatial database.

The sites investigated
Following a reconnaissance visit to the area two sites were selected for initial study that differed in terms of topographic location and setting and condition; Tom’s Hill (SS84 SW1 – Somerset HER No. 33858) and East Pinford (SS74 SE7 – Somerset HER No. 33041).

Tom’s Hill (33858)
This setting comprises six stones settings forming an irregular rectangle 17.5m long and at its broadest 7.5m wide situated on the gentle SW slope (5 – 6°) of Tom’s Hill (370mOD) (Figure 1). Although complete when first recorded in 1906 one of the stones has subsequently fallen and substantial erosion hollows surround this recumbent stone and three of the remaining settings. Survey by the RCHME also located the broken stump of a further setting and on this basis postulated the existence of a possible third line of three stones immediately to the West (Quinnell & Dunn 1992: 57). The presence of the erosion hollows (caused principally by sheep rubbing) and numerous mortar craters in the immediate and surrounding area, suggest potential damage past and present (Figure 2). Some 360m to the SE is a large cairn.
Figure 1- The Tom’s Hill settings (marked with red flags) looking NNW down long axis of the monument (photograph by Steve Sembay)

Figure 2 - The stone settings and erosion hollows at Tom’s Hill as surveyed by the RCHME (Quinell and Dunn 1992)

East Pinford (33041)
Very little is recorded of this setting other than it comprises a rectangle of six stones, 9.6m long and 4.2m wide, as depicted in the RCHME plan (Figure 3). Located at an elevation of 350m, this setting is aligned perpendicular to the gently sloping western side of East Pinford Hill (3 – 4°). The stones range between 0.37-0.70m in height, with the smallest forming the central pair (B and E). The stones of the eastern-most
pair (C and F), encountered as one walks downslope into the setting, are notable in being set at an angle to the axis of the monument.

While there exist erosion hollows around four of the settings, the stones are all upright and intact. It is immediately noticeable upon visiting the site that the setting is contained within a distinctive area of natural stone outcropping and clutter running down the slope of the hill (Figure 4).
Tom’s Hill – survey results
As well as the standing stones themselves, erosion and ordnance impact hollows in the immediate vicinity of the settings were also surveyed, along with a series of regular spot-heights (taken on a paced 4m grid). The results can be seen in Figure 5. What is immediately evident is that the area is peppered with impact craters, some within the body of the setting itself, making its survival remarkable and thus increasing the chance of there being possible lost components to the setting.

With respect to the erosion hollows and impact craters, it was difficult in practice to distinguish between the larger of the former and smaller of the latter. When the results of the Resistivity survey are integrated the picture becomes clearer as the mortar craters have a unique signature – the blast clearing topsoil down close to bedrock.
(giving a high resistance core to the feature – dark shade on plot) surrounded by a halo of upcast (lower resistance – lighter shade) (Figure 6).

Figure 6 – Resistance survey at Tom’s Hill

Figure 7 – Interpretation of Resistance anomalies
If we compare the results of the Resistivity survey to the RCHME plot (Figure 2) it is immediately clear that hollows ‘J’ and ‘K’ on the latter are in fact impact craters. The erosion hollows at ‘L’ and ‘H’ lack the characteristic crater signature and may well mark the position of former stone settings. The stone stump ‘G’ could not be relocated but the presence of a packing stone and its arrangement relative to stones ‘C’ and ‘D’ suggest it formed part of the setting.

The remaining erosion hollows (marked ‘M’) are more problematic (Figure 7). While M1 can be argued on the basis of response to correspond to an impact crater, the location of M2 and M3 within an area of higher background resistance (see below) makes it difficult to argue conclusively either way. M4 clearly lacks any crater signature. If M4, ‘L’ and ‘H’ do mark the positions of former stone settings then this suggest a more random placement of stones than indicated by the surviving uprights. Their status may ultimately only be resolved through a combination of Resistivity survey at a finer spatial resolution and/or excavation. Looking more broadly at the resistance results, there is a general band of high resistance running NW-SE across the survey area, which most likely reflects the presence of shallow subsurface geology. It is interesting to note that the setting appears to be aligned along this band. In terms of other features, a gently curving high resistance anomaly (marked red in Figure 7) is of note. This could correspond to a compacted pathway or buried stone boundary feature. There was certainly no clear evidence of a linear earthwork on the surface and interpretation is difficult based on the small sample of the feature contained within the survey area. Likewise, two rather indistinct low resistance linear features (marked in blue), would normally indicate ditches, however given the impact crater signatures, they probably represent shallow banks that retain more moisture than the relatively thin soil cover. In both cases a more definitive interpretation will be difficult without extending the survey area. The areas of white on the survey plot reflect thick clumps of grass that made taking readings difficult.

