

# **Colour Out of Space: Colour in the Construction and Usage of Monuments of Neolithic Atlantic Europe**



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Colour is a fundamental human experience – if not a universally constant one. There are, after all, individuals who are colour-blind to various degrees, or even those that see extra colours. However, there is something about the perception and categorisation of colour that is near uniform across humanity, as evidenced by Berlin and Kay's *Basic Color Terms* and studies into the key mechanisms of colour vision. Deeper still, it seems to be the case that specific colours re-appear in human art, iconography, ritual and folklore as a leitmotif running through our cultural evolution; that is, the colours red, white, and black. Evidence for this significant triad, as well as other colours showing repeated and deliberate selection, has been gathered and analysed. A summary of the literature on this is presented in this, along with a review with existing work on colour, and why the materiality and material semiotics of stone are important to this research.

The aim of this research is to survey a sample of Neolithic monuments across Atlantic Europe, and see if there are any commonalities, significant patterns, and demonstrable signs of specific colour selection that may hint at colour being an important part of Neolithic cosmology – regionally, locally, or culturally. There has been some work touching upon this concept, most recently and notably at the Clava Cairns and sites on Arran; this study will develop this existing research and deepen the understanding of colour use in the Neolithic. In order to see if the fascinating possibilities raised in these works has broader Neolithic context, this research will study sites in similar levels of detail at locations across Atlantic Europe. This will include many styles of monument, from stone circles to passage graves to long barrows to stone rows, in order to evaluate colour significance across a broad range of monument building traditions.

Colour was recorded via both human perception and through the use of a digital recording device, custom designed for this project. Recording these colours using a digital tool achieves two things: namely, to go some way towards compensating for the fallibility of the human visual cortex, and to provide a vector for the material properties to speak without being directly interpreted by a human intermediary. This taking into account of the material agency of the stones themselves played a key role in understanding the networks of influence that colours may have had on Neolithic peoples, and how this could have affected their cosmologies.

The main stage of this research is six case studies of groupings of Neolithic monuments across the Atlantic façade of north western Europe. Discussion is focused through a lens of these findings along with studies into ethnographic parallels on colour use, stone provenance, and materiality among early farming societies. Using the methodology refined by the initial pilot studies, these six regions are examined for patterns and connections, and analysed both within their own regions and in a wider context, to enable statements on the importance of colour to Neolithic monument builders to be made.

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*For Julian*

*Who has grown into a wild, adventurous, curious, brilliant child of fields and stones and exploration through the course of this research. Stay wild, stay curious, and keep exploring. I followed my dreams; always, **always**, follow yours.*



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## **1. Introduction**

### **1.1 Colour in archaeology - a very short background**

Colour is an experience that unites the vast majority of people on earth past, present, and future. Aside from those who have never had sight, or who are afflicted with extreme cases of colour-blindness, colour forms a rich contextual backdrop to the world and being in it – it comes to signify danger, edibility, rank, status, allegiance, affiliation, mood, and more. Colour has layers upon layers of meaning, not to mention unseen levels of significance to the material agency of dyes, pigments, and material used to create these colours. To ignore these stories is to ignore a vast influence on the human past.

The challenge of archaeology – to understand the peoples of the past through their remains in the present – would surely be a colourful discipline, full of artistic interpretations and material culture dripping with every chip of the Munsell Chart. However, this is not the case. Site plans, photographs, and reports are stark in their monochrome nature. Setting aside limitations of printing costs and capabilities, it is the very matter of archaeological discourse that has also been colour-less; sites and artefacts and landscapes described in typological features or in relation to how people came, saw, and conquered them. Although theories have developed and changed and more nuance in our interpretation of person-place-thing interaction and interconnectivity as begun, colour is still left behind. As chapter 2 discusses, there are some examples of challenges to this – Neolithic archaeology is no longer black and white – but there are still significant gaps in the conceptualising of a colourful past.

Since the ground breaking *Basic Color Terms* in 1969, the idea of the universal evolution of the language of colour conceptualisation in early societies has tantalised archaeologists with the possibility of providing new perspectives of how prehistoric peoples perceived their world. However, there has not been a comprehensive phenomenological or other experiential analysis of how colour was perceived, selected, and presented across the Neolithic of the Atlantic façade of Europe. By looking closely at colour presentation in both monumental architecture and material culture, in sites across the region and throughout the Neolithic period, patterns in colour selection can be recognised and analysed.

The early seven stage evolutionary model postulates that the very first stage of language evolution about colour is universal, and is that which highlights the key contrast: black and white, or dark and light (Berlin and Kay 1969). Colour category as a theory has developed since this early work; indeed the authors themselves spent twenty years developing a more

complete picture of language evolution across the globe, with discoveries that some cultures did in fact build the “blue/yellow/green” category first, and therefore the development is relative to individual and cultural experience (Berlin, Kay and Merfield 1991). Although some have attempted to develop a model that ameliorates the issue of the core relativism / universalism dichotomy by adding modifiers such as hue, brightness, cognition and cultural factors (MacLaury 1992), there remains a great deal of contention on the issue. Whether universal or relative to as yet undefined external factors, there is clearly a far-reaching impact upon cultures, affecting their interactions with their environment, and their understanding of their place in the wider cosmology (Hemming 2012).

Early societies have a significant relationship with colour - the scope of this research is to find just what significance it held for the Neolithic peoples.

Since Tilley’s work on the phenomenology of the Neolithic landscape (1994), the archaeological perspective on prehistoric peoples’ interaction with their environment, and the way this perspective is achieved, has gradually shifted to one that encompasses key natural features and local topography in a united cosmological framework (Bradley 2000, Cummings and Whittle 2003, Watson 2004, Whittle 2004). More recently, instead of merely pinpointing the immediate locality as an influence, the phenomenology of Neolithic sites has developed to encompass relation to natural features and their perceived properties (Cummings and Whittle 2004). However, as Darvill (2013) pointed out, we have the language of grey stones, of monochrome site reports; until recently we have not had the language of vibrancy, hue, and colour.

It has become increasingly clear with the study of megaliths through phenomenology that stones are not chosen merely on the basis of what is to hand or easily located - nor are they arranged haphazardly, or merely to replicate or copy an architecture style that was currently *en vogue* (Scarre 2004). Though it is recognised that there is a definite selection bias occurring (Jones 1999, Tilley 1996), interpreting it is acknowledged as difficult. Scarre points out that the stones chosen often have other interesting features, such as erosion marks, and may have been selected due to their location in important local sites such as river basins (Scarre 2004). Whilst focusing on one facet of interpretation alone risks missing important notions of Neolithic cosmology, dismissing colour selection as an aesthetic choice above a specific, significant ritual purpose is equally as narrow. Certainly, if monuments were an extension of the natural world, then significant materials, colours, and textures may have had similar levels of significance.

Colour presentation is not only seen through the selection of stone - there is increasing evidence that some sites were painted, across Atlantic Europe from Portugal (Shee Twohig 1981) to Orkney (Bradley et al. 2001). Although this evidence is currently limited, earlier excavations and recording of Neolithic sites may not have considered the possibility of painted stones, and therefore more examples may be forthcoming.

The colours that seem to be of particular fascination were red, white and black (Jones 1999, Scarre 2002, Lynch 1988). Several theories have been proposed as to what exactly these key colour categories could have represented. Jones suggests that colours have associations with the properties of materials they are found in, so white becomes barrenness, hardness, bone and rock; red becomes softness, flesh, life and blood; and black becomes darkness and the finality of death (Jones 1999). White being analogous to hardness also appears in the interpretation of Manx pottery finds, with the quartz inclusions being likened to bones that remain beneath the surface until the pot is broken, revealing them (Fowler 2004). Colour should not only be viewed as tangible, as rocks and artefacts, however - as all three important colours can be also viewed as light (or the absence of it). Bright, white light, the red of the sunset or dawn, and the blackness of night or an interior space can also confer colour.

Taking the chambered tombs of Arran as an example, it has been suggested that construction techniques related to this darkness, at least in the context of passage graves, symbolise the passage from life to death, from living to decay (Jones 1999). However, it is also the case that there are very strong links to local topography (Burl 1982). The first approach sees monuments as apart from the landscape, deliberate human attempts to tower over nature; whilst the latter suggests an attempt to work with nature and join with the landscape.

Julian Thomas makes an important argument that gets to the core of approaching Neolithic monuments from a phenomenological perspective: "In building their enclosures and tombs, Neolithic people were re-constructing the world itself" (Thomas 2004, 175). If deliberate colour selection and presentation can be exhibited across the Atlantic European Neolithic, then this "world building" had an understanding and interpretation of colours that affected attitudes to ritual and cosmology.

In the archaeology of prehistory, colour has been recognisably neglected (Scarre 2002), though there has been some recent work to rectify this (Jones 1999, Darvill 2013). However, where the primary focus is what specific colours signified, or at specific sites, there is a lack

of study into an overall pattern of colour interpretation and representation across a broad time period or large region. Lynch's survey (1998) provided a useful list of just where deliberate colour patterning could be recognisably viewed, however, this was related to the aesthetics of colour representation rather than ascribing meaning in a larger cosmological context.

It may be the case that it is geographically relative (Durbin 1972), or dependent on local topography, flora and fauna (Weirzbicka 1990), or dependent on new technologies (Hewes 1992). By looking at sites across the Atlantic facade of Europe, this study will draw conclusions on the nature of the development of the awareness and presentation of colour in the Neolithic, and will show if this time period either reflects or disagrees with the colour category theory.

This fundamental human experience, the categorising of the world into colours that remain redolent with meaning and implication and myth through the passage of time and the evolution of society and culture, becomes one which is difficult to dismiss as insignificant. As the few tantalising studies into colour in the Neolithic of Atlantic Europe have hinted at, selection and use of coloured stone is not random, and therefore has a purpose. This research seeks to draw conclusions on what this purpose might have been.

## **1.2 Research Questions**

Given the state of colour in archaeology noted above - one teetering on the brink of acceptance as a field of import, part of ever debated theoretical framework of assemblage and related object-oriented, materiality concerned big ideas - it seems that the key research questions should strive to focus upon distinct, measurable case studies into colour that allow individual areas and broader regions to be studied in parallel for patterns, themes, and hints at wider cosmological implications.

The main question addressed by this research – *does colour matter to Neolithic communities in the building of their monuments?* – naturally breaks down into three key research questions:

### ***1. Is there a coherent theory of colour perception?***

Despite the *Basic Color Terms* model having a number of critics since its inception in 1969 (see section 2.2.2), there has been no convincing refutation, and the science of colour vision appears to concur with its depiction of a universal process for colour perception. It shall be important to conduct brief research into a number of disciplines in order to establish if this theory is indeed robust. This shall form the basis of the literature review. Along with existing work on colour in Neolithic archaeology, a brief overview of materiality, a short analysis of work done on texture and other complementary properties of stone will be undertaken to see if there is correlation between existing thoughts on colour and the evidence as it is currently understood from the archaeological record.

### ***ii. Is there evidence across the Atlantic Façade of Europe?***

Surveying a range of monuments, across the entire Atlantic façade, is key to this research. Looking at a number of sites that are geographically, temporally, and typologically diverse will show if similarities in selection of stone colour are limited to regions and time periods, or if they are symptomatic of more universal cosmologies or ideas. The surveys undertaken as part of this study will be developed through use of a pilot study and reflexive practice in order to gain the best possible dataset for the purposes of analysis.

### ***iii. What are the implications on Neolithic Cosmology?***

Results from the survey will demonstrate if there are any regional variances or universal patterns that will have wide-reaching implications on how Neolithic cosmology developed. If universal, it could point to a constant, almost inevitable response that a developing society has to ideas of a “wider universe” and spirituality - a neurologically constant reaction to certain colours. If relative, it could begin to explain how early societies reacted to their environments, how they connected with their world, and in turn, how the landscape and materials within it affected the peoples of the Neolithic. Careful analysis of the data will be undertaken to understand the patterns that emerge.

These three key questions identify existing evidence, or gaps within it, for the significance of colour to Neolithic peoples - then explores these gaps through robust data collection and analysis. In order to focus upon SMART methodologies, targets, and timescales, the aim and objectives that will deliver findings on these key research questions are as follows.

### **1.3 Aim and Objectives**

Aim:

To evaluate patterns in the use of coloured stone within the construction of monuments in Neolithic Atlantic Europe, and use it to gain an understanding of the role of colour in Neolithic cosmology.

Objectives:

1. To develop an understanding of why colour is important to people, and how this is demonstrated through art, material culture, mythology, and other aspects of life.
2. To create a dataset of colour use in Neolithic monuments across the Atlantic façade of Europe.
3. To develop a method of recording colour on-site that will be accurate in all light levels and work towards ameliorating the issue of the variation in colour perception in the human eye.
4. To analyse these data with a view to highlighting any significant patterns, on a universal or local level, through the use of geographical analysis of the dataset from objective 2.
5. To assess if there are other correlations with colour, such as texture, location, origin, and shape of stones, and to visualise geographical patterns.
6. To examine the use of colour through the lens of object-agency based ontologies, in order to build up an idea of the translation of the concepts of “colours” through time and how this is influenced by both human and non-human actors, and the relationships between them; to look at Neolithic monuments from the perspective that the process of designing, collecting, and building with particular stone was as important as the finished objects, and what colour use can tell us about this concept.
7. To determine what colour may have meant to Neolithic people in the context of cosmology, through a combination of analysing survey results and exploring anthropological work on colour in extant cultures.



## **2. Literature Review**

This chapter deals with the complexities of colour – from the physiological to the theoretical. From early studies into the significance of language and colour conceptualisation in anthropology, to bitter arguments over how the eye physically senses colour, to ethnographic examinations of the intricate and hidden layers of meaning for colour in pre-industrial societies, to how current trends in archaeological theory make room for material agency and the fractal complexity of people-thing relationships when interpreting the past - all entwining to form a compelling call for colour to be a standard part of archaeological interpretation.

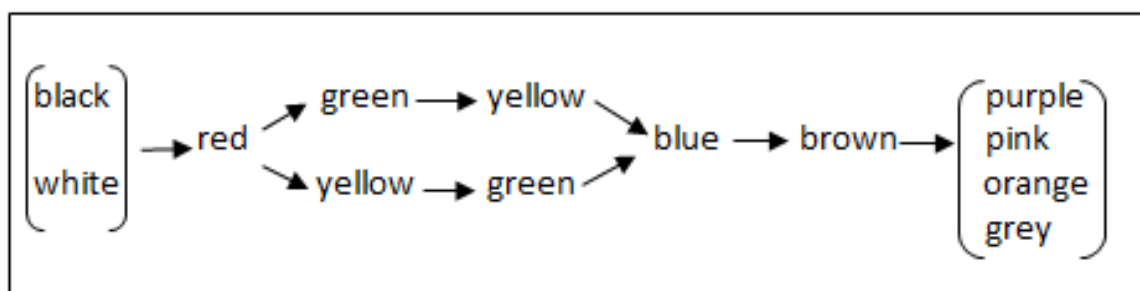
### **2.1 Colour Categories – how we think about colour**

#### **2.1.1 Berlin and Kay’s “Basic Color Terms”**

Berlin and Kay’s landmark study on language made a seemingly incredible claim – that all languages develop colour categories in a uniform manner; there are a basic set of colour categories which develop in a universal way to form the language of colour (Berlin and Kay 1969, Kay and McDaniel 1978). According to B&K, a “Basic Color Term” must adhere to several key definitions, namely:

- i. Monolexemic – must not be able to infer or guess meaning from the components of the word, excluding words such as “greenish” or “reddy-gold”
- ii. It must not be included in the definition of any other colour term (B&K give the example of Scarlet, which is merely a subdivision of Red rather than its own category)
- iii. It must not apply only to a narrow type of objects, such as specific animals, fruits, physical features
- iv. It must be “psychologically salient”, that is, seen as a primary and predominant word in a significant proportion of language users across different situations and occasions (Berlin and Kay 1969, 6).

The predominant theory prior to this was that colours were named arbitrarily, with the language then going on to influence how people perceived colours. Studying 98 languages, 20 of which in a first-hand experimental manner, Berlin and Kay found instead a *pattern* in the development of colour categories.



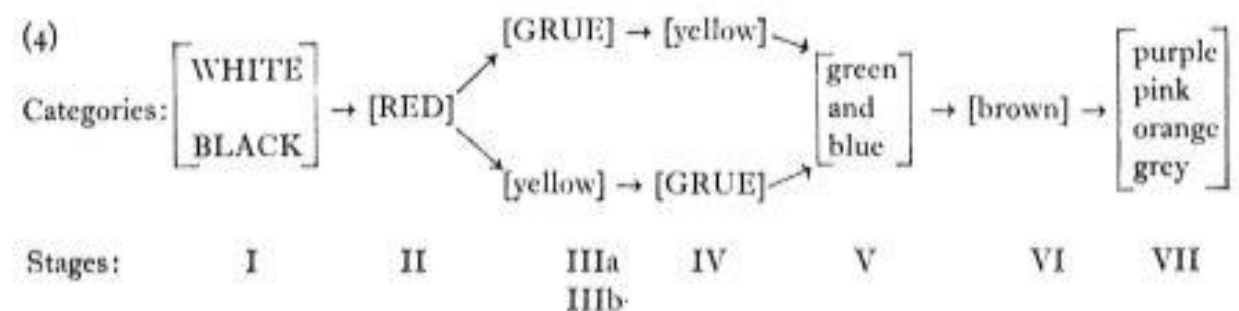
*Fig 1. Berlin and Kay's original Color Terms evolutionary chart. After Berlin and Kay 1969, 4*

They found that the distinction between black and white is first formed, then red is added as a third category, then either yellow or green, then blue, then brown, and finally either pink, purple, orange, or grey, as seen in figure 1. To discover this they studied evidence for basic colour terms in existing work on colour lexicons, and then studied 20 languages in person. By asking “informants”, that is to say native speakers, to pick out both the closest colours that corresponded to a certain term and all those that fit within it, they established key similarities in both loci and boundaries of categories (Berlin and Kay 1969). These colours were 329 “colour chips”, as standardised by the Munsell Color Company, that represented 40 hues in 8 degrees of brightness, and 9 in neutral hues – i.e. black, grey, white.

Establishing clear patterns around the loci of colour groups based on hue across all languages studied, they dismissed earlier predominant theories based on cultural differences and regional variation in colour categories – arguing that these had been based on looking too closely at the boundaries of colour groups, and not finding the focus or loci (Heider 1972b). In effect, they shifted the entire field of colour categories thus: language does not shape how the mind perceives colour, the mind shapes how the language of colour evolves.

These findings, and subsequent validations, initiated a period of lively discussion and debate in the fields of linguistics, anthropology, neurology, and psychology. Significant reworking and remodelling of B&K's theory followed swiftly on, and a new, more complete model was drawn up by Kay and McDaniell that drew upon the raft of new work that followed in the wake of Basic Color Terms, previous work by McDaniell, and the concept of “fuzzy sets” (Kay and McDaniell 1978, Kay and Maffi 1999). These “fuzzy sets” are a mathematical construct that means that a concept could have membership of more than one group, i.e. purple may belong 60% in blue, and 40% in red, which went some way towards explaining the complex colour categories such as “grue” that seemed to defy the original BCT model (Jameson 2005a, MacLaury 1992). Thus, they argued, there could be three types of colour category – primary, derived (i.e. a mix such as orange), and composite.

Composite colours are the most challenging argument against BCT, as they seem to contradict the idea that colour terms are based upon fundamental separation of the basic colours. Composite categories are generally a grouping of colours that English speakers would consider separate entities, with the most widely studied being “grue”, a category including both green and blue. Grue as a concept meant changing the way the evolutionary model had to be presented – stage III was no longer about determining when a loci based around blue or green emerges, but about developing a category that encompasses many shades of green and blue (Kay 1975). By tweaking the focus of the evolutionary model away from solely individual hue loci towards looking at wider categories, a new model was developed that retained stages similar to the original BCT whilst embracing the linguistic findings of composite colours (see figure 2 below).



*Fig 2. Kay's 1975 update to the color category evolution model, from Kay (1975)*

Analysis of some of early stage languages showed more nuance and subtlety in their colour categories than suggested by the original BCT theory. In particular, categories in the Dani language were found to have differing loci dependent upon who was being questioned, and the categories were often broader than originally described (Heider 1972a). This further work added credence to the BCT conclusions, as it found that the Dani speakers, possessing only two basic colour categories, found it easiest to learn and remember the foci of the main colour categories – lending weight to B&K's argument that it is these loci that are key to colour category evolution, not the boundaries of colour categories (Heider 1972b, Roberson et al 2000). This work has, however, met with some serious criticism in its lack of rigorous statistical analysis, and it has not been clearly replicated (Roberson et al 2000). The risk inherent in singling out one language to bear the weight of a theoretical construct as complex as universal colour term evolution is that anecdotal evidence is taken as data – something that would later be addressed in the World Colour Survey (see section 2.1.4).

### 2.1.2 Critique of *Basic Color Terms*

There are other caveats to following the BCT model. Heider warns of an inherent bias that may occur in any ethnographic language study – that of the ethnographer seeking terms that mirror common ones in their own mother tongue – and suggests this bias may have been present in some of the studies Berlin and Kay used as part of their literature analysis (Heider 1972a). Informants for both Berlin and Kay’s initial study and those selected by other ethnographers in later experiments were students sourced from the San Francisco area, meaning that though the languages they were questioned about were their mother tongue, they may have been significantly influenced by their English as a second language status (Collier 1973, Kay and Regier 2003).

Somewhat dismissively, Borstein categorises B&K as part of the “nurture over nature” school of thought of colour term development, though comments positively on the remarkable correlation between their findings of hue loci groupings and research into colour receptor centres in the human eye (Borstein 1973, 257). John Lucy (1997) is damning in his criticism of the BCT methodology’s “weaknesses”,

*“choosing a domain more for its ease of study than for its linguistic significance, being unreflective about the appropriateness of the domain for other languages, ignoring routine usage in favor of performance in a controlled task, and creating the appearance of examining a linguistic structure when none has been demonstrated on internal grounds”* (Lucy 1997, 300)

These flaws, he claims, lead to the study reducing language to simply a way of codifying “pregiven reality”, and not contributing to the field in a meaningful or rigorous manner. Similarly, Roberson et al. (2000) effectively accuse BCT of sweeping linguistic and language structures under the rug when, they argue, these should have been the primary focus. Their work on the Bernimo language attempted to highlight their perceived flaws in BCT, by showing that colour categories within a “stone age” language are constructed around broad-boundaried locally arising colour terms; they claim foci only developed later, almost as an afterthought, and therefore cannot be evidence of universal colour categories (Roberson et al 2000). This relativist stance has not received wide academic support, and was firmly rebutted by Regier, Kay and Cook in their reporting of the World Colour Survey, not least by pointing out that numerous important Munsell colour chips were omitted from their methodology, thereby removing many potential loci (Regier et al 2005, cf. section 2.1.4). Furthermore, their determination of where categories meet and where the boundaries lie have been labelled as inaccurate and contradictory by Paul Kay (2005, 43), who dismisses the “challenge” the

Bernimo language places on BCT. Claiming instead that within the linguistic constraints and categories of the Bernimo language, it actually supports a universal model not denounces it, Kay notes that the subjects performed well around the boundaries of their own colour categories, but not of those of the English language; that Roberson and her colleagues fell foul of the trap Heider warned of, that of the anthropologist focusing on the constraints of their own mother tongue.

### **2.1.3 A Pan-human physiological process?**

Alongside the development of the BCT model, contemporary academics theorised that it is a human neurophysiological process that leads the human mind to form categories of colours in this particular order (Kay and McDaniel 1978). These studies have played a vital part in the validation of BCT, as they bridge the gap between stimuli of the human eye and cognition of colours by the human mind.

One of the fundamental theories upon which BCT was built is that of Hering's opponent-processor theory of colour sensitivity in the human eye (Hering 1920, Jameson 2010). The colours found to have the most hits for best examples of particular colour terms lined up closely with Hering's primary colours (Berlin et al 1991). Hering believed that there was a fundamental uniqueness about certain colours, which all other colours derived from in some combination, and that they had key opposing relations – black vs white, red vs green, yellow vs blue. The latter two, he decided upon as humans cannot conceptualise of colours that are reddish green, or yellowish blue; therefore these pairs of colours must be seen by the human eye as some kind of oppositional process. His work was widely criticised by his peers (Hurvich, 1969), who were dismissive of his methodology and his lack of quantitative data, and the "unlikely" complexity of the human optic system this theory would require.

Hering was eventually vindicated by later studies into the neurophysiology of colour vision. His theory was "far ahead of the knowledge of neurophysiology at the time it was proposed", and it was not until the mid-20<sup>th</sup> century when attempts were made, most notably by Leo Hurvich, to provide quantitative body of evidence for the opponent-process model (Hurvich and Jameson 1957, 401-402).

Put briefly, this model is one of the basic theories of how the eye sees and processes colour. When light hits the retina of the human eye, it is absorbed by a type of cell with light receptors called cones, which are split into three different types for the differing wavelengths of light. Another type of cell, postreceptoral cells, pass information about differences in these light

wavelengths to the ganglia, which transmit this information to the visual cortex in the brain where it is converted into a cognition of “colour” seen (Hardin, 2005). Hering’s (and latterly, Hurvich’s) theory states that this conversion takes place via three opponent processes, that allow the mind to perceive colour based on the comparison of the outputs from the cone cells in three channels : white/black, red/green, blue/yellow. These channels work by a process of comparison:

*“The chromatic channels are configured antagonistically, so that when the red-green channel is excited, red is signaled, whereas when the channel is inhibited, green is signaled. Excitation of the yellow-blue channel yields yellow, and inhibition yields blue. When the excitation and inhibition of the channel are balanced, the result is achromatic.”* (Hardin 2005, 73)

As an example of how this works, imagine you are holding a Jonagold apple. The light from a nearby lamp bounces off this apple and is absorbed by the eye’s cells; the information received by these cells has three channels, which each work like a series of signals being switched on and off to signify different values, rather like binary code being interpreted by a computer. A white/black channel (giving information on brightness and contrast), a blue/yellow channel (in balance as these colours are not present), and a red/green channel, which is being stimulated, cancelling out the green signal, and so the eye sees a red apple. Conversely, should the apple be a fine Granny Smith, the red/green process would be inhibited, causing the eye to see a green apple.

Hering, in his determination to believe in the theory that the unique colour opponencies of black-white, red-green, and blue-yellow were they key to how colour vision works despite a lack of hard evidence, pre-empted later scientific research and earned posthumous respect of having these primary colours named for him in the literature of colour perception. It is a testament to the revolutionary nature of Hering’s work that this theory is still the bedrock for colour category research to this day.

There are two intriguing arguments against there being a common human physiology of colour processing; that of modern genetic studies finding new variances in photoreceptor sensitivities, and the suggestion of a significant gender difference in the processing of colour (Jameson, 2005). These two arguments are closely linked, due to an intriguing genetic discovery. Recent work on the genetics of colour vision has found that a significant proportion of Caucasian females (15-20%) possess the “genetic potential” to be tetrachromats, that is, in possession of four processes rather than the seemingly firmly established three (Jameson 2005). Although limited work has been carried out to test any differences this genetic variance

might yield, one study has found that there is an increase in perception in these individuals when asked to delineate colour separation in a spectrum of diffracted light (Jameson et al 2001). If this group of people, a significant 20% of Caucasian female individuals, do indeed differ in their cognition of colour, it could have interesting implications for gendered influence on colour categorisation. Could the existence of composite colour categories, that are difficult to explain under the opposition process model, be a result of tetrachromat individuals being the predominant influence in particular cultures?

Genetic variance in the eye's response to colour stimuli could have profound effects upon related groups of people, and therefore lead to localised differences and oddities, though even those seeking to critique BCT agrees that cross-cultural colour categorisation is bafflingly uniform given the statistical probabilities of genetic colour perception variance (Jameson 2005). Although Roberson does bring up the issue of the relative tardiness of colour category development in children as a possible indicator that it is not an innate universal process (Roberson 2005, 65), this does not seem to be significant enough a counter to the weight of current data supporting it.

Another interesting facet of the study of human colour vision is the experience of those individuals who are visually impaired. Alongside the well documented phenomenon of synaesthesia, where sounds, words, and music are most commonly associated with colour experiences (Harrison & Baron-Cohen 1994), there is some emergent evidence that the visually impaired perceive a surprisingly rich colour palette. To visually impaired individuals, who have never experienced colour vision, the concept of colour can be a difficult one to communicate. Although they can feel the heat of light sources like the sun, and therefore the concept of "light" is simple to comprehend, how do you quantify a golden sunset, a pale grey misty dawn, the soft blue of fresh snowfall? Although even those with relatively profound visual impairments can see a contrast between light and dark, this rules out the entire spectrum of colours. Yet there is some evidence that a colour sense persists against these odds – particularly studied in colourblind children, who learn to differentiate dozens of subtle shades as different hues (Lillo et al 2014), and famously Oliver Sacks' study of the achromats of Pingelap in Micronesia, who can see no colours but shades of grey, and yet have adapted to be excellent night fishers due to their ability to recognise such minute differences in contrast and shade that they can, effectively, see in the dark (Sacks, 1997).

Current research into improving the quality of life for the blind is already developing haptic devices that feedback information on colour, allowing their users to "feel" the colours of their surroundings (Wozniak et al 2015) – to these individuals, colour and touch become so closely

linked as to almost be a synesthetic experience. For Neolithic peoples, in the darkness of enclosed monuments, the textures of particular types of rock, and any carvings made upon them, may act as a stand-in for colours; the materials chosen may have had significance not just visually, but also to the haptic senses, to continue communicating their meaning and significance even in the blindness of the dark.

#### **2.1.4           The *World Colour Survey* and other recent studies**

The *World Color Survey* (henceforth referred to as WCS) set out to address some of the most common critiques of BCT – namely, that it relied heavily upon languages from Western, industrialised nations; gathered data from those who also spoke, and therefore could be influenced by, English; and that its methodology was too rigid, not allowing for linguistic nuance and variation (Kay et al 1997).

The WCS examined 110 languages from pre-industrial cultures, and similarly to the original BCT research, asked native speakers to name 330 colour chips, and then choose exemplars from these chips relating to each colour term. Once again, there proved to be loci around the Hering colours – Black, White, Red, Green, Blue, and Yellow – with the most positive hits being around chips A0 and J0, representing the purest examples of white and black respectively (Berlin et al 1991).

Comparing data sets from BCT and the WCS, the authors and subsequent researchers found the same patterning of clustering around specific loci (MacLaury 1997) when subject to statistical modelling (Berlin et al 1985, Regier et al 2005, Lindsey and Brown 2009, Kay & Regier 2003). These clusters lend weight to the original BCT findings, of colour terms being based upon universally recognised loci, and that this in turn must be based upon a universal neurophysiological process that effects how colour is perceived. Based upon these new data, and their work since the original BCT, Berlin and Kay reworked their evolutionary model to reflect the linguistic complexities found (see figure 3). It was now clear that the evolution of colour categories happened as a process of partition, and that the original categories did change in nature as new ones formed (Hardin 2005). For example, stage one is now white/warm/light vs. black/cool/dark, with new categories arising when specific colours are partitioned from these primordial categories, and the original categories become narrower.



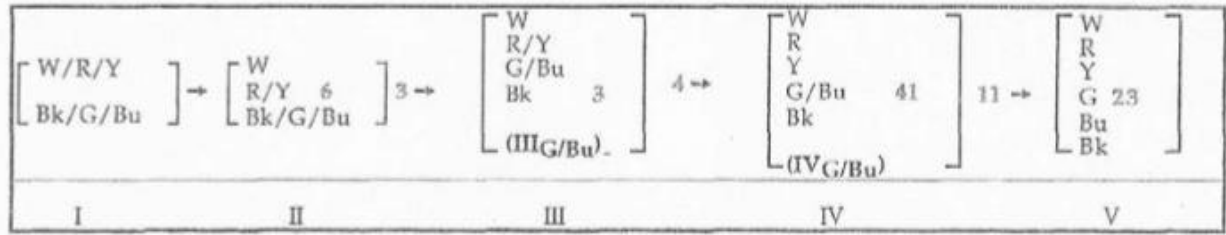


Fig 3. Colour categories model after the WCS. From Hardin 2005, after Kay et al 1997

In addition to the WCS, Jameson's "interpoint distance model" adds two complementary principles to the evolution of colour categories; one, that individuals in a culture may have individual perception and cognition of colours, but that as a societal group there is a consensus made for reasons of functionality and cohesion, and two, that cultures universally come to partition colour space and create their colour categories in strikingly similar ways because colour is "universally accessible" (Jameson 2005, 31). This model is founded upon the fact that there are "universal cognitive principles", and that

*"these universal cognitive principles can exert a similar influence on color-naming systems across cultures, and the degree to which cultures seem to universally name colors is related, in part, to their independent use of the cognitive principles proposed by this model"* (Jameson 2005a, 164).

This model accepts that there is indeed a universal pattern in colour category evolution, but intriguingly, suggests that other factors may function as modifiers that cause anomalies in the developments of particular languages. Based upon the idea that a colour naming system will demonstrate "polar symmetry" and will exist under pressure to be balanced (i.e. to have distinct colour spaces defined in contrast), Jameson admits that it comes unstuck when dealing with those languages that have unusual composite categories (Jameson 2005a, 169). Following on from this work, Jameson has used a range of further analyses of the WCS to raise concerns on relying solely upon the Hering model as the basis for universal colour experience, though found little in the literature to corroborate said concerns (Jameson 2010).

## **2.2 Ethnographic and archaeological examples – *what’s black, white, and red all over?***

### **2.2.1 Ethnography - after the data is done**

A significant study into ethnographic parallels for both colour and stone procurement strategies as cosmological entities was not undertaken until after the main body of surveying and research had been conducted. The reasoning for this was simple: any and all ideas, concepts, and theories found within the body of work on these topics would influence the research design, and therefore research outputs - even on a subconscious level. As seen with the discussion of devising digital recording techniques and the human effect on digital systems never truly being eradicated (see chapter 3.5), no matter the care and reflection taken during research design, bias will always creep in.

From the reflexive journal entries, it is possible to track the development of the theoretical framework and the various influences on the structure and content of this research project over time. With a field of study as contentious as ethnography, with the unsavoury hangovers of colonialism and the tendency towards unquantifiable, subjective interpretive studies (Gosselain 2016), it is vital to attempt an objective as possible approach to existing case studies and interpretations. Contemporary indigenous experience and practice is a vital aspect in examining past cultures, but often studies of these peoples is conducted by outsiders, and does not carry their voices, but the interpretive voice, and “linear Western thought processes of logic” (Robinson 2004, 93) of the ethnographer. There are some significant exceptions - one being the landmark 1998 paper *Stonehenge for the Ancestors* by Parker Pearson and Ramilisonina, and the groundbreaking body of work by Australian archaeologist Isabel McBryde (2005) - both of which acknowledge, and attempt to address, the lack of voices of indigenous peoples in the literature.

For this reason, the ethnographic study sits subsequent to the results of the digital recording and experiential case studies. Though no two societies can ever be directly analogous, the use of a broad ethnographic data gathering study is that it can find evidence of patterns in behaviour and belief that point to likely earlier iterations of such patterns in past societies. Unlike Topping’s substantive thesis on the matter of stone extraction (2017), which used ethnographic research as a significant methodological approach and source of extensive statistical analysis, this chapter is designed to identify broad ethnographic parallels and inform the summarising of existing results (see chapter 7). In this manner, ethnography acts as another device for examining the core questions of colour and stone as cosmological

entities that this research seeks to answer; like the ORAC recording device, it is a tool, one with acknowledged constraints but also significant benefits, if approached critically.

## **2.2.2 How do people look at colours?**

### **2.2.2.1 Victor Turner and the *Forest of Symbols***

One of the keystones of literature on colour categorisation and colour as cosmology is Victor Turner's body of work on the Ndembu of Zambia, most notably in 1967's essay collection *The Forest of Symbols* - which serves as an exemplar of 1960s, post-Lévi-Strauss cultural analyses that uses a great depth of ethnographic study to construct a depiction of ritual life for the Ndembu through the lens of burgeoning 1960s attitudes to sociology, ethnography, ethics, and post colonialism. Turner used his findings on colour categorisation to dismiss the diffusionist idea of human culture in favour of his structuralist ideas; "Since the experiences the three colours represent are common to all mankind, we do not have to invoke diffusion to explain their wide distribution" (1967, 90). Turner is viewed as something of a giant in the field of ethnography, and is credited with starting an entire school of anthropological thought that embraced human creativity and imagination alongside a rigorous approach to recording and reviewing cultures, societies, and peoples - as well as being one of the instigators of ideas of ritual being an embodied act (Grimes 1996, 358), which places him distinctly within the bounds of current popular narratives within archaeology on the embodied experience of materials, landscapes, and ritual in the Neolithic.

The lengthy essay on colour classification examined how Ndembu ritual broke the contemporary narrative of ethnographers favouring theories of "primitive" dual classification of the world - something Turner was wary of examining due to the probability of stirring up dichotomies associated with social conflict, particularly across the gender divide where he assumed he would find the most evidence of a dualism in Ndembu ritual and culture - and found that their worldview was heavily influenced by a "tripartite mode of classification": red, white, and black (Turner 1967, 59-60). Each colour does not have one simple, overarching characteristic, but a series of interwoven meanings and significances, bound up in a mythology and mystic initiatory tradition about three rivers: one red, one white, and one black (Turner 1967, 64-65.)

Red	White	Black
<p>The river of blood (represented by a mixture of fowl's blood, red clay, tree gum in ritual)</p> <p>Secrets</p> <p>Copulation and a symbolic man/woman pairing</p> <p>Impurity (blood seen as impure)</p> <p>Blood of animals</p> <p>Blood from childbirth</p> <p>Menstrual blood</p> <p>Blood of a stabbing/murder, circumcision (red pigment used to purify a murderer or someone who has slain a lion, leopard, or buffalo also classified as this blood)</p> <p>Blood of witchcraft</p> <p>Power (things with blood, ie living things, have power of life - inanimate object must be given this through ritual to have power imbued in them)</p> <p>Both good and ill</p> <p>Impotence</p> <p>Infertility</p>	<p>Spirit protection</p> <p>Semen - "blood whitened by water"</p> <p>Breast milk</p> <p>Masculine and feminine symbols, but not combined as in red</p> <p>Communication / good will with ancestors</p> <p>Purity, ritual purification</p> <p>Fertility (as white beads)</p> <p>To lack bad luck</p> <p>To have power</p> <p>Authority</p> <p>Health</p> <p>Life</p> <p>Huntsmanship</p> <p>Generosity</p> <p>Memorialising the dead</p> <p>To laugh</p> <p>To eat</p> <p>Crop and animal fertility</p> <p>To reveal, make visible</p> <p>To become an elder</p> <p>Washing</p> <p>Free from ridicule</p>	<p>Ashes from ritual burnings at the close of seclusion rituals</p> <p>Death (passing to next phase of life rather than a final act)</p> <p>Concealment</p> <p>Darkness</p> <p>Evil</p> <p>To lack luck</p> <p>Suffering</p> <p>Disease and illness</p> <p>Witchcraft and sorcery (viewed as a necessary evil)</p> <p>Sexual desire (illicit)</p> <p>Night</p>

*Table 1. Colour symbology and significance among the Ndembu - collated from Turner (1967, 60-92).*

Turner highlights the fact that evidence of this colour triad has been in the anthropological literature across the first half of the twentieth century, and picks out several examples from

Africa that show a trend for puberty and coming of age rites, in both male and female variations, heavily encoded with r/w/b symbolism and the painting of bodies in black for death, white for purity and passage into adulthood, and red as a qualifier of the less neatly defined human emotive responses like joy, gratitude, health, and life - see table 65 (Turner 1967, 67-68). He also makes a “haphazard” attempt at surveying the literature from other peoples and nations, and finds significant evidence of the r/w/b triad from West Africa, Malaysia, Australia, “North American Indians”, all of whom display a complex system of colour significances that, like the Ndembu, fail to fall into neat dichotomous categories. Compare this to the findings of chapter 7 where modern day associations were collated and examined - and a similar white/black dichotomy, made human and messy and emotional by a quixotic and mercurial red collection of words emerged.

#### **2.2.2.2      *Red, White, Black As A Mode of Thought and related texts***

Seeking to critically evaluate (and ultimately, reject) the colour analysis offered by Turner and his contemporaries, Anita Jacobson-Widding conducted her own lengthy examination of the peoples of the “lower Congo” region to ascertain their ritual engagement with red, white, and black (Jacobson-Widding 1979). She was dismissive of both structuralist, duality-driven approaches and what she perceived as Turner’s failure to come to grips with the true tripartite nature of the peoples studied - when it came to the difficult, contradictory, red category, she accused him of “sweeping under the carpet” (1979, 375).

To formulate her own response she drew on the ethnographic observances of both missionaries and her own research to form a large dataset of colour related ritual activities and observances - an approach that drew significant contemporary criticism for the lack of professional approaches to anthropology or unifying methodology, as the accounts and records span a disjointed time period covering some seventy years (Biedelman 1980, Fukui 1981).

Jacobson-Widding did pick out some similar core themes to Turner - though unlike the strong white/red association he noted with rituals surrounding coming of age, sexual maturity, and puberty, she identified red as being the sole category of these turning points. She found that the intense correlation of red with multiple categories of blood found by Turner did not have analogy in the peoples of the Congo. Indeed, there was significant difference in the way the peoples she studied categorised the dead and the ancestors using r/w/b - rather than them being a largely unified entity being associated with white (when communicating and having harmonious relationships with) or tangentially, black (the act of

dying and entering the spirit world), Jacobson-Widding found that ancestors were mercurial and changeable in their attributes, and colour, depending on their time-depth (see table 66).

Red	White	Black
Moral Neutrality	Matriliney	Anti-social order
Far Distant Ancestors (neutral, live in the air)	Distant Ancestors (live in water, benevolent, good)	Recently departed dead (loitering on earth, malicious, evil)
Unpredictability	Reason	Evil
Shadows	Clarity	The body (as an impure thing)
The Moon	Noon	Earth (as in the physical dirt)
Water	The soul	Evening
Rainbows	Sky	Logic
Irrational thought	Underground	Land-based medicine
Air-based medicine components (feathers)	Water-based medicine components	components (wood, soil, clay)

*Table 2. Jacobson-Widding's broad interpretations of red, white, black associations in the peoples of the Congo. Jacobson-Widding 1979; 219, 318-340*

There were, however, numerous rituals and rites where the three colours were complexly entangled with each other, to the extent it is difficult (when using second hand accounts and reports from non-uniform and non-specialist sources as Jacobson-Widding primarily did) to *dis-entangle* the component meanings and symbolisms - take, for example, the presence of the niombo puppet at funeral rites; a giant, red-cloth bound puppet containing a mummified chief's corpse, tattooed in black and white (Jacobson-Widding 1980). Where does the boundary lie between life, celebration, death, endings, beginnings, and protection when it comes to how the colours embody these concepts at this ritual?

The recognition of this key triad continues in ethnographic literature of recent years, particularly in the work of colour theorists like the late John Gage, who recognised the depth of significance these colours had beyond mere categories. He noted that in contemporary Australian Aboriginal language framed red, white, and black in terms of ochre - with red carrying the deepest significance and being the most treasured of all ochres (Gage 1999). In his experiences of living with the people of Kakadu National Park, Tacon found that red ochre was the central material to a vast array of public and private ritual uses - mainly

focused on ideas of protection for the living after the death of a community member, and therefore alarmingly hovering closeness of evil spirits - red ochre is applied to people, trees, buildings to make them “safe” (Tacon 2004). The source of the best quality (where quality infers cosmological and ritual value as well as material properties) are redolent with myth, particularly that these places are the site of “the blood of totemic beings” (Smith 2000, 665).