Figure 8 – results of fluxgate magnetometer survey
The results of the fluxgate magnetometer survey add little to this picture, the whole area being covered by fragments of ferrous material, no doubt shrapnel from the repeated mortar blasts. No other magnetic anomalies are evident (Figure 8).

**Summary**
In many respects this is a true ‘ordnance survey’, as the geophysical results are dominated by impact craters and shrapnel spreads. This has not only indicated the level of disturbance the site has suffered since it was first planned in 1906 but has also allowed refinement of the RCHME interpretation of erosion hollows associated with possible former stone settings. In addition to the ordnance, a number of possible linear features were suggested, it is impossible to either date or characterise these on the basis of the small area surveyed (1600m$^2$). What is interesting is that the settings are aligned along a band of generally higher resistance readings that appears to reflect a shallower coverage of soil above bedrock. Whether this would have been evident in antiquity through the nature of vegetation cover (thus making the location distinctive) is open to discussion.
East Pinford – survey results

As with the Tom’s Hill setting, the survey sought to record the micro-topography of the immediate landscape setting of the monument along with stone settings and what appeared to be possible fallen stones. In addition, in an attempt to unravel the relationship between the settings and an apparently natural spread of stone, the location of stone clitter and areas of outcrop were also recorded (Figure 9).

Along with the stones surveyed by the RCHME are a number of possible broken stones in amongst the outcropping and clitter, running from the centre of the monument to a point c. 15m to the east, and slightly off its axis. All comprised ‘stumps’ set vertically within the clitter, which superficially seem to describe an additional four stone pairs. Without excavation it is impossible to say whether these represent artificial settings or angled elements of natural clitter, but if the former then they describe a much longer and more complex setting than previously suspected, or an earlier arrangement subsequently replaced by the existing three-pair setting. What is of particular interest is the way in which the setting is aligned along (and respects) the main band of natural outcropping.
This close relationship between the placement and orientation of the setting and the band of outcropping is clear in the results of the resistance survey (Figure 10).

Figure 10 – East Pinford Resistance survey

Figure 11 – East Pinford Magnetometer survey
Although the resultant plot is rather ‘noisy’ as a result of the dense clumps of wet grass to the immediate north and south of the setting, it is clear that the stones have been set upon a band of high resistance (reflecting shallow soil cover over bedrock) running approximately E-W across the survey area. Aside from geology, no other features are apparent in the resistance results.

As in the case of the Tom’s Hill survey, the results of the fluxgate magnetometer survey are dominated by shrapnel, in this case a single large lump to the immediate W of the setting with a spattering of smaller ferrous chunks (Figure 11). The former was confirmed to be a large (0.3m) chunk of casing lying just outside the geophysical survey area.

In terms of further archaeological features there are areas of slightly enhanced magnetic readings to the immediate N of the setting and at the far W end of the survey area, but it is difficult to discern any structure in these spreads and they probably relate to natural variation.

**East Pinford - summary**

The detailed survey has suggested that the original record of a rectangle of six stones underestimates the true complexity of the setting. If the stones identified as fallen or broken were indeed part of the original fabric, its form is more reminiscent of a short (25m) stone row. Alternatively, they could represent elements of an earlier setting. In this respect, the possible double stone settings in the central-western portion of the monument are of particular interest. Shrapnel aside, the geophysical surveys detected little in the way of additional structural features. However, once again the setting was shown to be aligned closely upon a band of shallower topsoil over stony ground. In this case the size, shape and orientation of the monument appear to be closely constrained by this band and its accompanying spread of clutter and natural outcropping.
The wider landscape of East Pinford

In contrast to Tom’s Hill, the East Pinford setting is located in close proximity to a number of notable archaeological and natural features. Most apparent are two prominent outcrops of rock situated on the break of slope above the valley bottom, 121m to the NW.

![Figure 12 – East Pinford environs](image)

Whilst not directly aligned with the axis of the setting these are visually prominent from the site location, the shape of the slope leading the eye down to them. In the immediate vicinity of the setting are a low mound to the SSW (50m) and a large cairn to the NEE (160m) (Figure 12).

![Figure 13 – prominent rock outcrops (circled) on lip of valley bottom](image)
The rock outcrop is of particular interest, given the close relationship between the stone settings and natural outcropping discussed above. From the location of the monument the ground slopes gently down towards the outcropping, with two clusters of stone forming a clear and prominent landmark, echoing the paired upright stones of the setting (Figure 13).

Upon closer investigation, adjacent to the larger, southernmost outcrop, was a flat panel of rock with a distinctive pattern of hollows that bore a striking similarity to cupmarks (Figure 14a). This is a distinctive feature and the important point to note is that the difficulties we encountered in deciding whether the depressions were weathering features, weathered carvings (or a combination of the two), may have been the same in prehistory (Figure 14b).

That the artificial settings of the monument referenced, in visual and material terms, the natural outcropping rock is further suggested by identical depressions on the side of one of the stone uprights implying a source for this upright at this location if not the panel itself.

As part of the survey programme geophysical surveys were also carried out on the nearby round mound and cairn features.

**The East Pinford Mound (HER No. 33042)**

This small, low earthwork is located close to the break of slope above the stream that separates the spur of East Pinford containing the stone setting from West Pinford. Recorded in the SMR as a “well-defined, turf-covered, prehistoric cairn”, there is little to mark the location of the mound today, the feature being defined largely on the basis of a marked change in vegetation (Figure 15).

A single 20m grid of resistance and magnetometer survey was undertaken across the feature. The results of the resistance survey (Figure 16) identify the mound as a distinctive high resistance feature, adding confirmation to its interpretation as a cairn. To the south of the mound a band of high resistance readings mark the break of slope and thinning of topsoil cover above the bedrock. To the west of the feature the low resistance banding reflects the effects of dense clumps of waterlogged grass.
The magnetometer results were rather noisy and diffuse, most likely a reflection of the dense grass clumps that made steady traverses difficult (Figure 17). However, a high magnetic response was recorded for the mound structure, suggesting the presence of a zone of concentrated burning within the body of the feature. Tentatively, this may indicate the presence of a pyre or cremation deposit within the body of the mound. No other clear structural features could be discerned within the data.
The East Pinford Cairn (HER No. 33043)
The cairn comprises a much more substantial structure, marked once again by a clear vegetation change with a spread of stone rubble evident immediately beneath the turf (Figure 18). The SMR notes two robber holes in the top of the mound and a “short tail” that may reflect spoil from the above activities or part of a field bank noted on aerial photographs of the monument. There is no evidence of a surviving ditch.

As in the case of the mound, the cairn produced a high resistance response to the internal structure of stone. What is more, the secondary structure adjacent to the cairn on its southern side (the “short-tail”) is also clearly visible (Figure 19).
Although no clear low resistance anomaly is visible indicative of a surrounding ditch, this may be indicated by the cluster of missed readings (caused by dense, high grass clumps) around the edge of the mound anomaly. Looking to the “tail” there is no clear evidence of its continuation in the form of a field bank, though the limited size of the survey area makes interpretation difficult.

More surprising was a very diffuse, higher resistance linear anomaly that can be discerned 5m or so to the NW of the mound (indicated in blue on Figure 20).
As with the anomalies on Tom’s Hill this can be read in two ways - either an eroded stone boundary (most likely) or a trackway. Although the feature is not marked on any of the O.S. map editions (from 1st to most recent) confirmation that it is the former comes from aerial photographic evidence. Although not readily apparent on the ground at the time of survey, this feature is clearly visible as a major boundary on the 1946 survey of the area, though much eroded by the time of the 2003 aerial survey.

The magnetometer survey identified a number of small, discrete anomalies spread across the survey area, with two large, high magnetic anomalies marking the approximate centre and northernmost projection of the cairn (Figure 21).

Close examination of the raw data suggests that the northernmost of the mound anomalies corresponds to a ferrous spike, being closely comparable in magnitude to the shell casing recorded on the main stone setting. The more central anomalies are noticeably weaker than the ferrous spikes and point towards a localised area of intense burning most likely associated with a cremated deposit. It is worth noting that the southern extension to the main body of the cairn (the “tail”) lacks any such signature.
Conclusions
The two days of survey proved highly productive: refining and enhancing existing records regarding the morphology of stone settings; identifying close relationships between setting location and underlying geological trends; and indicating the potential of geophysical survey to enhance the detail of stone settings and cairns. Looking forward, the next stage would be to repeat the Resistivity survey of the stone settings at a higher spatial sampling resolution (i.e. 0.5m x 0.5m). In addition, survey at the existing sampling resolution (1m) should be extended to cover a broader area around the features discussed in the main body of the report. This would certainly shed important light on the suspected linear features detected. More generally, given the success of the exercise in generating new information, the methodology should be extended to the other stone settings and related features in the Badgworthy Water study zone.

Acknowledgements
Warmest thanks are extended to Rob Wilson-North, Tim Parish and Matt Sully of the National Park, Rob for encouraging and supporting this work and offering constructive feedback on an earlier draft of this report, Tim for arranging necessary access and Matt for kindly sharing data. Thanks are also extended to Mr. Hawkins (Warren Farm) and Jeremy Holtom (Badgworthy Land Company) for kindly giving us permission to work on their land and to Chris Webster of the Somerset HER for taking the time to answer our queries. The work was directed by Mark Gillings, Josh Pollard and Jeremy Taylor and carried out with considerable enthusiasm and dedication by Brett Harrison, Steve Sembay, Konstantina Tsaoyssi and Carol Yiend, all Master’s students at the University of Leicester.

Bibliography