### **2.2.2.3 Recent work**

As seen previously in this chapter, there have been a small but vocal body of anthropological work into the ways pre-industrial cultures use colours as concepts immeasurably more significant than mere categorization. This section highlights some of the more recent and detailed anthropological work in this regard.

In the recent colonial past of African anthropological studies, intersections between old “indigenous religious practices” and missionary control included those around ritualised colour - as with the case of the deep and powerful nexus of meaning, association and valuable supernatural properties of white cloth in the Bunu Yoruba peoples of central Nigeria (Renne 1991, 709). The colour of this cloth - and the process to achieve this colour - is an immensely rich assemblage of gender (men own black cotton seeds, sell the white tufts to women who weave, and young girls pick the fibres clean of black seeds and sell them back to men), culture, hierarchy, magic, power exchange (to bridge ‘social and natural domains’ in harmony), medicine (where white cloth is prescribed to remedy the ‘disorder of the cosmos’, of the intrusion of evil that causes illness) , wellness, spirituality, and other, unknowable attributes that persisted until very recently in Bunu culture - with white cloth still spun by some women today and is still an important exchange-offering, forming a bridge between the spirit world and our own (Renne 1991, 710-13). More broadly in Bunu Yoruba peoples, their three colours are red, white (including transparent things such as rain and snail trails, and embodied by bodily substances including milk, semen, and saliva), and black.

Briedenbach’s time among the Twelve Apostates Church in Ghana highlighted how such cultural melanges - old ritual mixed with incoming Christian doctrine - can form a new synthesis of ritualised colour. Part of the wider group of Fante peoples in Ghana, whom are well recorded as having deep ritual behaviours encoded into their definition and ritual use of the colours red/white/black in vision work and healing, they make use of red cloth to adorn people, holy objects, and significant places amidst healing rituals (in contrast with the strict wearing of white at all other times, and the apparent rejection of the use of black due to its

historic associations in pre-Apostate ritual) is immediately suggestive of a deep history of the colour triad's significance (Briedenbach 1976). This hidden aspect of black as a significant, but not overtly referenced to in ritual or daily life due to its power and possibility of consequences for its improper use has been noted as far back as Turner's original work on the Ndembu; he critiques previous ethnographers' "artificial and constrained" model of many pre-industrial cultures as utilising a simple, dualist, white-red colour classification system, leading to problematic and muddled and contradictory interpretations as to the meanings of red and white; black is necessary for a rounded cosmological model, but is often elided from open discussions with outsiders (Baumann 1935; Turner 1967, 60).

For contemporary Australian Aboriginal groups (and by inference, historical and ancient ones, given the nature of storytelling and passed down oral culture in Aboriginal societies), colour is significantly more than just a categorisation tool; colour and brightness are "associated with the power of great Ancestral Beings" (Tacon 2004, 31).

It is easy to miss the small things when examining literature for big themes and overarching narratives. In folklore and landscape studies, there are often small nuggets of rituality around colour that act as reminders of the unpredictably varied, but predictably rooted in place-thing-colour entanglements as seen throughout this research. As an example, there is a Hebridean Gaelic word, *Eig*, that means white pebbles deposited in a stream to attract salmon in the moonlight (Macfarlane 2012). Consider this alongside the much documented, much theorised practice of ritual deposits in water sources across multiple time periods and cultures; what if it is all in aid of a hearty fish supper?

The near-unique ability of humans to experience colour vision trichomatically - and therefore see red objects clearly - may be the reason red foods, and the colour red in general is so appealing - and maintains association with desire, sexuality, and attractiveness even in the face of other connotations such as blood and anger, argues Petru (2010).

From recent folklore, popular culture, and media studies (following the classic work of symbology, Circlot's 1972 work *A Dictionary of Symbols*), it is clear that the red/white/black triad has been utilised in a variety of forms in story and folk tale in two key ways; as a signifier of a beauty ideal, or as the indicator that a protagonist will undergo a ritual journey, an ascension to greatness. This was touched on in Chapter 2's discussion on the heroes of myth being categorised as exemplars of human form via use of r/w/b features; most recently (and relatably to audiences at conferences and public engagement events for this research), the r/w/b triad as journey was retold as the rebirth and reanimation of popular television



show *Game of Thrones*' character Jon Snow after his blood was spilled in the snow, surrounded by "crows" - a plot twist that came as a surprise to no researcher in early modern and medieval myth and folklore. Compare the Western beauty ideal that Vaz Da Silva equates with the colour triad - maidens with pale skin, red lips, black hair, the sexually attractive ideal of being simultaneously pure whilst being suggestively "ripe" and brimming with the feminine mysteries of death and rebirth (Da Silva 2007,247) - with the confluence of colour associations Turner found in the Ndembu - red for a couple and their sexual togetherness, black for illicit lust, and white for fertility and purity of the act of child making. Three very different types of sexual behaviour all codified into three colours, seen in two very different cultures.

What is clear from all of these sources - from 1960s anthropologists to present day folklore studies - is that colour is more than just a way to categorise the world into neat, discrete parcels. It is codified with layers of meaning, conscious and unconscious, that have both developed and yet survived over generations of cultural and social change. They are mnemonic shortcuts to ideas of sexuality, magic, death, dichotomy, change, and difficult to categorise emotional human responses to the world around us. They are a link to deep time, to human experiences past. The core triad of red/white/black has seen remarkable persistence through time to remain a striking and significant influence even in modern post-industrial societies; it grabs our attention from road signs to lingerie to architecture. It seems unreasonable, then, to assume the people of the Neolithic did not have an affinity, and a codified set of embodied rituals, to engage with this remarkable triad of colours.

### **2.2.3 Procuring materials – symbolism, practicality, or a little of both?**

When is a stone not a stone, but an entity redolent with history, meaning, significance, myth, tactile presence, personality, material properties, strength, weakness, emotion, and value? The answer is, always.

*"The persistence of diverse perspectives on our earth's mineral heritage into the present day emphasises the need for practitioners of not just archaeology but a whole range of disciplines to take into account the possibility of alternative understandings of the mineral world."* -Boivin 2004, 21

When groups of people seek out stone and extract it from its "natural" habitat - through excavation (in flint mines), quarrying (langdale axes, Preseli bluestone), hauling from its

surface socket in its post glacial landscape (the granite blocks of Drenthe), or any number of other techniques - the acts of selection, procurement, removal and eventual re-deployment are full of ritual and rite as well as practical techniques and necessities: once again, an assemblage comes into play. Much of the literature on this topic is concerned with extraction for the purpose of tool or portable art manufacture, rather than monument building - an acknowledged shortfall in archaeological and anthropological literature, where the quarrying of stone for megalithic building purposes is significantly lacking, even in areas remarkably rich in monument building traditions such as sub-Saharan Africa (Insoll 2015, 204). Though this presents challenges of scale and context when examining ritualised behaviours around stone procurement as an embodied experience, broad arguments on the significance of place, associations with entities and cosmological properties, and the ritualisation of journeying, access, and extraction are still analogous.

As Boivin (2004) points out, the familiar animal, vegetable, mineral categories we use to neatly order the world today are not universal, particularly among pre-industrial societies where agency, energy, and intent, even if not labelled as such, are inferred upon what we in modern Western cultures would see as “inert” objects. To a significant number of peoples around the world today, minerals, she points out, are *alive* (Boivin 2004, 4); in contemporary Maori cultures green nephrite is very much an entity, with individual stones having gender, personality, personhood and identity of their own (Brumm 2004). Boivin also notes, however, that the field of cultural anthropology has frustratingly failed to research material culture as a social, political, cosmological, cultural and ritual entity - the stones, ready with stories, have not been listened to as they deserve. Fortunately, since the time of writing, there have been some advances in this field; one only has to see the debate and discussion spurred on by works such as Bennett’s *Vibrant Matter* to see that matter, suddenly, matters after all.

From what does exist in the literature on the procurement of stone in these pre-industrial societies, the common theme of stone procurement is the process of journeying to retrieve it: usually arduous, proscriptive, strictly ritualised, and used as a test of readiness for adulthood or ascension to a particular role within the community (McBryde 2000, Robinson 2004). Several groups, including the Wintu in California, gave the journey an additional layer of hardship - and potential for hallucinogenic and delirious experiences - by fasting even under strenuous distances and difficult routes (Robinson 2004). For precious materials, such as red ochre from particularly prized and significantly storied extraction sites of the Dieri tribe, Coopers Creek, the journey length could be extreme; over 500 kilometres in this case (Tacon 2004). It is not just journeys across land, either; the Maori of the Poutini Coast, South Island, New Zealand, traversed several hundreds of kilometres of open sea voyage one

every generation or so to access greenstone sources at the very north of North Island (Coutts 1971). Compare this with the remote quarrying sites for Neolithic axe heads, nestled in isolated and stunning locations away from the messy mundanity of daily life (Edmonds 1995, Bradley 2000). The journey to a site, and the landscape passed through to reach it, is transformative. Once this arduous journey has been completed, the custodian of the stone's quarry site - as McBryde points out, a venerated and strictly rule bound individual for the particular Aboriginal people he was studying - must be petitioned for access and, eventually, removal of stone itself (McBryde 2000). Layers upon layers of performance and ritual movement through place. Consider this in the context of Neolithic monument building, and the biography of the stone suddenly expands from a simple extraction > construction model to one that is a tangled map of identification, ownership, encoding into ritual, ritualised travel and journeying, rites of access and permission, rites of extraction, retrieval, carrying back, presentation, construction, use, performance, disuse, and unfathomable levels more. Stone is never just stone.

The source of stone is also a deeply meaningful aspect in procurement strategies. Even if material is functionally identical from numerous sources, one will be selected and exploited repeatedly if its perceived properties are important or align with perceived cosmological and practical necessities. Tacon found that particular stone sources in Australia are used by Aboriginal groups for knives; the power of the kill itself came from the stone, not the hunter - so stone chemically and materially identical to an outside observer is actually inert ritually to these people, with only one source, ritually travelled to and exploited, of any value (Tacon 1991). In a manner tantalisingly similar to the European Neolithic axe trade, the Dani people of Irian Jaya categorise their tools based on stone provenance as well as function and form (Hampton 1999).

With this intense significance placed on the extraction point, and the ritualisation of the journey to reach it, it is clear that ownership of such extraction sites would be an issue of conflict, control, and deep importance. The Chumash people of modern day California embody the quarry sites for obsidian with the concept of *'atishwin* - an impossible to translate concept that falls somewhere around the embodied power of supernatural beings, and the supernatural entities themselves as concepts (Robinson 2004); the sites must be approached via an arduous journey, negotiated with precisely ascribed ritual, and full of terrifying consequences for improper behaviour. The land and the minerals within it are alive - and require respect. Similarly, stone quarrying sites in Arnhem Land, northern Australia, are seen as places where the bodies or bodily secretions of powerful beings from the Dreaming have been petrified into solid, tangible, and useable rocks - as long as you follow

the correct ritual to obtain them (Brumm 2004). This “storied” nature of extraction sites, as Topping categorises it, appears at over 70% of the sites in communities studied by him in his ethnographic examination of stone procurement (Topping 2017, 52). From his analysis, a storied extraction site should possess several key characteristics from evidence of ritualised and seasonal behaviours to the presence of rock art and an output of functional tools - all commonly seen in cultures in his research, and in Neolithic quarrying and mine sites. Stories and mythology, used in this way to endow landscapes with personality and power, also serve to tie place to peoples, and therefore confer ownership - the association with a shared past and specific supernatural and deific beings associated with specific groups ties them indubitably to that place in perpetuity. As an example, access and extraction rights of these Aboriginal lands in both ancient and modern Australia are governed by strict Aboriginal Law that is “...informed by ‘mythico-cosmological’ religious and spiritual doctrine that in turn informs all aspects of Aboriginal life” (Piotto et al 2018, 30); a Law that alters and affects behaviour and actions surrounding stone extraction and selection.

Unsurprisingly given these themes of ritual journeying, storied landscapes, ownership and origins, and ritualised behaviours around access to extraction sites, the very process of quarrying, mining, or removing stone from site is frequently a ritualised one - seen in multiple cultures across each continent that suggests it is “...a mechanism which connects resource procurement directly to the cosmology and ideologies of indigenous communities, centring people in place” (Topping 2017, 73-74) . Rituals surrounding the extraction can be lengthy and wrap around the physical act of removal by several days or weeks - from purification via sweat lodge in Minnesotan Pipestone Quarries (Holmes 1903), to years-long cycles of ritual behaviour that culminate in offerings to “Ancestral skulls” in the Una people of New Guinea (Hampton 1997).

From this brief cross section of the literature, clear patterns emerge: that the very act of sourcing stone is imbued with ritual at every step - throughout cultures that use stone, ritual is deeply embedded in the journey to claim it; the cosmological and supernatural personality and deification of the landscape it comes from; the complexity of ideas around ownership and respectful, ritualised access; the process of removing the stone itself; and the way it is framed as an entity, imbued with properties of personhood and awareness and mercurial, powerful properties deep in myth and folklore. It seems extremely likely that these common strands were also a part of Neolithic stone selection practices, and that part of this vast ritual framework included an awareness of, and the cosmologically codified attitude towards, the colour of the stone itself.

### 2.2.3 Summary of ethnographic study

When looking for evidence of colour selection and use by societies in the archaeological record, it rapidly becomes obvious that certain colours are chosen time after time, and can be reasonably assumed to have significance to an extremely broad range of peoples. Those colours are red, white, and black (henceforth written r/w/b). Pastoureau, having spent many decades in the study of colour use in history of the West, declares that these colours “were these cultures’ main colors until the height of the Middle Ages; around them were organized all social codes and most systems of representation based on color” (Pastoureau 2001, 15). Upon studying the Ndembu people of Zambia (a culture that, significantly, has only three colour categories), Turner found the r/w/b triad to be intrinsic and integral to the nature of their ritual structure and belief system to the extent that he went looking for evidence of this in other cultures (Turner 1967). He found it in abundance, not just across southern and eastern Africa, but from the paintings of aboriginal Australians, to Malay tribespeople and their body painting rituals, to the cosmology of the Dogon in West Africa, to spirit correspondences for the Cherokee, to being the “only truth about the world” in the Hindu Upanishads of ancient India; above all, he noted, they seemed to be a vital component in initiation ceremonies in a vast number of societies (Turner 1967, 83-88).

It is clear that these colours – and in particular, red - are integral to the development of symbolism for the ancestors of modern man. Red pigment was used by *Homo heidelbergensis* in Middle and Upper Pleistocene Africa (Barham 2002), and red jasper stones may have been selected as grave goods by Neanderthals at La Chapelle-aux-Saints (Wreschner 1976). Red ochre is one of the most significant and symbolically imbibed minerals in the history of human art and expression - in Australian aboriginal contexts it is found in burials and art from as early as 71000 BP and is found throughout aboriginal cultural practice in the present day (Tacon 2004). Red is linked to burials as early as the Middle Palaeolithic in the Levant, as evidence from ochre assemblages at Qafzeh cave demonstrates; indeed, the authors suggest this may be the very “prototype” of red ochre use in burial sites (Hovers et al 2003). In the case of the Upper Palaeolithic, red and black is the dominant colour scheme, with surviving artwork created from charcoal, manganese oxides, and iron oxides known as ochre; white is generally the colour of the chosen background, though these pigments may have been lost (Petru 2006).

Red is chosen for a significant selection of uses, particularly the prominent use of red ochre at Upper Palaeolithic burials and on the “Venus” figures of Western Europe (Wreschner,

1980). Petru interprets this as being indicative of red being the colour of a transformative, feminine symbolism – as the body is transformed in death, and the female body transforms in a way the male one cannot, red becomes suggestive of mysterious and miraculous changes (Petru 2006, 207). Similarly, the use of red ochre in middle stone age Africa has been tentatively linked to the concepts of facsimile menstrual blood, the biological impetus of women to reproduce, and deception of potential mates as to female fecundity – eventually imbuing the colour red with the symbolism of fertility - supported somewhat tenuously by ethnographic examples of menstrual blood rituals in extant African societies (Knight et al 1995).

Conversely, Wreschner speculated that early use of ochre as body paint was a form of male hunting party bonding – sharing the red stain made you a real man's man (1976, 717). Others are more cautious; Marshack admits the use of ochre in particular is “early, widespread” but also “probably variable” – although r/w/b is seen across the upper Palaeolithic he states that “there can be no preconceived general rule for the possible meaning or intent” (Marshack 1981, 190-191). His pragmatic caution is echoed by John Gage, who sees the r/w/b palette as a limitation rather than a conscious choice, a practical rather than symbolic gesture, that “together with the almost complete lack of evidence about the functions of these paintings, rules out the clear establishment of meaning based on context” (1999, 10). However, with red ochre found as far in the distant past as *Homo erectus* at Olduvai, raising questions of just how early colour categories formed for early man (Wreschner 1980), it is clear that however basic the concept may have been, the idea of red carrying significance is extremely ancient, pervasive, and suggestive of a more complex association than simply fertility or gender archetypes, that is not easy to conceptualise in a neat manner.

It is seen again in the building materials of mortuary structures Old Kingdom Egypt, where architecture was carefully planned and designed to allow patterns and significant layouts to be created with r/w/b stone, despite their being both a wealth of other materials to choose from, and significant challenges in the extraction and transportation of the r/w/b stone (Spence 1999). In this case, the symbolism of the colours can be more confidently asserted thanks to the survival of written language and a wealth of symbolic art – black for fecundity of the land, white for purity, and red for magical transformations. In the case of the latter, it was often used in doorways, or supporting columns, suggesting both the transformative properties of liminal spaces like doorways, and the key role magic played in supporting the land (Spence 1999, 116).

In the Ndembu people of Zambia, an extant hunter gatherer society, the three colours connote an immensely complex system of symbolism and ritual functions; white is powerful, pure, the

colour of chieftains and good hunting, good luck, good health, fertility, cleanliness and generosity; red relates to various types of blood, including that of animals in the hunt, childbirth, menstrual blood, from wounds at a murder or assault, and that used in witchcraft, which are specified by the association with the other two colours; black is the colour of night, of illicit and passionate desires, of death, suffering, disease, witchcraft, and bad luck (Turner 1967, 70-71).

This triad of significant colours is not only found in early farming or hunter gatherer societies – it seems to persist long into pre-industrial and even industrial cultures. What was salient about them in our past has been retained through art, mythology, folklore, and language. This is perhaps best seen in their use in fairy tales, arguably the best modern representation of folk memory. Red, white, and black form a set of ideal parameters for fairy tale maidens (Da Silva 2007), as in Basile's "The Crow";

*"Oh,Heavens! Would that I could have a wife as red and white as this stone, and with hair and eyebrows as black as the feathers of this crow."*

As Da Silva points out, this is seen time and again in fairy tales, where a prince (or in the case of Snow White, a mother) sees blood red stark against white, with the contrast of the black of a crow's feathers, and are inspired with the vision of the perfect woman; red for the blood of the womb, white for purity, and black as enchantment or transformation through death (2007, 243). This triad is not merely the domain of the perfect woman, however. As Hemming (2012) recounts, it also may apply to a particularly striking male individual; in a tale from the Book of Leinster, *The Cattle Raid of Fróech*, Fróech himself is described in his shining pale-skinned glory swimming across a black pool, with vibrantly red berries at his throat; striking indeed. Once more, in *The Exile of the Sons of Uis*, the heroine Dierdriu sees a raven drinking blood from the snow, and wishes for a man who exemplifies these colours (Hemming 2012, 314). Just as the apparent universality of colour categories hints at a pan-human process for colour vision, so too it has been argued that recurrence of motif in folk tales "...implies the operation of psychological and cognitive universals" (Giradot 1977, 276).



*Fig 4. Chancel steps, St Mary's, Studley Royal. Penelope Foreman 2015*

The colours are still in use today, though need to be looked for more carefully. At St Mary's Church in Studley Royal, Yorkshire, the triad is seen once more, this time through a biblical lens. The three steps leading to the richly decorated chancel are that familiar r/w/b – though in the grand and vibrant Victorian gothic setting it would be easy to miss. According to the volunteer guide, the stone was chosen to represent the three stages of man – infancy, virility, and old age – though alternative suggestions are more in keeping with the ritual and religious setting, a metaphor for the three manifestations of God. It is certainly a talking point. Still resonant to modern cultures, the r/w/b triad takes on new meanings for new generations, and is thereby retained in folk memory, however far removed from the original intent.

Decoding that original intent – finding what Neolithic peoples experienced when they used a specific colour – is what will develop from a more robust understanding of the role colour played in a Neolithic cosmology. Some initial inroads have been made into cataloguing the use of colour at Neolithic sites in Atlantic Europe – with accompanying initial theoretical extrapolations.

### **2.3 Current work on colour in the Neolithic**

There is some existing study on the use of colour in Neolithic monuments – from the cataloguing of sites that demonstrate colour contrasts (Lynch 1998) to the increased emphasis



on researching those that show evidence of paint or pigment (Card 2013, Teather 2015). Scarre boldly states that “nowhere is the question of colour perception more tantalising than in the case of stone selection in prehistoric monuments” (Scarre 2002, 232). Indeed, his subsequent paper on geology and material selection by Neolithic peoples, focusing on sites in north-western France, again mentioned the apparent, but undefined, importance of colour in the monuments (Scarre 2004). Hensey, looking at the origins and development of Newgrange, believes that there is significant use of colour in the passage grave tradition, and there is “little doubt” that colour use developed and deepened over time and is “likely to relate to a wider association present in the Neolithic” (Hensey 2015, 39). Just as the field of phenomenology paved the way for new understandings of the importance of landscape setting, this step out of the monochrome of old is building a more and more complex schematic of the intentional colourisation of megalithic monuments. As noted in section 2.1 and 2.2, there is a significant triad of colours – red, white, and black – a leitmotif that runs throughout the use of colour in Neolithic monuments, in a variety of ways.

In the Iberian peninsula, the gateway to Atlantic Europe, there is significant evidence of the painting of early megalithic monuments (Shee Twohig 1981); what is now emerging is that this early deliberate selection and application of colour is only a small piece of a jigsaw of painted stones at sites along the Atlantic façade, from Portugal to Brittany to Orkney (Card 2015, Ramirez et al 2015). Painting is not the only method of demonstrating colour significance in monuments – it is increasingly clear that the very raw materials themselves are frequently selected for their colour. Recent discoveries at Ness of Brodgar are bold statements in favour of deliberate colour use, with finely and intensely decorated red and yellow sandstone, procured from some distance away, placed in “key locations” in the grand and imposing Structure 10 (Card & Thomas, 2015). These stones were worked only on their visible planes, and therefore most likely worked after being placed in situ. Their decoration was meant to stand out, to be experienced with both visual and tactile senses. This use of the haptic senses, that is, those of touch and movement, has recently been examined in Neolithic archaeology as an avenue of understanding why certain textures seem to have been deliberately chosen during monumental construction. Vikki Cummings (2002) focused upon chambered tombs of south-west Wales and south-west Scotland, and theorised that not only was there a notable pattern of rough vs. smooth stones that demarcated the left-right or east-west divide in many Scottish tombs, but that this could form part of a larger symbology based upon the transformative nature of materials being manipulated from rough natural into smooth worked, as is the case of stone axes and pottery making. Especially in the case of the Scottish monuments, which were in all likelihood sealed beneath cairns (Henshall 1972), this ability to navigate via touch would have been vital for those generations re-using the tombs. Indeed,

the decoration of Irish passage graves has been analysed, finding spatially significant locations for particular motifs and styles, which Guillaume Robin has described as “threshold signs” – indicators of places of particular liminality within the grave (Robin 2010).

MacGregor, examining the tactile significance of the Scottish carved stone balls, reminds us not to take cultural or symbolic significance as unchanging and permanent as the carvings themselves – though we may make assumptions on the significance of the stone ball texture, often based upon appearance rather than haptic experience, these assumptions are almost entirely removed from the Neolithic mindset (MacGregor 1999). As seen in section 2.1.3, colour is still experienced and even “felt” by the visually impaired – it is therefore possible that these textures may have been analogous with colours seen at other Neolithic sites, and that both colour and texture may be part of a system of lived experience rather than a simply visual significance – itself a modern Western emphasis (Howes 1990).

It is important to note that stones are not always a uniform or definite colour. In a critique of Lynch’s survey of the recumbent stone circles in north east Scotland, MacGregor points out that upon close inspection there is a myriad of small variations, and that these can prove to be significant; in the case of one stone at Castle Fraser, a granite slab has been split so the inner facing side is pink, whereas the outside is grey (MacGregor 2002, 146). This is tantalisingly similar to the pattern shown at Kong Svends Høj, Lolland, Denmark, where boulders were split into pairs of twins with the rough, raw side facing inwards and the smooth, weathered side facing outwards (Price 2015, 147), and again at Fussell’s Lodge, Wiltshire; Haddenham, Cambridgeshire (Fowler 2010); and Storgård, North Jutland, Denmark, where a similar process was undertaken with split logs (Tilley 1996, 76). Thorough study of megalithic monuments at Carnac has revealed that not only was stone hewn from rock formations and then deliberately deposited with the fresh inner surface facing inwards, and the weathered exterior surface facing outwards, but that entire monuments were built from single outcrops and could, theoretically, be reconstructed back into their original form (Mens 2008). Although at the time of this research the physical limitations of reconstructing boulders of several tons was prohibitive, and the “mental refitting” method is problematic in terms of accuracy and confirmation bias, modern digital scanning and modelling techniques could reveal the exact configurations of stones within monuments to their “parent” outcrop, and highlight any potential patterns and significance in their placement. The process of building becomes as important as the complete monument itself. Whatever significance this deliberate placement of the raw, natural side of materials, it could be reflected in, and represented by, the colour red/pink at Castle Fraser.

Repeated patterns and deliberate placings point towards colour selection being a matter of significance. The paint or pigment seen at Barnenez in Brittany is arranged in “fundamentally geometric themes” (Ramirez et al 2015, 59). The iconic passage graves of Knowth and Newgrange both incorporate starkly contrasting white quartz and dark granodiorite in their construction (O’Kelly 1992 and Mitchell 1992). Andrew Jones remarks on the “subtlety” at play in the selection of stones used in the construction of the cairns on Arran, that reveal not only a series of stones placed to face outcrops of similar material, but also a consistent pattern of alternating red/white materials, demonstrating a delicate balance between the practicality of availability and the desire to communicate meaning or significance (Jones 1999, 343). At sites where red sandstone is abundant, this makes up the large blocks while the less abundant white schist forms the dry stone walled infill; the obverse is true at sites where sandstone is meagre and schist abundant. In both cases the alternating pattern was maintained, whilst making use of the locally available materials, in a carefully thought out and deliberately designed manner. This pattern is echoed in the passage graves at Skåne, Sweden, where once again red stones are used for packing (Tilley 1996, 316). Unlike its more famous bluestone brothers, the red sandstone “Altar Stone” of Stonehenge is mostly obscured from sight due to being covered by fallen sarsens, so the vivid contrast of the rich red is lost; this contrast was worth transporting the stone almost 120km and therefore must have held some special significance to those who chose it (Darvill 2013).

There is also mounting evidence for the colours being selected at specific sites to be experienced at particular times of the day or season. Along with the thoroughly documented solstice sunrises and sunsets of Stonehenge, Maes Howe and Newgrange (Lewis-Williams & Pearce 2005), there are smaller scale tricks of the light to be found. At Barnenez, the deliberate darkening of the pale rock surface and subsequent etching to reveal patterns in the contrast between light and dark are thrown into an entirely new perspective when sunlight from the east facing passage allows “the hidden brightness of the raw material” to be revealed (Ramirez et al 2015, 64). At Balnaran, Clava, the setting midwinter sun floods the dark red sandstone of the entrance slabs with rich red light, whilst the reverse has bright white quartz to sparkle in the bright midsummer sunrise (Jones & Bradley, 1999).

The inclusion of white quartz is a common motif, notably among passage graves and long barrows (Darvill 2011, 41). Across the Iberian peninsula white quartz causes monuments to stand out like beacons in the landscape – Bueno Ramirez hypothesises that this not only makes burial mounds unmissable, providing an easy visual cue to remembering the ancestors, but also combines with different light sources, natural and artificial, to add to the “theatricality of funerary spaces” (Bueno Ramirez et al 2015, 53-54). This theatricality can be imagined in

the darkness as well as the light. Trevarthen paints a vivid and almost chilling picture of initiation rites in the dark of the midwinter solstice night at the Clava cairns, where the midwinter solstice sunrise illuminates the black stone in the depths of the chambers; “extremely cold, the scattered ashes of ancestors, possibly relatives, underfoot. At sunset the chamber would be flooded with red light followed by darkness. All of this would produce a dramatic, emotionally charged experience.” (Trevarthen 2000, 313).

Cataloguing colours, and acknowledging the significance of their selection, is only the first step. Conferring meaning upon these findings is the proverbial giant leap. As Darvill points out, the materials used were familiar, being present in the local landscape, but through some process of arrangement or alignment become redolent with meaning (2011, 42). Monuments were built of everyday materials, re-ordered and placed and configured so as to make use of their pre-existing associations and meanings to symbolise something significant (Thomas 2004), drawing upon and reinforcing the power of the generation-spanning long term “Cultural Memory” (Furholt 2011). It has been argued that rather than being a pure linguistic inevitability that red/white/black categories being first formed and therefore most fundamental, that archaeologists need to consider the contextual significance of colours, “the encounter with colour in terms of bodily and sensory experience” (Scarre 2002, 232).

Using the Arran cairns as a discrete sample, Jones draws parallels between life, death, the body, and the landscape as being the key relationships at play when colours are chosen in grave construction; the intertwining of the red/white/black triad in the materials chosen being a reflection of the surrounding landscapes and lived experiences, from white barren mountains and bare bones to the rich red sandstones of the fertile lowlands used in the chamber entry walls, whilst bodies are placed in the darkest, black areas of the tombs to re-cloth them “in the flesh of the land”(1999, 348). Similarly, in the Balnuaran Clava cairns black stone is selected only for very specific locations and is vastly outnumbered by the red and white material, despite being equally as abundant and convenient to procure in the local environment (Trevarthen 2000). It is once again placed in the deepest and darkest chamber, which Trevarthen speculated may reflect black being the colour of danger, death, and the occult, whereas the white and red are safer concepts, of life and the landscape. This is perhaps representation through colour of a concept that seems to be represented in passage tombs across the Neolithic, that of the backstone being a “false door”, connected to the world of the dead, that only the spirits can pass through (Robin 2010, 394-395). With backstones framed like doorways with sills and lintels at Knowth; deliberately empty sealed back chambers in Orkney, Spain, France, and Ireland; and those decorated with chevrons and scalariform signs at Loughcrew, (Robin 2010) there is a pattern of significance for the back of these tombs,

which may signify a place where communication with the ancestors was possible in the darkness.

The key idea, looking at sites across Europe and throughout the Neolithic, seems to be *contrast*. It seems to be not simply the case that the certain colours were significant, but the contrast between them that is an important concept. As well as deliberately selecting natural materials that embody the important colours of red, white, and black, the contrasts between these colours were sometimes “emulated and intensified with artificial applications that provided bigger contrasts” (Bueno Ramirez et al 2015, 64). Scarre notes that symmetry and contrast are at play to a very great extent in the megaliths of Pornic, north western France - to the extent that he believes it is deeply tied in with ideas of origin, location, and landscape of belonging (Scarre 2004). Similar ideas of contrasting stone types (and by extension colour, and texture, and shape) embodying particular places, and therefore capturing something of their inherent power or significance by selecting stone from there for particular placement within a monument, has been suggested by Bukach as a significant component in the design and construction of chambered tombs on Jersey (Bukach 2003). Contrast here, then, serves as a theatrical attention-grabbing statement: look at me, I came from a place of power, so now the power is in *this* place.

This contrast becomes more obvious when stones are cleared of lichen, as in the recording of the recumbent stone circles at Easter Aquorthies (Lynch 1998). This trouble with lichen may, as Trevathen points out, be a contributing factor as to why the significance of colour was not discussed during earlier excavations of sites such as Balnaran (Trevathen 2000). There is the possibility of further examples of contrasting stone colour, should those sites with significant lichen growth be cleared.

The most significant gap in data on colour is from Scandinavian sites, and data on possible painting will be hampered by the modern practice of highlighting of rock art through the liberal application of red paint (Darvill 2013, 237). Although little data exists on the colour of material chosen for the monuments, Tilley has attempted to match up the possibility of a deliberate r/w/b colour triad in Scandinavian grave goods with their respective associations with functions of the human body – red for blood, white for semen, black for death – drawing parallels to Turner’s work with the Ndembu (Tilley 1996, 321-322). Emerging evidence from northern Germany is showing clear signs of colour selection and distinct patterns of contrast, with particular focus on red stone being used for one key part of a monument, such as the capstone of dolmens at both Friedrichsruhe Goldenbow, Ludwigslust-Parchim district, and Everstorfer Forst, Grevesmühlen, Nordwestmecklenburg district (Darvill 2013, 10), and this study shall

seek if similar evidence can be found across sites in Denmark, Sweden, and other regions. There is also a significant bias towards passage graves and other chambered tombs, though some evidence for the colour red being selected in standing stones in Britain has been noted (Darvill 2013, 235); further work on less mainstream monument forms is required.

## **2.4 Materiality**

Materiality, or “a social construct based on material” (Hurcombe 2007), is concerned with the way that societies form associations, meanings, and ritual frameworks around materials and material culture. This is not merely how we look at a material, but rather how we feel it, smell it, listen to it, and interact with it; it is an experience built upon all the senses. As Hurcombe points out, modern society is far removed from the production of common materials such as metals, and so has a vastly different perception of the progress from ore to furnace to polish to finished object than, for example, an Iron Age smith – which causes a disconnect in our materiality from that of our ancestors (Hurcombe 2007, 537). This disconnect has meant that certain properties of the archaeological record, such as selection based upon cosmologically significant colour and texture in monument construction, have been neglected as they are not part of the modern materiality experience. Ingold believes that a heightened emphasis on materiality rather than the physical matter of materials themselves has contributed to this very disconnect, that “To understand materiality, it seems, we need to get as far away from materials as possible.” (Ingold 2007, 2); he argues that by over-philosophising material culture, archaeologists lose sight of the physical experience of knapping flint, or hewing stone, or shaping clay, that “materials appear to vanish, swallowed up by the very objects to which they have given birth” (2007, 9).

Despite this criticism, and the inherent disconnect of our own modern mindset with those of prehistoric peoples, materiality does afford researches a fresh perspective on monuments and material culture. Instead of seeing construction of megalithic architecture, settlement building, farming, tree felling, or mining flint as something done *to* the land, materiality shows us instead that they “are rather generated out of interaction”; the landscape is an entity that is experienced and lived in, that inspires and nurtures – it is not an inert foundation (Jones 2006, 212). Barbara Bender coined an eloquent phrase for this idea: “landscape is time materializing” (Bender 2002, S103) – always changing, in flux, shaped by and shaping those who live within it. The landscape is not merely what we see with our eyes – it is an encounter built of our memories, the culture and remains of our ancestors, our sensual experiences, our beliefs, our prejudices, our politics, our social habits, our family relationships, our occupations, our age, our gender, and our self as constructed by all we have experienced until this point in

time (Bender 2002, S107). It is a complex construct that is neither simply the physical land beneath our feet, nor simply our mind's eye view of what surrounds us (Ingold 1993) – it is a series of processes that have happened, are happening, and shall continue to happen. As a capitalist and industrial society, we privilege the finished object, the consumable, over the process of creating it. Materiality, then, returns us to a level of understanding where we see the processes that affect a material (both physical and metaphysical) as being as vital as the finished appearance (Jones 2006, Cummings 2012). As Ingold points out, “Every feature, then, is a potential clue, a key to meaning rather than a vehicle for carrying it” (1993, 172).

Materiality may prove a great leveller when it comes to looking at, in particular, monuments in the Neolithic. As Chris Scarre points out, privileging “megalithic” as a descriptor separates stone monuments from typologically similar ones in wood or earthen construction, which is likely to be an artificial dichotomy based on the survivability and general visibility of stone monuments rather than a genuine attempt at differentiation on the part of Neolithic peoples (Scarre 2004). Whilst stone is an object lesson in (relative) material permanence - one that has been interpreted as a medium for the idea of persistence and immortality in Neolithic culture (Bender 1998), a signifier of “ancestral permanence” (Whittle 1997), this doesn't take into account the immortality of legend, myth, and oral tradition that other materials and objects made of them can also carry with them. As discussed in section 2.3, the similarity of split log and split boulder construction techniques in funerary monuments suggests a commonality of significance, at least at a material level – it is we as archaeologists, discovering grand stone tombs that to us stand apart from the “natural” landscape, that set them apart.

Ingold argues that, from the perspective of cultures that embody an animistic cosmology, objects have spirit not because they have been imbued with such by their creators, but because the very materials they are formed of have significant properties and qualities that form key parts of cosmological beliefs (2007, 12). Thus, the coloured stones that have been selected at sites such as Clava had their own intrinsic meaning and “spirit” before they were part of the whole; a case where the finished structure may not be more than a sum of its parts, but rather a complex blending of distinct materials that requires further examination in material properties and qualities before any attempt to generalise the materiality of the site as a whole. By going back to a very detailed and specific analysis of the individual materials themselves, the problems of modern materiality being so far removed from the ancient can be, if not totally avoided, at least ameliorated. Although de Lumley asserts that early humans sought symmetrical and fine coloured stone for tool making despite the fact that “symmetry and colour do not affect the functional effectiveness of a tool” in his examination of the origins of symbolic thought, this is a functionalist, simplistic view: the materiality of a stone tool, including its

colour-ness, is as important a feature as its ability to hold a sharp edge or to weigh enough to cause damage within use. What to him is an expression of the development of the concept of beauty and harmony, could be a response to a different understanding of material, in an ontology far removed from our own. Do red stones cut deeper? As Andrew Jones acknowledges in his work on applying materiality to British rock art, we will likely never know the meaning, but we can endeavour “to explore how – as a socially constitutive activity – the production... is nevertheless meaningful” (Jones 2006, 215).

## **2.5 Material Agency and “Vibrant Matter”**

If materiality is key to understanding some of the reasoning behind certain colour choices in Neolithic monuments, then it becomes important to understand the implications of a more object-orientated ontology that encompasses the agency of the materials themselves rather than merely focusing on the human element. Matter, states Jane Bennet, has a vitality of its own that should be respected; it is pure human hubris to view it as a dead, inert commodity and only given significance via human interaction (Bennet 2010). One particular theoretical framework encapsulates this emphasis on the breaking down of barriers between entities previously artificially separated by arbitrary categorisation into polarised groups, e.g., human and non-human. This is Actor Network Theory. It is a loosely-bound collection of theoretical approaches that sees physical objects as entities just as living beings that “share the capacity for making a difference to the world and to other beings” (Olsen 2012, 212). Within the vast relational networks that make up complex systems such as cultures, societies, towns, and families, things gain and retain influence and meaning by their uniqueness or useful individuality leading to a significant relationship with other things, whether they are sentient or not (Law & Hassard 1999). It is a way of seeing *how* relationships between things form, rather than just *why* (Law 2008).

Archaeologists to some degree have been reticent to use ANT as a theoretical framework, worried about giving agency to non-human entities and hand wringing over the possible ethical concerns of suggesting materials, places, objects or processes have in some way their own influence over events, and that the human “creators” therefore somehow bear a lesser degree of responsibility, or have become dehumanised by being lumped in with non-human entities (Olsen & Witmore, 2015). This is a curious criticism, as by Latour’s definition, any actor part of a network is “exactly what is not substitutable” – the difference and unique nature of each actor is what makes them valuable to the network, they are an integral part of it, not lost in a morass (Latour 2007). Indeed in the Deleuzian idea of Assemblage, similar in many respects to ANT when looking at the ideas of webs of influence and the agency of non-human entities,



views things as “ontologically one, formally diverse” (Deleuze 1992, 67). To this end, the agency of the stones themselves, and indeed the individual colours, should be considered as vital a part of the puzzle as the human thought processes involved.

One of the core concepts of ANT is that networks survive because of translation – that is, the original founding idea or principle they are based upon becomes translated over time through various processes in a manner that will maintain the influence of the network over its constituent actors, and that it can recruit new actors in order to spread its influence further (Law & Hassard, 1999). As the main focus of this research is colour use, then seeing how significant colours were used is in fact a study of how the ANT of colour use has been translated by people, places, and objects in the Neolithic. Looking at patterns in the way colour presents in certain regions, or monument types, or time periods, will enable a model for a network to develop that will highlight connections, fractions, and mingling of ideas surrounding colour use. Although the “why” of colour selection must be the end goal of this research (as the storytelling of a concept, artefact or culture is one of the main roles of the archaeologist) the “how”, as provided by utilising an ANT approach, gives a strong foundation upon which to build such conclusions.

To approach a more constructive and applicable modelling of Neolithic cosmology than is afforded by an ANT theoretical approach, Assemblage theory provides a way to visualise cosmology as a vast network that becomes gradually revealed through investigation, discovery, and interpretation. Assemblage - the Deleuzian concept of fractal inter-relatedness and connectivity between things as actants upon the behaviour and status of each other (Deleuze & Guattari 1980) - is a theoretical framework that allows social systems to be examined as the complex, difficult to model, messy structures that they are. Though originally conceptualised by Deleuze, it is the later refinements by Latour (2005), DeLanda (2006), and Bennett (2010) that make it a viable and valuable theoretical tool in the archaeologist’s arsenal of interpretation. It is defined by Hamilakis (2013) as “the contingent copresence of heterogeneous elements such as bodies, things, substances, affects, memories, information, and ideas” - living and non-living things, and their intrinsic ability to affect the other elements, form the relationships that define the assemblage.

Briefly put, societies, cultures, and other complex social systems are vast entities that do not evolve in a set and predictable manner, but instead are an *assemblage* formed of almost innumerate processes that both influence and are influenced by each other in a vast fractal pattern. They are a mosaic created of heterogeneous features, that interact with each other

in ways both obvious and subtle, which has the effect of making them difficult to predict. Difficult, but not impossible.

Neolithic life can be viewed as one assemblage – a giant universe of stars, galaxies and phenomenon that interact with each other in both subtle and obvious ways. In this analogy, colour is a black hole within this universe – a black gap in our view of the world, that cannot be seen directly – after all, we have no direct connection to a Neolithic person to elucidate their use of specific colours, no ethnographic accounts to demonstrate their time-deep attachment of meaning and ritual and belief to specific colours and colour combinations. Instead, like astronomers crunching vast data sets to extrapolate black hole existence by seeing the effects on space, light, and matter around it, archaeologists must examine the assemblage as a whole. Examine the ways stone as a material was extracted and moved. Examine the ways landscapes were navigated. Examine the ways spaces were treated – artefacts and remains left, returned to, remade. Only by knowing more of the universe of Neolithic cosmology, can the black hole of colour be discovered and its place in that universe understood. The following section outlines both the fieldwork and theoretical methodologies that make this a possibility.

### **3. Methodology**

This chapter outlines ways that colour can be both recorded and subsequently analysed to provide data in two ways – both a gazetteer of coloured stone in Neolithic sites across Atlantic Europe, and to demonstrate patterns in the way this coloured stone manifest across the study area. This includes details of why certain digital techniques were selected, touching on both technical and theoretical aspects of digital tools in archaeology.

Following this, there is some discussion of how this can be approached theoretically to begin to understand the way that colour fits into the wider Neolithic cosmology – locally, regionally, and across the entire region.

#### **3.1 Definitions**

Throughout the course of this research, the specific terms related to colour will be used, of which there are several which appear to be similar in nature until they are discussed. Here are the most salient terms and the usage which shall apply through the course of this document.

##### *Hue*

Hue is generally what someone means when they say “colour”; it is the discrete quality of a particular part of the spectrum that we split off and give a name to. Thus, red, green, yellow, blue, purple, and orange are hues, and gain modifiers such as pale green, dark red, rich blue, to denote differing shades. When colours of individual stones are recorded, it is the hue that is being referred to.

##### *Brightness*

Brightness is the quality of a particular object or substance that states to what degree it appears to emit or reflect light. For example, the moon will appear bright on a clear winter’s night, but appear less bright if still visible on a clear summer’s morning. When stones are recorded, a note on their surface texture and their geological composition will also be noted, to explain the relative brightness of stones to each other.

##### *Lightness*

Lightness is similar, but not to be confused with, brightness. It is the relative brightness of a material to a white material under the same lighting conditions. It is more commonly used in comparative scales. For example, several pieces of cloth with the same fibre content, one

white and others dyed with successively stronger dyes, will show a range of lightness values when examined under the same lamp or light source.

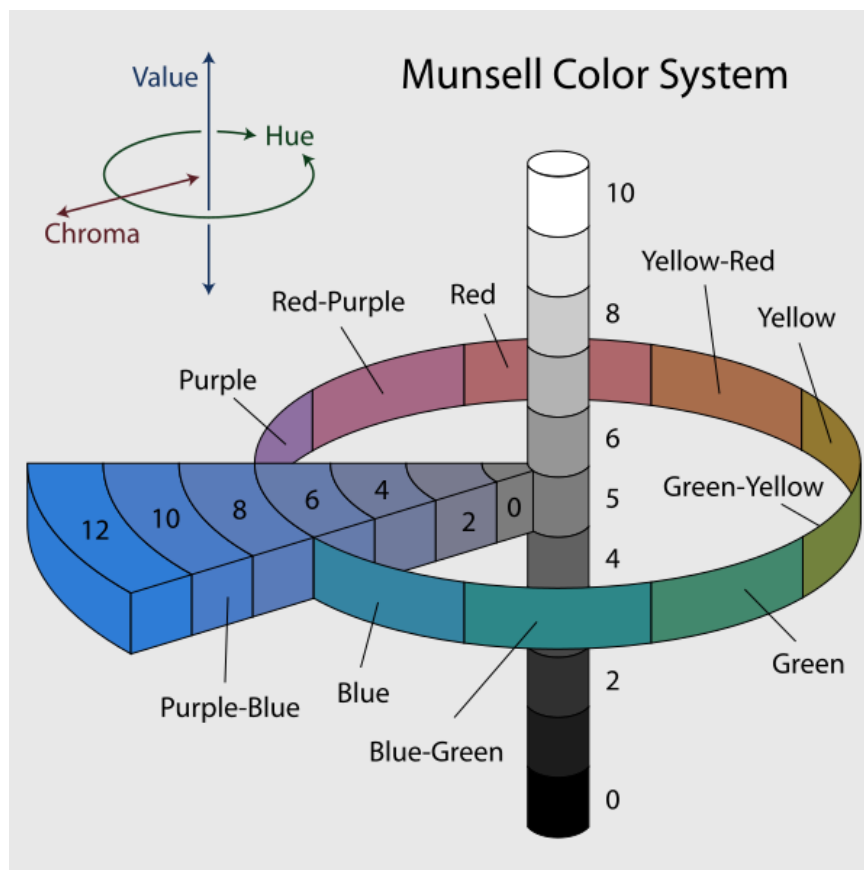
### *Saturation*

Saturation is to what degree a particular hue is composed of the wavelength it corresponds to and to what degree of intensity this originates from; simply put, it is the hue of an object in relation to its *own* brightness. For example, a green LED will emit light in a highly concentrated light source very close to pure the green segment of the wavelength of visible light, and so we see it as a very clear, bright source of green.

### *Gain*

In digital photography and other image capture technology, gain refers to the relationship between the input signal and the output signal. Higher levels of gain amplify the signal, resulting in greater levels of brightness and contrast. Lower levels of gain will darken the image, and soften the contrast. For the purposes of this research, gain is a feature of the colour sensor (see 3.3.2) which needs careful adjustment to record accurate hue of stones.

### *The Munsell Color System*



*Fig 5. The Munsell Colour System. Diagram by Jacob Russ, used under Creative Commons Attribution ShareAlike 3.0 license, 2018.*

The *Munsell Color System* is a three dimensional representation of colour, that depicts colour space as a range with three value axes; hue, value (lightness), and chroma (saturation). It is widely known in archaeological literature as a method for categorising soil types, but more widely is a comprehensive system for categorising colour shades by measuring particular values.

Hue, measured horizontally, is a value with a certain percentage of one of five “principal hues”; red, yellow, blue, green, and purple, and five further “intermediate hues” that fall exactly between these, where a blend of the two colours will form a continuous variation. Value is a vertical scale, from black at 0 to white at 1. Chroma is slightly more complex, being related to the saturation of a particular hue – i.e. a scale from the pure hue, to gradually paler (Thompson 1995, 46, munsell.com 2015). Together they form a near-spherical model, as seen in figure 1.1 above.

The colour chips mentioned in this study, particularly as historic measures for colour categorisation in studies such as BCT, are all a selection taken from set Munsell Color System values; for ease of interpretation and comprehension they are placed on a flat “chart” rather than on the spherical model.

### *RGB Colour*

The most common expression of colour values in design and related disciplines is RGB - that is, the makeup of a particular colour in relation to the percentages of red, green, and blue it contains. The colours recorded in this research have been logged as RGB values to enable meaningful depiction of them in illustrated form, and standardised descriptions and values should the data be used in future by other researchers.

### *Open Source software*

The digital solutions selected for data capture and analysis in this research have been deliberately selected to be open source - that is, free at point of download, with free and open technical support and transparent distribution models. This not only affords the study repeatability among non-academics and those without access to expensive licences, it also means that legacy projects to further the objectives of this research can easily generate compatible, relevant data with minimal setup expense.

## **3.2 Site Selection**

### **3.2.1 Geography of Atlantic Europe**

For the purposes of this research, “Atlantic Europe” refers to the coastal and near-coastal strip of land (and interconnecting seas) that reaches from its southernmost point in the Iberian Peninsula at southern Portugal, up through the western and northern regions of Spain and France, the British Isles, Belgium, the Netherlands, northern Germany, Denmark, Norway, and southern Sweden. A comprehensive study of monuments from every region within this broader one would be a physical impossibility given the timeframe of a doctoral research degree, and so a sampling of sites was made to encompass temporal, typological, and geological variation across Atlantic Europe.

### **3.2.2 Islands and Mainlands**

In order to look at patterns across the region, a number of locations were selected to survey. These represent a spread across the Atlantic façade of Europe and are not meant to be comprehensive, rather, to give a sampling across the region that could be expanded upon in future studies. Sites were chosen to select areas where monuments lie in relatively close geographical groupings, both for ease of access and upon the assumption that even if they are not constructed contemporaneously, their presence in the same area of the landscape suggests at least awareness and perhaps inter-connected use and mutual influence between the sites.

Sites clustered upon islands not only provide groupings easy to categorise geographically, but also an opportunity to see what happens to cultural mores such as megalithic tomb building when it happens on the confine of an island. The Deleuzian idea of islands as conceptual places “good to think with” (Rainbird 2007), a place apart from the world and embodying the liminality of the border between land and sea, makes them interesting case studies in distilled culture. Contrasting this with mainland groupings will highlight if any significant similarities carry across both landscapes, or if differences are associated with either of them.

With these considerations in mind, the following case studies were undertaken:

- Anglesey, Wales – an island of passage graves
- Pembrokeshire, Wales – dolmens that look to the sea
- Falbygden, Sweden – the passage grave heartland of Sweden

- Møn, Denmark – a Baltic island of well-preserved passage graves
- Central Wessex, England – the Sarsens of the Avebury and Stonehenge landscape
- Drenthe, Netherlands - giant's graves and boulder clay

### **3.3 Recording the Stones**

#### **3.3.1 Reflexive journaling**

Throughout the research and surveying process a reflective journal shall be kept, written at the time of site visits in order to preserve the thought process beyond the standard survey records, an important context-giving step that preserves rationale and reasoning behind research design and implementation (Marshall & Rossman 2011). This will help to highlight any cognitive and interpretative bias, as well as giving further insight into the sites visited. In the tradition of the original Tilley interpretation of phenomenological archaeology (1994), the reflexive journal documents reaction to landscapes and places. Taking the form of audio recordings of site visits, along with diary entries reflecting current reading, conference visits, and peer discussions, the journal is recorded in appendix 2.

#### **3.3.2 Public outreach - multivocality in recording the stones**

As well as recording personal experiences alongside raw data, at several instances during the course of this research the opinions, feelings, and remarks of members of several groups have been recorded to see if the findings are mirrored in a general population. This serves two purposes - continuing in the spirit of reflexive practice already established by use of the reflexive journaling method of progress monitoring, it serves to flag up any personal bias and interpretative slant placed on data that is not reflected in the experiences of others; it also makes the research accessible, relevant, and engaging to those without academia and archaeology as a discipline. This is vital - one only has to see the constant rumblings of discord and discontent between different interest groups and significant ancient sites (Blain & Wallis 2007) to know that inadequate consultation with key stakeholders and poor communication with local and wider communities can mean archaeological work is viewed at best irrelevant, and at worst hostile.

The sites visited as part of this research - particularly those in the British Isles - are subject to significant visitor footfall, from individuals and groups with a wide variety of backgrounds, interests, and agendas. To reflect this, outreach events inviting visitors to share their

experience were designed, and held on existing open days to maximise the diversity of respondents (see sections 7.1 and 7.2).

### **3.3.3 Constructing a digital recording device**

In the early stages of this project, it became clear that a technological method for recording colour was needed, to avoid issues of varying light levels, accessing sites at different times of day or year, and the fallibility of the human eye. With that in mind, options for colour sensing technology were explored. There are commercial options available - mainly for detecting Pantone colours, for use in the design and high end decorating industries. At around £500, these were unviable. Further research revealed that a more “DIY” approach could be much more realistic –and indeed, flexible as to the needs of the project.

There are several colour sensors on the market, aimed at home electronics and programming enthusiasts, for use with popular open source devices such as the Raspberry Pi, Arduino, and BeagleBoard. These small computers offer an extremely wide variety of peripherals that can be programmed to perform a number of tasks, ranging from simple LED lighting to temperature and humidity sensors, to wireless controls for household appliances. With basic knowledge of how to construct circuits, the logic of computer programming, and rudimentary soldering skills, projects can be built both cheaply and specifically to highly specialised requirements.

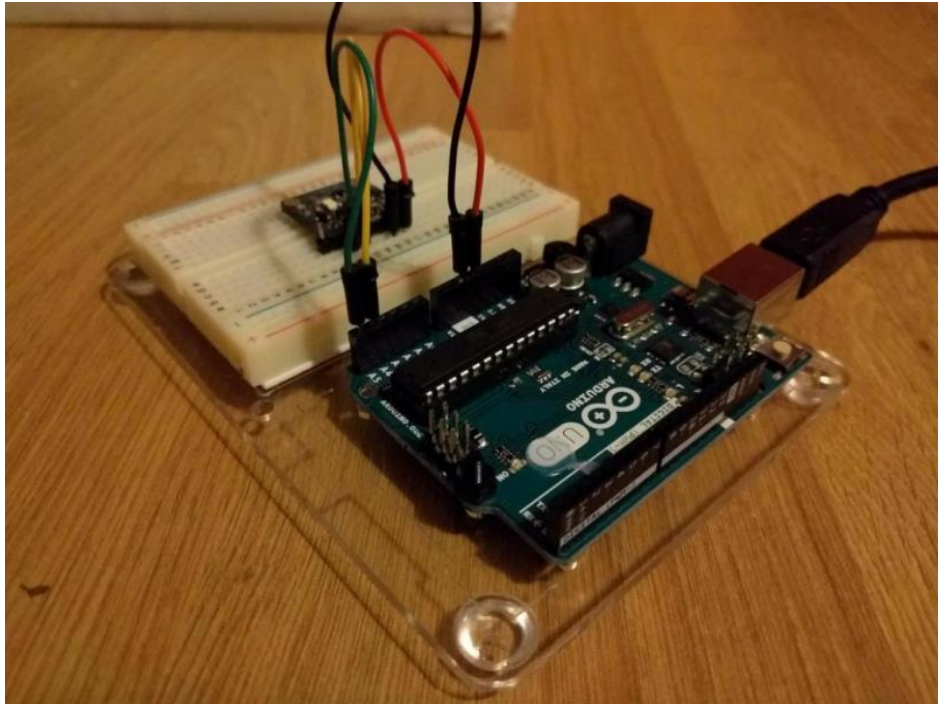
#### **3.3.3.1 Design and prototyping**

Cost aside, several key factors were considered in the design phase of a potential colour sensing device:

- Would it be robust enough to survive fieldwork, and continue to function reliably and accurately?
- Would it be easily repairable in the field, then testable to be delivering repeatable results even after such repairs?
- Would components be reliably available going forward?
- Would the device be easily portable, and function for long periods on battery power?

For technical details on the selection of hardware and design process, see appendix 1.





*Fig 6. ORAC, V1.1. December 2015. P Foreman 2015*

Once this stage was successfully tested, field requirements were considered, to see what kinds of alterations were needed. The basic requirements were:

Portable; LCD screen to give instant feedback of results; allow a consistent distance from the sensor to the surface being recorded; block out external light sources; internal power source; easily accessible to allow for field repairs.

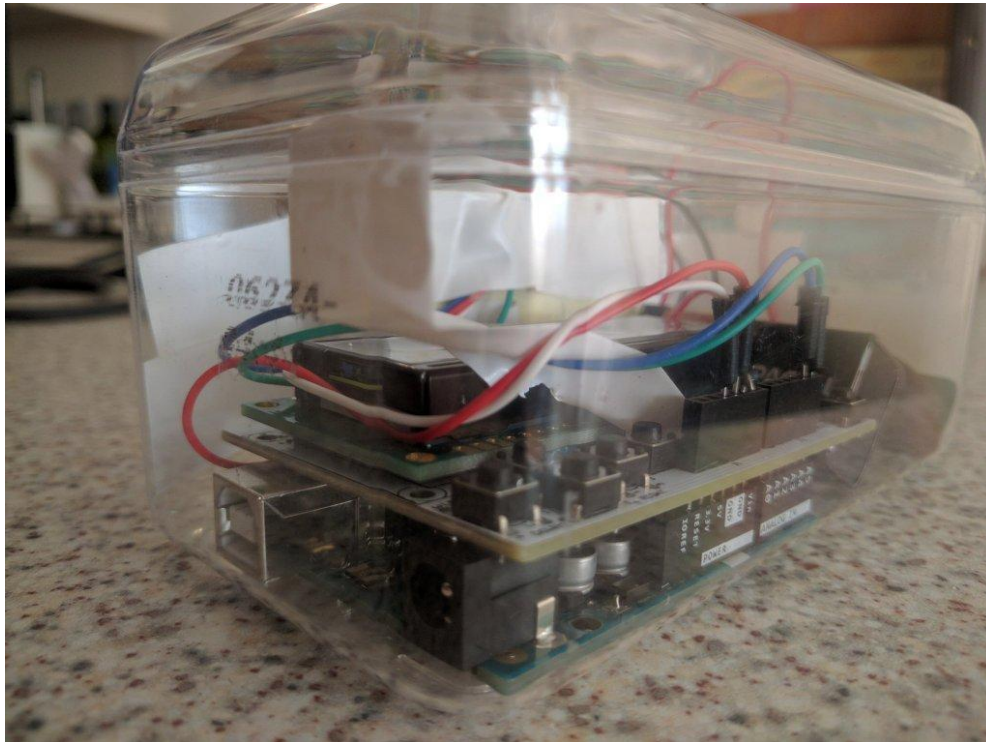
With these requirements defined, new components were sourced, including a simple LCD screen, battery compartments, a switch, a suitable case, and more robust wiring.

### **3.3.3.2 Refining the programming**

With new set of components and a basic plan in mind, the coding for the device now needed altering to reflect the changed nature of its performance. For a full breakdown of this coding, as well as technical data of the device, see Appendix 1.

This first stage of coding was subsequently refined following on from the Bryn Celli Ddu pilot study (see chapter 5.1), where minor tweaks were made to default settings variables such as gain, in order to have truer hue readings.

### 3.3.3.3 Construction



*Fig 7. Orac V2.1 - now waterproof and dog proof. P Foreman March 2016*

After the initial prototyping phase, the first version of the device was constructed for testing at a pilot study at Bryn Celli Ddu, Anglesey (see chapter 5.1). This construction phase took the components from the prototyping board seen in figure 10, and permanently soldered them in place on permanent circuit boards along with a battery module and LCD screen, meaning the device could function in the field without use of a laptop.

#### 3.3.3.3.1 Challenges and adaptations in construction

As the first stage of the research design, the pilot study naturally highlighted a series of challenges that form valuable feedback and opportunity for finessing of the methodology. The main challenges identified were issues with the prototype colour sensor, issues with the removal of lichen on site, and issues with the recording of data.

Although the initial results gave recognisable values that did show a difference between pale, dark, and reddish material on site, the results were “muddy” – not as precise as expected for a device as sensitive as the hardware specifications suggested, and always on the darker end of the spectrum. This could be explained by two factors; 1, that the mapping of RGB values from 16bit to 8bit has made the values less accurate and more prone to

giving dull results, or, 2 - the wooden emergency casing for the device meant the sensor was slightly too far from the surface of the material being measured.

These could both be addressed by further adaptations to the device, most notably creating a custom thin plastic casing which will allowed the sensor to be much closer to the material surface, but also the possibility of tweaking the parameters the colour sensor works upon. At the beginning of the code that initialises the sensor, there is a default setting for gain – which is, in effect, the white levels within the colour values it records. Altering the gain will make colours lighter or darker depending upon how the setting is changed – by raising the gain level, a lighter reading could be achieved, which may resolve the “muddying” issue.

As with most uncleaned rock surfaces exposed to the elements, the stones of Bryn Celli Ddu are covered, in various degrees, by lichen of numerous species. These manifest in a variety of colours and can cloak the actual colour of the stone beneath. During this pilot study removal of small patches of the lichen was attempted, using water and a soft toothbrush. However, it was soon obvious that this was not a simple task, and that the attempt to remove lichen actually spread staining further – usually as a faintly green mark on the cleaned area, that returned a slightly green RGB result with the sensor. It soon became apparent that a firmer approach was needed, perhaps with a hard bristle brush – which then raised concerns on the damaging of the rock surface. Short of power washing with pressure washer, it would be very difficult to remove all traces of lichen. It was decided instead to attempt to locate portions of the rock that were least affected and to take readings there, making careful note on each stone’s recording sheet if there was the suspicion that any particular reading was polluted by lichen.

As has been previously noted, the original prototype was made into a wooden case, for ease of temporary construction and to develop an appreciation for the general reliability and durability of the components and wiring before the device was placed in a more permanent home. As a custom plastic casing would take some time to be delivered, a short term replacement was made from materials to hand, and so a small wooden case was constructed. This contained the components securely and was robust in nature, though clumsier in appearance and less convenient than a more streamlined plastic casing would be. The advantage of wood as a material was that it could be easily drilled to allow the switch and colour sensor to fit correctly to the exterior, but the disadvantage was that the wood was slightly too thick to allow the sensor to be as close to the stone surface being measured as desired.

A further issue, highlighted by repeated delays caused by poor weather, was the fact that the device is not waterproof or even splashproof. The sensor itself is by necessity open to

the elements in order to be placed close to the stone and measure colour accurately – tests involving thin, clear plastic did show slight alterations in RGB values and were thus rejected. However, as weather conditions can never be guaranteed, it would be valuable to make the device as weather proof as possible, and so, further iterations should explore options to protect the sensor whilst still allowing it to record data without compromise.

Otherwise, performance was acceptable. Although battery power failed after a few hours, the interior was easily accessible to replace the 9V batteries into the simple clip. The screen was clear and easy to read, and the wiring was reliable, requiring no repairs or inspections over the course of the study. Improvements decided upon for the next iteration improved portability, weatherproofing, performance of the sensor, and battery life, as follows;

1. A custom designed case that accommodates all components safely and securely, that retains the feature of being easily accessible to enable battery replacements, any emergency repairs, and inspection of the device,
2. Covering the sensor with a material that will not affect the fidelity of the readings,
3. A material thickness of not more than 3mm above the surface of the colour sensor, to optimise its performance, and,
4. A further 9V battery clip, which should extend the time between battery changes and reducing the number of times access into the device is needed in the field, during which the device vulnerable to damage through dust and moisture ingress.

Though the recording sheets proved broadly adequate for noting the key details of each stone, the sheer volume of sheets (over 100 for Bryn Celli Ddu) was unwieldy in the field, especially in the typically inclement blustery Welsh weather. As the sensor device was bulky, it became necessary to put it down in between each reading and record it, then put the notes down, take a second reading, pick the notes back up again; repeated over 100 times this was time consuming and not always convenient, especially when there were numerous other visitors at the site who may have inadvertently damaged the sensor when it was placed on the ground during physical recording of results.

To avoid this issue, a tablet or phone with access to an offline version of the results spreadsheet is necessary, with a wrist strap so it does not require picking up and placing down regularly. There should also be an increase of data recorded from two to three repeats, to improve the accuracy of the colour average and to further ensure the sensor is giving consistent results.



*Fig 8. - ORAC on location at Calderstones, as shared by their social media accounts.*

In order to achieve a daylight reading with the recording device, modification was needed. A simple daylight blue gel, of a type frequently used in photography to get a daylight effect when shooting images with bright lighting, was fitted over the LED and a separate set of readings taken. The results were interesting; whereas the white LED gave readings that were more yellow than observed by the human eye, the ones under daylight gel were closer to their apparent red colour, though with a blue tinge that stubbornly refused to be adjusted for even with tweaks to gain, time of recording, and physical distance between the LED and the blue gel. It also took a significant amount of time to record readings six times over for each stone - three white LED, three “daylight” - which will not be practical at sites with larger numbers of individual stones, particularly those where access is time limited.

Going forward, therefore, the daylight readings were not attempted. Though it would be ideal to have a record of something that approaches the “original” daylight reading, this technical solution does not come close enough to make an accurate simulacra of daylight to function as a fitting recreation of the stone’s “true” colour. Rather than depict a colour close to that first experienced by the Neolithic stone seekers, it would simply be another layer of artificial, “born digital” data that would not approach even an approximation of the original assemblage of colour-aesthetic-meaning-choosing inherent in the construction of the monuments studied in this research.

### **3.3.3.4 Rationale for open source software**

The Arduino range of devices, peripherals, and documentation is one of the most popular home computing and prototyping platforms in use today (arduino.com 2018) - and one of the main reasons for this is the fact that it is open source. As stated previously in this methodology, the professional tool to conform to the same function as ORAC would be in the region of ten times as expensive to purchase - and comes with the inherent black-boxed, user separation from comprehension of function and performance inherent with all pre built consumer IT solutions. The flexibility to conceptualise, design, prototype, and construct in affordable stages is a significant benefit, particularly in a research project such as this one where objectives are narrow and specific, and results required to be repeatable and quantifiable.

Open source software and hardware is not merely an affordable and flexible IT solution, however - it is also the source of a significant community of free, welcoming, and helpful expert and enthusiast advice - available freely online through the use of web forums, social media platforms like Reddit, and the support services of the Arduino team themselves. For any problem or issue, it is almost guaranteed that someone has come across it before and has solved it - often a quick Google search will solve a problem easily and cheaply. This community of immense value to postgraduate researchers looking for support and guidance often in isolated, non-standard working hours situations. As one of the key future goals of this research is to develop a crowdsourced initiative to collect massive stone colour datasets (see chapter 10.3), access to these welcoming and free communities means that any group wishing to take part - from academic to school coding club to adult learner training facilities - can find friendly and accessible help with ease.

## **3.4 Analysing the stones**

It should be noted that this research is designed largely to be qualitative, with quantitative elements - though data is being collected and compared, this is largely to develop accessible, readily comprehensible charts, maps, and datasets that allow data from the research to be examined and disseminated readily. As qualitative data analysis is generally defined as the search for a meaningful pattern, an underlying theme, or a significant relationship (Marshall & Rossman 2011), it requires a carefully researched progression from recorded data, to thoughtful analysis, to informed theorising. In order for this progression to develop, this research undertook a process of analysis right from the beginning, with the

very first survey at Bryn Celli Ddu (see Chapter 4). By continually analysing and reflecting upon both progress and challenges, the observed and understood significances became gradually more apparent, and allowed for an almost fractal development of interpretation (Schatzman & Strauss, 1973). Thus the analysis and theorising was a process of continual development, refining and improving as the research continued.

Meaningful patterns were drawn by collating recurrent themes and highlighting instances that conform. By coding certain properties (such as presence of red stone or an interior setting), then creating initial categories and comparisons, the basic ingredients of theories come together, as defined by grounded theory (Moustakas 1994). Thus, the “essence” of colour related phenomena was explored in the context of the sample taken, distilling the possible meanings and interpretations into a structural synthesis (Cresswell 1998).

In order to achieve this structural synthesis, it is necessary to take steps towards the removal, or at least attempt to acknowledge and ameliorate, the prejudices of a modern mind viewing prehistoric culture: hermeneutics provides the lens for this view (Moustakas 1994). Understanding that our own conclusions of what we see are grounded in our own experiences is a step towards viewing phenomena with a degree of objectivity and awareness.

When this methodology discusses analysis, this is not a mathematical model, nor an in depth statistical analysis - though R, the software package chosen for this analysis is at its heart a statistical modelling tool, its powerful ability to seamlessly connect data stored in unwieldy Microsoft Excel spreadsheets to the mapping tools available in QGIS and similar GIS systems means it is extremely valuable outside of its native environment.

R and QGIS are both open source software options that afforded powerful yet accessible solutions to the requirements of this study - that is, to record and query a dataset of coloured stone, and find commonalities and differences that hint at wider cosmological significance.

### **3.4.1 QGIS and R - a brief outline and justification**

Although the first iteration of results data tabulation (for the purpose of the pilot study, see chapter 4) was a simple Excel spreadsheet, to even minimally analyse these findings a further step was needed. For this purpose, the software environment and statistical modelling toolkit R was chosen, as its potential for highly customisable statistical functions and seamless integration with other packages was advantageous. Although R is not suitable

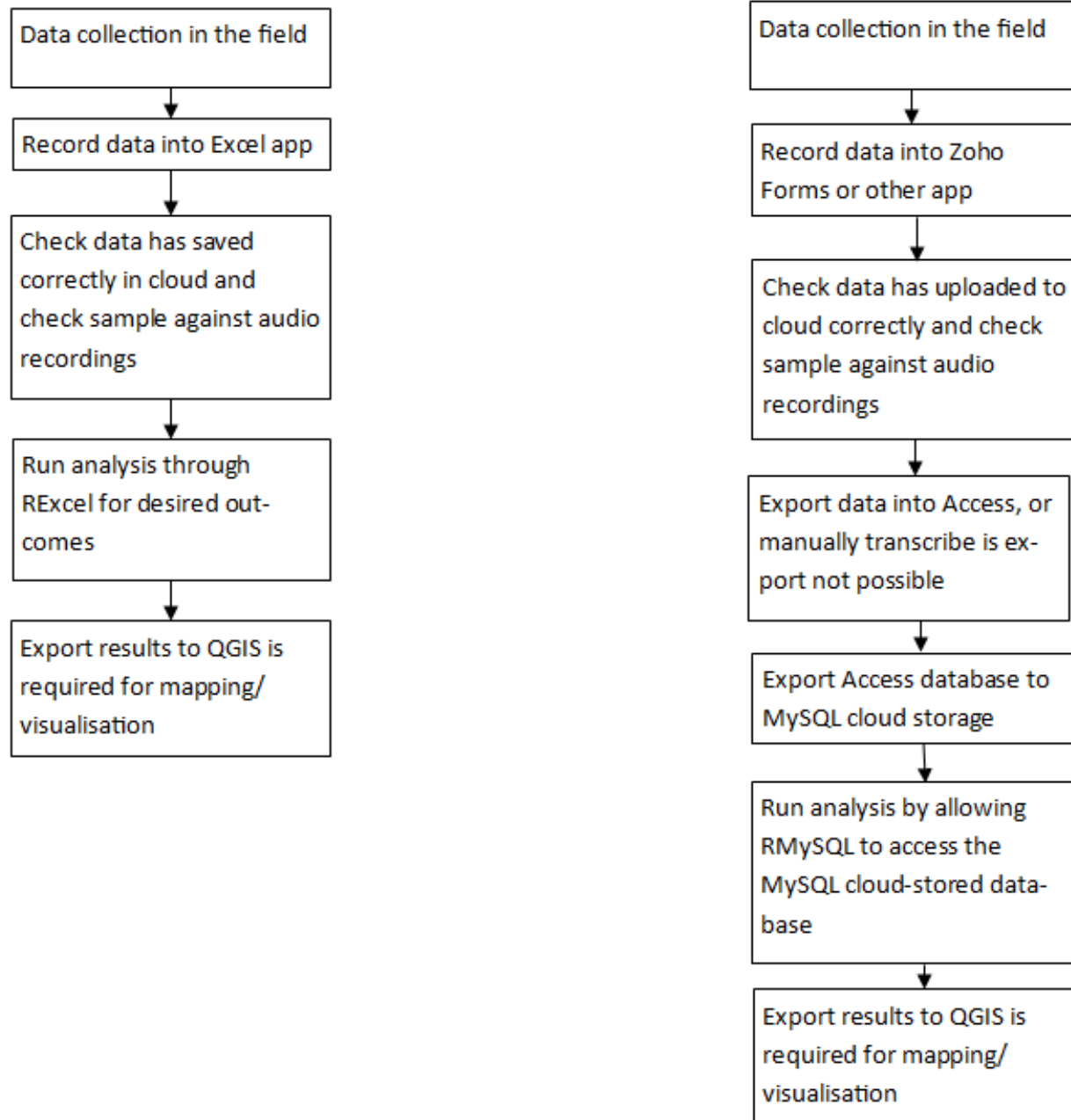


for extremely large datasets, such as those deployed in medical trials, for the purposes of this study where records will not exceed more than a few thousand individual stones, it performs well. R integrates with Excel via an add-in called "RExcel" that works directly from the columns in a given spreadsheet to perform statistical analysis, and results can be output to a number of useful applications.

Data was recorded in the field using the mobile version of the Excel app, which supports offline data collection for areas out of signal - a common issue as most sites are in rural or isolated locations. In the pilot study, both paper recording sheets and alternative apps were tested as alternatives, but both suffered from issues, most notably the additional time needed to transcribe results into Excel. Each stone has both a unique identifying number and a number to identify the monument it belongs to, along with geographical coordinate information that will allow mapping of common features to take place. Excel is the only piece of non open-source software utilised in the data collection and analysis, on the basis that its output files can be accessed via free open source services such as Open Office or Google Docs if required, and it is extremely common to have free access via libraries and other public institutions - which would not be the case for specialised software such as GIS systems.

Originally a slightly different approach was considered, of creating a database in Access or similar programme; this proved to have a more complex path to the output of results, with more potential for errors in processing and analysis as a result, as illustrated by the flowcharts below:





*Fig 9. Comparison of Excel(left) vs Access(right) for data handling and analysis. P Foreman 2016*

In order to visualise the connections highlighted by the analysis conducted via R, a GIS mapping of results was proposed that would allow the visualisation of networks across geographic and temporal layers. QGIS was chosen for this due to its open-source nature; maps and other data can be easily shared and distributed, there is a broad community of support for troubleshooting, and it supports integration with R, making the handling and visualisation of data efficient. QGIS provides clear, accurate mapping of queries generated

from the dataset - for example, heatmaps of common features in a region (where are capstones red, where do kerbstones form contrasting patterns of colour, where do pale stones correspond to certain alignments?). It provides a medium for the production of accessible and easily comprehended graphical realisations of the connections discovered over the course of this research.

Package	Purpose
xlsx	Bringing Excel spreadsheets into the R environment
RQGIS	Integrates R and QGIS to take advantage of the capabilities of both without needing experience or knowledge of Python programming language
RExcel	Gives R functionality directly in Excel, making analysis simpler and more efficient

*Table 3. List of R packages used to interrogate data and output findings into QGIS*

It should be noted that although the use of QGIS does provide a technical solution to the issue of processing data efficiently, it is not to be merely viewed as a tool. As described by McLuhan's Laws of Media (McLuhan & McLuhan 1988), there are critical evaluations to be made of the technology used in any investigation to fully appreciate the effect on "both ourselves and our practice" (Huggett 2012). These fall under the general headings of *amplification, obsolescence, retrieval, reversal*; each law, reflected in the others, gives a depth of understanding of the effect the technology has. This tetrad of "laws" is a sounding board for discussion rather than an attempt at a definitive rule of the evaluation of technology, but it provides a key component of reflexive practice for the digital archaeologist (Huggett 2012).

In the case of QGIS and its application in this research, the following (adapted from Huggett's 2012 discussion of critically evaluating GIS applications) can be considered a brief overview of the affordances these four laws present;

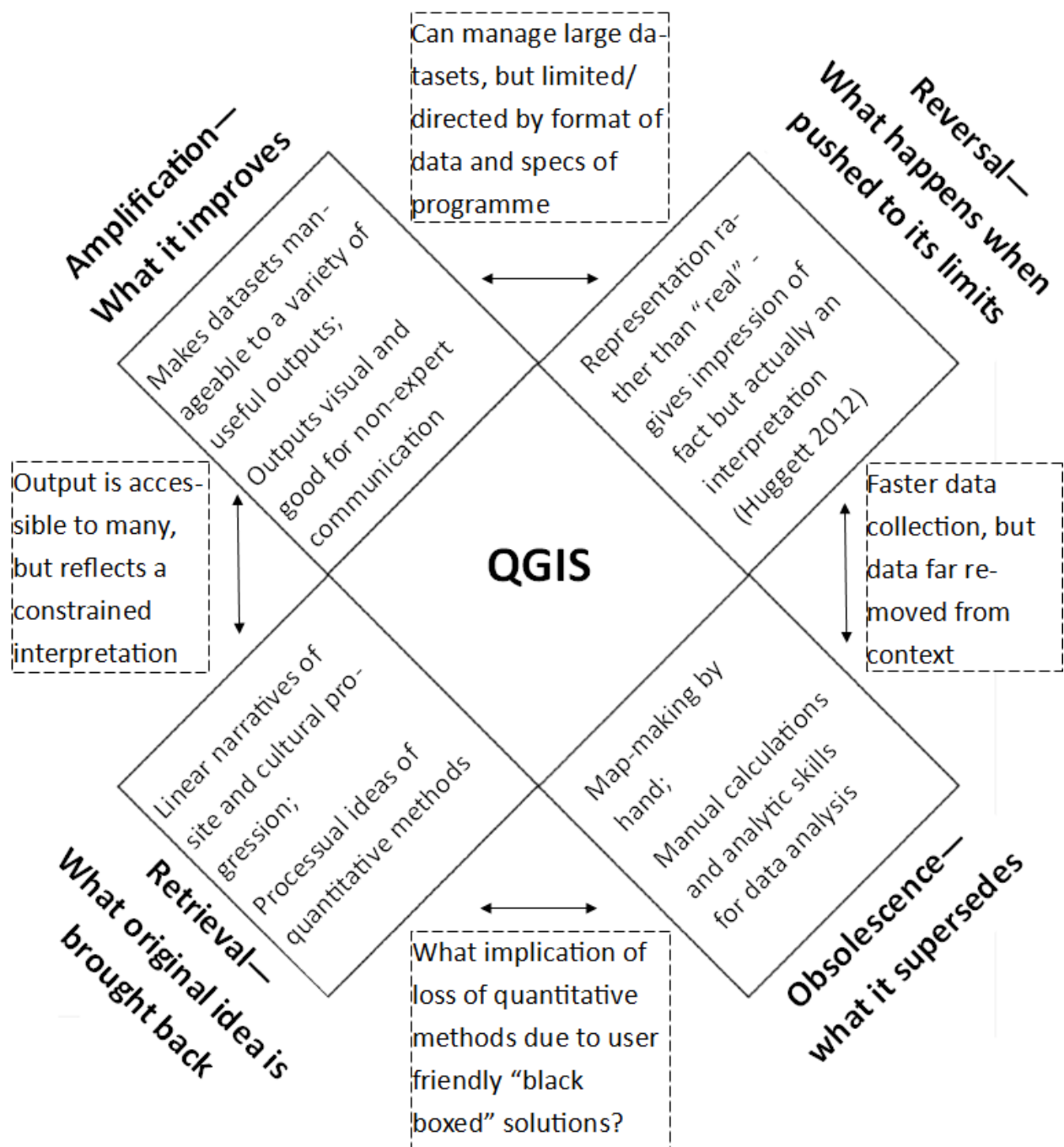


Fig 10. Representation of the four “laws” in McLuhan’s Laws of Media in relation to QGIS affordances – After Huggett 2012

This examination of the implications of the use of digital tools to analyse analogue things - people, places, stones - is an important element of the reflexive practice at the heart of this research. It also has implications on the core interpretative framework of Assemblage - what is the role of the digital in materiality?

### 3.5

#### Digital media as mouthpieces for material agency

The use of digital tools for data collection, analysis and presentation has wider implications than merely describing a methodology. Understanding the theoretical implications of the use of digital tools upon the nature of the data they generate, analyse, and visualise is an important facet of critically examining how methodology impacts upon interpretations of material agency (Gordon et al 2016). Caution must be taken to avoid “black boxing” analytical skills and relying purely upon technology to do so: integrating new technology may be efficient, but without careful critical analysis of its form and function, and the effect these have on any resulting interpretations, it brings the risk of “denigrating (or eroding) the human practitioners’ interpretive powers and skill” (Gordon et al 2016, 19). An understanding of how the technology does what it does is key to keeping touch with the processes involved.

Digitally recording material properties – under constant conditions and without the need to approximate or judge best fit as an analogue method would – allows the material to speak for itself more clearly than through a human interpreter, allowing the original message to come through fewer translations. This is the story of the material itself. Although the process of recording data is not without its own translation and subjectivity, these can be largely quantified in respect to device accuracy, possible technical reasons for irregularities, or mechanical failure. As an example, the original design of the colour sensor used in this research utilised a white LED light source to take colour readings; doing so would have placed a new translation on the original influence of the stones, as the white LED in no way approaches any quality of light foreseeably available to Neolithic peoples when viewing the stones. What was a technical fix for the problem of needing reliably consistent light sources for the data lead to the masking of the voice of the material itself. To help ameliorate this, a daylight filter was proposed, to give a second set of readings, closer to the “natural” state (see 4.6); however, each solution was found to be unsatisfactory, and so the stones’ story is still not being heard in its original form. Translation abounds.

Thus the story of the stones is recorded in two ways in this study – recorded digitally, the colour readings of the stones become a tale that is “born digital”, and lives its life entirely virtual. The colour data is recorded, analysed, and visualised entirely digitally. This digital story is then supplemented by that of the interpretation of the researcher – standing in, as far as is ontologically possible, for the human actor in the creation of the monuments. This is the story of the people connecting with the stone. Bringing the two together, telling the story of human and material via the lens of colour, approaches an understanding of the complex relationships between people, things, landscape, nature and mind in the Neolithic.

### 3.5.1 “Born digital” data and its implications

Digital stories are generated when data is collected or created via digital means and collated electronically – on file, online, on a cloud storage system. This is *born digital* – art created on a computer, ebooks that have never seen a real page, maps generated from data points collected in the field. These digital stories have an uneasy relationship with their “hard copy” companions – ebooks remembered less than a paper copy, databases at the mercy of hacking, but also photos that will never fade in the sun and text that will never be used as firewood. The born digital files are a distinct entity to the hard copy, and even the scanned-from-analogue files such as digitised books and museum collections. They bypass many of the human touches and form a new ecosystem of data.

Digital archaeology is not a paragon of progress when it comes to archaeological interpretation; the removal of the human element in analysis is not without significant drawbacks. Working with particular tools and their natural limitations of output and ways their results can be displayed and shared means results are often presented as absolute truths or definitive answers, particularly when interpreting archaeology and heritage in museums or other public settings (Taylor & Gibson 2016). Enhancements in data analysis programmes, especially in areas such as GIS, mean that traditional skills are lost, replaced by “black-boxed” computational programmes that remove the intuitive, skilled eye from the core tasks of examining, interpreting, analysing and presenting results from data (Gordon et al 2016). As Huggett noted, this brings processual, data-driven interpretations back to the fore, ones that reduce findings to symptoms of how data is manipulated and processed by opaque computer applications that have no room for anything outside their programming logic, and limit our perception of the results to solely what I outputted to us (Huggett 2012). Non-critical use of such digital tools risks making results at best incomplete, and at worst irrelevant to a thorough and well-researched archaeological interpretation.

When designing digital recording devices, then, it becomes important to know several key things, not least:

1. How will it work – what goes on “under the hood” that could affect how data is processed, and what effects may that have on how the eventual results are presented and can therefore be used?
2. Who is the audience for the results – will they be able to access the original data, understand how results were found, need results to be interpreted into particular outputs (e.g. maps, file formats)

3. What implications will having the device on-site on the way that the rest of the investigation is conducted?
4. How will differentials in the way the device is used by different people effect they data collected and eventual results?

With these questions in mind, it becomes possible to construct an idea of what kind of translation will be possible when recording the story of matter via digital devices, of how the original story will be shaped by new technologies.

### **3.5.2 Letting stones speak free of human voices?**

The possibility is a tantalising one: record sites with digital devices, use computer programmes to analyse them, and computer programmes to output interpretative visualisations and information. The human element for error, miscalculation, and bias in data selection and interpretation is removed – the matter has spoken directly to the outputted results. Sadly, this is science fiction rather than science fact; even with the use of such technology, there will never be true separation from human bias until machine learning and artificial intelligence reaches such a stage of development that the devices conducting the interpretation are building their own paradigms and not ones part of their (human-designed) basic programming.

As with all analytical tools, recognising the limitations and acknowledging that it is the best we can currently do is an important reflective practice. Although we cannot state that data gathered digitally is a perfect sample, or the findings are an absolute truth regarding the representation of the matter being recorded, we can state that is as close an approximation and simulation as can be achieved within the parameters of the research. Just as equipment such as the ones employed in geophysical survey are calibrated and their limitations quantified by degrees of accuracy in their technical specifications, so too should all data gathering tools be quantified as to how close to the truth they are aiming to model. This is simple when pure data is measured – looking at material properties such as colour under specific lighting conditions, or the chemical composition of particular pottery. What becomes more complex is attempting to conceive how this reflects the degree to which the material agency is being represented. What other data needs to be collated with that recorded in the field to contextualise it sufficiently to make it a translation of the matter's story, rather than simply a snapshot of one page of the story?

Several aspects and properties of matter lend themselves to be studied via the application of these digital devices. Well established research and analyses of lithic composition via PXRF is one of the most readily accessed, but there is also growing work into looking at roughness

of texture (Stemp 2014), colour (Foreman, forthcoming), and recording the acoustics of particular sites (Debertolis & Gulla 2016). Analytical techniques like PXRF undertake research techniques that clearly cannot be done by a human in the field – whereas the latter three could be recorded or noted by an archaeologist, subject to a wide number of variables and drawbacks that would make much of the data non-reproducible. Digital recording techniques, though neither totally fallible nor totally objective, go some way to removing the issue in the wide variability of human perception. Attributes of material subject to these vagaries – ones perceived by the archaeologist's own senses – could be recorded digitally to allow the matter to speak directly from source to data, removing one layer of filter between origin and result.

### **3.6                    Is phenomenology dead? Object orientated approaches to experiencing the stones**

The goal of hermeneutic phenomenology is to understand how the physical world and the interaction with it create meaning to particular people (Thomas 2006). Although Hodder's "contextual archaeology" has been critiqued for not accepting that a philosophical objectivity is not inherent in any archaeological analysis (Johnsen and Olsen 1992), the underlying hermeneutic principle of narrowing down the interpretation of an object or monument by reconstructing the intent of the creator or architect has merit when examining the work of a society at several removes from our own (Layton 2011). Tilley's embodied engagement with place (1994), the idea of experience being mediated by physical interaction with landscape, proved to be a thunderclap in the field of prehistory - suddenly, landscapes were places to *be*, not just to be aware of.

However, what was once the bright young thing of archaeological theory has become something of a cause célèbre - with significant criticism of the lack of empirical rigour inherent in any phenomenological analysis, deconstruction of its lack of consideration towards the dichotomy between ancient and modern ontologies (Bruck 2005), and the problematic reduction of all body experiences and reactions to the physical as being identical (Hamilakis et al 2002). Though it serves as a benchmark for theoretical approaches that bring the chaotic, un-modellable human element back into archaeological interpretation, it has significant drawbacks and limitations.

Gellner (1995) dismisses this hermeneutic guiding principle as a soft approach, an act of self-aggrandisement for the theorist rather than a rigorous scientific method. However, as a counterpoint, more recent critiques of archaeological fieldwork have recognised that a

phenomenological interpretation is not only a more visceral, personal and valuable sensory approach than that of more analytical geophysics (Tilley 2008), but a keystone in bridging the gap between the empirical and the interpretive (Hamilton 2011). Though a renaissance in interpretative archaeology and a new, creative, intuitive appreciation of landscapes is a laudable and valuable contribution to archaeological theory, this does not afford phenomenology *carte blanche* when it comes to examining its efficacy and relevancy when constructing interpretations of past ontologies and mindscapes of Neolithic peoples. What phenomenology fundamentally lacks is even a close approximation of objectivity; as Bruck notes, the dual problems of modern interpretation not being proven to map onto prehistoric lived experience, and the high degree of subjectivity when discussing experience of landscape and the perceived relationships between things within it are of significant concern (2005).

Firmly taking the place of phenomenology as the most fiercely debated theoretical battleground is that of object-oriented ontologies that shift the focus away from man-the-maker to thing-the-actant; so fiercely debated is this topic that archaeological theorists cannot even agree upon a name for this broad umbrella of object-oriented matter-concerned ideas, with camps ranging from Hodder's entanglements to Witmore's symmetrical archaeologies to the New Materialisms of Fowler, Witmore and Harris (Cipolla 2018). However one wishes to label it, the general thrust is the same: matter has agency, things act upon other things, objects are individuals too. In sharp contrast to phenomenology and the interpretation of landscape through a human experiencing it, these new archaeological ontologies consider the landscape as networks of things, of materials in constant agential interaction, of matter that is vibrant in and of itself (Bennet 2010). What this leaves us with is the idea that the materials themselves warrant consideration when constructing archaeological narratives of interpretation - a material decolonisation that affords new ways of examining place-human-thing-material interaction.

### **3.7 Assembling the cosmology of colour**

#### **3.7.1 Assemblage theory and its relevance**

The proposal of this section of methodology is to develop an idea of the assemblage of Neolithic cosmology (as discussed in the closing section of Chapter 2), in particular, the components within it that are related to colour. To construct patterns based on observations – drawing together evidence for colour selection and its relation to a whole host of other features such as origin of stone, significant alignments, shape, relationship with local and



regional topography, location within the monument – then it becomes possible to begin to construct a rudimentary diagram of how the vast assemblage of Neolithic cosmology fits together.

To imagine how this works in practice, consider a pair of socks. Not unlike Ingold's infamous drying stones (2007), they serve as an important yet familiar metaphor for a difficult to quantify theoretical idea.

Socks are daily wear in winter for a significant proportion of British adults, due mainly to the fact that the British weather making it somewhat uncomfortable to do otherwise. It is a near universal experience for the group of people most individuals reading this research identify as being part of. Should a 26th century archaeologist recover some perfect condition socks from the researcher's (inevitably eclectic) grave goods selection, what would they infer from the fact that they are rainbow striped? Let us look at the assemblage of rainbow striped sock wearing in 21st century Britain:

- Necessity – protection from the elements, and to avoid unpleasant feet. Not much clue here as to why rainbow stripes are necessary. Perhaps some idea of the totemic value of rainbow guarding against the rain.
- Expression of a particular identity – a cultural historian should be able to enlighten the archaeologist on the adoption of the rainbow by particular groups, particularly LGBTQ individuals/groups and to some extent alternative lifestyle cultures commonly denoted under the generalising catch-all title of “hippies” by the establishment.
- Availability – what if the shop had nothing but rainbow socks?
- Trends and popularity – have sales ledgers and photographs of prevailing trends survived along with the artefacts themselves?
- Material advances – cheapness of bright colour dyes in relation to earlier periods in time.
- Family or friendship connections – perhaps they were a gift that were worn out of duty? Or a cherished present from a deceased family member, a kind of 21st century ancestral heirloom?
- Political or social statements – perhaps they were worn as a deliberate act of social rebellion? Or social conformity to a particular group? Or solidarity with a certain cause?

If a few pieces of information are known for any of the above facets, inferences can be made about others; and once that is done, ideas can be extrapolated out into having wider implications for society as a whole. An archaeologist recovering technicolour socks would imagine the wearer as a vaguely counter-cultural, society-defying individual; that this was the grave of someone moderately active in their political and activist circles, and they could make some kind of estimation of what sort of circles they were. They could hazard an idea of the political landscape the wearer lived in, and where they fit in with it.

Assemblage theory does not privilege the “higher” concepts above the “lower” – cognitive functions such as an individual’s social consciousness and ideals on the ritual significance of objects, even as seemingly mundane as a pair of socks, is equally as important as the basic drive to keep feet warm – they are all part of the great mosaic. In order to gain a better imagining of this great mosaic as relates to Neolithic cosmology, this study will take the findings of colour surveys and use the above thought process of assemblage deconstruction to place them in a wider, richer context. Rather than taking colour readings and placing a value on them merely aesthetically, this segment of the methodology focuses on conducting a mental journey around the landscape of colour in the Neolithic - drawing together ideas of necessity, individual and collective identity, availability, trends and fashions, material advances, family/kin/trade relations, and political or social statements. Examining the role of colour in each of these thought-scapes of the Neolithic gives a rounded, nuanced view of why specific colours were significant.

### **3.7.2 Russian Dolls - colour in local, regional, international cosmologies - and archaeological interpretation itself**

It is important to note that the assemblage of Neolithic colour and cosmology does not neatly begin and end with the accepted time frame of the Atlantic Neolithic itself - as a phenomena it persists right from the formation of the stone itself; through early human language, art, and ritual expression utilising colour; right through to archaeological interpretation. To visualise this, the diagram below displays the ways concepts and ideas nest within each other as the assemblage expands and survives over time - becoming a series of Russian doll-like layers of significance, interpretation, and expression.

Viewing the assemblage of colour significance in this way means that it becomes possible to juggle both concurrent and disjointed aspects of Neolithic cosmology relating to colour - individual circles within the whole can be examined, explored, and findings used to inform how the other circles within the fractal pattern are connected, related, informed or inspired by

each other. Monuments that are spread geographically, temporally, and typologically can be simultaneously considered as individual entities (within their own, local circle), and part of greater groups of entities (within regional traditions, within areas of common trade, within areas of particular domestication practices, within regions dominated by particular geologies - the list is long and, as will be unsurprising when considering it in terms of an assemblage in and of itself - complexly inter-connected and inter-influential). In doing so, statements can be made about broad Neolithic cosmological practices and beliefs, as well as local and individual practice - making the mosaic of Neolithic cosmology ever closer to completion.

It is in the context of the unremittingly harsh reality of climate change, the environment, and the vast and unknowable complexity of the network that is our earth that the idea of assemblage becomes painfully and poignantly relevant: the idea of human ignorance of non-human agents and the need to not only recognise but empathise, conserve, protect, collaborate with them in order for the very assemblage we are part of to survive is an idea long nested in environmentalist texts from Lovelock's *Gaia* to Capra's *The Turning Point* - updated for the even more alarming modern reality by Timothy Morton in his *Hyperobjects* and finally, fiercely argued as an anthropological and political reality in Jane Bennett's *Vibrant Matter*. Our assemblage is the earth: the agents are not just humans. The stone, the land, the monuments are all part of this vast network, alive with agency and intent, and to elide their part in the development of cosmology, culture, environmental awareness, and personal gnosis of peoples of the Neolithic of Atlantic Europe is hubris itself. To dismiss the role of non human agents, and to assume human supremacy that visualises every network as a pyramid with us at the top, rather than a vast network that we are woven intricately within, is the kind of anthropocentric arrogance that got us into the ecological disaster zone that is the anthropocene. Assemblages are alive with a multiplicity of voices, that need to have their chance to be heard.

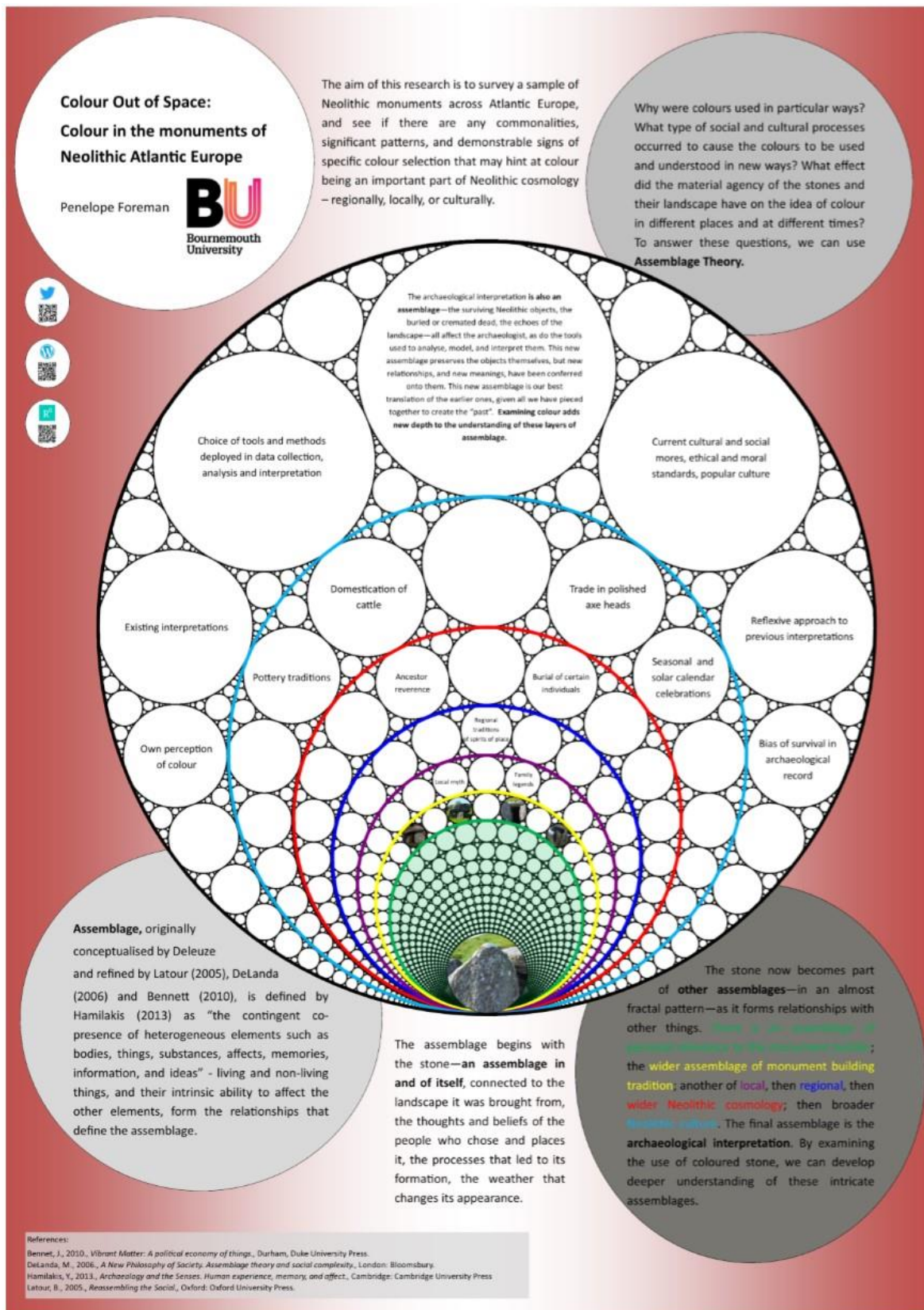


Fig 11. Assemblage of colour in Neolithic cosmology, visualised as a series of concentric, fractally related circles developing ever outwards. P Foreman 2017

### **3.8 Whither Ethnography?**

Just as the digital storytelling addresses the material side of the stone story, the story behind the people involved must also be addressed. In order to assert the fact that past ontologies were removed from our own, and to see how people in early farming cultures perceived their thing-person-land relationships, ethnographic analysis provides needed context. As noted by the literature review, colour, particularly the red/white/black triad, can have significant and deep meaning to cultures (Turner 1967). Combining an analysis of recorded data from the field with an understanding of ethnographic sources on attitudes to both colour and stone as material will enable a process of inductive reasoning to begin. This study of the ethnographic source material will take place after the site surveying has been completed, in order to avoid any unconscious bias in data recording.

#### **3.8.1 Ethnography's troubled image**

In the attempt to find a more suitable framing for past ontologies than looking at it through our modern cultural mores, ethnographic archaeology deploys studies of the experiences and interactions with matter by extant societies that fall outside assumed “modern” behaviours and beliefs, that still employ hunting and gathering, or live remote, cut-off lives presumably almost unchanged for many generations. It was recognition of the need for critical approaches to the standard epistemological constraints of archaeology, to address the fact that “archaeology is a social practice in the present”, subject to political, ideological and social influences (Hamilakis & Anagnostopoulos, 2009). This is problematic in several significant ways, not least that using datasets from earlier ethnographic work returns once again to processual ideas of modelling human ideas around collated data and fitting things into artificial, date-driven patterns, but also the often superficial level of study and less than robust methodologies lead to less than reliable interpretative models (Gosselain 2016). Ethnographic studies have the troubling possibility for the othering of both past cultures and contemporary non-Western societies – though we must recognise their differences and value them for what makes them a unique and vital part of the human story, we must not exoticise them to the extent that they become alien, inhuman things.

As more reflexive practice becomes mainstream within archaeological theory, it allows more room for these problematic issues to be acknowledged and discussed. Although our reconstructions of the past have their issues, it must be remembered that it is all we have available to us, and in lieu of the unlikely invention of time travel and the technology to observe totally and infallibly without alerting the observes or altering the course of history in

any respect, there will never be an absolute way of knowing the human past. Stories will always be told by new storytellers in new ways.

Instead of putting these past-scapes on a pedestal, it is important to accept that our own limitations as constructors of meaning is reflected in the limitations stopping past humans from constructing systematic, cohesive ideas of their world that obeys any kind of internal logic as we would understand it. Human minds will always react to stimuli, social or environmental, in eccentric and ultimately unknowable ways – just as our interpretations take forms that, to archaeologists as distant from us as we are from the studied past, will seem almost entirely incomprehensible. Our interpretations of the past are the current iteration of a very long story, on which grows and shifts each time we develop a new way of translating it, a new way of illustrating the pages. Past versions influence the present one, and that current one will make way for future retellings; what remains constant is the eccentricities, the oddities, the inherent fragility of human imagination are preserved throughout, a fractal pattern of how the human mind views the world as new ideas expand and contract its view.

### **3.8.2            Timing of ethnographic research - a justification**

The ethnographic analysis of relevant cultures and their relationships with colour and stone was conducted after data collection was complete and initial analysis had taken place. This was an important step to take to avoid the inclusion - consciously or unconsciously - of bias in the representation of data. As seen in chapter 2.2, several interesting patterns in these relationships emerge that, if prior knowledge were to exist, may have shaped the research design and fieldwork behaviours in ways that sought to confirm or deny leading theories. For this reason, the ethnographic work is the final chapter before discussion of findings, rather than taking place as part of the initial background reading and literature review in any significant depth.

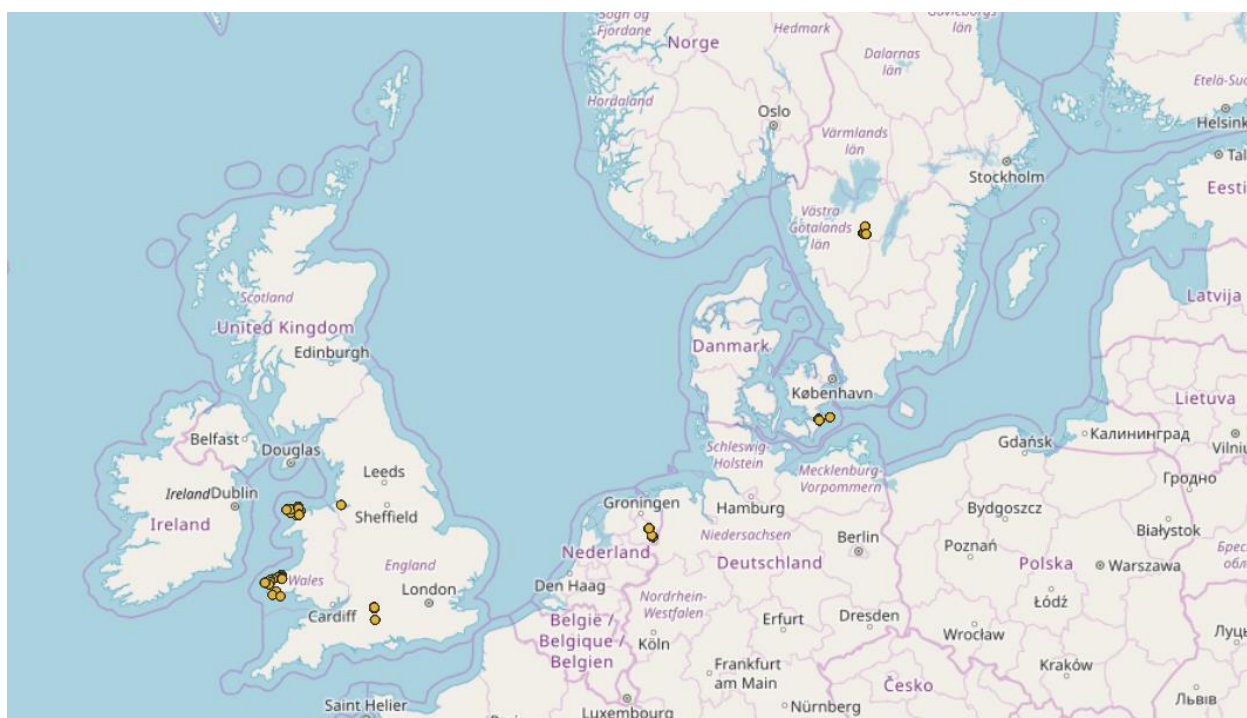
### **3.9                Summary**

Through an examination of the technical limitations of existing colour sensor technology, it is clear that a basic colour survey of monuments can be conducted, and is one that can be easily replicated and repeated for further iterations of this study. However, it is also clear from an examination of the theoretical interpretative framework of Assemblage and critical digital archaeology, these results are not a true representation of the corpus of Neolithic colour – and that the recording of these colours is but the initial step in constructing a place for them with Neolithic cosmology. Recording the colours and using these data to map

commonalities, patterns, and evidence of deliberate selection is a useful way to acknowledge the overall research question of this study – *does colour matter to Neolithic communities in the building of their monuments?* – but it is the use of Assemblage to then place that data in the huge fractal dance of the Neolithic world that bridges the gap from raw data to interpretation.

The next chapter addresses the first part of this process – gathering the data across sites in six key areas to build up the basis of a catalogue of colours across Atlantic Europe.

#### 4. Gathering data digitally - using a colour sensor to map colour patterns in the monuments



*Fig 12. Map of sites covered in this research. Maps from OpenStreetMaps and QGIS. P Foreman 2018*

This chapter looks at individual monuments and their constituent stones - recording the colour digitally and building a database of stones. It should be noted that site plans are a combination of existing literature (referenced as such in each figure), and notes taken in the field - as some sites have stones that have become occluded, or do not completely match with the existing drawn plans. Some site plans are also simplified, to reflect recording of the stones least likely to have been moved or tampered with, or to reflect sites where certain stones were not recorded due to safety of access (as with the capstone at Pentre Ifan, Pembrokeshire, which was too high to reach).

##### 4.1 Pilot Study - Bryn Celli Ddu, Anglesey

Bryn Celli Ddu, a passage grave on the Isle of Anglesey, Wales, was chosen for ease of access, relatively good levels of preservation, and the existence of detailed published theories into its alignment and possible stages of construction (O'Kelly 1969, Bradley 1998, Burrow 2010).



When recording the stones, it was important to recognise which may have been moved incorrectly positioned during the reconstruction by Hemp in the late 1920s. By carefully examining his report, and photographs of the site, it is clear that the main orthostats of the passage and chamber are the most likely to be in original position, followed by the capstones which effectively “slot” into them; the passage shelf and lower sections of the packing material between orthostats may be similarly original in positioning, but a lack of definitive evidence means they should be viewed with caution. The remains of the kerb are slightly less certain, and much of the upper layer of infill was by Hemp’s own admission replaced for structural stability reasons – the rear of the chamber where the pit and carved stone were originally found are entirely modern constructions (Hemp 1930).

With that in mind, the main priorities for recording this site lay with the chamber, passage, and kerb immediately to the exterior of the passage.

#### **4.1.1 Bryn Celli Ddu - the site in context**



*Fig 13. Bryn Celli Ddu, site of modern pilgrimage and offering. P Foreman 2016*

Bryn Celli Ddu is instantly recognisable as one of the best preserved (or at least, most convincingly reconstructed) Neolithic sites in the British Isles, and the poster star for CADW and other heritage organisations. From the evocative name (translation from the Welsh: “mound in the dark grove”), to the summer solstice alignment (Burrow 2010), to the riddle-like nature of its stages of construction, use, destruction, re-use and abandonment (Eogan 1983, Cummings 2010), to the current use by several contemporary pagan and druid ritual

practitioners, it has a life-long beyond its original henge construction, beyond the deliberate covering of the intricate pattern stone, beyond the sealing of the passage grave.

The current iteration of the site is a passage grave in a truncated mound, reconstructed heavily by Hemp after his excavations in the 1920s (Hemp 1930). Fortunately for contemporary archaeologists, Hemp denoted his repair jobs and work to stabilise the site's passage and chamber walls with packing material drilled with small holes - so it is immediately apparent what is Neolithic, and what is twentieth century engineering. He conducted similar repairs at nearby Bryn yr Hen Bobl, and so the two sites are interconnected across multiple time periods and for multiple reasons beyond the shallow "passage grave" category.

The monument sits at the bend of a stream, close to prominent outcrops of blue schist.

#### **4.1.2 Recent findings**

Recently Bryn Celli Ddu has been the focus of some exceptional new studies that have utilised new digital techniques, new appreciations of wider ritual landscapes, and new interpretations on the nature of rock art and ritual settings (Nash et al 2005, Griffiths et al 2015, Miles et al 2015). As well as mapping the newly appreciated proliferation of rock art on outcrops in the locality, recent excavations are ever expanding the wider ritual landscape context of the site, with the most recent cairn excavation in the adjacent field locating a structure possibly larger than Bryn Celli Ddu itself (Reynolds et al, in press). As with all archaeology, the past never stands still and is ever changing - the Neolithic world of the site is always in flux as new discoveries, new methodologies, and new fashions in interpretation colour our understanding of the site. Significantly, the site has been the setting for numerous public outreach and creative arts sessions, bringing the archaeology and ritual use of the site to many new audiences - and extending the assemblage of stone drawing people to the site into the present and future.

#### **4.1.3 Blue schist as important to Anglesey past and present**

The geology of Anglesey is complex, rich, and the source of significant passion and enthusiasm from geologists - and has therefore been widely studied, researched, and published upon (for further details, see chapter 5.1). Of all the stone types present on the island, Anglesey is perhaps best known for its ribbons of blue schist, a metamorphic rock formed under intense pressure of being plunged into deep ocean in swift succession from its

rising, molten and volcanic, to the earth's surface (Greenly 1919). Its fine grained texture and rich colouration make it aesthetically pleasing, and its ancient nature and relatively rare status in such accessible form means it lead to areas around Llanfair PG being designated sites of special scientific interest, preserving them from construction work and ensuring patches of nature reserve in perpetuity (BBC News website, 2010). This is but the latest iteration in the stone's important history on the island; numerous of the Neolithic monuments here are constructed at least partly of the stone, and it appears in buildings and walls and other domestic and agricultural architecture in both subtle and obvious ways.

#### **4.1.4 Methodology - ORAC V1**

This pilot study used the first version of the colour sensor as described in chapter 3, alongside paper hard copy recording sheets to collect data on site at Bryn Celli Ddu in April, 2016. This iteration of the device was housed in a temporary wooden box, the challenges associated with which are noted in the summary and the transcription of the reflexive journal. Each stone was recorded twice, and other notable features such as general shape, surface texture, presence of rock art, and the presence of any surface mica was recorded, for later cross referencing.

Monument Survey Recording Sheet		Sheet : /
Site Name :	Location :	
Date :	Site Number :	
Plan :		
Elevation :		
Uniform Colour	<input type="checkbox"/> Entrance	
Quartz Inclusions	<input type="checkbox"/> Passage	
Rock Art Present	<input type="checkbox"/> Chamber	
Orthostat	<input type="checkbox"/> Backstone	
Infill	<input type="checkbox"/> Floor/Paving	
Kerbstone	<input type="checkbox"/> Interior	
Capstone	<input type="checkbox"/> Exterior	
Description : (including weather conditions, texture notes, rock type etc.)		
Penelope Foreman		2015/16

Monument Survey Recording Sheet		Sheet : /
Site Name :	Location :	
Date :	Site Number :	
Recording Number :		2015/16
Penelope Foreman		

Fig 14. Initial recording sheets used on site -site plan to left, individual stones to right.

#### 4.1.5 Human responses to stone stories - from the reflexive journal

As a prominent and highly publicised ancient site, Bryn Celli Ddu is the focus of attention from numerous groups and interested parties, and as such is interpreted through many lenses. When visiting, surveying, and researching the monument, many voices speak up - and sometimes clash - over the meaning, history, archaeology, ownership, and rights of access. This naturally informs response to the site on conscious and unconscious levels. These snippets from the reflexive journal examine the ways interpretation can be informed by the experiences and opinions of other key stakeholders.

##### **Reflexive Journal, 05.04.16**

PF: Site visit record, April 5th, 2016. It has been several years since my last visit to the site, and the route to access it has changed - there is now a new processual way, from car park over gravelled path, through gorse and hawthorn hedge, over stream and farm track. Today is a fine clear spring day, mild with a nippy wind, and clouds chasing overhead to make the sunlight patchy and weak. Conditions are dry, though it has rained recently, and the soil is damp. I can't help but think that the nearby farm walls look chock full of suspicious looking stones. How many have been dragged from ground to chamber to farm gate?

<Pause, sound of rustling.>

PF: Initial pilot study, testing of ORAC. Device initialised and battery checked, charge full. All circuits clear. This study will focus upon the stones of the passage, chamber, and section of kerb closest to the entrance. It should be noted that the breeze is making paper recording a significant challenge. The contrast of the breeze and the still of the passage and chamber is palpable, even today in its open and tamed state. I can already see, the colours here.

<Pause, further rustling. Mumbled sounds. Distant low voices.>

PF: There are visitors to the site, so I have left ORAC inside the chamber and I am conducting survey of the stone shapes and surface inclusions. There are significant pale veins here - quartz of some kind - that thread their way across some stones like snail trails, or constellations.

<louder voices, a dog barking>

PF: <very loud> For f\*\*\* sake! <quieter, at a distance> Excuse me, sorry, yes it's mine. 1,low voices> It's a computer <low voices> No, no I think it's ok. Serves me right for making it out of <low voices>- yes, wooden. It's just a prototype. For colour reading - I'm a researcher. <low voices, receding> Device check - all wiring intact, box worse for wear - their enthusiastic puppy decided it was delicious. Check against initial reading on clipboard - clear. It's fine, it's fine. Next iteration, no wood.

### **Reflexive Journal 15.05.16**

The Neolithic Studies Group trip - I was excited and terrified. Excited to be on Anglesey again, to be among my favourite stones - but nervous of how green a researcher I am, to be surrounded by a who's who of my literature review. Instead it was a relief - an immersion into commonality, the ease of shared passion, the smirk of shared experiences. Bryn Celli Ddu featured large on the itinerary, and once comments about the car park's own henge-cum-picnic spot and the quiet joys of ministry of works signage, and we're exploring these deeply familiar sounds. Conversations buzz - had I heard about theories on the archaeoacoustics of the site? Had I seen the original carved stone in Cardiff's National Museum? What did I think of the interpretation panels? Could I spot the spiral carved within?

It was unsettling, almost, to see others pay the site as close attention as I had previously done, and continue to. I'm used to half interested family members and slightly more interested walkers and families. It's strange to hear familiar, words-from-a-book-only phrases like viewsheds and phenomenology uttered so matter of factly here. Almost like they don't belong.

### **Reflexive Journal 17.06.2017**

A baking day at Bryn Celli Ddu for the CADW open day **[nb see chapter 7.2]**, where hundreds of interested members of the public came to see the site in all its finery, attended to by a swarm of archaeologists, reenactors, druids, historians, and enthusiasts. It was a strange kind of affair, almost like a coronation - we came to the monument, brought our gifts of time and storytelling and long lines of the curious to witness its hidden and not so hidden depths, crowning the stones in a ring of seated people on its brow, all photographing the view or scribbling onto activity sheets or trailing crumbs of tinfoiled sandwiches and scotch eggs.

My activity - asking people to record the colours of stone in the main chamber - drew an interesting range of responses. Some used smartphones or torches to illuminate the dark within, some used intriguing qualifiers to their answers (“elephant grey”, “sky blush pink”, “blood maroon”), and some described in depth the colour of the creeping lichen. Whole families worked together, and all on the promise of a free pen.

I was given a pentacle wand made of willow by a Druid boy, who told me his name was Gwidion - I asked him if he knew where his name came from and he regaled me with his own wild retellings of the Mabinogion and other Welsh myths. I may have missed a few stone colour seekers, absorbed in his stories - but his wide-eyed seven year old enthusiasm for the night-long drumming and fire parties to mark the solstice were worth it. He told me the stones were silver.

#### **4.1.6 Initial findings**

Far from being simply grey stones, colour is a significant component of the experience of being at Bryn Celli Ddu. Colour is a definite part of the experience of being in this site. Entering the passage the visitor is faced with pale stones standing out of the red earth, dark corners, walls bright with flashes of quartz. In harmony with recent work on Iberian megaliths that emphasises the theatricality and performative nature of colour in monuments (Bueno Ramirez 2015), the stones of the chamber enact a sense of drama, of presence.

The chamber is a space of contrast. Two stones, almost black, face each other across the chamber, whilst a bright and quartz-rich rock shines and sparkles with its reflected light. Pale grey stones with contrasting textures rise from the deep red soil and stand between these other stones, and a pale pillar stands in silent watchfulness in the chamber corner. As it is thought that the infilled passage blocked light out for all but the midsummer sunrise (Burrow 2010), these colours would largely have been lost to the darkness after the initial creation and construction phase - suggesting their deliberate selection and use had lasting significance that needed to be manifest within the mound.

It seems from where the pale capstones, portals, and orthostats in the main chamber lie, that it could be seen as following the passage of light - from the world of the living to that of the dead. With the passage infilled and only a slight gap left for the midsummer sun, it is these

stones that would have been touched by the light on its journey to the chamber on that one significant day. The brightest stone, however, is one that never sees the sunlight at all - stone 6, the first stone on the right within the main chamber - has prolific surface mica and shimmers in even the slightest light. Yet what could have been the ultimate in theatrical events - this bright shining stone being hit by the midsummer sunrise - does not occur, as due to its position is it totally out of the path of sunrise. Does it then, in the dark months between solstice light, act as the light source for this chamber - when the sun's rays no longer shine along the near-blocked passage, is this stone how the light gets in to brighten the long night of the dead within?

In sections not touched by the solstice sunrise light, the focus instead seems upon the idea of contrast, with the passage being a patchwork of alternating colours and textures. The meaning behind this contrast is more obscure, but may relate on a very basic to signifying the contrast between life and death, or a more complex interwoven series of meanings. With such variations in texture present alongside the contrasting colours, it is tempting to view the stones as a map of contrasting parts of the landscapes – smooth stones to represent water, rough for the land, shaped stones such the two enigmatic stones 16A and 16B representing farmed or domesticated landscapes. Whatever the case, the fact that such differing materials were chosen, when in what is now the very next field there is a large outcrop of more uniform and easily accessible rock to be exploited, suggests more than a mere chance or haphazard selection process.

Though this study is, by its very nature, limited, it does reveal some interesting insights that prove curious in isolation, and will be significant if they prove to be more widespread. As the majority of the stones looked at in this study appear to be in their original places, or very close to them, we can assume that their placement was a deliberate act on the part of the original builders and not a romantic reconstruction made by later antiquarians and archaeologists.

Though full conclusions can in no way be judged from a single site, the evidence for colour being significant at Bryn Celli Ddu seems to point to some relationship between light and dark, and the importance of the dead seeing that light at a significant part of the year (i.e., midsummer, the day with the most hours of light). This connects interestingly with the significant colours of stones at the Clava Cairns, with red stone being washed by red light of the setting midwinter sun, and bright white stone lit up with the pale midsummer sunrise (Jones & Bradley 1999). If colour and light are related in this way, then further examples



should be seen across Atlantic Europe. The underlying theme of contrast may also yield significant findings should it be evidenced in other sites.

Although bulky and sometimes impractical due to weather constraints, the use of the colour sensor meant that some stones, difficult to discern in bad light, could be defined accurately. The RGB readings meant that colouring site plans was a simple task, merely feeding the colour values into a simple graphics programme. This aspect of the method, when tweaked with the improvements suggested in the “challenges” noted in section 4.6, should give both clear and accurate results in an efficient manner.

Although the small scale study was broadly successful, this methodology now requires a larger dataset to see if the results found at Bryn Celli Ddu are significant and part of a larger pattern in Neolithic monuments.

#### 4.1.7 Digitally coloured site plan

From the colour readings recorded, an average was taken and used to colour a site plan (after Hemp 1930, updated to reflect current position and presence of stones). This enables a fast overview of the colours present at the site, and an appreciation of the contrasts at play, and the path of pale stones along the midsummer (ENE direction) sunrise path.

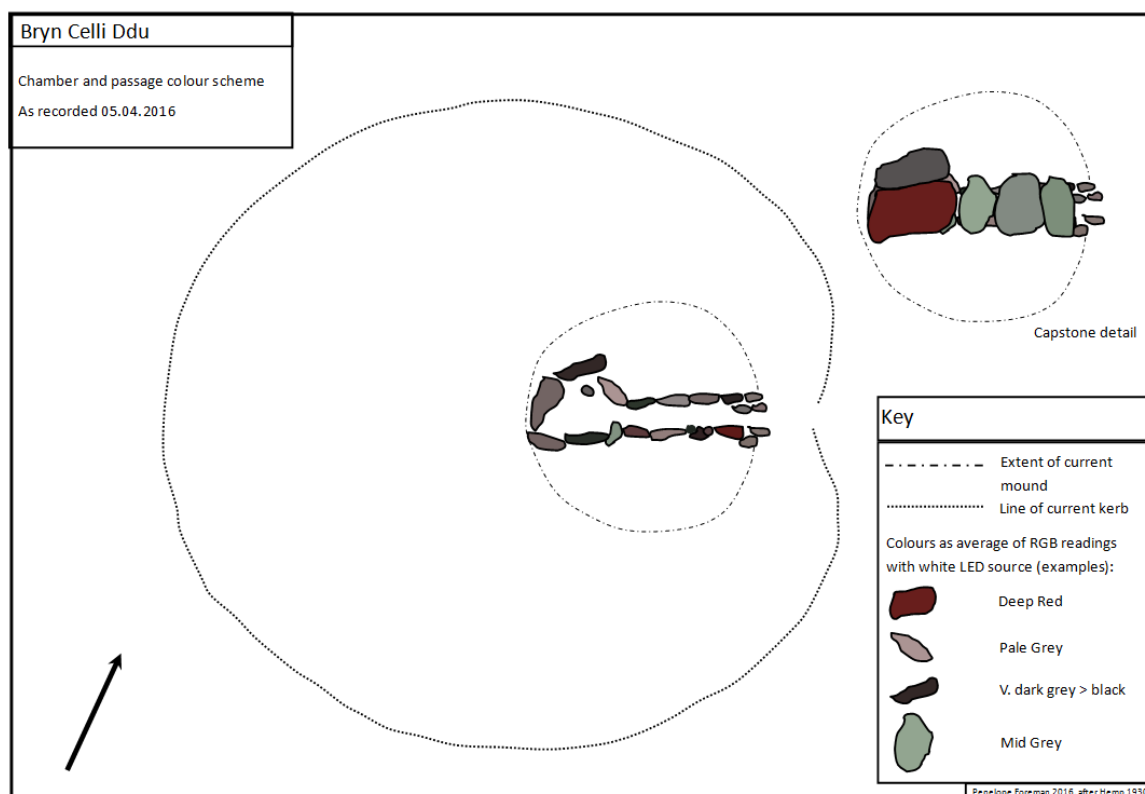


Fig 15. Initial RGB results (white LED only) Bryn Celli Ddu, Penelope Foreman April 2016

## 4.1.8

## Raw data

This is an example of the spreadsheet of raw data, recorded on site via ORAC and the hard copy record sheets. In this pilot study, it was envisaged that results for each site would form a separate sheet within a larger collection. As well as colour, key characteristics were noted.

Pilot Study - Anglesey																						
Site Number: 10001																						
Site Comments: BRYN CELLI DUU																						
Weather conditions: First hour, bright sunny spells, lots of contrast. Rest of the day dull with sporadic bright sunny spells. Dry conditions, though capstone damp to touch. Contrast seems to be the main theme of this site - opposing stones contrast in colour in the passage, and in the chamber. In the exterior passage, opposing slabs define each side. There is variation in the stone despite it being of the same type - some is a very deep grey, almost black, whilst some shines bright with quartz, and some is a rough-pecked, deep red sandstone or siltstone.																						
Not all stones are reflected in this list - only those likely to be in original position. Kerb, aside from that immediately outside the tomb (and noted here has "exterior passage" after Hemp, Lynch etc.) is not listed due to dubious nature of stone placement.																						
The soil colour is of interest as it is a rich, deep red - presumably due to high iron content (TBC).																						
Stone	RGB1	RGB2	Visual	Match?	N - darker	Uniform	Entrance	Passage	Chamber	Backstone	Paving / Floor	Kerbstone	Infill	Capstone	Orthostat	Interior	Exterior	Rock Art	Dressed	Quartz?	Material	Locality
3	100, 95, 95	104, 90, 90	Pale grey			Y			Y						Y			?	Y		Schist	Close
1	85, 81, 81	77, 70, 68	V. dark grey / black		Y	Y			Y					Y					Y		Schist	Close
2	104, 30, 28	94, 27, 25	Deep red		Y	Y			Y					Y					Y		SILTSTONE	Close
4	114, 100, 99	127, 109, 108	Pale to mid grey		Y	Y			Y					Y					Y		Schist	Close
5	50, 35, 38	51, 37, 36	V. dark grey / black		Y	Y			Y					Y					Y		Schist	Close
6	171, 148, 147	179, 220, 179	Very pale, bright		Y	Y			Y					Y					Y		Schist	Close
7	129, 146, 129	156, 164, 156	Pale to mid grey		Y	Y			Y					Y					Y		Schist	Close
8	41, 46, 40	42, 50, 42	V. dark grey / black		Y	Y			Y					Y					Y		Schist	Close
9	114, 98, 97	137, 123, 122	Pale grey		Y	Y			Y					Y					Y		Schist	Close
25	146, 165, 144	147, 161, 146	Pale grey		Y	Y			Y					Y					Y		Schist	Close
26	130, 138, 130	158, 168, 157	Pale grey		Y	Y			Y					Y					Y		Schist	Close
27	124, 142, 122	117, 122, 116	Pale grey		Y	Y			Y					Y					Y		Schist	Close
11	44, 53, 43	38, 48, 36	V. dark grey / black		Y	Y			Y					Y					Y		Schist	Close
12	82, 95, 60	92, 58, 60	Deep red		Y	Y			Y					Y					Y		SILTSTONE	Close
13	141, 133, 133	124, 107, 108	Pale to mid grey		Y	Y			Y					Y					Y		Schist	Close
16	48, 33, 34	61, 38, 40	V. dark grey / black		Y	Y			Y					Y					Y		Schist	Close
16a	30, 37, 31	37, 48, 38	Deep grey		Y	Y			Y					Y					Y		Schist	Close
16b	87, 64, 66	80, 50, 52	Deep grey, red tinge		Y	Y			Y					Y					Y		?	Close
14	145, 125, 123	122, 108, 107	Pale to mid grey		Y	Y			Y					Y					Y		Schist	Close
17	43, 35, 35	57, 44, 40	V. dark grey / black		Y	Y			Y					Y					Y		Schist	Close
19	113, 108, 107	104, 96, 94	Pale to mid grey		Y	Y			Y					Y					Y		Schist	Close
23	133, 118, 114	135, 128, 125	Pale to mid grey		Y	Y			Y					Y					Y		Schist	Close
24	125, 111, 106	135, 121, 117	Mid grey		Y	Y			Y					Y					Y		Schist	Close
21	125, 114, 111	108, 93, 89	Mid grey		Y	Y			Y					Y					Y		Schist	Close

Table 4. Raw data from initial pilot study phase at Bryn Celli Ddu.

#### **4.1.9 Follow up case study at the Calderstones, Liverpool**

Feedback from the first pilot study lead to a second, shorter case study to test some modulations to the colour sensor and tweaks to the methodology. This was undertaken at the Calderstones, Liverpool; a series of red sandstone blocks that were likely the orthostats of a passage grave (Roberts 2010).

##### **4.1.9.1 Brief history of the monument**

The Calderstones, a series of six red sandstone blocks of differing stature and shape, are the only surviving remnants of a passage grave from an unknown location in the historically hotly debated border area between the Allerton and Wavertree regions of Liverpool. They have stood in various locations around what is currently known as Calderstones park, from their very own, specially constructed circle enclosure at the entrance to the park, to the modern day indignity of a dilapidated glasshouse - a setting that is causing them considerable harm due to the effects of condensation, freezing, thawing, and rapid heating in full sunlight.

Their original covering mound was totally removed in the early years of the nineteenth century to provide sand for building mortar at a local house, and contemporary accounts suggest the builders removing material there found significant quantities of bone, cremated remains, and pottery - none of which survives in any known collection (Cowell 2008). With their context removed in such a thorough manner, it is difficult to any longer call the stones a monument in and of itself; rather, the spiritual successor of the monument - one that holds enough importance to modern visitors and pilgrims to warrant significant plans and funding into a new, custom built home to preserve and re-interpret them (thereader.org 2018). The material of the majority of the stones appears to be highly uniform, and all likely came from the same source - given the hyper-local availability of richly coloured sandstone that makes a perfect surface for engraving artwork, and a lack of other stone sources, this is perhaps unsurprising. The sixth stone is distinctly different in texture and colour, and is possibly the menhir known as the Roger Stone on sixteenth and seventeenth century maps and accounts rather than part of the original passage grave - this accolade may belong to the nearby, but orphaned “Robin Hood’s Stone”, a lone standing stone in an iron cage some streets away from the current Calderstones location (Cowell 2008, Nash 2010, Roberts 2010).



*Figure 16. The Calderstones in their protective greenhouse. P Foreman 2018*

What makes this otherwise anonymous collection of stones unique is the proliferation of rock art upon them - from cupmarks to spirals - that have ensured the stones have received constant attention from academics, artists, pagan and druid groups, and other interested parties. In particular, as the field of rock art recording and interpretation has flourished in the age of digital techniques and methodologies, there has been a flurry of activity surrounding the stones (Nash & Stanford, 2010). Though the surviving art is clearly of many different time periods and forms an intriguingly interwoven assemblage of inspiration and imitation all of its own, some is undoubtedly Neolithic, making the Calderstones very special indeed within British prehistory.

#### **4.1.9.2 Geology of Liverpool area**

Liverpool sits upon a series of Triassic age sedimentary rocks - siltstone, sandstone, and mudstone - of various shades of red, orange, and beige thanks to differing mineral composition and conditions during their laying down. These materials have proven desirable and valuable as building materials, with the harder, pale, fine grained "Helsby Sandstone" found in prominent hills and outcrops across Merseyside used from Roman times, to the cladding of the Empire State building, to the construction of Liverpool's Anglican cathedral among others (Howard et al 2007). Exposed areas of rock within Liverpool city boundaries show just how dramatic the colour can be, even coated in modern pollutants and grime - the

rich orange red rock faces to the south of the main Albert Dock, beneath the surviving rail infrastructure and rail tunnels of the Mersey line, come alive in sunrise and sunset shades and are an unmissable presence in the landscape even surrounded by modern architecture and the brash hues of modern day signage.

#### **4.1.9.3 Results**

These results (see next page) lead to slight tweaks in the design of the ORAC device – for further details, see Chapter 3.3.3.3.1 and Appendix 1 for technical details.



## **4.2 Anglesey**

### **4.2.1 On sample size and distribution**

Of the surviving confirmed Neolithic sites on Anglesey, the following locations were selected for detailed recording of colour. These nine sites, along with the original pilot study site of Bryn Celli Ddu, form a large proportion of the island's megaliths, and are spread across different geological regions. They represent a cross section of the island's idiosyncratic construction types. They are also all sites that are either freely accessible or available to access via prior negotiation with landowners (as with Bryn yr Hen Bobl and Plas Newydd).

### **4.2.2 Background**

Anglesey, the large island at the north of Wales, is a place full of mythology and history - many of the surviving Neolithic monuments have evocative names and associated folklore, and the stories of part-mythologised events from the island's history, like the last stand of the Druids, are still very much part of the rich cultural heritage here. From antiquarian investigation (Rowlands 1723) to modern reinterpretation and discovery of rock art and ritual landscapes (Nash et al 2005, Griffiths et al 2015, Miles et al 2015), the Neolithic archaeology has been studied and re-studied closely here for several centuries.

The monument building tradition on Anglesey is one of rich variety and constant experimentation, with forms that play on those seen in regions presumably connected by trade and social contact (particularly the Irish passage grave tradition). The authority on monuments on the island is undoubtedly Frances Lynch, who has spent many decades of her career studying, excavating, and discussing the sites. More recently, the understanding of Neolithic Anglesey has been boosted by the excavation of large houses at Llanfaethlu (Rees & Jones, 2016) - a rare find for Wales - and the re-examination and excavation of the landscape around Bryn Celli Ddu, which has shown it to be a rich, multi-period ritual landscape on a scale not previously appreciated (Devereaux & Nash, 2014).

Cummings believes that the island is central to the Neolithic world of the Irish Sea due to its views over to Snowdonia, which she believes to be the focal point as it has views of mountains in other areas of dense Neolithic activity in Ireland, south Wales, Cumbria, the Isle of Man and Scotland (Cummings 2004). This, she states, would explain the variety of monument types on the island, rather than groups of similar monuments as seen in the portal dolmens of Pembrokeshire, for example.



The sites in this study were visited in the March of 2016, May of 2016, and July of 2016. They represent a sample of the surviving sites on the island, which are available for public access. Bryn Celli Ddu represents the pilot study of this research (see chapter 4) and as such is not included in this chapter, though is mentioned in the discussion in relation to these sites. The site of Barclodiad Y Gawres, a significant passage grave in the Irish rock art tradition, is not included in the main study due to difficulties of access to the site, though discussions of the rock art within in relation to the way colour and light is used at other sites is included in the discussion.

### 4.2.3 Geology of Anglesey

Anglesey owes its undulating, rippled landscape to glaciation at the end of the last Ice Age. The landscape is one of gentle rolling hills and stocky, short statured rocky outcrops, that contrasts sharply with the rise of Snowdonia on the mainland to the east. Geologically speaking the island is relatively complex, and attracts the attention of geologists for its preservation of very ancient Precambrian / Cambrian divide period rocks, and the potential to understand just where this rock was shifted from during the immense tectonic shifts that brought it to its current location.

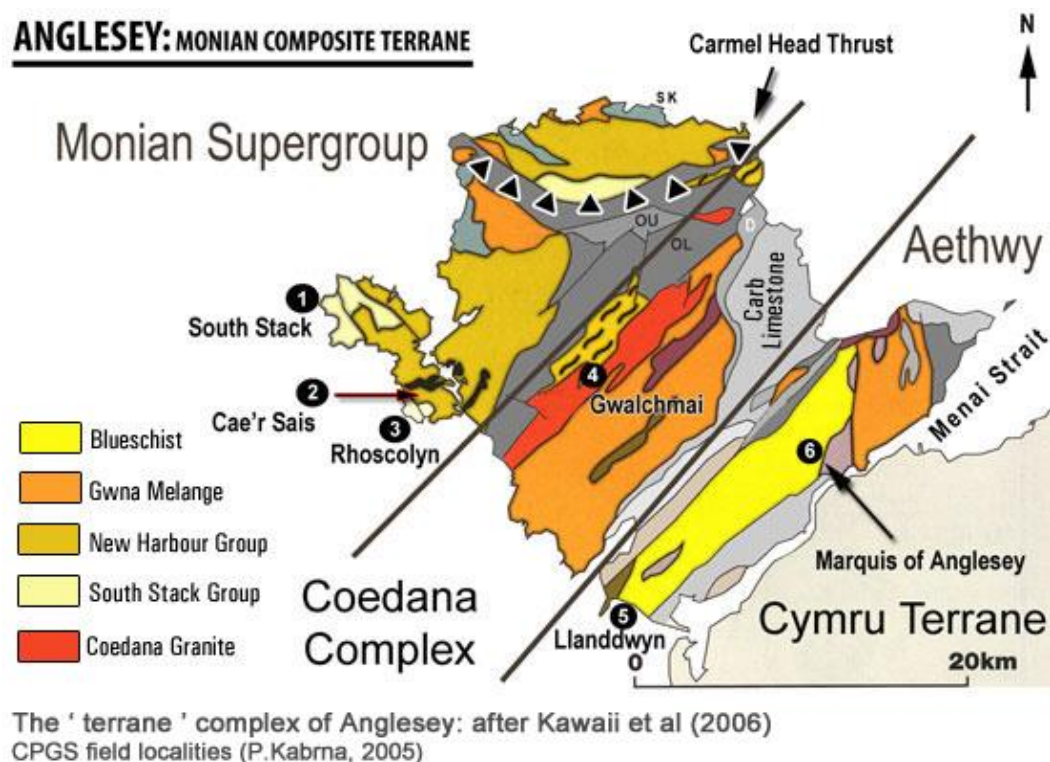


Fig 17. The main geological formations on Anglesey. From

[http://www.kabrna.com/cpgs/anglesey/images/anglesey\\_geolmap.jpg](http://www.kabrna.com/cpgs/anglesey/images/anglesey_geolmap.jpg) 2018



There are very distinct bands of rock on the island, giving a wealth of building material that has very different tactile and visual properties. The rock is largely sedimentary, particularly in the north and west of the island, with varying fineness of grain size and colours ranging from grey, green to beige-brown sandstones to the warm yellow limestones on the north eastern corner; though there are clusters of volcanic granites and gneiss that thrust up from the earth in dramatic outcrops in the centre of the island. To the south west there is the distinctive band of blue schist, a metamorphic rock favoured by builders from the Neolithic to modern times - that displays rich, velvet-like deep blue-green-grey colours when fresh, and weathers to many shades of blue-grey with interesting surface textures.

The rocks on Anglesey display signs of the colossal forces they have been subject to, leaving them folded and rippled from the intense pressure and heat of tectonic and volcanic activity - and in the case of the Gwna group, home to clasts of incredible variety; a melange of chert, quartzite, limestone, pillow-lava, granites of dozens of types in sizes from pebble to kilometres long, thrust into the green siltstone of the bedrock by a major undersea debris-slide of catastrophic proportions (Greenly 1919, Smith 1961).

These unique set of geological circumstances make Anglesey a place of interest for geologists, and in 2010 the area around the Marquess of Anglesey's Column (just north of the Plas Newydd estate, where the a burial chamber of the same name stands, made mostly of the very same blueschist) was designated a Geological Site of Special Scientific Interest, protecting the rock from collectors and over enthusiastic geologists. The allure of the stone here has been long abiding.

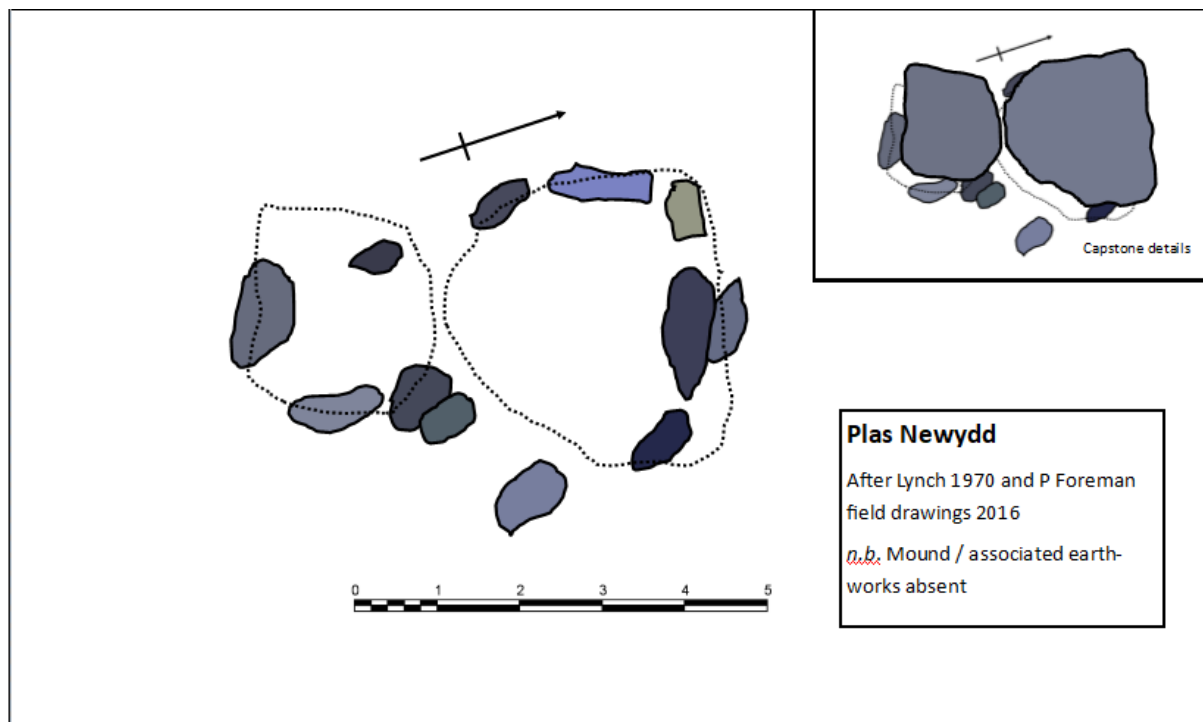
Overall, the geological picture on Anglesey is complicated, intricate, and undeniably attractive for anyone with an interest in stone. To the peoples of Neolithic Anglesey, this abundance of materials with such radically different material (and probably, spiritual, cosmological, ritual) properties would have been a significantly important resource.

#### **4.2.4 Plas Newydd**

Enjoying a sheltered, manicured position on the edge of a cricket pitch in the grounds of Plas Newydd House, this monument sits on a slight slope down to the Menai Strait that looks out eastwards over to Snowdonia. The two chambers lie on a roughly north-south alignment (closer to nne-ssw), though the location of the entrance is difficult to determine. Frances Lynch believes it is "impossible to classify" (1991, 86) due to its unusual construction and

more than likely tinkering with by eighteenth century landscapers - its silhouette is a suspiciously pleasing one, perfect for a folly in a grand house's garden. The orthostats mostly have a slight slant to the north - looking suspiciously as if the entire monument has suffered shifting of movement due to said tinkering. It has not been the subject of modern excavation or investigation, and until it is, classification and even a more complete understanding of just how much it has been tampered with will remain elusive.

The stone used here is mostly the local blueschist, and particularly dark navy blue examples at that. The site (and the later Plas Newydd estate) sits on the blueschist band that runs NE-SW across the eastern corner of the island, and the rich colour in its "raw" form before weathering clearly made it an appealing material. The relatively uniform colour suggests at a common extraction site.



*Fig 18. Plas Newydd site plan in colour*

1	Plas Newydd	Wales	SH520697	53.2039311	-4.2174674	Chambered Tomb	115, 121, 142	103, 107, 125	105, 110, 128	Mid blue-grey
2	Plas Newydd	Wales	SH520697	53.2039311	-4.2174674	Chambered Tomb	109, 114, 133	119, 124, 145	109, 115, 134	Mid blue-grey
3	Plas Newydd	Wales	SH520697	53.2039311	-4.2174674	Chambered Tomb	148, 151, 132	138, 141, 121	146, 149, 128	Mid Grey
4	Plas Newydd	Wales	SH520697	53.2039311	-4.2174674	Chambered Tomb	122, 130, 155	118, 125, 146	109, 119, 138	Mid blue-grey
5	Plas Newydd	Wales	SH520697	53.2039311	-4.2174674	Chambered Tomb	114, 121, 149	104, 110, 128	138, 144, 167	Mid blue-grey
6	Plas Newydd	Wales	SH520697	53.2039311	-4.2174674	Chambered Tomb	60, 62, 87	40, 43, 67	49, 51, 71	Deep blue-grey
6A	Plas Newydd	Wales	SH520697	53.2039311	-4.2174674	Chambered Tomb	59, 58, 85	48, 50, 68	65, 68, 91	Deep blue-grey
7	Plas Newydd	Wales	SH520697	53.2039311	-4.2174674	Chambered Tomb	36, 40, 75	40, 44, 68	58, 51, 85	Deep blue-grey
8	Plas Newydd	Wales	SH520697	53.2039311	-4.2174674	Chambered Tomb	119, 126, 158	116, 124, 155	105, 116, 133	Mid blue-grey
9	Plas Newydd	Wales	SH520697	53.2039311	-4.2174674	Chambered Tomb	77, 80, 100	71, 73, 92	80, 82, 105	Deep blue-grey
10	Plas Newydd	Wales	SH520697	53.2039311	-4.2174674	Chambered Tomb	127, 133, 155	119, 128, 148	135, 141, 159	Mid blue-grey
11	Plas Newydd	Wales	SH520697	53.2039311	-4.2174674	Chambered Tomb	57, 58, 75	61, 65, 87	65, 70, 89	Deep blue-grey
12	Plas Newydd	Wales	SH520697	53.2039311	-4.2174674	Chambered Tomb	81, 95, 105	78, 83, 104	68, 74, 91	Deep blue-grey
13	Plas Newydd	Wales	SH520697	53.2039311	-4.2174674	Chambered Tomb	68, 72, 89	62, 66, 84	70, 74, 92	Deep blue-grey
14	Plas Newydd	Wales	SH520697	53.2039311	-4.2174674	Chambered Tomb	113, 119, 140	109, 116, 167	114, 119, 143	Mid blue-grey
15	Plas Newydd	Wales	SH520697	53.2039311	-4.2174674	Chambered Tomb	101, 108, 134	114, 121, 141	104, 111, 128	Mid blue-grey
16	Plas Newydd	Wales	SH520697	53.2039311	-4.2174674	Chambered Tomb	102, 107, 125	109, 116, 133	104, 109, 128	Mid blue-grey
17	Plas Newydd	Wales	SH520697	53.2039311	-4.2174674	Chambered Tomb	116, 122, 144	104, 107, 124	102, 119, 122	Mid blue-grey

*Table 6. Plas Newydd data*

#### 4.2.5 Hendrefor

Two somewhat sad looking piles of stone are today's visible remains of the site - though visible from the road, their ruined condition makes it impossible to get a good impression of possible original layout and design without getting a closer look, for which you have to negotiate access from the cattle that currently enjoy the site as a back scratcher and windbreak.

Early nineteenth century drawings show that the eastern chamber at least was still standing, with the capstone sloping back from the tall orthostat/portal stone that is still standing today (Lynch 1991); the western side was already ruined. Lynch classifies it as a "long grave", tentatively linked typologically to Din Dryfol and Trefignath (Lynch 1991, 70), though the latter displays evidence of a much more complicated architectural history. There is no evidence of a connecting passage or shared cairn between the two chambers, but then due to the ruined state, there is little evidence of many architectural features. It lies on an east-west alignment, and if the still-standing orthostat is indeed a portal stone, then the entrance appears to have been to the east.

Despite the ruined state, the stones themselves are of interest - texture and colour is significantly different and contrasting. The capstone of the eastern chamber is instantly recognisable as "different", fine grained and smooth, compared to the rippled and rough texture of the remaining orthostats. It sits on the border of a limestone bedrock and the Gwna Group, full of its rich melange of stone types, making it the perfect hunting ground for stone of different material properties.

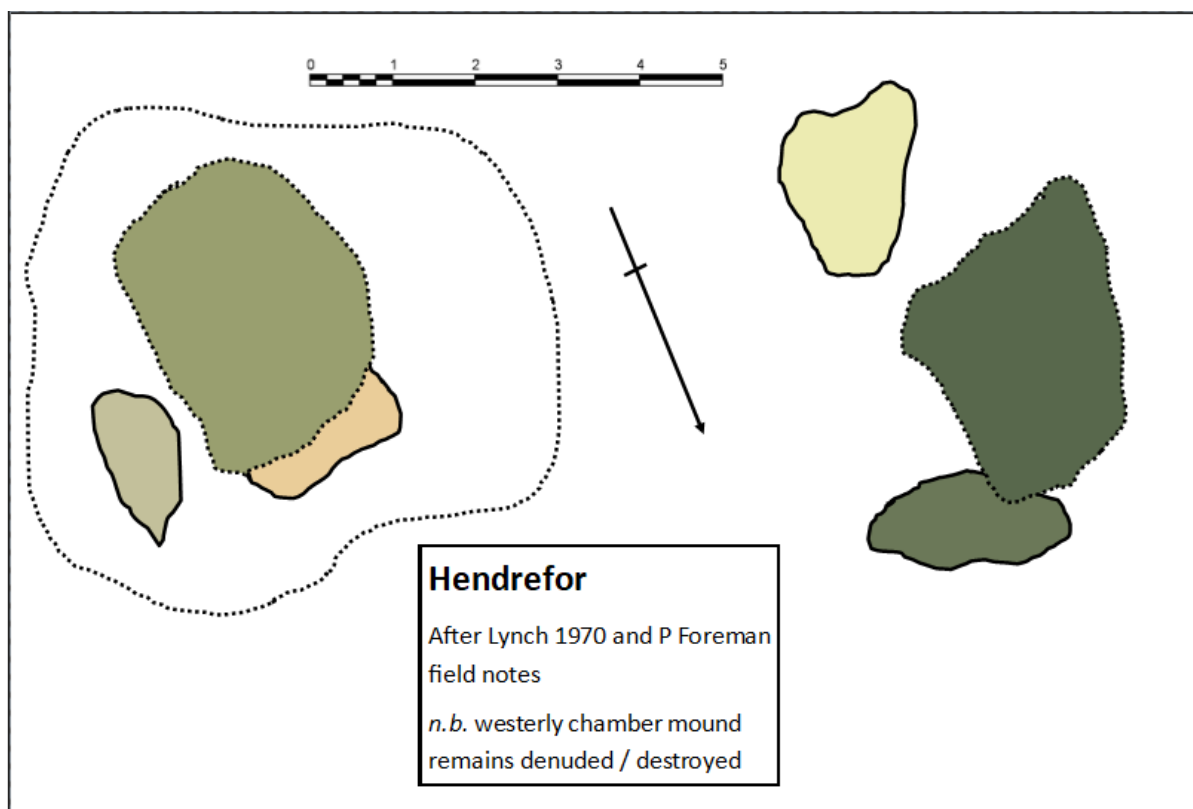


Fig 19. Hendrefor site plan in colour

1	Hendrefor	Wales	SH551773	53.2725344	-4.1742063	Chambered Tomb	195, 192, 155	138, 147, 114	160, 165, 113	Pale Grey
2	Hendrefor	Wales	SH551773	53.2725344	-4.1742063	Chambered Tomb	234, 205, 153	164, 178, 124	147, 152, 117	Pale Grey
3	Hendrefor	Wales	SH551773	53.2725344	-4.1742063	Chambered Tomb	153, 159, 111	159, 168, 113	132, 137, 96	Yellow Beige
4	Hendrefor	Wales	SH551773	53.2725344	-4.1742063	Chambered Tomb	88, 104, 76	94, 111, 93	119, 141, 96	Deep Grey
5	Hendrefor	Wales	SH551773	53.2725344	-4.1742063	Chambered Tomb	107, 120, 88	103, 119, 89	120, 136, 95	Deep Grey
6	Hendrefor	Wales	SH551773	53.2725344	-4.1742063	Chambered Tomb	236, 235, 177	224, 239, 168	185, 180, 127	Pale grey

Table 7. Hendrefor site data

#### 4.2.6 Bodowyr

A diminutive but well-preserved site, generally classified as a simple passage grave (Lynch 1991), that sits fenced into a small enclosure on the south eastern side of the island. Its distinctive mushroom-shaped profile and convenient location by the road make it a popular stopping off point for tourists, so footfall remains moderate despite the protective barrier. It has not been excavated.

It is sited on the same blueschist belt as Plas Newydd. From the location of the probable passage, and the low “sill-stone” still in evidence, the site is on an east-west alignment, with its entrance to the east. This sill-stone, as Lynch points out, is more commonly a feature of the grander, later passage grave styles in Ireland (1991, 64) - yet another example of Anglesey’s architectural eccentricities and experimentation.

Again, texture and colour (along with shape and outline) seem to be significant here - the stone chosen has deep and extremely tactile surface ripples and textures; like much of the stone in certain regions of the island, it has been subject to extreme geological forces that have left it bearing the marks of pressure and heat powerful enough to warp, fold, and bend the stone. The capstone's shape in particular, pointed to the eastern entrance end then sloping smoothly to the western closed end, may be mimicking one or more of the peaks of Snowdonia that form the backdrop to the north and east of the monument - a phenomenon that has been discussed at some length in the literature in recent years (Cummings and Whittle, 2004, Whittle 2004).

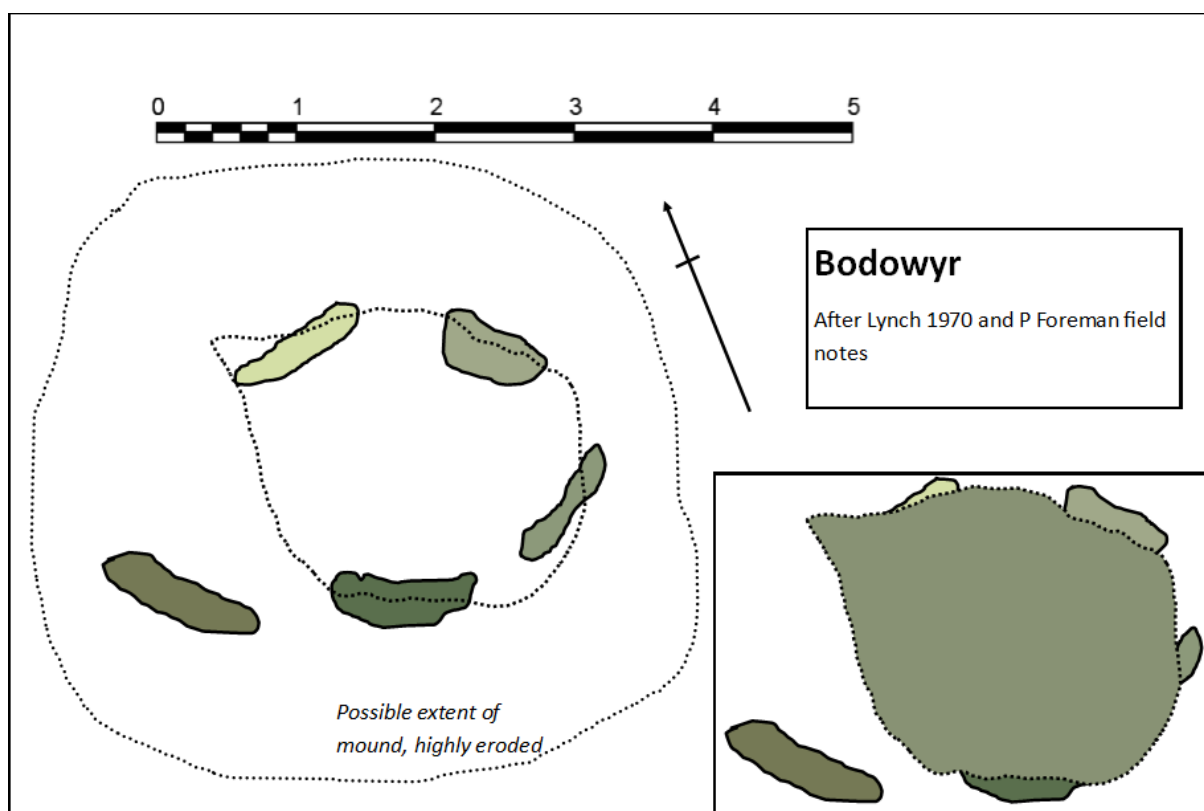


Fig 20. Bodowyr site plan in colour

1	Bodowyr	Wales	SH462861	53.1882357	-4.3038903	Passage Grave	117, 121, 85	128, 141, 93	137, 149, 108	Deep Grey
2	Bodowyr	Wales	SH462861	53.1882357	-4.3038903	Passage Grave	90, 111, 77	130, 134, 93	83, 87, 61	Deep Grey
3	Bodowyr	Wales	SH462861	53.1882357	-4.3038903	Passage Grave	140, 153, 122	156, 165, 129	131, 139, 95	Pale Grey
4	Bodowyr	Wales	SH462861	53.1882357	-4.3038903	Passage Grave	160, 168, 137	145, 143, 98	128, 145, 98	Pale Grey
5	Bodowyr	Wales	SH462861	53.1882357	-4.3038903	Passage Grave	136, 144, 96	212, 223, 166	153, 173, 127	Pale Grey
6	Bodowyr	Wales	SH462861	53.1882357	-4.3038903	Passage Grave	136, 146, 116	187, 182, 149	174, 158, 124	Pale Grey

Table 8. Bodowyr site data

#### 4.2.7 Ty Newydd

Excavated by Charles Phillips in 1935, this small chambered tomb unfortunately failed to provide much in the way of reliable dating evidence, other than some pottery fragments interpreted as later Beaker period use of the site (Lynch 1991). It is on a roughly east-west alignment, and the excavation report concluded that the entrance and original passage were located in the eastern end (Phillips 1936). Lynch groups it with Bodowyr and Ty Mawr as representing an early, simple passage grave tradition on the island (1991, 63).

The capstone has very different characteristics depending upon the angle of viewing - and is currently damaged, cracked at some point in its long history, and is supported by a modern column of bricks. The effect is bizarrely theatrical; from the east, the proposed original entrance, it is tall, narrow, intimidating; from the north or south (the angle at which it is most commonly photographed), it appears flat, dumpy, and unremarkable.

The chamber sits almost at the top of a gentle slope, that eventually meets the sea to the south west at Rhosneigr - the sea is not quite visible. Geologically speaking, it is situated on a rocky outcrop on the border of a band of gneiss/granite and more common sedimentary stone. The stone appears to be fine grained sedimentary stone, close in colour to the blueschists but with a finer, less geologically ravaged texture - it has a blue-green appearance, with smooth, defined slopes and edges. Texture and colour here are more nuanced than at other sites on the island.

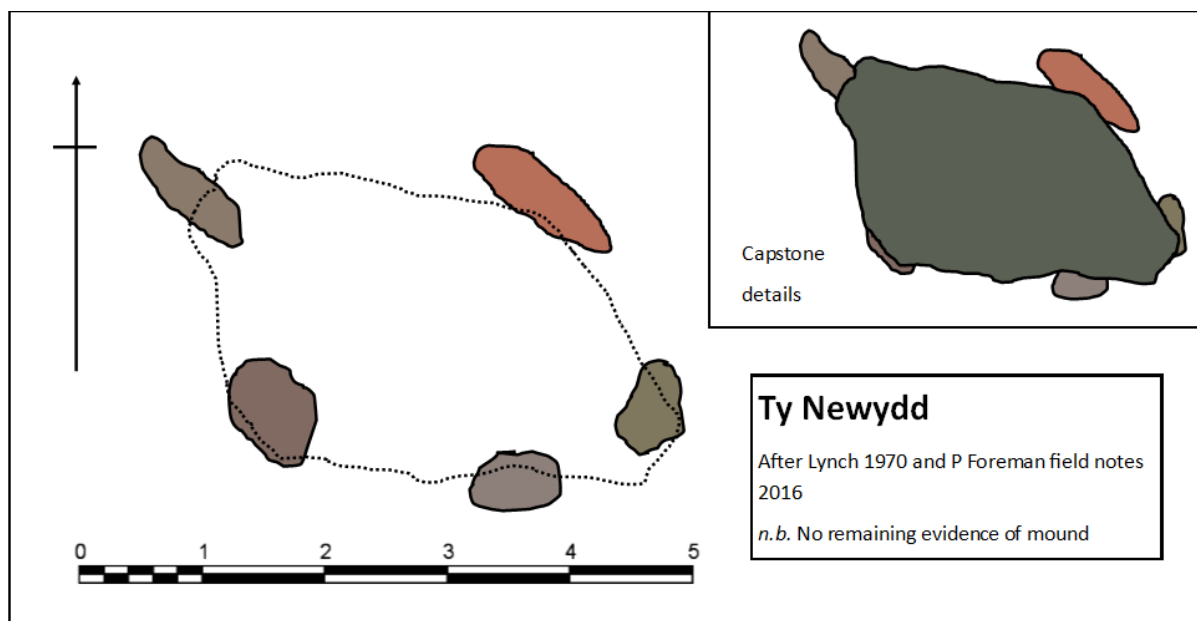


Fig 21. Ty Newydd site plan in colour

1 Ty Newydd	Wales	SH344738	53.2357993	-4.48254903	Passage Grave	127, 119, 104	138, 109, 111	156, 130, 122	Mid Grey
2 Ty Newydd	Wales	SH344738	53.2357993	-4.48254903	Passage Grave	138, 119, 91	141, 128, 122	118, 109, 84	Mid Grey
3 Ty Newydd	Wales	SH344738	53.2357993	-4.48254903	Passage Grave	129, 115, 94	138, 122, 107	120, 109, 98	Mid Grey
4 Ty Newydd	Wales	SH344738	53.2357993	-4.48254903	Passage Grave	178, 108, 82	184, 111, 90	190, 110, 92	Red
5 Ty Newydd	Wales	SH344738	53.2357993	-4.48254903	Passage Grave	156, 138, 122	128, 106, 98	135, 115, 101	Mid Grey
6 Ty Newydd	Wales	SH344738	53.2357993	-4.48254903	Passage Grave	109, 115, 90	91, 96, 84	115, 122, 109	Deep Grey

Table 9. Ty Newydd site data

#### 4.2.8 Trefignath

A tomb with a view - of an aluminium plant. Industry is slowly encroaching upon the boundaries and surrounding landscape of this site; with the expansion of the nearby Parc Cybi industrial estate over the coming years, the site will be only a few hundred metres from industrial units, car parks, offices, trunk roads, traffic, and general buzz of modern life.

Typical of Anglesey monuments, Trefignath defies categorisation and its investigation has given rise to divergent interpretations and discussions on the nature of its phases, influences, and purposes. Excavated in 1977-79 (Smith & Lynch 1987), it is generally agreed to be a multi-phase monument, but exactly what each of those phases represent is debated. On an east-west alignment, the entrance to the “final” chamber, the easternmost, is to the east. The three chambers are blocked from each other by septal stones (or evidence of their existence if they are currently missing), suggesting a sequential use and disuse of the chambers as the site developed, expanded, and shifted in form. Although cairn material and obvious outlines for some of the chamber walls, the portal, and probable courtyard survive, the nature of the site’s location on a rock outcrop mean sockets for the stones are very shallow and difficult to both excavate and recognise (Lynch 1991).



It is sited in a region of turbidite sedimentary rocks, that display “spectacular, intense folding” thanks to the combination of oceanic sediment deposition and volcanic action. The stone used for the site is a pale green-grey siltstone or possibly metamorphosed rock that is similar, but less richly coloured than, the blue schist to the east (e.g. Plas Newydd). There are only subtle differences in colour, but there are a number of stones that display significant quartz inclusions, particularly in the earliest phase of the monument - notes on the plan.

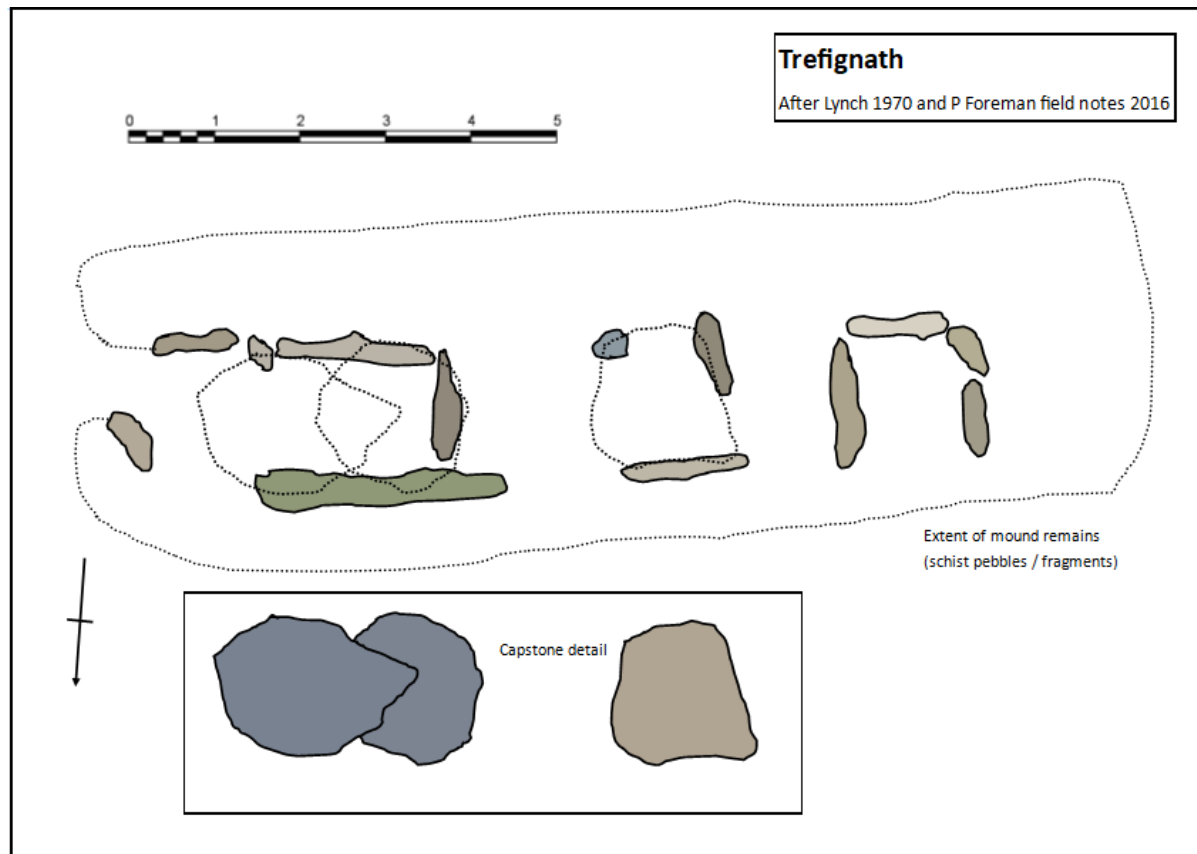


Fig 22. Trefignath site plan in colour

1	Trefignath	Wales	SH258806	53.2932442	-4.6143109	Chambered Tomb	163, 156, 137	161, 155, 138	163, 157, 140	Mid grey
2	Trefignath	Wales	SH258806	53.2932442	-4.6143109	Chambered Tomb	176, 169, 151	179, 173, 157	181, 174, 154	Pale mid grey
3	Trefignath	Wales	SH258806	53.2932442	-4.6143109	Chambered Tomb	212, 207, 195	214, 209, 195	217, 212, 199	Very pale grey
4	Trefignath	Wales	SH258806	53.2932442	-4.6143109	Chambered Tomb	176, 170, 155	171, 163, 140	173, 166, 144	Pale mid grey
5	Trefignath	Wales	SH258806	53.2932442	-4.6143109	Chambered Tomb	148, 141, 121	143, 137, 121	135, 128, 107	Mid grey
6	Trefignath	Wales	SH258806	53.2932442	-4.6143109	Chambered Tomb	179, 173, 157	189, 183, 168	186, 179, 158	Pale grey
7	Trefignath	Wales	SH258806	53.2932442	-4.6143109	Chambered Tomb	144, 154, 163	140, 153, 161	145, 157, 168	Mid grey
8	Trefignath	Wales	SH258806	53.2932442	-4.6143109	Chambered Tomb	176, 164, 147	171, 164, 150	166, 156, 138	Pale blue grey
9	Trefignath	Wales	SH258806	53.2932442	-4.6143109	Chambered Tomb	163, 153, 135	163, 156, 142	161, 153, 138	Mid grey
10	Trefignath	Wales	SH258806	53.2932442	-4.6143109	Chambered Tomb	179, 169, 152	184, 176, 162	186, 178, 164	Mid grey
11	Trefignath	Wales	SH258806	53.2932442	-4.6143109	Chambered Tomb	184, 178, 167	179, 171, 157	189, 183, 172	Pale mid grey
12	Trefignath	Wales	SH258806	53.2932442	-4.6143109	Chambered Tomb	186, 180, 168	186, 177, 160	191, 183, 166	Pale mid grey
13	Trefignath	Wales	SH258806	53.2932442	-4.6143109	Chambered Tomb	143, 136, 123	148, 141, 127	145, 139, 126	Mid grey
14	Trefignath	Wales	SH258806	53.2932442	-4.6143109	Chambered Tomb	138, 131, 118	143, 135, 120	145, 138, 124	Mid grey
15	Trefignath	Wales	SH258806	53.2932442	-4.6143109	Chambered Tomb	119, 128, 143	124, 132, 145	121, 130, 145	Mid grey-blue
16	Trefignath	Wales	SH258806	53.2932442	-4.6143109	Chambered Tomb	119, 128, 143	121, 130, 145	103, 115, 135	Mid grey-blue

Table 10. Trefignath site data



#### 4.2.9 Presaddfed

Possibly the only Neolithic chambered tomb to feature on the badge of a cricket club, Presaddfed sits in a slight hollow in the landscape, close to significant bodies of water, though the surrounding landscape is now largely occluded by relatively young forest. The two chambers are, typically, resistant to classification. Their orientation is difficult to ascertain due to the state of preservation, though the entrance looks like it is most likely to be on their eastern sides, and they lie on a north-south axis. This orientation takes it for granted, however, that the two chambers were linked as one monument under a common mound or sharing a common kerb or forecourt: for which there is no surviving obvious evidence. Recent excavations of the immediate vicinity of the chambers shed no further light on this conundrum (<https://presaddfed.wordpress.com/> also find papers?). It could be the case that they are two very close, but separate chambers, built on an east-west axis that is one of the few common strands to megalith building on Anglesey.

The northernmost chamber is the most ruined, with the capstone fallen and several supporting orthostats missing completely; Lynch muses upon this group representing a passage, though points out that the northernmost orthostat of the southern group/chamber would actually block passage from this direction entirely (Lynch 1991). Though such “false” entrances are seen elsewhere on the island (notably at Pant Y Saer), there is little to link this site conclusively to this style of construction. The southern chamber is more recognisably complete, and resembles a simple passage grave as at Bodowyr, though no evidence of a passage survives. There is no dating evidence from the site, and with the typology being so confusing, it is difficult to place in any chronology. It is sited the furthest “inland” of the monuments within this study, as far as any site is inland on Anglesey, though it is near a significant body of water - Llyn Llywenan, a great shallow lake that is the largest natural body of water on the island.

Geologically, it sits close to the edge of the New Harbour Group, with its green schist and green-grey siltstone type rocks; the less showy, less richly coloured cousin of the blue schist to the east of the island. The stone used at Presaddfed is differing grades of this grey-green, fine grained schist. There is definite distinction between colour and texture of the stones, particularly between the orthostats of the southern chamber, which are similar in size and shape, but immediately different in colour. The fallen capstone of the northern chamber has significant quartz inclusions that mark it out from the others in the group; work undertaken in 2013 by Vicki Cummings attempting to local quarrying sources for these schist blocks found no evidence of quarry sites, and their geologist suspected most of the stones were large

glacial erratic boulders (Cummings <https://presaddfed.wordpress.com/> 06.02.2018 11:17). If this is the case, and assuming there was not a severely restricted source of such material, then the builders had the choice of many glacial erratics (or local quarrying sources that they strategically ignored), and specifically selected the stones seen today.

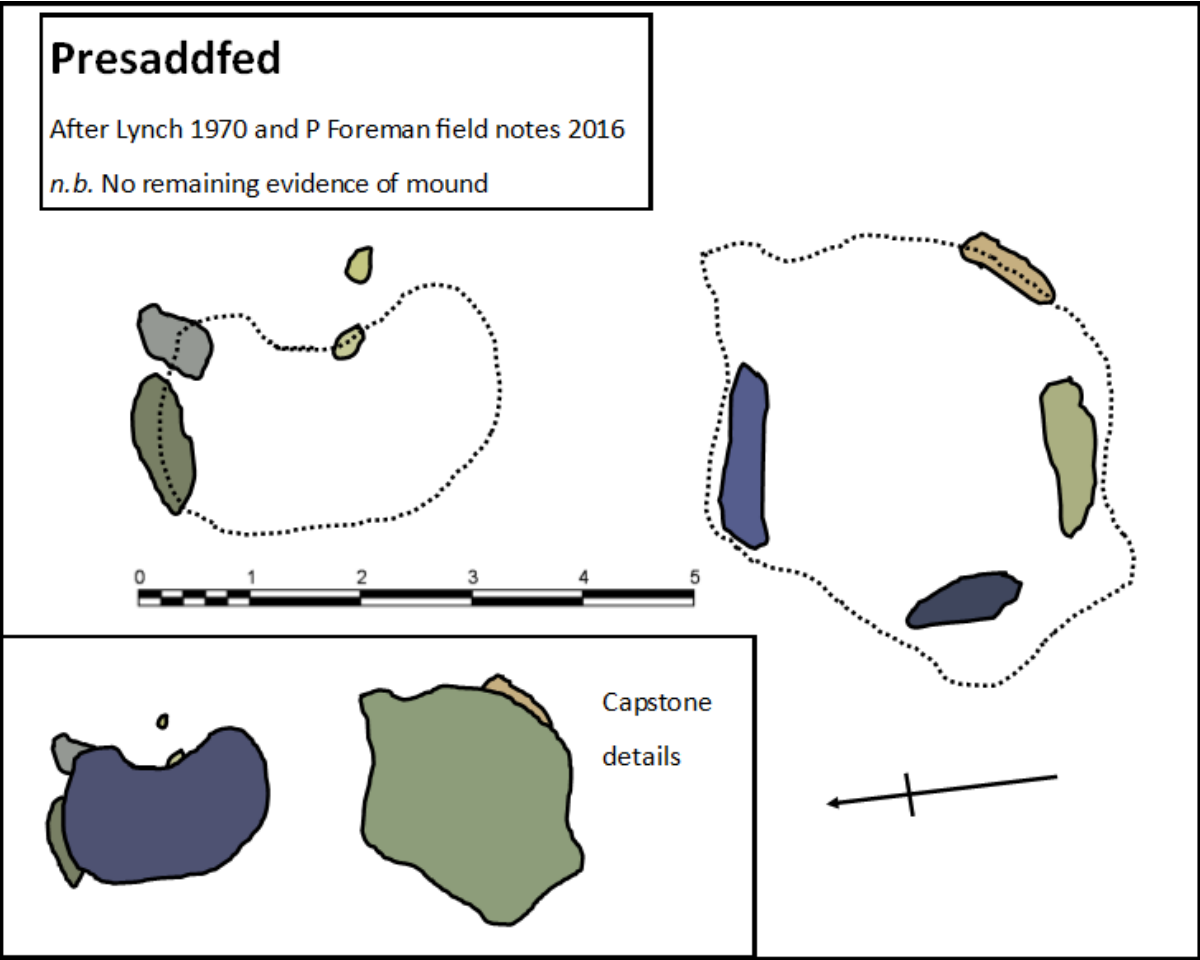


Fig 23. Presaddfed site plan in colour

1	Presaddfed	Wales	SH347808	53.2991236	-4.4809899	Chambered Tomb	120, 127, 100	121, 122, 91	142, 152, 111	Deep Grey
2	Presaddfed	Wales	SH347808	53.2991236	-4.4809899	Chambered Tomb	148, 152, 147	146, 146, 136	143, 148, 146	Mid Grey
4	Presaddfed	Wales	SH347808	53.2991236	-4.4809899	Chambered Tomb	198, 201, 151	182, 175, 132	183, 179, 152	Yellowy-beige
4A	Presaddfed	Wales	SH347808	53.2991236	-4.4809899	Chambered Tomb	196, 198, 129	154, 167, 129	196, 179, 150	Yellowy-beige
5	Presaddfed	Wales	SH347808	53.2991236	-4.4809899	Chambered Tomb	84, 90, 115	78, 82, 114	77, 72, 117	Deep blue grey
6	Presaddfed	Wales	SH347808	53.2991236	-4.4809899	Chambered Tomb	87, 93, 139	85, 93, 141	90, 91, 141	Deep blue grey
7	Presaddfed	Wales	SH347808	53.2991236	-4.4809899	Chambered Tomb	194, 180, 129	198, 175, 128	184, 190, 129	Dk Yellowy-beige
8	Presaddfed	Wales	SH347808	53.2991236	-4.4809899	Chambered Tomb	198, 210, 136	170, 175, 129	195, 184, 132	Dk Yellowy-beige
9	Presaddfed	Wales	SH347808	53.2991236	-4.4809899	Chambered Tomb	67, 70, 95	65, 70, 93	65, 72, 95	Deep blue grey
10	Presaddfed	Wales	SH347808	53.2991236	-4.4809899	Chambered Tomb	145, 160, 122	141, 157, 119	148, 143, 121	Dk Yellowy-beige

Table 11. Presaddfed site data

#### 4.2.10 Lligwy

The brooding, almost tank-like appearance of this chamber, caused by the sheer scale of the capstone and the method of construction, disguises what it actually a relatively roomy, large

chamber. The chamber is dug into the ground, so the orthostats are actually much taller than visible from the outside of the chamber – superficially the construction method is similar to Pant y Saer, but the actual layout and design are significantly different. It is probably on an east-west alignment, with an entrance to the east where flagstone-like stone was found in the 1909 excavation (Lynch 1991), though Lynch believes there was no “formal passage” – once again, it is a tomb difficult to classify.

Thanks to excavation of relatively undisturbed soils in 1909, the preserved stratigraphy of deposits was recorded – though the excavation reports did not accurately report the location of finds in relation to each other within layers (Lynch 1991). The colour of the deposits is intriguing: the upper one of notably black earth, with a sealing layer of limpet shells, and featuring unburnt human and animal bone; the lower layer was similar black soil, more significant amounts of bone, some flint and pottery sherds, resting upon a layer of mussel shells (Baynes 1909, Lynch 1991); not only an interesting series of ritual deposits in its own right, but an interesting juxtaposition of black – white material. The site has not been radiocarbon dated, but finds from just outside the chamber of a distinctive “slug knife” flint and a sherd decorated cardium shell in a style comparable to the Newborough Warren Beakers suggest that, at least in its final phases of use, it was a late Neolithic site (Lynch 1991, 90).

The stone of the chamber is relatively uniform in colour, from the local butter-yellow limestone, and likely did not travel far – indeed, there are still large boulders in the field adjacent to the site. It sits on the same limestone ridge as Pant Y Saer, though the stone here is not as friable and has weathered better. Shape and texture are more notable here than colour: some stones reflect the capstone’s unusual rippled texture, that looks too defined (and would have been protected from the elements within the chamber) to be entirely the product of natural erosion.

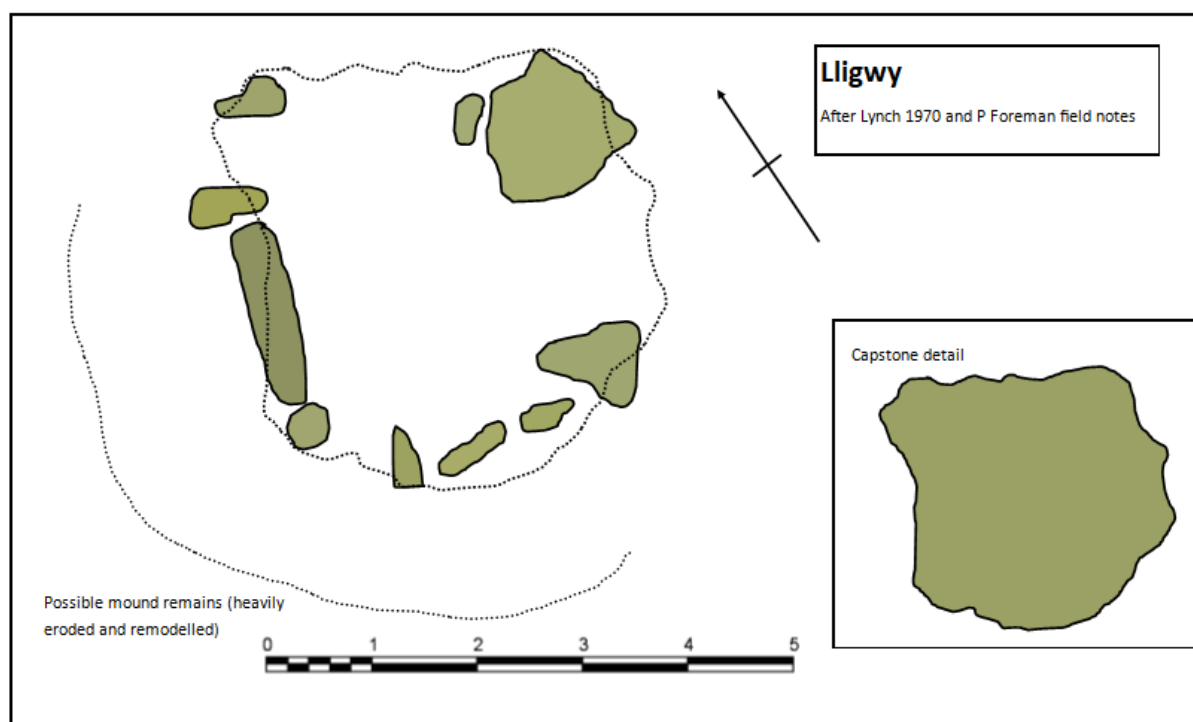


Fig 24. Lligwy site plan in colour

1	Lligwy	Wales	SH501680	53.3499375	-4.2529207	Rock-cut tomb?	159, 164, 109	166, 164, 98	156, 160, 102	Beige-Yellow
2	Lligwy	Wales	SH501680	53.3499375	-4.2529207	Rock-cut tomb?	157, 158, 118	161, 165, 85	147, 152, 96	Beige-Yellow
3	Lligwy	Wales	SH501680	53.3499375	-4.2529207	Rock-cut tomb?	148, 152, 107	141, 146, 96	155, 161, 98	Beige-Yellow
4	Lligwy	Wales	SH501680	53.3499375	-4.2529207	Rock-cut tomb?	161, 166, 113	158, 163, 101	155, 159, 98	Beige-Yellow
5	Lligwy	Wales	SH501680	53.3499375	-4.2529207	Rock-cut tomb?	161, 168, 109	157, 162, 97	163, 169, 104	Beige-Yellow
6	Lligwy	Wales	SH501680	53.3499375	-4.2529207	Rock-cut tomb?	159, 165, 109	169, 171, 104	158, 163, 101	Beige-Yellow
7	Lligwy	Wales	SH501680	53.3499375	-4.2529207	Rock-cut tomb?	157, 166, 102	144, 149, 78	161, 168, 100	Beige-Yellow
8	Lligwy	Wales	SH501680	53.3499375	-4.2529207	Rock-cut tomb?	163, 169, 101	159, 166, 111	156, 161, 101	Beige-Yellow
9	Lligwy	Wales	SH501680	53.3499375	-4.2529207	Rock-cut tomb?	155, 159, 98	164, 171, 116	157, 160, 106	Beige-Yellow
10	Lligwy	Wales	SH501680	53.3499375	-4.2529207	Rock-cut tomb?	164, 169, 103	166, 172, 109	155, 161, 100	Beige-Yellow
11	Lligwy	Wales	SH501680	53.3499375	-4.2529207	Rock-cut tomb?	155, 160, 101	161, 168, 108	166, 170, 108	Beige-Yellow
12	Lligwy	Wales	SH501680	53.3499375	-4.2529207	Rock-cut tomb?	157, 159, 117	161, 166, 109	167, 173, 111	Beige-Yellow

Table 12. Lligwy site data

#### 4.2.11 Pant y Saer

The modern above-ground remains of this site bely its complex and unusual nature; though it is small, and now consists of a few large limestone slabs that appear somewhat precariously balanced, the underlying archaeology of its kidney shaped mound and forecourt built around the large northern orthostat, suggesting there was a paved facade to this side, though the stone here was too massive and well set to have been opened or used as an entrance (Lynch 1991). This false entrance seems to have been the subject of ritual offerings, with finds of pot, decorated pebble, human and animal bone all found in the forecourt area, with the pottery dated to the middle neolithic (Lynch 1991, 82). Within the chamber, finds of distinctive chert and flint arrowheads suggest Irish influences; whilst the

pottery, tempered with local limestone and locally produced, is typologically very similar to Abingdon Ware of southern England - a multicultural site indeed (Lynch 1991).

It is on a roughly east-west alignment, with the presumed location of the entrance to the west, with the “false” entrance and forecourt facade to the north. It has panoramic views of Snowdonia to the east and south, and though it is relatively close, the sea (nor indeed the village of Benllech that sits on the shore) is not visible.

The chamber itself was cut into the rock, and constructed of large limestone slabs that have not survived erosion and weathering well; the capstone now leans to the east thanks to the crumbling of its supporting orthostat. The stone used is relatively uniform, of the warm butter-yellow limestone local to the site, and likely did not travel far.

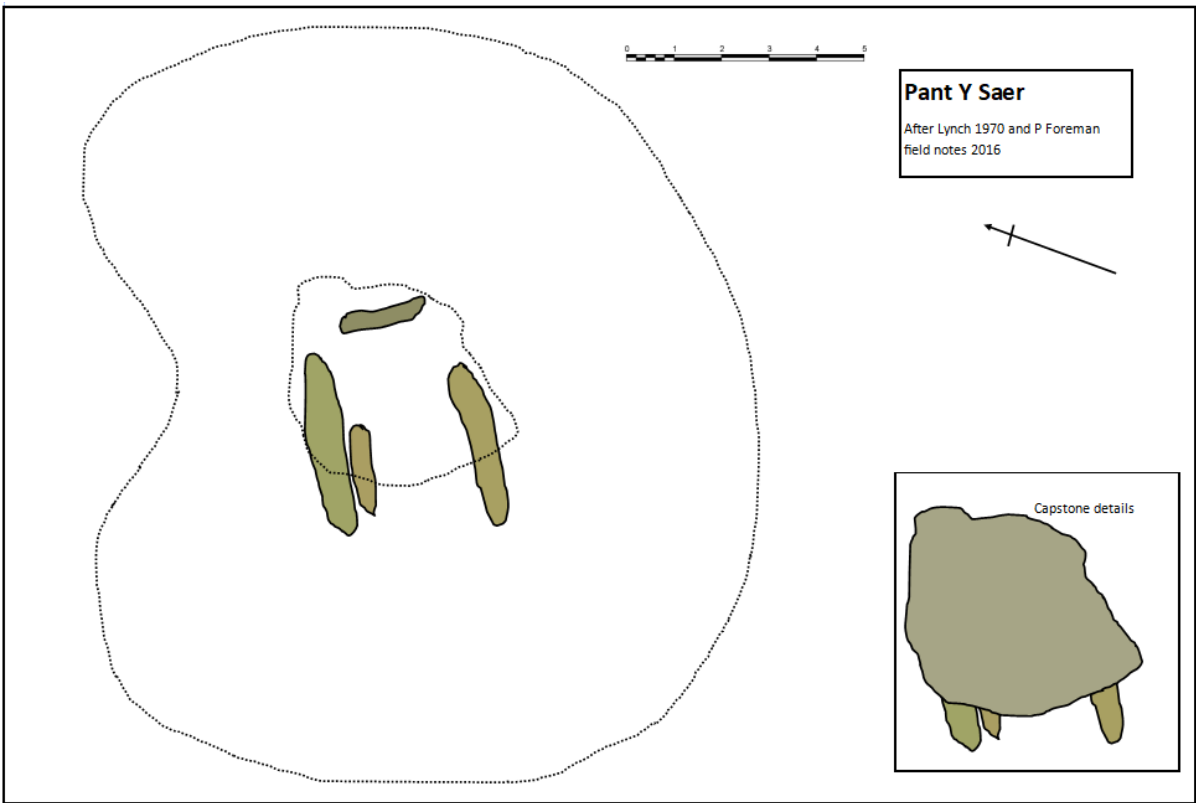


Fig 25. Pant y Saer site plan in colour

1	Pant Y Saer	Wales	SH509824	53.3174887	~4.2386328	Chambered Tomb	170, 158, 98	166, 164, 102	166, 165, 120	Yellow-beige
2	Pant Y Saer	Wales	SH509824	53.3174887	~4.2386328	Chambered Tomb	174, 172, 115	170, 168, 108	168, 160, 98	Yellow-beige
3	Pant Y Saer	Wales	SH509824	53.3174887	~4.2386328	Chambered Tomb	142, 141, 100	172, 165, 104	166, 163, 108	Yellow-beige
4	Pant Y Saer	Wales	SH509824	53.3174887	~4.2386328	Chambered Tomb	166, 165, 134	172, 158, 108	164, 160, 96	Yellow-beige
5	Pant Y Saer	Wales	SH509824	53.3174887	~4.2386328	Chambered Tomb	154, 152, 109	160, 164, 102	166, 158, 98	Yellow-beige

Table 13.Pant y Saer data

#### 4.2.12      **Bryn yr Hen Bobl**

This intriguing monument is currently sited on private land and as such is off the “beaten track” when it comes to monument tourism on Anglesey. It is unusual in its construction, confusing in layout, and unique both on the island and in the wider context of the British Neolithic. Though its name, “The Hill of the Old People” is evocatively mythological, the site has therefore had unfortunate associations with the fair folk, and their treasure – leading to looting and damage to what is an unusually well preserved cairn mound.

Superficially it has parallels to Pant Y Saer – the kidney shaped mound, square chamber, and use of limestone blocks all point to close cultural connections (Lynch 1991). However, it features several eccentricities that set it apart – the distinctive sill stone, ambiguous entrance location, and the long stone paved “terrace” that approaches the monument from over 300ft to the south, bordered by a low wall (Powell et al 1969, Lynch 1991). The resulting monument is a curiously elongated mound in the landscape. Though excavation by Hemp in the 1930s found a large quantity of human remains, the site had been subject to significant later disturbance, from Bronze Age burials right to eighteenth century looting of the mound and dumping of later Iron Age and Medieval burial matter into the chamber, so the skeletal material was highly disorganised and removed from any original context (Hemp 1935, Lynch 1991).

Though the “terrace” approaches the site from the south, the entrance (if the still stone represents the entrance) is to the east, in common with many other Anglesey monuments. A midsummer solar alignment has been suggested, but not studied fully (Hensey 2015).

As the cairn is well preserved, the chamber’s orthostats, capstones, some drystone walling, and the façade of the courtyard have remained in place. For the purpose of this study the drystone walling was not examined in detail, as much was reconstructed by Hemp but not denoted as such with the drill-holes as at Bryn Celli Ddu. Although the site sits on the same blue schist ridge as Plas Newydd, the stone used here displays a rich variety of type, texture, and colour – the site is distinct in almost every way to that of its (geographically) close neighbour. The sillstone is a limestone, of similar beige-yellow to that found at Lligwy and Pant Y Saer – and was undoubtedly selected due to the two natural holes that have eroded into the centre. If the site does indeed have any kind of solar alignment, these holes would have played a role in the tricks of the light/dark associated with such alignments. Limestone plays a prominent role in the chamber construction, with several stones featuring

surface clasts of pebbles in different sizes that give the inside of the chamber an interesting and distinct haptic experience. The diminutive back stone – theorised as a possible actual entrance by Lynch (1991), is of limestone, a very deep beige to brown example. The soil is a rich, deep red, which makes for an interesting contrast between the deep blue of the schist and the various beige shades of the limestone.

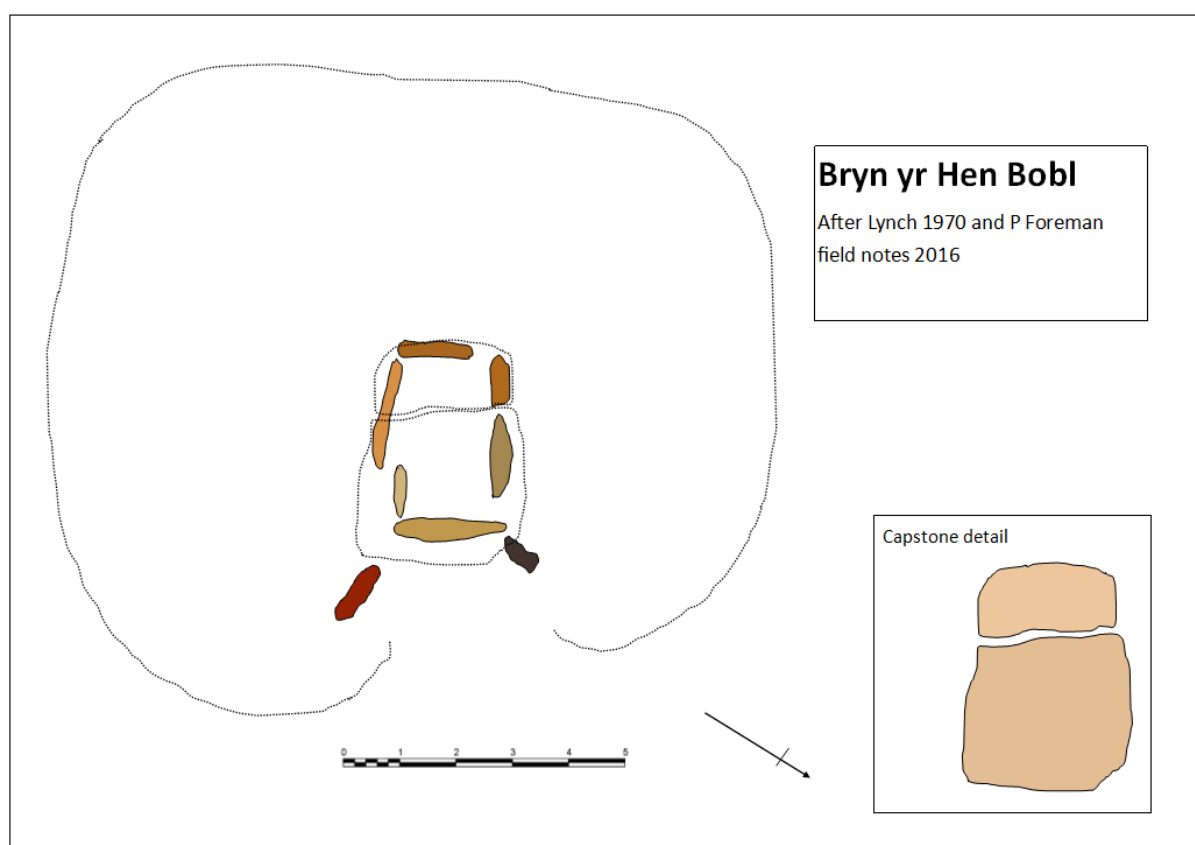


Fig 26. Bryn yr Hen Bobl site plan in colour

1	Bryn yr Hen Bobl	Wales	SH518691	53.1974177	-4.2185783	Passage Grave	161, 44, 11	148, 34, 3	148, 38, 7	Orange-red
2	Bryn yr Hen Bobl	Wales	SH518691	53.1974177	-4.2185783	Passage Grave				Orange-red
3	Bryn yr Hen Bobl	Wales	SH518691	53.1974177	-4.2185783	Passage Grave	64, 48, 43	66, 51, 46	74, 58, 54	Deep Grey
4	Bryn yr Hen Bobl	Wales	SH518691	53.1974177	-4.2185783	Passage Grave	191, 151, 77	194, 153, 78	196, 155, 79	Deep beige yellow
5	Bryn yr Hen Bobl	Wales	SH518691	53.1974177	-4.2185783	Passage Grave	214, 183, 126	209, 179, 123	214, 183, 126	Very pale beige
6	Bryn yr Hen Bobl	Wales	SH518691	53.1974177	-4.2185783	Passage Grave	161, 131, 76	163, 134, 80	166, 137, 83	Deep beige
7	Bryn yr Hen Bobl	Wales	SH518691	53.1974177	-4.2185783	Passage Grave	222, 153, 80	214, 145, 71	217, 147, 74	Orange beige
8	Bryn yr Hen Bobl	Wales	SH518691	53.1974177	-4.2185783	Passage Grave	168, 98, 24	173, 103, 28	176, 105, 28	Deep beige brown
9	Bryn yr Hen Bobl	Wales	SH518691	53.1974177	-4.2185783	Passage Grave	171, 101, 27	168, 102, 30	171, 101, 26	Deep beige brown
10	Bryn yr Hen Bobl	Wales	SH518691	53.1974177	-4.2185783	Passage Grave	235, 194, 150	237, 198, 157	230, 191, 149	Very pale beige
11	Bryn yr Hen Bobl	Wales	SH518691	53.1974177	-4.2185783	Passage Grave	222, 182, 140	227, 189, 148	224, 185, 144	Very pale beige

Table 14. Bryn yr Hen Bobl data

### **4.3               Pembrokeshire**

#### **4.3.1           On sample size and distribution**

Given Pembrokeshire's dense concentration of monuments and the sometimes challenging conditions of access, the following fifteen monuments were selected for reliability of access, and a broad spread across the diverse geological bedrock and glacial deposit types of the region. Sites were also selected to be on or close to recognised footpaths and routes, as visiting the sites in January meant that ground conditions were not ideal for off-track walking, and lone working necessitated a careful risk assessment of site visits that involved monuments close to cliffs on the coastal paths, or on isolated hillside spots such as Bedd yr Afanc.

#### **4.3.2           Background**

This case study examines monuments in the modern-day county of Pembrokeshire (with a few over the border into Carmarthenshire). This south west corner of Wales is rich in Neolithic mortuary activity, with unique monument types and interesting landscape interactions. Landscape setting seems to be a key aspect of their construction, and all monuments are built with close relationships to mountains, though “no sites were actually built in the mountains themselves, they have clear views towards them” (Cummings 2004). It seems to be the case that what is seen, and what is unseen, holds deep significance for these places: many are constructed in coastal regions but face inland, or are sited in sheltered hollows that occludes them from the sea and renders them almost hidden in the landscape until you are almost on top of them (Nash 2006). This visual trickery may indicate that paths to the sites were a ritualised experience, and had to be navigated by a small group of guides who help the knowledge of how to approach them and make them “appear”.





*Fig 27. Pentre Ifan, the star attraction of the Pembrokeshire Neolithic. P Foreman 2017*

The monuments of this region do suffer from a lack of chronology and dating evidence, with only Carreg Coetan (see part 4) having confirmed radiocarbon dates; others have relied on artefact typology (Nash 2006). For the purposes of this research, existing radiocarbon dates will be noted, along with tentative use of artefact typology in dating – however, it should be noted that a tradition of re-use at Neolithic mortuary monuments means that relying on artefacts to date sites is problematic. The monuments of Pembrokeshire have received renewed archaeological interest since the 1990s, when in succession they were revisited, re-interpreted, and written about at length in both plainly descriptive terms and as the basis for theoretical frameworks on phenomenology and landscape cosmology (Barker 1992; Tilley 1994, 2004; Whittle & Cummings 2004).

The surrounding mountains, with the sources of healing springs (Darvill & Wainwright 2016), rock for axes, and dramatic changeable weather, are easy to imagine as significant entities to the Neolithic peoples in the area. Indeed, the very shape of these surroundings may have influenced the builders, and several prehistorians have commented on the apparent mirroring of nearby hilltops and other natural features in the shape of capstones as a trend in the British Neolithic (Tilley 1994, Bradley 2000, Whittle 2004). Though such landscape mirroring has been dismissed in favour of mere pragmatism over complex cosmological associations (Fleming 2005), the careful selection of stone and the strenuous effort of monument construction itself belies the mundane. For people as reliant on the landscape and knowing its intricacies as early farming communities as those of Neolithic Pembrokeshire, a careful attunement to the landscape during funerary ritual construction is a

safe assumption. The Preselis, situated in the north west of Pembrokeshire, are clearly a highly important region to the peoples of Neolithic Britain, being home to not only the Stonehenge bluestones but also acting as the centre for a concentration of monuments of many different styles - suggesting that despite the influence of different cosmological, ritual, or construction techniques, the region itself retained its importance.

Many megaliths in the area are of the portal dolmen type, likely heavily influenced by contact across the Irish Sea (Lynch 1976). From the scant dating evidence, these are generally accepted to be the earliest phase of Neolithic monuments in the region (Whittle 2004). A recent re-examination of this type has sought to suggest they were not mortuary monuments, but rather a means of displaying the skills of the builders to create the great floating capstones, painstakingly balanced on their pointed orthostats – and were therefore never covered with a mound but instead built to be seen “naked” (Cummings & Richards 2014). Although this brings up interesting questions on landscape interactions and challenges the normal assumption of these monuments being for the dead, the idea of their incredible construction being enough of a focus for them to remain uncovered by a mound occludes the idea that the process and ritual of construction was as important, if not more important, than the finished article: the whole is less than a sum of its parts. Fantastic feats of construction as seen in portal dolmens would have been important events, and not merely forgotten when the mound was complete and its marvels hidden within. Even if, as Whittle suggests, their creation was relatively swift and indeed done in one session of building, this would have been a magnificent feat of engineering, of “bringing the world into existence” (Whittle 2004), where the new monument was a new mountain, a new world in microscopic scale, emulating the natural landscape and harnessing it in the small scale to something that could be entered, interacted and entangled with.

“Earth-fast monuments” of Pembrokeshire are possibly the latest phase, with the suggestion that their construction seeps into Bronze Age, due largely to being associated with cremations rather than skeletal remains, suggesting a very different burial custom than neighbouring, “earlier” portal dolmens (Nash 2006). They have the distinguishing feature of a capstone that partly rests on in the ground, and are unique to this area in Wales. Cummings and Richards, again seeking new interpretations, see these as incomplete or failed dolmens, where the stone did not successfully become raised into the sky (Cummings & Richards 2014).

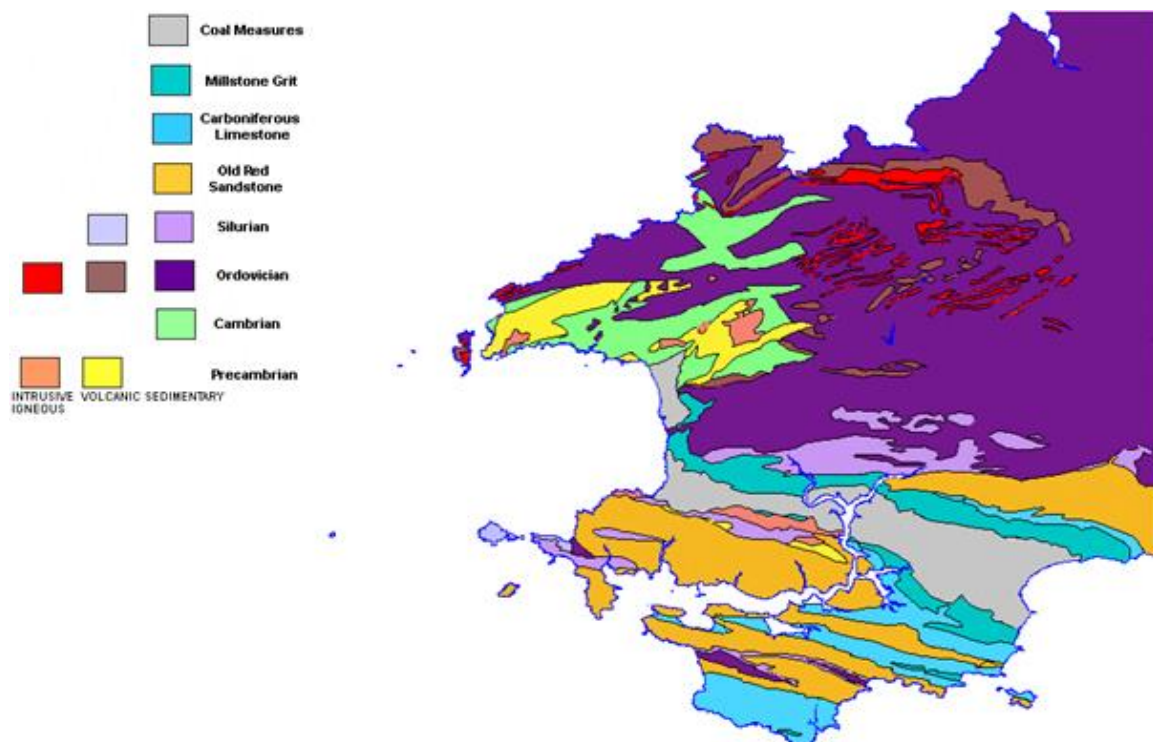
If the early Neolithic date is accepted for the monuments in this region, then Whittle’s theory that they represent some kind of megalithic embodiment of the previous Mesolithic culture

blending with the new Neolithic one – a way for old beliefs to be translated into the new Neolithic ideas of monument construction and ways of joining with the landscape to become entwined – has interesting implications (Whittle 2004). The strong correlation with previous Mesolithic activity would seem to support the idea, though a lack of similar correlation in areas of Ireland with a portal dolmen tradition seems to refute it.

The monuments in this study were surveyed in January 2017 and January 2018, when vegetation was low so access to some of the less well-kept sites, such as Cerrig y Gof, was less problematic.

### 4.3.3 Geology

The Pembrokeshire region is something of a geologist's paradise - and as such there is substantial literature on the topic. There is a very rich variety of rock types, mostly very ancient and formed during two great geological periods of mountain building, the Caledonian Orogeny (400 mya) to the north, and the Armorican Orogeny (290 mya) to the south (John 1979). The exposed rocks along Pembrokeshire's dramatic coastline record the vast tectonic forces that creased, shattered, and thrust upwards the rock strata into the shapes visible today, a record of ancient earth movements.



*Fig 28. Geology of Pembrokeshire – map by Sid Howells, Pembrokeshire Online 2018*

Within these two general periods of ancient rock, many rock types are present, largely sedimentary and igneous in nature. As can be seen in figure 31, there are seams of old red sandstone, millstone grit, limestone, and a rich variety of volcanic igneous rock including rhyolites and ash tuffs, and intrusive igneous types including dolerites and granites (John 1979). The Lower Cambrian (c. 550 mya) region around St David's peninsula has a particularly closely grouped spectrum of geologies, where colours and textures sharply contrast in the cliff faces - from red conglomerates, to green-grey sandstone, to deep red shale, to green and pebble-strewn sandstones, to dull grey brown shale and mudstones, to the distinctively "green and purple" Caerbwdi sandstone, which was visually striking and "special" enough in appearance to be used in the construction of St David's Cathedral (John 1979).

The northern, Ordovician geology is more dominated by pale, difficult to distinguish sedimentary rocks, though some slate regions stand out from the limestone/sandstone/mudstone, and extensive volcanic action has left seams of intrusive dolerites and other igneous types, which have gradually become exposed as ridges in the landscape; the dramatic coves and headlands of this coast are caused by erosion of the softer shales and sediments, leaving headlands of dolerite, agglomerates, ash tuff, and pillow lava (John 1979). The Preseli bluestones are an example of one of these volcanic ridges.

The very southern part of the Pembrokeshire peninsula is relatively "simple" geologically speaking, being largely formed of younger sedimentary rocks of the upper Cambrian period (c.320 mya), with some younger coal measures at the eastern edge (that are the far reaches of the South Wales Coalfield), and a few exposed areas of Pre-Cambrian igneous rock known as the Johnston Series (John 1979). These variations in rock type have led to an equally rich variety in soil types (and colours); the iron-rich red soils of the sandstone bearing region inland from Milford Haven and Manorbier, to the less fertile, thin and pale brown soils around the volcanic ridges of the hills around Pentre Ifan.

The geology of the region has been exploited by many industries in modern times, and the landscape bears many scars of this: limestone quarries, lime kilns, failed coal mines, entire villages built from Ordovician sediments, stone walls built from blocks of exposed igneous rocks, hewn from the land and put to work. With such a wealth of stone material, in so many forms, colours, textures, it becomes easy to see why Pembrokeshire would be a hub of Neolithic monument building.

#### 4.3.4 Llech-y-Tribedd

This megalith appears in many antiquarian and tourist accounts of the region, and is relatively well preserved since early depictions in the literature, notably the illustration by Col Hoare which shows the monument almost as it appears today (Barker 1992). It is still well-visited today, thanks to lying on a public footpath.

Frances Lynch views it as “not an entirely classical” example of the portal dolmen type (1972, 77), though Grimes (1936) views it as a simple chamber. Like many of the monuments of the region, it defies clear and simple classification. Although excavation has been conducted near to the chamber, no contemporaneous finds were in evidence, and the monument itself has not been investigated in modern times (Barker 1992). The massive, rugged shaped capstone is one of the more dramatic in the region, giving the site a distinctive outline from several directions, and with a distinctive “bump” that possibly reflects a similar formation at the peak of Carn Ingli to the south west. The sea (in this case, Newport Bay) is just visible to the north and west. The stone used is of a grey sandstone, probably local as the geology of the immediate vicinity is sedimentary in nature.

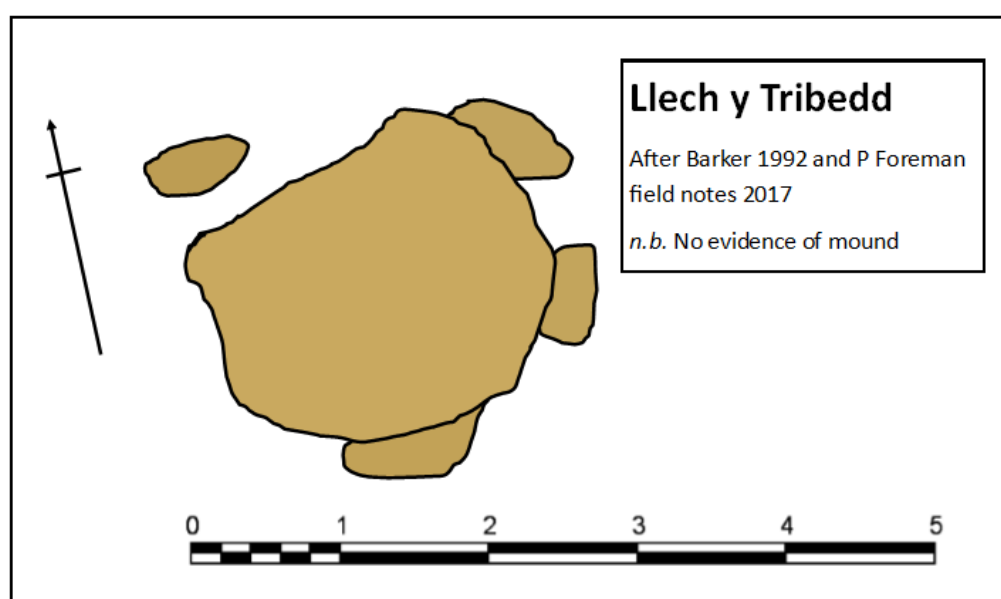


Fig 29. Llech y Tribedd site plan in colour

1	Llech-y-Tribedd	Wales	SN101432	52.0545406	-4.7716696	Chambered Tomb	189, 158, 87	194, 162, 87	189, 158, 87	Mid beige
2	Llech-y-Tribedd	Wales	SN101432	52.0545406	-4.7716696	Chambered Tomb	194, 163, 91	196, 165, 92	194, 163, 91	Mid beige
3	Llech-y-Tribedd	Wales	SN101432	52.0545406	-4.7716696	Chambered Tomb	196, 166, 94	194, 164, 93	199, 169, 99	Mid beige
4	Llech-y-Tribedd	Wales	SN101432	52.0545406	-4.7716696	Chambered Tomb	191, 161, 90	189, 157, 83	191, 160, 88	Mid beige
5	Llech-y-Tribedd	Wales	SN101432	52.0545406	-4.7716696	Chambered Tomb	196, 165, 90	201, 169, 95	195, 165, 92	Mid beige

Table 15. Llech y Tribedd data

### 4.3.5 Trelyfaint

Evocative folklore surrounding this site - whose name translates to “place of toads” - lends it an air of intrigue not reflected in its now ruinous state. Widely classified as a portal dolmen, Barker suggests that the relatively diminutive capstone, that does not entirely cover the remaining uprights, is suggestive of a missing second capstone or lintel (Barker 1992). Indeed, the portal stones here seem out of scale with the general size and stature of the monument, giving the illusion of the capstone being small (when viewed from the “back” of the monument, its true stature is more obvious). A second, smaller chamber sits to the north of the main one, also missing its capstone; Lynch believes these were once covered by the same cairn (Lynch 1972). The site sits in low lying, almost level ground, circled by views of surrounding peaks. The entrance is probably to the south east (Daniel 1950).

The site has been the subject of recent archaeological interest, with geophysical survey (summer 2017) and a small excavation (summer 2018), both undertaken as week-long training and volunteer project by George Nash and the Welsh Rock Art Organisation, due to interest in the cupmarked capstone - results not yet in press.

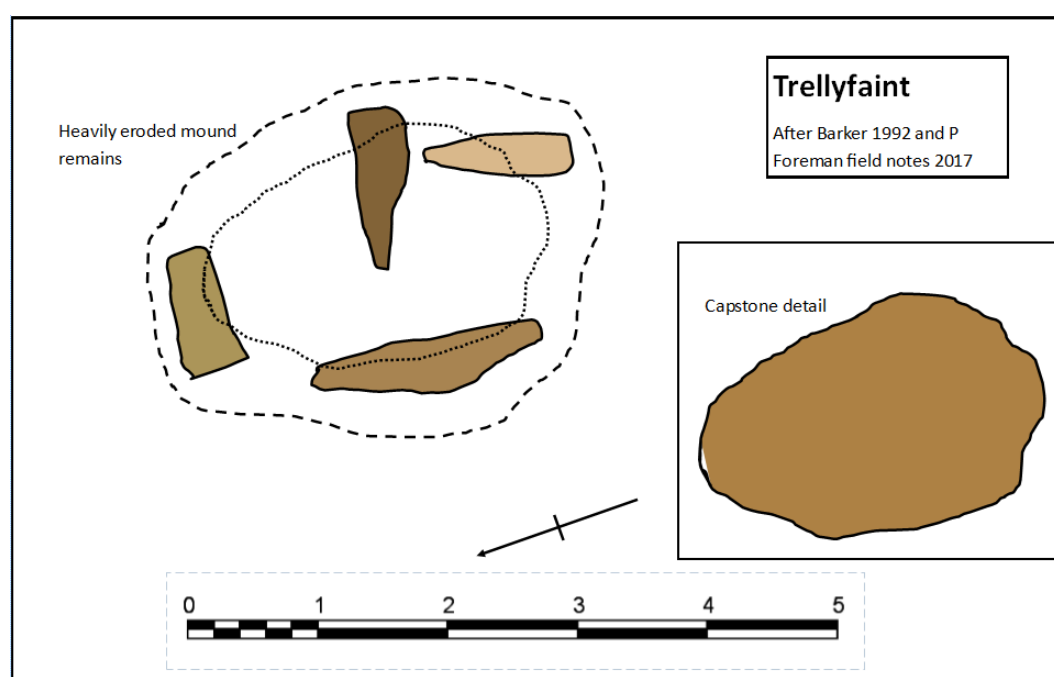


Fig 30. Trelyfaint site plan in colour

1	Trelyfaint	Wales	SN082425	52.0478447	-4.7981796	Chambered Tomb	173, 137, 87	171, 149, 89	176, 141, 91	Beige-Brown
2	Trelyfaint	Wales	SN082425	52.0478447	-4.7981796	Chambered Tomb	168, 129, 74	168, 132, 81	171, 134, 82	Beige-brown
3	Trelyfaint	Wales	SN082425	52.0478447	-4.7981796	Chambered Tomb	214, 183, 139	217, 184, 139	214, 186, 146	Pale beige
4	Trelyfaint	Wales	SN082425	52.0478447	-4.7981796	Chambered Tomb	138, 104, 58	130, 99, 55	133, 102, 58	Deep beige brown
5	Trelyfaint	Wales	SN082425	52.0478447	-4.7981796	Chambered Tomb	171, 126, 63	173, 29, 68	171, 130, 72	Beige-Brown

Table 16. Trelyfaint data



#### 4.3.6

#### Carreg Coetan



*Fig 31. Penned in: Carreg Coetan in its fenced enclosure. P Foreman 2017*

Somewhat incongruously, Carreg Coetan sits amid a small housing estate, nestled between gardens in its own enclosure surrounded by hedges. A very low-lying site, the monument now seems squat and short, but investigations revealed an accumulation of ploughsoil that hides the true height of the orthostats by a considerable margin (Nash 2006). Another of Pembrokeshire's typology-busting monuments, it is variously described as a portal dolmen (Lynch 1972), a polygonal chamber (Grimes 1936), or perhaps a little of both (Nash 2006). The large capstone slants towards the sea in the West. Wyndham's 18th century description of the capstone being "shaped like a mushroom" is deeply apt, giving the site the appearance of a great grey toadstool (Wyndham 1775). It was excavated in 1979 and 1980 by Sian Rees for the Inspectorate of Ancient Monuments, which identified the lack of any further sockets for "missing" orthostats (which had previously assumed to be the case), and finds of four distinct pottery types and associated cremated bone, yielding radiocarbon dating of c.2700bc for the site's construction (Barker 1992).

The stones here are rhyolite, and are either glacial erratics, or have been transported from outcrops at least kilometres distant (John 1979). They have been highly weathered, most notably the capstone's upper surface, so that the rhyolite's natural green-grey-blue colour has become a pitted pink-grey with pale orange patches, giving the monument the appearance of being uniform pale grey from a distance. Closer inspection sees that the

stones have patches of both natural and weathered, highlighting differences in texture and colour, with the “fresher” sides generally on the inside of the monument.



*Fig 32. The weathered, pale sides to the exterior, the “fresh” blue-green to the inside of the chamber at Carreg Coetan. P Foreman 2017*

Although two-tone, the stones are uniform across the site, and if they are indeed glacial erratics, then they have been selected from the landscape specifically, in contrast to the more local geology.



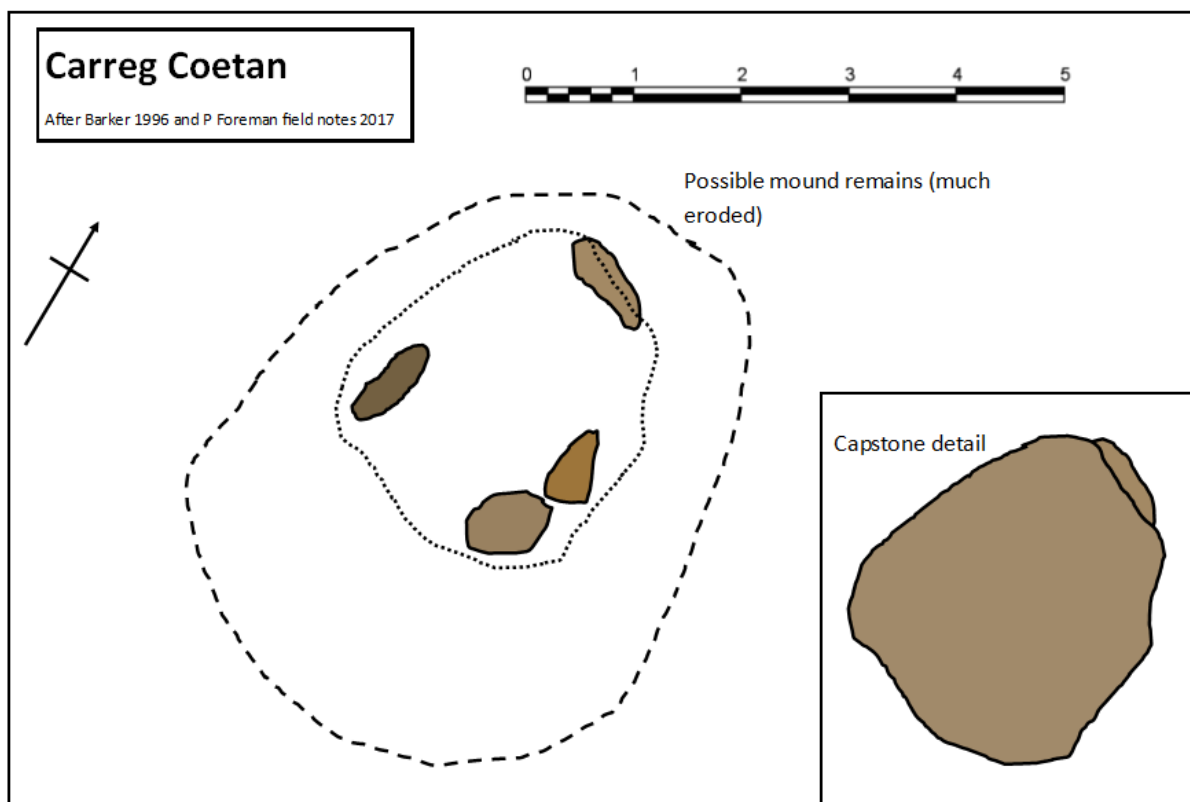


Fig 33. Carreg Coetan site plan in colour

1 Carreg Coetan	Wales	SN060394	52.0185981	-4.8281844	Dolmen	153, 128, 93	153, 129, 96	158, 135, 103	Mid grey beige
2 Carreg Coetan	Wales	SN060394	52.0185981	-4.8281844	Dolmen	153, 113, 58	158, 117, 58	163, 121, 62	Beige brown
3 Carreg Coetan	Wales	SN060394	52.0185981	-4.8281844	Dolmen	161, 135, 98	163, 137, 100	168, 139, 98	Mid grey beige
4 Carreg Coetan	Wales	SN060394	52.0185981	-4.8281844	Dolmen	112, 93, 65	115, 96, 69	121, 101, 74	Dark grey beige
5 Carreg Coetan	Wales	SN060394	52.0185981	-4.8281844	Dolmen	153, 131, 101	161, 138, 106	163, 141, 109	Mid grey beige

Table 17. Carreg Coetan data

#### 4.3.7

#### Cerrig Y Gof



*Fig 34. Occluded by bramble and last season's bracken, the chambers of Cerrig y Gof. P  
Foreman 2017*

At time of visit, this site is heavily overgrown, making certain features hard to discern. The series of chambers has a commanding view over the coast, though only one looks directly out to the sea, and there is a low ridge between it and the coast that slightly occludes it from the sea. It is possible that this is a Bronze Age complex, associated with the nearby “intense” activity in that period on Dinas Head, Mynydd Dinas, Mynydd Melyn, and Carningli, all of which are interdivisible with the site (Nash 2006). Somewhat unkindly, Lynch suggests that it is an indication of a less than thoughtful interment of the dead, a “haphazard agglomeration which must be the local answer to the need for more burial space” (Lynch 1972). This would seem at odds with the effort behind such monumental work.

Excavated (or perhaps more accurately, investigated and significantly disturbed) by antiquarian Richard Fenton in the early 19<sup>th</sup> century, the capstones were removed and finds included charcoal “rude” pottery and black beach pebbles (Daniel 2013) – an interesting contrast to the usual white quartz, especially given the amount of readily available white pebbles on nearby beaches. The stones here have been significantly altered in position, moved, collapsed, and generally fallen into a state of neglect through centuries of haphazard “archaeological” investigation, stone robbing, and general erosion.

There are no radiocarbon dates for these chambers, nor surviving finds to attempt dating through.

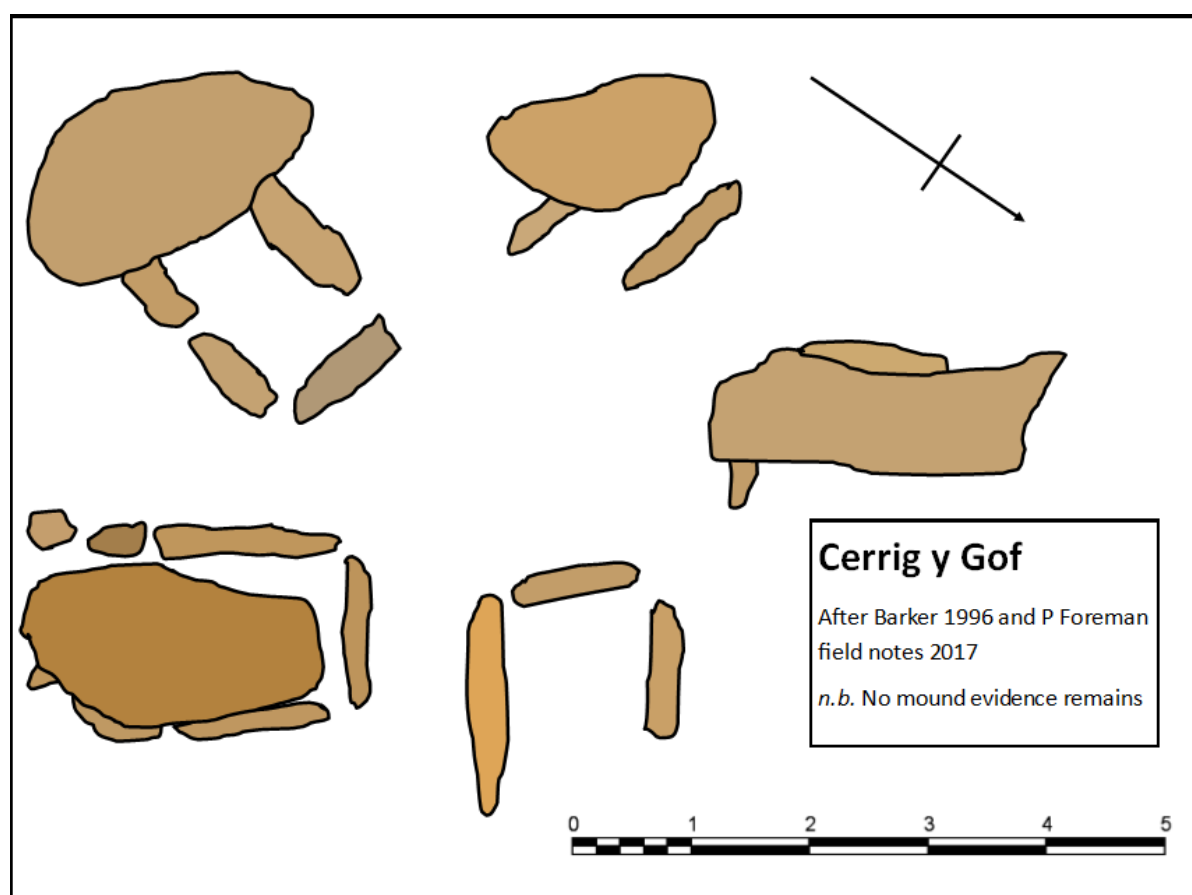


Fig 35. Cerrig y Gof site plan in colour

1	Cerrig - y - Gof	Wales	SN036389	52.0136888	-4.8626349	Chambered Tomb	194, 155, 101	201, 160, 103	196, 158, 104	Mid beige
2	Cerrig - y - Gof	Wales	SN036389	52.0136888	-4.8626349	Chambered Tomb	199, 160, 105	194, 157, 105	201, 163, 109	Mid beige
3	Cerrig - y - Gof	Wales	SN036389	52.0136888	-4.8626349	Chambered Tomb	217, 162, 85	222, 165, 87	214, 162, 90	Deep beige
4	Cerrig - y - Gof	Wales	SN036389	52.0136888	-4.8626349	Chambered Tomb	191, 152, 98	194, 157, 105	196, 160, 108	Mid beige
5	Cerrig - y - Gof	Wales	SN036389	52.0136888	-4.8626349	Chambered Tomb	196, 161, 112	196, 162, 114	191, 156, 107	Mid beige
6	Cerrig - y - Gof	Wales	SN036389	52.0136888	-4.8626349	Chambered Tomb	194, 160, 112	204, 169, 120	196, 161, 112	Mid beige
7	Cerrig - y - Gof	Wales	SN036389	52.0136888	-4.8626349	Chambered Tomb	189, 153, 102	194, 157, 105	199, 161, 107	Mid beige
8	Cerrig - y - Gof	Wales	SN036389	52.0136888	-4.8626349	Chambered Tomb	196, 161, 112	201, 168, 121	196, 161, 110	Mid beige
9	Cerrig - y - Gof	Wales	SN036389	52.0136888	-4.8626349	Chambered Tomb	209, 166, 107	204, 162, 104	191, 154, 101	Mid beige
10	Cerrig - y - Gof	Wales	SN036389	52.0136888	-4.8626349	Chambered Tomb	189, 155, 108	194, 159, 110	199, 162, 111	Mid beige
11	Cerrig - y - Gof	Wales	SN036389	52.0136888	-4.8626349	Chambered Tomb	191, 152, 98	194, 156, 103	196, 159, 106	Mid beige
12	Cerrig - y - Gof	Wales	SN036389	52.0136888	-4.8626349	Chambered Tomb	191, 157, 109	196, 162, 114	191, 158, 111	Mid beige
13	Cerrig - y - Gof	Wales	SN036389	52.0136888	-4.8626349	Chambered Tomb	184, 159, 125	176, 152, 118	168, 148, 119	Grey beige
14	Cerrig - y - Gof	Wales	SN036389	52.0136888	-4.8626349	Chambered Tomb	194, 159, 110	199, 163, 113	201, 166, 117	Mid beige
15	Cerrig - y - Gof	Wales	SN036389	52.0136888	-4.8626349	Chambered Tomb	196, 163, 116	194, 158, 109	196, 160, 110	Mid beige
16	Cerrig - y - Gof	Wales	SN036389	52.0136888	-4.8626349	Chambered Tomb	163, 125, 72	163, 126, 75	166, 128, 76	Deep beige
17	Cerrig - y - Gof	Wales	SN036389	52.0136888	-4.8626349	Chambered Tomb	196, 154, 94	191, 150, 92	184, 142, 84	Mid beige
18	Cerrig - y - Gof	Wales	SN036389	52.0136888	-4.8626349	Chambered Tomb	191, 151, 94	189, 148, 91	191, 146, 90	Mid beige
19	Cerrig - y - Gof	Wales	SN036389	52.0136888	-4.8626349	Chambered Tomb	189, 149, 94	191, 151, 96	194, 154, 99	Mid beige
20	Cerrig - y - Gof	Wales	SN036389	52.0136888	-4.8626349	Chambered Tomb	189, 150, 96	191, 153, 99	189, 149, 99	Mid beige
21	Cerrig - y - Gof	Wales	SN036389	52.0136888	-4.8626349	Chambered Tomb	194, 152, 93	191, 150, 92	194, 152, 93	Mid beige
22	Cerrig - y - Gof	Wales	SN036389	52.0136888	-4.8626349	Chambered Tomb	181, 134, 69	179, 130, 62	176, 129, 63	Mid to deep beige

Table 18. Cerrig y Gof data

#### 4.3.8

#### Pentre Ifan



*Fig 36. Heavy lichen cover at Pentre Ifan. P Foreman 2017*

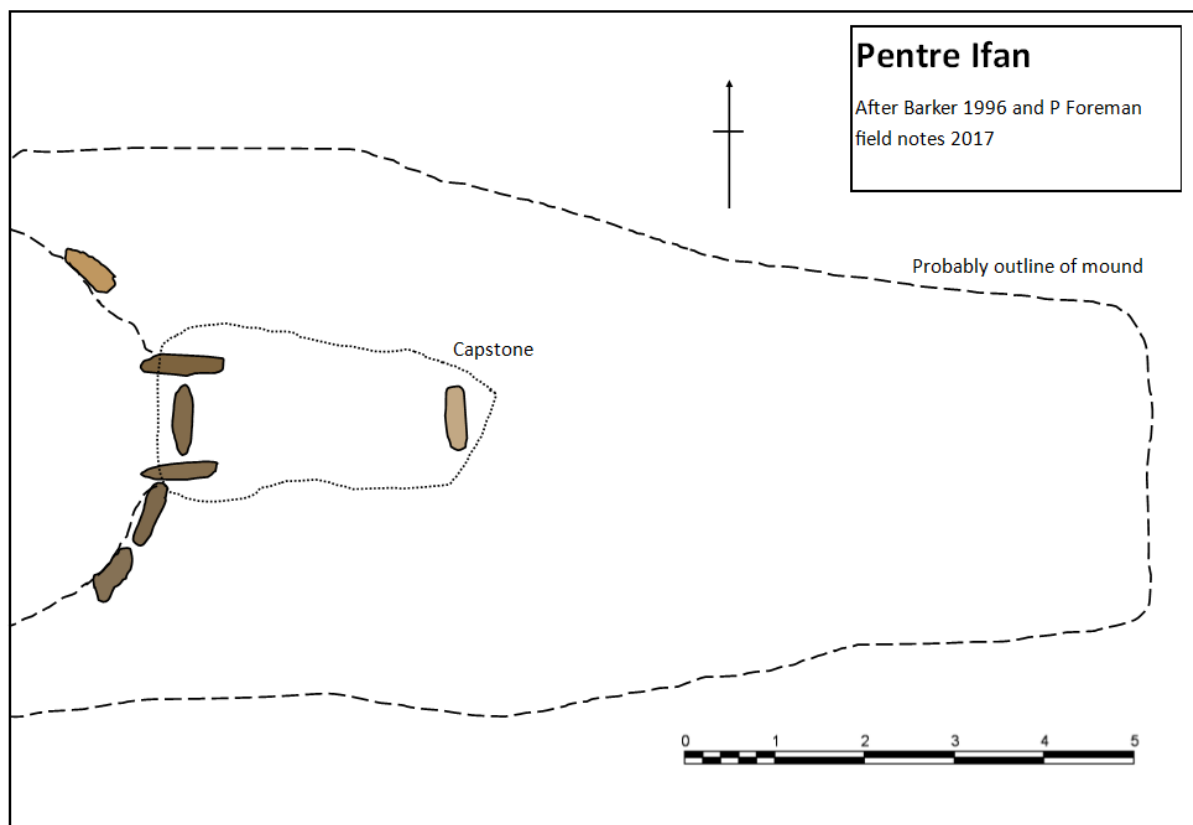
An icon of Neolithic Wales, Pentre Ifan stands on a hillside to the east of Mynydd Carningli, with views across the Nevern valley and out to sea. The capstone slopes in parallel with the land, and is suggested to mirror the shape of the mountains to the west (Tilley 1994). Its exact chronology, typology and influence is subject to debate, ranging from a multi-phase monument (Lynch 1972), to a closed-portal tomb after the Costwold-Severn type (Barker 1992).

“The most ink-besplattered monument in Pembrokeshire” (Eyre-Evans 1922, 497), Pentre Ifan has been excavated and investigated by a wide range of archaeologists, antiquarians, and general enthusiasts since at least the early 17th century. Grimes conducted a detailed excavation at the site twice, from 1936-7 and from 1958-9, and found the chamber to be cut into the hillside, with meagre finds of flint flakes and one pot sherd, amongst a layer of charcoal (Barker 1992). The cairn is entirely denuded, and would originally have formed a long, horned mound, delineated by a low kerb, that covered the deliberately felled upright and associated “ritual pits” (Barker 1992).

Lichen is a significant challenge at Pentre Ifan – the rocks are covered in numerous species, making colour identification difficult. The extent to which this occludes the colour is clearest when comparing stones 7 or 8 to those of the monument itself; they have clearly been walked and sat upon by visitors to the site, clearing them of lichen and letting the “fresh” colour of the stone stand out.

Overall, the stones are of relatively uniform colour appearance, and are heavily weathered local volcanic tuff, examples of which are a common sight in the surrounding fields. Indeed it is difficult to separate these field boulders into those associated with prehistoric activity, and with more modern field clearance. A local farmhouse has a deeply suspicious looking gatepost that would not look out of place propping up the capstone of a monument. This local rock is an interesting chameleon; it is hard to get a grip on the colour as it seems mercurial, shifting each time you look at it. When fresh, this rock has a vibrant deep blue-grey appearance, as seen in local field boundaries and outcrops on the surrounding hills, but the stones chosen for Pentre Ifan are deliberately highly weathered (by glacial action during the last ice age), ancient, and beige-grey. Only on the underside of the capstone, and on the upper side of the presumably broken off or damaged stones 11 and 12, is the richer inside colour seen, likely a result of the capstone’s inner surface being originally beneath ground surface and therefore not subject to glacial forces.

The stones used for this site, then, were convenient – rather than sites like Bryn Celli Ddu, where obvious local sources were overlooked for a collection of more interesting and diverging colours and textures, the source here was hyper-local and prestige focused on the construction rather than the difficulty in acquiring the matter it was constructed of. That is not to say that the stones themselves were insignificant – building a monument of great slabs from the locality would of course be significant, incorporating the spirits of place from the locality and landscape into a structure likely for the commemoration and celebration of the human dead, will always be an act deep with intertwining meanings and significances. The act of choosing highly weathered, ancient rocks rather than “fresher” ones from outcrops not vastly distant seems to suggest they had some significance over the darker rocks.



*Fig 37. Pentre Ifan site plan in colour*

1 Pentre Ifan	Wales	SN099371	51.9989479	-4.7699734	Portal Dolmen	130, 109, 81	133, 113, 85	128, 108, 82	Deep beige grey
2 Pentre Ifan	Wales	SN099371	51.9989479	-4.7699734	Portal Dolmen	122, 103, 76	125, 104, 75	130, 109, 79	Deep beige grey
3 Pentre Ifan	Wales	SN099371	51.9989479	-4.7699734	Portal Dolmen	125, 103, 71	125, 99, 62	128, 103, 69	Deep beige grey
4 Pentre Ifan	Wales	SN099371	51.9989479	-4.7699734	Portal Dolmen	128, 105, 73	130, 107, 75	125, 103, 72	Deep beige grey
5 Pentre Ifan	Wales	SN099371	51.9989479	-4.7699734	Portal Dolmen	128, 106, 75	133, 110, 78	135, 113, 81	Deep beige grey
6 Pentre Ifan	Wales	SN099371	51.9989479	-4.7699734	Portal Dolmen	189, 149, 94	191, 151, 96	196, 155, 98	Mid beige
7 Pentre Ifan	Wales	SN099371	51.9989479	-4.7699734	Portal Dolmen	191, 165, 128	194, 168, 132	199, 173, 137	Pale grey beige
8 Pentre Ifan	Wales	SN099371	51.9989479	-4.7699734	Portal Dolmen				Deep beige grey

*Table 19. Pentre Ifan site data*

#### 4.3.9 Bedd yr Afanc

An unusual monument in a region full of unusual monuments, Bedd yr Afanc, “the grave of Afanc” (a water monster from Welsh mythology), sits in boggy ground, surrounded by mountain ridges - most significantly, the Preseli hills to the south. The long, oval shape and diminutive stones make it more difficult to spot in the landscape than its portal dolmen and passage grave cousins, but it is no less impressive. It has a definite east-west alignment, though the entrance is more difficult to state definitively - possibly to the south west side.



Defining the typology of this site has frustrated archaeologists for many decades: Grimes (1936) originally believed it to be wedge-shaped passage grave after the Irish wedge tomb style, but after excavation in 1938 found no evidence for this - and indeed, very little evidence of anything, with no finds of any sort other than the remains of dry stone walling between the orthostats (Barker 1992). Its long profile and two end stones are evocative of the dutch *hunebedden*, though even in their most diminutive form they do not appear as Bedd yr Afanc does, and there is no trace of any capstones. Lynch believes it “appears to be a type unique to these islands” (1972, 82), another confusing chapter in the rich and complex history of megalith building.

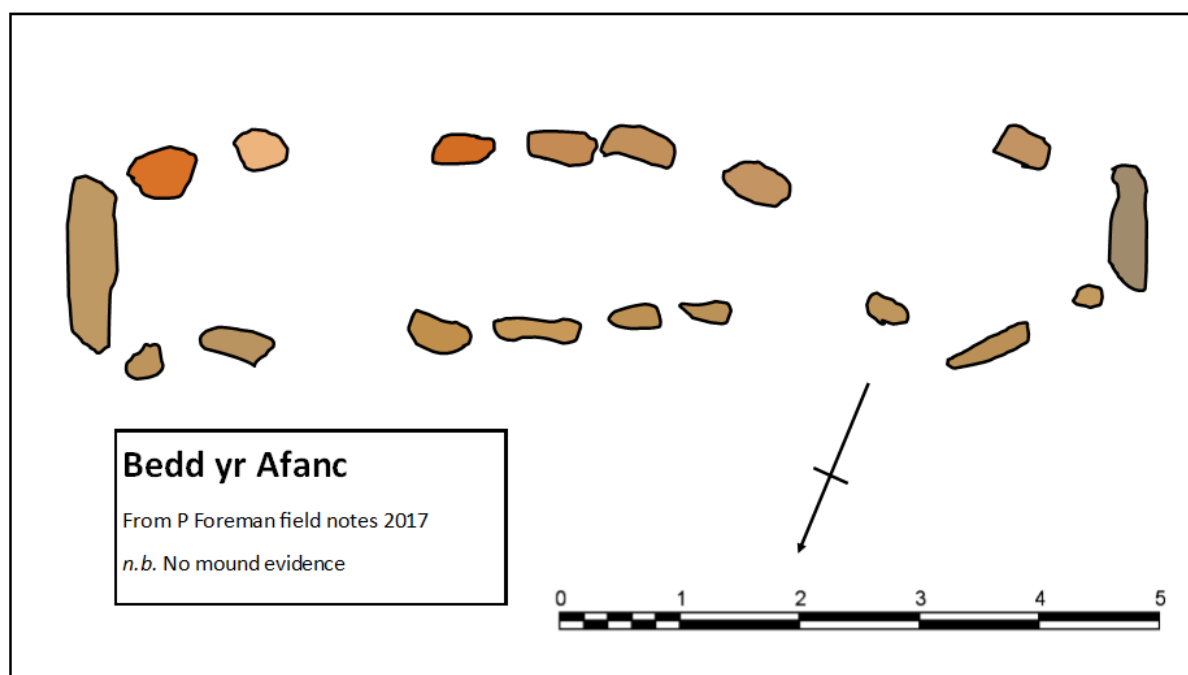


Fig 38. Bedd yr Afanc site plan in colour

1	Bedd yr Afanc	Wales	SN107346	51.9772382	-4.7555227	Gallery Grave	156, 135, 107	161, 139, 109	166, 144, 113	Grey beige
2	Bedd yr Afanc	Wales	SN107346	51.9772382	-4.7555227	Gallery Grave	194, 152, 93	196, 154, 94	191, 149, 90	Mid beige
3	Bedd yr Afanc	Wales	SN107346	51.9772382	-4.7555227	Gallery Grave	186, 143, 82	186, 144, 86	194, 150, 89	Mid beige
4	Bedd yr Afanc	Wales	SN107346	51.9772382	-4.7555227	Gallery Grave	186, 144, 86	191, 150, 92	194, 153, 97	Mid beige
5	Bedd yr Afanc	Wales	SN107346	51.9772382	-4.7555227	Gallery Grave	191, 149, 90	186, 145, 87	189, 147, 89	Mid beige
6	Bedd yr Afanc	Wales	SN107346	51.9772382	-4.7555227	Gallery Grave	181, 137, 76	189, 145, 83	196, 151, 86	Mid beige
7	Bedd yr Afanc	Wales	SN107346	51.9772382	-4.7555227	Gallery Grave	191, 147, 84	199, 152, 88	191, 145, 80	Mid beige
8	Bedd yr Afanc	Wales	SN107346	51.9772382	-4.7555227	Gallery Grave	184, 138, 73	191, 143, 75	191, 148, 88	Mid beige
9	Bedd yr Afanc	Wales	SN107346	51.9772382	-4.7555227	Gallery Grave	189, 148, 91	186, 148, 96	184, 145, 92	Mid beige
10	Bedd yr Afanc	Wales	SN107346	51.9772382	-4.7555227	Gallery Grave	191, 153, 99	189, 149, 92	191, 151, 96	Mid beige
11	Bedd yr Afanc	Wales	SN107346	51.9772382	-4.7555227	Gallery Grave	189, 149, 94	191, 153, 99	199, 155, 93	Mid beige
12	Bedd yr Afanc	Wales	SN107346	51.9772382	-4.7555227	Gallery Grave	212, 109, 36	217, 113, 39	209, 102, 25	Rich orange beige
13	Bedd yr Afanc	Wales	SN107346	51.9772382	-4.7555227	Gallery Grave	232, 178, 128	237, 180, 126	242, 185, 131	Very pale beige
14	Bedd yr Afanc	Wales	SN107346	51.9772382	-4.7555227	Gallery Grave	209, 107, 33	212, 109, 36	201, 104, 35	Rich orange beige
15	Bedd yr Afanc	Wales	SN107346	51.9772382	-4.7555227	Gallery Grave	191, 134, 80	196, 139, 84	199, 146, 90	Mid beige
16	Bedd yr Afanc	Wales	SN107346	51.9772382	-4.7555227	Gallery Grave	194, 143, 89	194, 144, 91	199, 150, 97	Mid beige
17	Bedd yr Afanc	Wales	SN107346	51.9772382	-4.7555227	Gallery Grave	191, 142, 90	196, 149, 98	201, 155, 105	Mid beige
18	Bedd yr Afanc	Wales	SN107346	51.9772382	-4.7555227	Gallery Grave	196, 150, 100	194, 148, 99	189, 142, 92	Mid beige

Table 20. Bedd yr Afanc data

#### 4.3.10 Ffyst Samson / Trellsyscoed

This megalith sits on an exposed site, just below the highest point on the ridge, and with a dramatic stone outcrop as a backdrop to the east (presumably the “back” of the chamber given the slant of the capstone). It has almost 360 degree views of the surrounding landscape, across to the just-visible sea at Aberbach.

Its appearance is delicately balanced, the capstone seeming to defy gravity with it barely-touching position on the two remaining uprights. Unlike many monuments of the region, it stands out clearly (though obscured to the modern visitor by overgrown gorse), and enjoys a prominent position rather than one that is obscured or camouflaged. It is possible that the scatter of surrounding stones is the remainder of a cairn, though this is obscured by a close field boundary. The pale limestone used in construction is likely highly local, from the nearby outcrop.

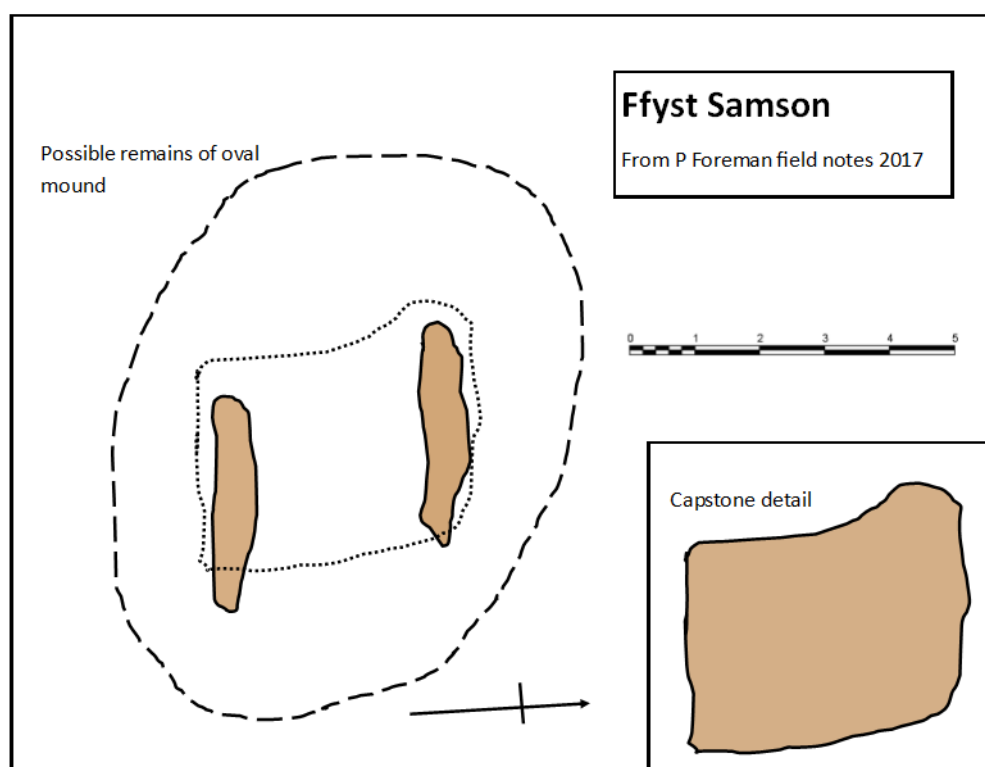


Fig 39. Ffyst Samson site plan in colour

1 Ffyst Samson	Wales	SM906349	51.9733392	-5.0489491	Portal Dolmen	212, 169, 123	214, 174, 131	214, 170, 122	Pale to mid beige
2 Ffyst Samson	Wales	SM906349	51.9733392	-5.0489491	Portal Dolmen	207, 164, 118	209, 166, 119	212, 171, 127	Pale to mid beige
3 Ffyst Samson	Wales	SM906349	51.9733392	-5.0489491	Portal Dolmen	209, 170, 128	212, 175, 135	209, 174, 135	Pale to mid beige

Table 21. Ffyst Samson data

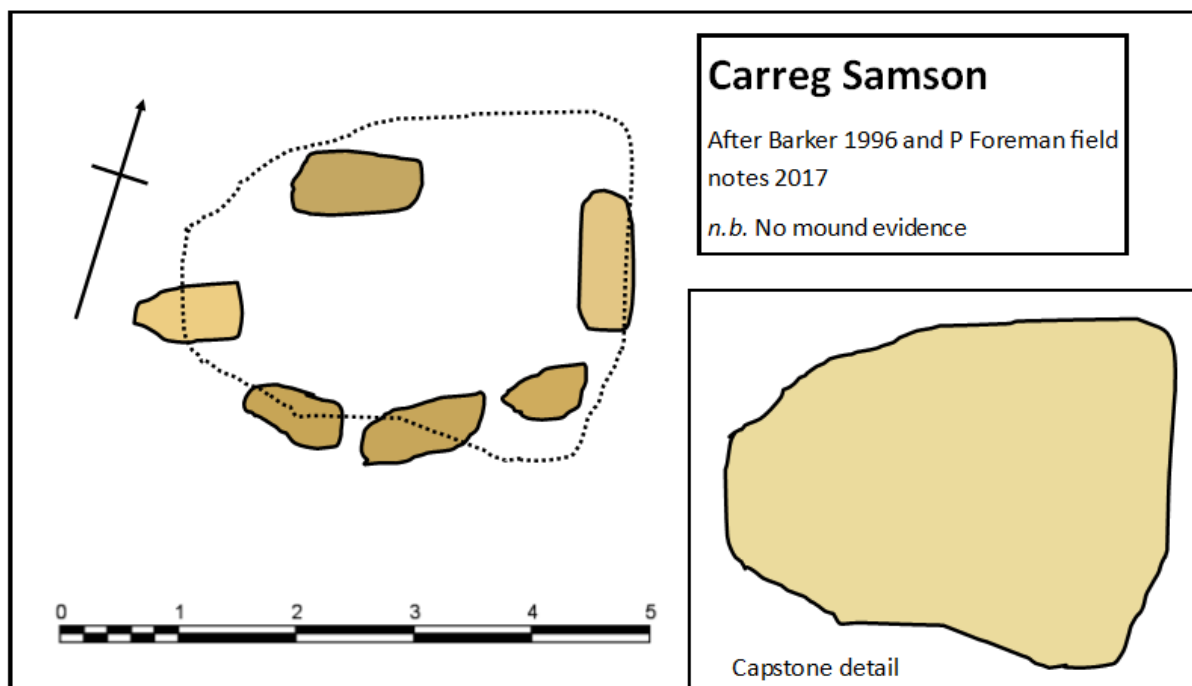


#### 4.3.11 Carreg Samson

Excavated in 1968 by Frances Lynch, this dramatically-sited megalith is largely complete, though missing one of its uprights and the stones of its short, NW facing passage; the chamber floor had a deliberately deposited layer of yellow clay, below which were found sherds from a single “early Neolithic” bowl (Lynch 1975).

The stone used at this site is sandstone, though of differing grades - the three northernmost orthostats are a fine grained, smooth stone with defined edges, whilst the other three orthostats and the capstone are a more rugged, conglomerate sandstone with a rough surface texture and less clearly defined edges. The finer grained stone is a rich beige yellow, and the more rugged stone is more grey-beige.

Dramatically situated on a gentle slope of a slight peninsula, the monument has views down to the sea (and the bay where a nearby spring empties into) to the north and east, and dramatic mountains to the north east. The relatively complete structure, and the impressive views, has led to it being one of the most commonly photographed sites in the region.



*Fig 40. Carreg Samson site plan in colour*

1	Carreg Samson	Wales	SM848335	51.9583595	-5.1329702	Chambered Tomb	240, 207, 129	237, 205, 130	235, 204, 134	Pale beige
2	Carreg Samson	Wales	SM848335	51.9583595	-5.1329702	Chambered Tomb	201, 167, 87	199, 165, 86	207, 172, 93	Mid beige
3	Carreg Samson	Wales	SM848335	51.9583595	-5.1329702	Chambered Tomb	196, 162, 82	199, 166, 90	201, 168, 89	Mid beige
4	Carreg Samson	Wales	SM848335	51.9583595	-5.1329702	Chambered Tomb	204, 170, 92	207, 172, 93	199, 167, 93	Mid beige
5	Carreg Samson	Wales	SM848335	51.9583595	-5.1329702	Chambered Tomb	232, 204, 137	227, 198, 132	235, 204, 134	Pale beige
6	Carreg Samson	Wales	SM848335	51.9583595	-5.1329702	Chambered Tomb	194, 164, 93	196, 167, 98	199, 166, 90	Mid beige
7	Carreg Samson	Wales	SM848335	51.9583595	-5.1329702	Chambered Tomb	232, 215, 149	235, 219, 157	237, 221, 159	Pale beige

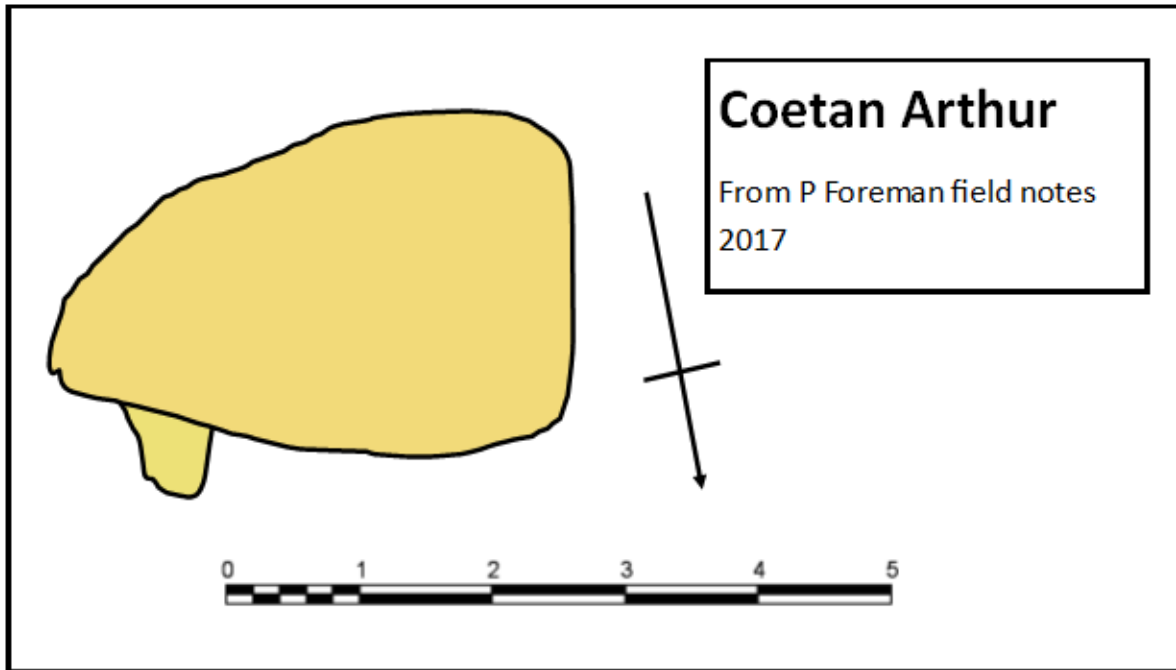
*Table 22. Carreg Samson data*

#### 4.3.12 Coetan Arthur

On a gentle slope above Whitesands bay, covered in rocks exposed by the Pembrokeshire winds and storms from the soil, Coetan Arthur's capstone raises up and looks out over the sea, and up to the peak of Carn Llidi to the north east. Although it was excavated in 1898, the outcome was somewhat alarmingly described as "without result" (Barker 1992), and though its appearance is impressive today, it is in poor condition. Daniel's interpretation of the site as having a passage would generate an interesting discussion on the site's typology and influences, though such a passage is not in evidence today, nor documented in other accounts (Daniel 1950, Barker 1992).

Like the nearby monument at Carn Llidi, it has a changeable nature, and views of it are dramatically different from different angles - looking out towards the sea in a south westerly direction, its outline is bold and impressive, but looking up to the peak of Carn Llidi in a northeasterly direction, it is much more muted in appearance, blending with the landscape. This is suggestive of construction-as-performance, not only of referencing the landscape when sourcing and placing material, but interacting with it, performing a theatrical kind of hide and seek with the surrounding features.

Inside the chamber, a rough boulder with significant, bright white quartz seams sits roughly in the centre.



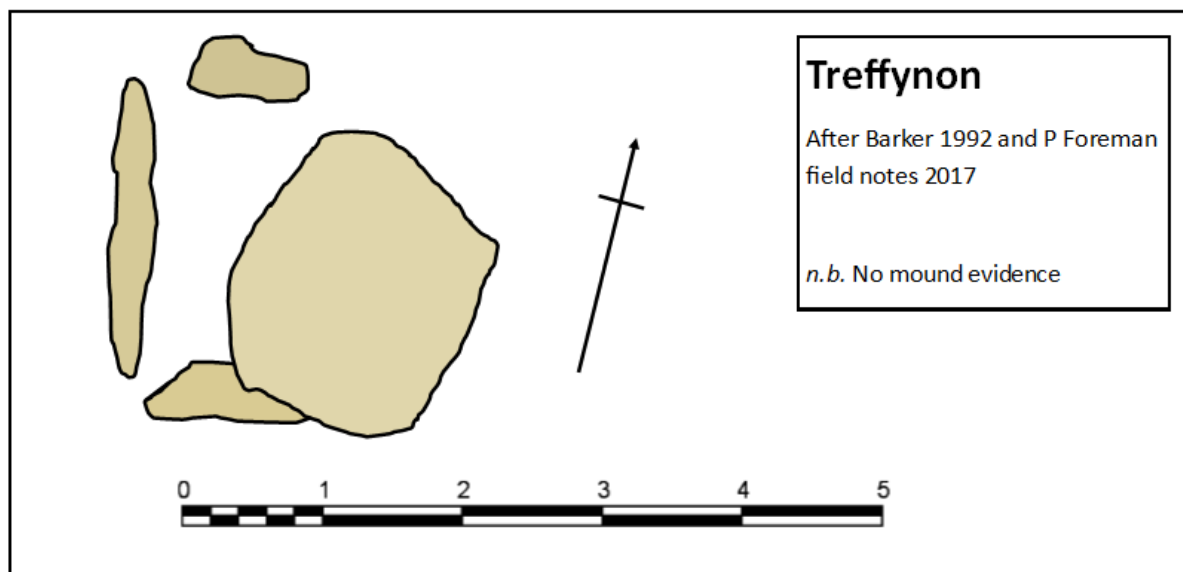
*Fig 41. Coetan Arthur site plan in colour*

1	Coetan Arthur	Wales	SM725281	51.9033251	-5.3100717	Earthfast Dolmen	235, 223, 102	237, 225, 119	240, 228, 122	Pale yellow beige
2	Coetan Arthur	Wales	SM725281	51.9033251	-5.3100717	Earthfast Dolmen	242, 212, 90	242, 218, 121	237, 211, 107	Pale yellow beige

*Table 23. Coetan Arthur data*

#### 4.3.13 Treffynon

The capstone of this small chambered tomb has slipped, and now fills the gap left by missing orthostat on the eastern side; the interior has been reportedly filled with field-gathered stone (Barker 1992). Upon visiting for this survey, it was clear the interior had been filled with “modern” spoil, as well as ploughing taking place extremely close to the stones. The resultant appearance of this monument is one of dilapidation, a disorganised pile of rocks.



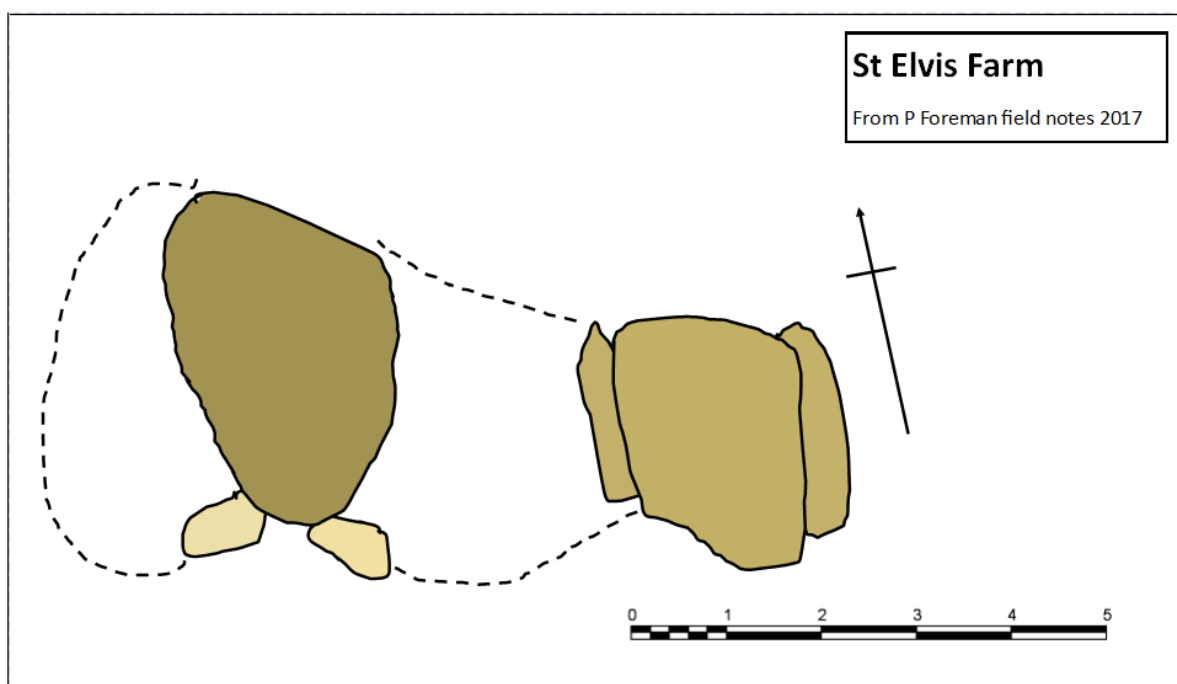
*Fig 42. Treffynon site plan in colour*

1	Treffynon	Wales	SM854287	51.9150266	-5.1223101	Chambered Tomb	204, 191, 141	207, 195, 147	209, 197, 151	Pale beige grey
2	Treffynon	Wales	SM854287	51.9150266	-5.1223101	Chambered Tomb	217, 205, 156	214, 202, 152	207, 193, 140	Pale beige grey
3	Treffynon	Wales	SM854287	51.9150266	-5.1223101	Chambered Tomb	212, 198, 144	217, 203, 147	212, 194, 140	Pale beige grey
4	Treffynon	Wales	SM854287	51.9150266	-5.1223101	Chambered Tomb	222, 210, 164	224, 214, 171	227, 216, 172	Very pale beige grey

*Table 24. Treffynon data*

#### **4.3.14 St Elvis Farm**

The exact incident that rendered the eastern chamber at this site almost totally destroyed is documented; a tenant farmer blasted it for building material and carried off much of the resulting debris - and the monument suffered significant erosion and damage due to farming and associated human, animal, and vehicular traffic around it (Barker 1992). Thankfully the site is now fenced off in its own enclosure, and at the time of visiting appeared to be well cared for and maintained. Although it sits on relatively flat land, and is in close proximity to the sea, it does not have a view of it: the most notable view is over to the west, where a shallow valley has been cut by a spring heading out to sea.



*Fig 43. St Elvis site plan in colour*

1 St Elvies Farm	Wales	SM812239	51.8713838	-5.1659669	Chambered Tomb	194, 176, 103	196, 178, 106	199, 181, 107	Mid beige
2 St Elvies Farm	Wales	SM812239	51.8713838	-5.1659669	Chambered Tomb	204, 186, 114	194, 176, 107	196, 179, 108	Mid beige
3 St Elvies Farm	Wales	SM812239	51.8713838	-5.1659669	Chambered Tomb	191, 174, 103	194, 176, 103	196, 178, 106	Mid beige
4 St Elvies Farm	Wales	SM812239	51.8713838	-5.1659669	Chambered Tomb	235, 219, 155	240, 224, 163	235, 220, 160	Very pale beige
5 St Elvies Farm	Wales	SM812239	51.8713838	-5.1659669	Chambered Tomb	237, 223, 166	237, 223, 168	230, 217, 168	Very pale beige
6 St Elvies Farm	Wales	SM812239	51.8713838	-5.1659669	Chambered Tomb	158, 143, 81	163, 147, 83	166, 150, 85	Deep beige

*Table 25. St Elvis Farm data*

#### 4.3.15 Carn Llidi

Twin chambers of Carn Llidi sit very close (in the case of the easternmost chamber, touching) the rock face of the cliffs near Whitesand Bay. The eastern chamber is now collapsed, and a natural ridge in the rock wall surface at roughly the original height of the capstone is suggestive of its original position.

The cliffside setting and relative low to the ground stature make these two chambers somewhat chameleonic at first glance - from certain angles they are difficult to spot in the landscape, from others they stand out immediately. This kind of visual trickery may be evidence of ceremonial or ritual routes to visit the sites, with the theatrics of them “appearing” as part of the experience of being in the monument. The location is a dramatic

one - affording the two chambers more than 180 degree vistas of the sea, surrounding islets, and the flat, fertile land of St David’s peninsula. Of the two chambers, the western most one probably “looked out” to the sea, while the eastern likely had its entrance to the south.

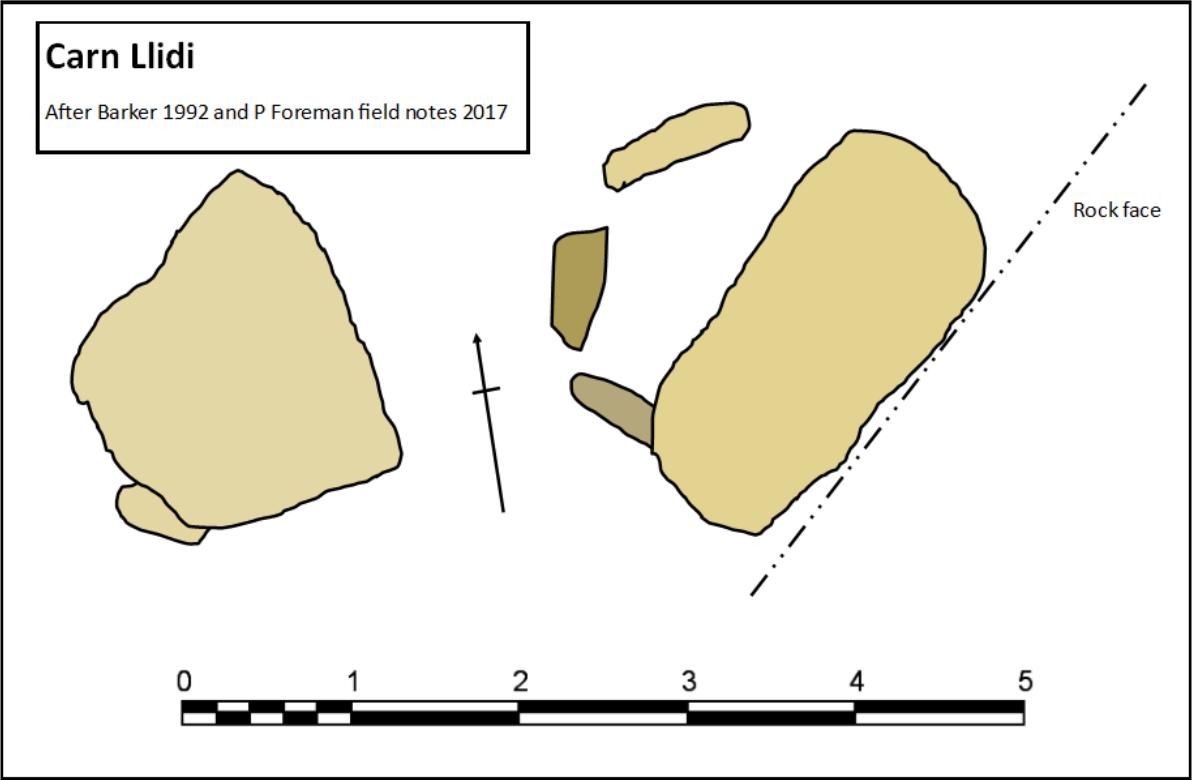


Fig 44. Carn Llidi site plan in colour

1	Carn Llidi	Wales	SM735279	51.9035368	-5.2937452	Chambered Tomb	224, 206, 135	227, 211, 145	224, 209, 146	Pale beige
2	Carn Llidi	Wales	SM735279	51.9035368	-5.2937452	Chambered Tomb	232, 216, 153	227, 212, 150	224, 208, 144	Pale beige
3	Carn Llidi	Wales	SM735279	51.9035368	-5.2937452	Chambered Tomb	171, 154, 85	173, 156, 87	176, 158, 88	Deep beige
4	Carn Llidi	Wales	SM735279	51.9035368	-5.2937452	Chambered Tomb	171, 159, 113	179, 167, 123	181, 169, 123	Pale grey beige
5	Carn Llidi	Wales	SM735279	51.9035368	-5.2937452	Chambered Tomb	232, 219, 165	227, 215, 166	230, 217, 168	Pale beige
6	Carn Llidi	Wales	SM735279	51.9035368	-5.2937452	Chambered Tomb	224, 211, 159	227, 214, 163	224, 212, 164	Pale beige
7	Carn Llidi	Wales	SM735279	51.9035368	-5.2937452	Chambered Tomb	217, 205, 156	214, 203, 156	217, 205, 158	Pale beige

Table 26. Carn Llidi data

### 4.3.16 Hanging Stone

The confused and damaged state of this monument has lead to a wide variety of interpretations, including a double chamber (RCAM 1925), a passage grave (Grimes 1936), and a “chamber and passage” tomb (Lynch 1975). The level capstone and suggestive fallen

orthostats/capstone make it seem unlike the traditional portal dolmen type; like many sites of the region, it defies simple typological classification.

As well as a general state of disrepair, the site's evaluation is hampered by its location on the border of two active agricultural fields, meaning a buildup of soil has obscured the remaining stones. Although located in farmland it benefits from being sites at a field boundary, so avoids the worst of modern agricultural damage. Its proximity to a dirt track and footpath means it is easy to visit, and although not in the leagues of Pentre Ifan, it sees a steady foot flow of visitors.

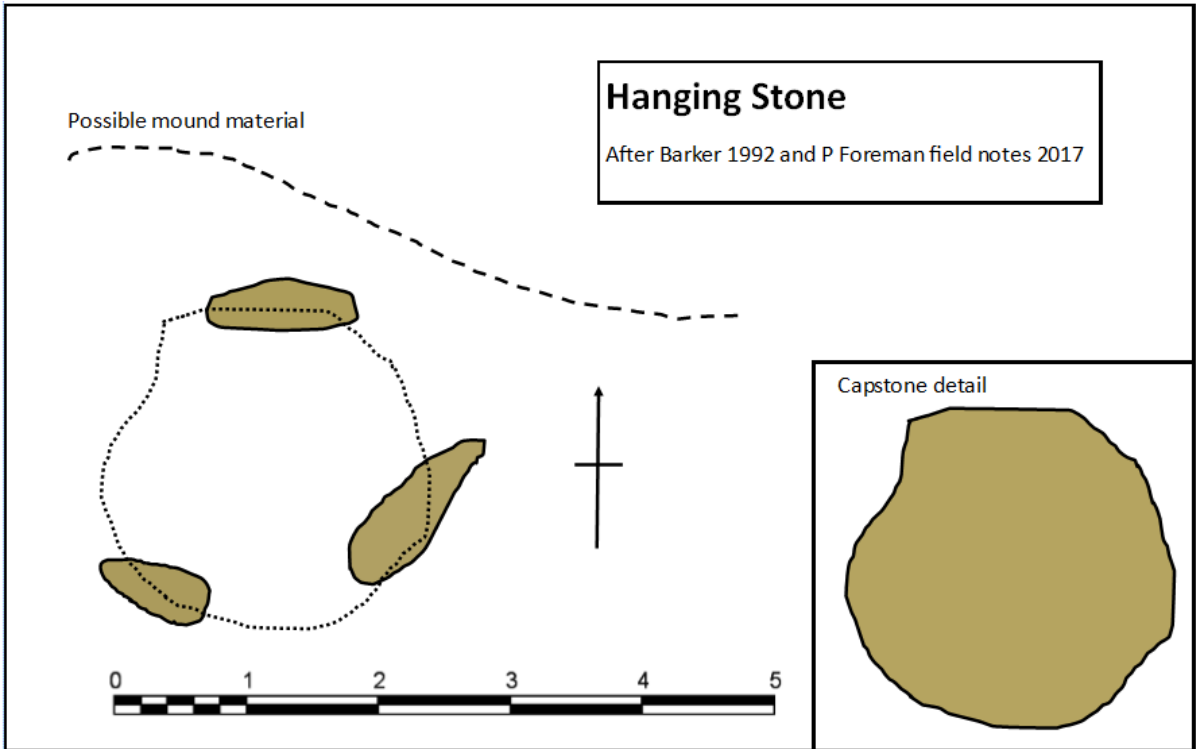


Fig 45. Hanging Stone site plan in colour

1 Hanging Stone	Wales	SM972082	51.7359195	-4.9382126	Passage Grave	171, 154, 85	173, 157, 90	179, 162, 96	Deep beige
2 Hanging Stone	Wales	SM972082	51.7359195	-4.9382126	Passage Grave	176, 159, 93	171, 155, 92	166, 151, 90	Deep beige
3 Hanging Stone	Wales	SM972082	51.7359195	-4.9382126	Passage Grave	171, 156, 97	176, 160, 99	179, 162, 96	Deep beige
4 Hanging Stone	Wales	SM972082	51.7359195	-4.9382126	Passage Grave	176, 159, 91	181, 164, 96	171, 154, 87	Deep beige

Table 27. Hanging Stone data

4.3.17
Devil’s Quoit

A collapsed chamber (though interpreted as being earthfast by Daniel in his 1950 report on the Welsh monuments), this monument becomes more impressive as the scale of the sandstone rocks, particularly the capstone, becomes more apparent as you approach it. It sits in a slight hollow and though it is close to the sea, the slight dip and low rise of the dunes means it does not have a view of Freshwater Bay itself. Its modern environs include a backdrop of a disused oil refinery to the north, placing it in a curiously modern-ancient-old-new-used-disused landscape rich with connections to the changing ways people inhabited the same space over time.

The stone is uniform across the surviving uprights and capstone, and is a pink-red sandstone from the local “Old Red Sandstone”, so has likely not travelled far.

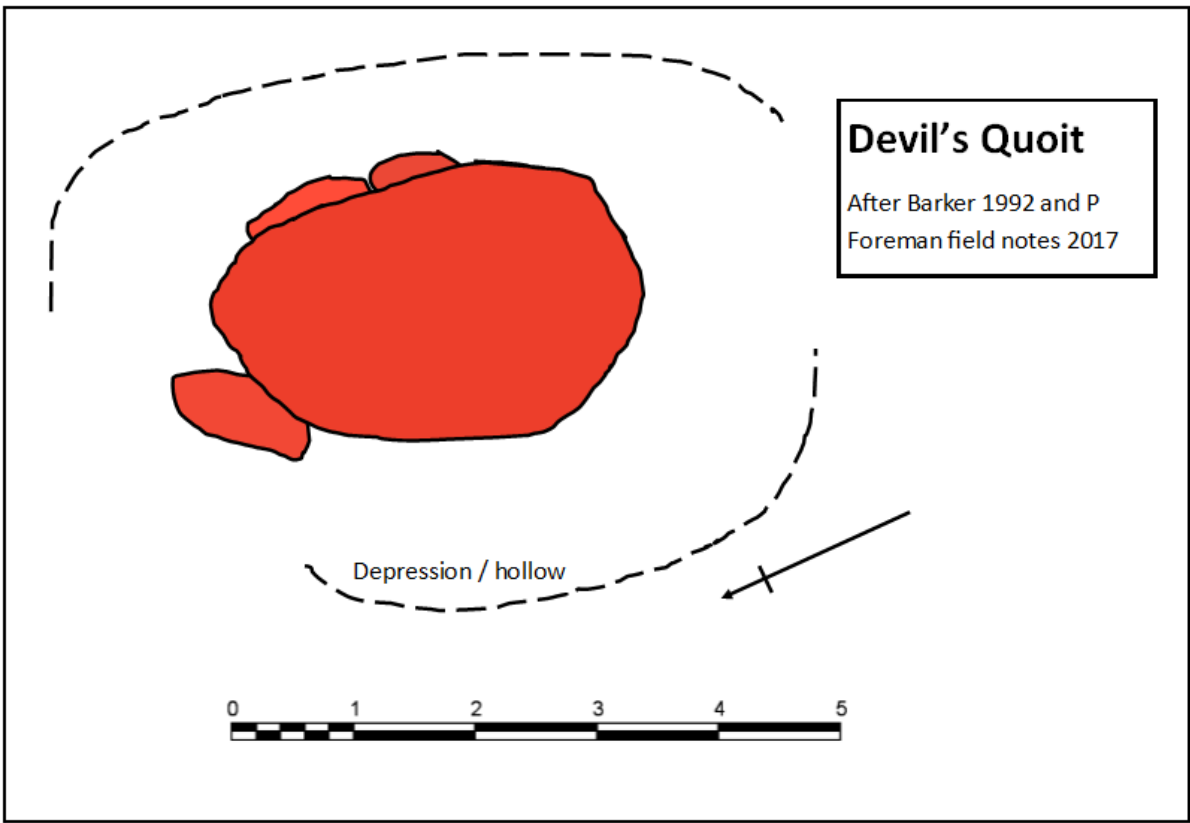


Fig 46. Devil’s Quoit site plan in colour

1	Devil's Quoit	Wales	SM886008	51.6672293	-5.0592153	Portal Dolmen	199, 46, 46	242, 72, 53	245, 73, 54	Pink-red
2	Devil's Quoit	Wales	SM886008	51.6672293	-5.0592153	Portal Dolmen	232, 50, 30	255, 76, 56	247, 71, 52	Pink-red
3	Devil's Quoit	Wales	SM886008	51.6672293	-5.0592153	Portal Dolmen	240, 69, 50	235, 72, 54	240, 71, 53	Pink-red
4	Devil's Quoit	Wales	SM886008	51.6672293	-5.0592153	Portal Dolmen	242, 68, 48	237, 62, 43	240, 65, 46	Pink-red

Table 28. Devil’s Quoit data



4.3.18 King’s Quoit

This monument nestles in the cliff side above Manorbier Bay, and turns its “back” to look out over the bay and inland rather than out to sea. It is another interestingly performative monument; the approach along the coast path from the south gives a view of the capstone, looking like a natural rock outcrop; it is only when travelling around the monument and viewing from the northern side that its more dramatic outline and inviting entrance becomes apparent.

Interpreted as an earthfast monument (Daniel 1950, Barker 1992), the stone is of the Old Red Sandstone that makes up the main outcrop of rock along these cliffs, and is therefore likely to be hyper local. It is a deep pink red, with a rugged natural texture, and is mirrored in the same coloured stone in the cliffs behind it along the northern end of the bay.

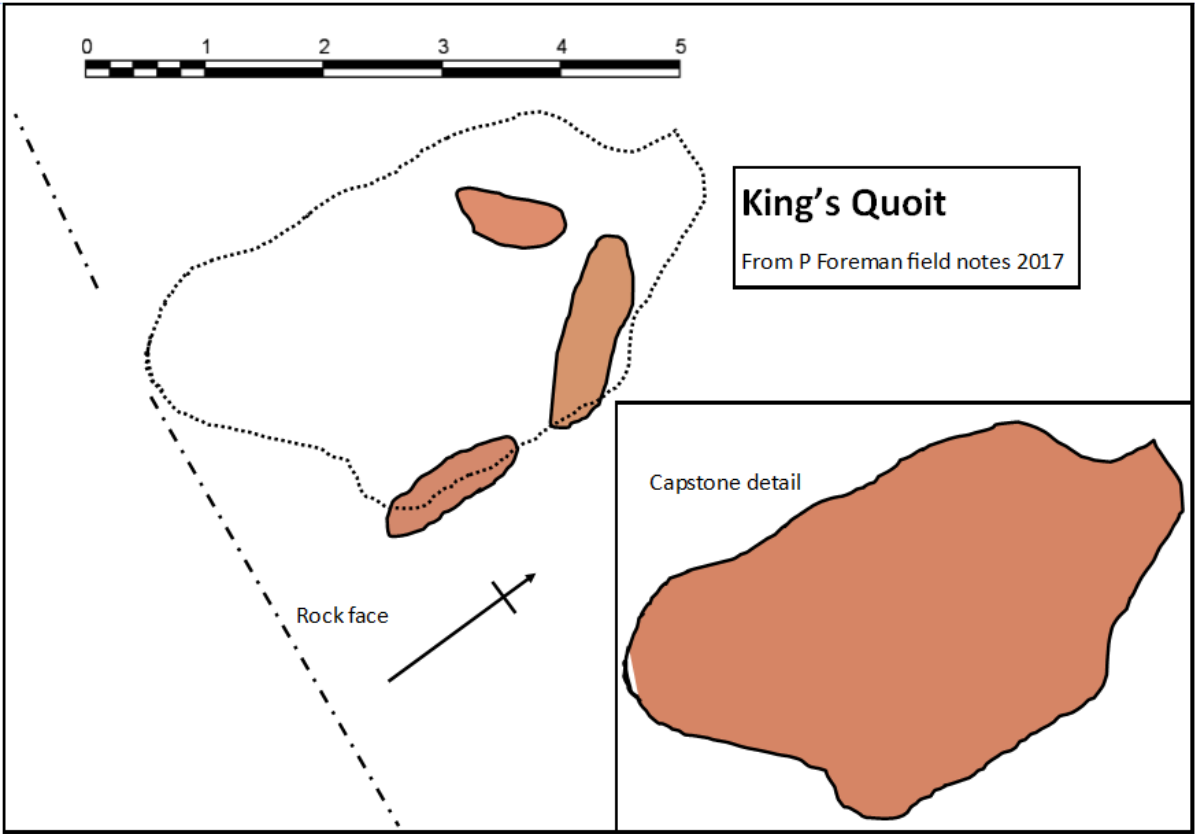


Fig 47. King’s Quoit site plan in colour

1 King’s Quoit	Wales	SS0599723	51.6407861	-4.8060583	Earthfast Tomb	209, 151, 115	214, 149, 109	217, 151, 111	Pink beige
2 King’s Quoit	Wales	SS0599723	51.6407861	-4.8060583	Earthfast Tomb	217, 141, 111	222, 141, 109	224, 144, 112	Pink beige
3 King’s Quoit	Wales	SS0599723	51.6407861	-4.8060583	Earthfast Tomb	219, 138, 105	214, 133, 101	214, 136, 105	Pink beige
4 King’s Quoit	Wales	SS0599723	51.6407861	-4.8060583	Earthfast Tomb	209, 136, 107	212, 137, 108	217, 141, 111	Pink beige

Table 29. King’s Quoit data

## **4.4 Wessex**

### **4.4.1 On sample size and distribution**

Given the combination of the large size, the footfall of general public at each site, and issues with access to the stones for the extensive periods of time required, the following four “big name” sites were chosen to represent the richness of Neolithic megaliths in the Wessex region.

Due to the nature of availability of access to these sites, and the large size of the monuments surveyed, they were recorded across a large time period, at differing times of the year. Visit dates are noted at each individual site. Originally, the West Kennet Avenue was also part of this dataset, however on examination of the recorded information from the two days of survey, the file was found to be corrupted and the colour readings not correctly recorded on the spreadsheet. Time constraints meant a repeat visit was not possible.

### **4.4.2 Background**

It is difficult to imagine any study on the Neolithic of Atlantic Europe without discussing the region known historically (and in modern literature, somewhat poetically) as Wessex; largely in modern Wiltshire and Oxfordshire, the region covers instantly recognisable and high profile sites from Salisbury Plain to Avebury’s wide spanning stone circle. It is home to iconic exemplars of Neolithic monumental architecture; during the course of this research, across Atlantic Europe, few interpretation boards and museum exhibits about the Neolithic did *not* mention Stonehenge and its landscape. Though it has been substantially covered by archaeologists and those involved in adjacent disciplines over the last few centuries, discussions on colour have been few, and lacking in detailed analysis or comparison to contemporary sites either locally or across Europe (Hensey 2015, Marshall 2016). If the sites in Wessex were as significant as their size, uniqueness, and dense concentration would suggest, then any study of the Neolithic of Atlantic Europe would be lacking if not considering them.

The sites in this case study are some of the most high profile historic sites in the British Isles, and as such are both subject to extremely high visitor numbers, and the source of significant tensions between various stakeholders and individuals who feel connection to them. They loom large in the popular imagination. They have been studied, examined, excavated (though surprisingly not as thoroughly as would be imagined - their status as “superstar”

monuments means that access permission is rarely granted) and generally theorised upon by an extraordinarily broad range of institutions and individuals, and the source of much impassioned debate.

#### **4.4.3 Geology of Wessex**

Unlike the other regions within this study, Wessex is somewhat geologically simple - it lacks the dramatic and geologist-bothering complicated rock strata of Pembrokeshire or Anglesey, or the glacier-dropped boulder clay richness of the Dutch and Scandinavian sites. The region is sited on chalk downland, with a bedrock largely composed of soft, pale Cretaceous limestone with a few areas of clay deposits (Green 1997). The great Sarsens littering the landscape across the Marlborough Downs and Kennet Valley are the remains of the soft sedimentary Tertiary rock formation layer, that has since eroded to leave the hard, dense, silicified sandstone blocks behind - these represent hyper-localised patches of cementation of the Tertiary sediments. Their rugged, rippled surfaces are often riddled with fossilised tree-root holes that must, due to the very dense and durable nature of the Sarsen, have occurred parallel to the cementation process - so it occurred close to the surface when the plants and trees were growing. It lends the stones an extra layer of visual, haptic, and mythological interest - the holes appear so perfect, so artificial. The fact that stone surfaces in Avebury and the Avenue so often are selected to display surfaces pock marked by these holes on the interior suggests the “holey” stones were desirable as a material.

Sarsen is a material primed for folklore; not only is it often found loitering as huge blocks in fields or stood by ancient hands in great monuments, haptically speaking it is mercurial - rugged and rippled in a wide variety of textures and grades of roughness of the surface silica, and so changeable in differing weather conditions, becoming warm in the sun but easily cold and slimy to the touch in winter. It retains moisture in such a way to make it a terrible building material; the smashed sarsen “recycled” at Avebury for house building proved a poor choice - its lingering dampness meant the stone, according to Stukeley, was “always moist and dewy in winter which proves damp and unwholesome, and rots the furniture” (Stukeley 1743). There is perhaps no more persuasive argument for the material agency of stone and a lack of human foresight into the complex relational nature of human and non human agents than the old stones of Avebury driving their vandals to bankruptcy.

Sarsen weathers “dull” - when freshly dressed, damaged, or pulled from the earth, it displays a rich range of colourings, but over relatively short periods of time the colours are muted and require close study to make their subtle differences apparent. The exception to this are the

rare “red” sarsen stones, those with some iron content in their makeup, that retain their rich colouring - but are generally small in stature, much more diminutive than their more common, massive pale and butter-coloured cousins (Whittaker, personal comm.)

#### **4.4.4 The Avebury Circles / ‘Z Feature’ stones**

The stones at Avebury were visited over the course of several days in December 2016. Conditions were dry, cold, and clear, though dusk fell early and daylight was noticeably poorer after 2pm on each day. Lichen cover is a challenge, as very public nature makes it difficult to clean – natural clefts in rock with as little coverage as possible chosen.

Avebury is the kind of monument and ritual landscape that would sound like a work of fantasy if it were being described to you for the first time without you knowing it truly existed: a grand circle made of massive, multi-tonne sarsen blocks transported across the plain from Marlborough Down and possibly further, its enormous ditch and bank dug by hand with antler and bone tools, containing multiple (and many since disappeared) smaller satellite circles and stone features, all sitting in a landscape riddled with similarly massive monumental structures including a massive artificial hill, a stone-lined avenue of several miles, and great mounds to the dead. To those growing up in the pastoral idyll of Avebury village as it was up until the latter half of the twentieth century, this was an everyday kind of landscape: from Saxon settlers the village grew inside the great circle, and in the midst of religious fervour and profiteering the stones were burnt and broken to build new homes, livestock sheltered in the lea of surviving stones, and the surrounding pastures were ploughed and planted. It took until the 1870s and John Lubbock’s passion for prehistory (and deep pockets) to attempt to halt the burying, burning, and general vandalism by buying up land to rescue it, and it wasn’t until the 1930s that Alexander Keiller was able to use his marmalade fortune to purchase the entire site and begin the work of excavating, reinstating, and reinvigorating the stones and landscape. Keiller may have tried to recapture some kind of prehistoric golden age by removing “modern” buildings from the circle, but his efforts were thwarted and it still inhabits the circle today, in a sometimes uneasy peace brokered between villagers, heritage organisations, spiritual journeyers, and millions of curious tourists.

The site has been subject to many different archaeological investigations, from the passionate curiosity and druidical leanings of Stukeley to Keiller’s ambitious land-clearing and excavations of the 1930s, to recent geophysical surveys on behalf of the National Trust locating and measuring previously unrecorded buried stones. It has been the subject of

several recent studies, re-analysing the circle and its missing stones, and looking at the social phenomena behind the sheer scale and relish behind the destruction of stones, a very Avebury phenomenon compared with more mundane stone theft and petty vandalism at other Neolithic sites (Gillings and Pollard 2009). The stones themselves are a matter of scholarship in disciplines outside of traditional academia, being subject to significant attention from spiritualists, pagans, and new age travellers, whose output is often sniffily dismissed as “pseudoarchaeology” but often contains new, imaginative, and innovative ideas about landscape and the experience of being in it at sites such as Avebury.

There is some noticeable variation in colour and some stones are not uniform, displaying slightly pink-tinged or pale surfaces on one side of the stone. As noted in 5.3.3, sarsen, as a sedimentary rock, is very variable in texture from fine-grained to more rough and craggy, sometimes within the same rock. Texture alongside colour seems to be an important focus, many stones having natural fossilised tree root holes on one side but not the other, and natural crags and clefts in the rock. Several have a gully or cleft down the right hand side of the stone, which then features rough surface to one side and smoother surface to the other. This pattern sometimes reversed – deliberate on part of the builders, or have they been put back wrong in restoration? Pale stones seem often to be co-selected to display a smooth surface texture (despite the fact that pale colouring is evident in less smooth stone, and not all smooth sarsen is pale in colour) – perhaps this acts to amplify the effect of their paleness in different light levels.

One popular interpretation of the differing stone shapes within Avebury’s circles and the Avenue is that the stones represent male and female forms - along similar lines to the idea that the different shape of passage portal stones at long barrows and chambered tombs, one pointed and one rounded, represents male and female figures (Pollard and Gillings 1998). Although judging the shape of stones to ascribe gendered characteristics is subjective, there does seem to be some tentative patterning of colour and shape. “Male” (if interpreted to be represented by pointed and square stones) seem to be almost always pale or very pale - compare this to the often phallically interpreted pillar within the chamber of Bryn Celli Ddu, Anglesey, and the persistent interpretation of the tall sarsens of Stonehenge’s trilithons as phallic symbology (Meaden 2017).

“Female” stones, (those having the “lozenge” or diamond shape typical of stone selected for use at many Neolithic monuments) seem roughly 50% pale and 50% darker tones, but, where stones have dual aspect (ie point AND lozenge), then point is pale round is darker. More “female” shaped stones are represented in the surviving assemblage. The matter of

Avebury's history as a site of stone destruction must be considered - were more "male" stones destroyed, or is the high percentage of female stones significant?

An obvious caveat is that some of the stones are so massive that cannot say that they are uniform in colour, or see clearly variations in colour towards the upper reaches, or take readings above head height. A limitation that must be accepted, and that those building/using the site would have faced similar limitations once the monument was constructed: during selection colours may have been noticed and selected for, but probably only on surfaces that could be seen by the "users".

30 Avebury	England	SU103700	51.42854	-1.853888	Stone Circle / Henge	166, 178, 119	147, 149, 133	144, 148, 125	Beige-grey
31 Avebury	England	SU103700	51.42854	-1.853888	Stone Circle / Henge	178, 185, 152	181, 191, 141	185, 194, 138	Pale beige-grey
32 Avebury	England	SU103700	51.42854	-1.853888	Stone Circle / Henge	189, 168, 151	191, 171, 151	194, 173, 153	Pale beige-grey (pink tinge)
33 Avebury	England	SU103700	51.42854	-1.853888	Stone Circle / Henge	189, 170, 148	199, 172, 145	204, 177, 151	Pale beige-grey (pink tinge)
34 Avebury	England	SU103700	51.42854	-1.853888	Stone Circle / Henge	200, 205, 179	229, 250, 161	231, 250, 167	Very pale beige grey
35 Avebury	England	SU103700	51.42854	-1.853888	Stone Circle / Henge	184, 191, 158	181, 194, 147	188, 201, 153	Pale beige-grey/pink tinge
36 Avebury	England	SU103700	51.42854	-1.853888	Stone Circle / Henge	224, 218, 168	232, 226, 171	224, 219, 175	Pale beige-grey
40 Avebury	England	SU103700	51.42854	-1.853888	Stone Circle / Henge	209, 205, 176	212, 208, 171	214, 211, 184	Pale grey
41 Avebury	England	SU103700	51.42854	-1.853888	Stone Circle / Henge	145, 132, 114	150, 130, 110	156, 135, 114	Dark beige-grey
42 Avebury	England	SU103700	51.42854	-1.853888	Stone Circle / Henge	227, 222, 170	222, 217, 166	222, 218, 171	Pale beige-grey
44 Avebury	England	SU103700	51.42854	-1.853888	Stone Circle / Henge	227, 235, 185	233, 240, 191	230, 237, 192	Very pale beige grey
45 Avebury	England	SU103700	51.42854	-1.853888	Stone Circle / Henge	228, 235, 185	232, 240, 181	222, 227, 186	Very pale beige grey
Il cove Avebury	England	SU103700	51.42854	-1.853888	Stone Circle / Henge	136, 125, 98	140, 130, 98	143, 132, 97	Dark beige-grey
I cove Avebury	England	SU103700	51.42854	-1.853888	Stone Circle / Henge	173, 181, 172	186, 188, 181	193, 194, 182	Very pale grey
206 Avebury	England	SU103700	51.42854	-1.853888	Stone Circle	155, 142, 121	161, 148, 121	166, 153, 126	Mid beige-grey
201 Avebury	England	SU103700	51.42854	-1.853888	Stone Circle	144, 133, 112	146, 136, 118	151, 140, 119	Dark beige-grey
50 Avebury	England	SU103700	51.42854	-1.853888	Stone Circle / Henge	146, 135, 114	148, 136, 114	139, 130, 104	Dark beige-grey
68 Avebury	England	SU103700	51.42854	-1.853888	Stone Circle / Henge	193, 185, 161	199, 189, 161	207, 195, 163	Very pale beige grey
98 Avebury	England	SU103700	51.42854	-1.853888	Stone Circle / Henge	148, 135, 117	153, 137, 117	158, 142, 123	Dark beige-grey
1 Avebury	England	SU103700	51.42854	-1.853888	Stone Circle	142, 129, 109	148, 135, 109	153, 140, 115	Dark beige-grey
101 Avebury	England	SU103700	51.42854	-1.853888	Stone Circle	169, 166, 137	173, 170, 137	181, 178, 147	Mid beige-grey
102 Avebury	England	SU103700	51.42854	-1.853888	Stone Circle	215, 208, 191	222, 215, 191	217, 210, 189	Very pale beige grey
103 Avebury	England	SU103700	51.42854	-1.853888	Stone Circle	138, 127, 101	145, 134, 101	148, 138, 108	Dark beige-grey
105 Avebury	England	SU103700	51.42854	-1.853888	Stone Circle	216, 209, 184	222, 215, 184	219, 212, 182	Very pale beige grey
106 Avebury	England	SU103700	51.42854	-1.853888	Stone Circle	214, 191, 171	222, 199, 181	230, 207, 188	Pale beige-grey (pink tinge)
4 Avebury	England	SU103700	51.42854	-1.853888	Stone Circle / Henge	217, 204, 189	222, 211, 197	230, 218, 204	Very pale beige grey
5 Avebury	England	SU103700	51.42854	-1.853888	Stone Circle / Henge	212, 205, 189	217, 206, 193	219, 209, 197	Very pale beige grey
6 Avebury	England	SU103700	51.42854	-1.853888	Stone Circle / Henge	204, 217, 150	212, 224, 155	205, 217, 154	Beige grey
7 Avebury	England	SU103700	51.42854	-1.853888	Stone Circle / Henge	220, 230, 181	228, 237, 191	224, 232, 193	Very pale beige grey
8 Avebury	England	SU103700	51.42854	-1.853888	Stone Circle / Henge	230, 216, 179	224, 208, 161	219, 205, 167	Pale Beige grey
9 Avebury	England	SU103700	51.42854	-1.853888	Stone Circle / Henge	184, 161, 136	173, 154, 134	181, 162, 141	Dark beige grey
10 Avebury	England	SU103700	51.42854	-1.853888	Stone Circle / Henge	192, 194, 151	197, 193, 145	192, 194, 138	Pale beige grey
12 Avebury	England	SU103700	51.42854	-1.853888	Stone Circle / Henge	148, 145, 122	141, 138, 120	161, 158, 128	Beige grey
14 Avebury	England	SU103700	51.42854	-1.853888	Stone Circle / Henge	191, 186, 153	199, 194, 159	207, 201, 167	Pale beige grey
16 Avebury	England	SU103700	51.42854	-1.853888	Stone Circle / Henge	209, 199, 169	196, 182, 143	201, 187, 147	Pale beige grey
24 Avebury	England	SU103700	51.42854	-1.853888	Stone Circle / Henge	146, 135, 113	137, 125, 102	140, 132, 104	Deep beige grey
iii Avebury	England	SU103700	51.42854	-1.853888	?Stone Row	204, 207, 189	208, 210, 191	210, 212, 192	Very pale beige-grey
iv Avebury	England	SU103700	51.42854	-1.853888	?Stone Row	179, 77, 30	184, 78, 29	184, 72, 20	orange red with some deep beige
v Avebury	England	SU103700	51.42854	-1.853888	?Stone Row	188, 81, 35	179, 74, 35	186, 76, 35	orange red
vi Avebury	England	SU103700	51.42854	-1.853888	?Stone Row	185, 74, 27	179, 75, 37	184, 69, 28	orange red
vii Avebury	England	SU103700	51.42854	-1.853888	?Stone Row	158, 84, 28	173, 70, 29	179, 72, 30	red-brown with deep beige
viii Avebury	England	SU103700	51.42854	-1.853888	?Stone Row	161, 50, 6	173, 60, 16	171, 66, 24	red-brown with deep beige

Table 30. Avebury data

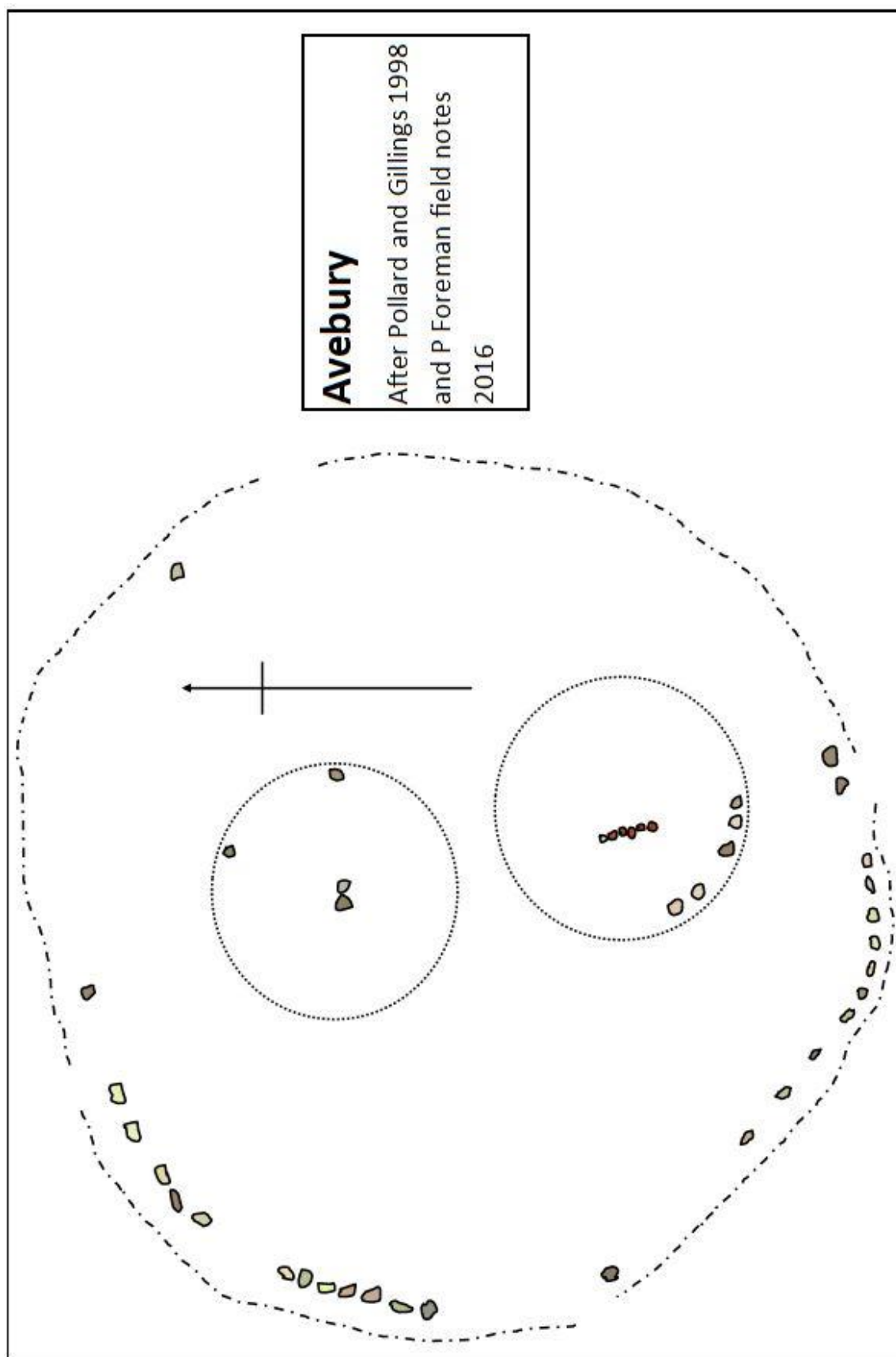


Fig 48. Avebury site plan in colour

Though very dense and difficult to shape, the Sarsens at Avebury are still a sedimentary rock, and therefore are subject to various natural weathering and erosion effects that can be easily confused with deliberate human acts of alteration. There are many holes and markings in the surface of the sarsens, and the vast majority are interpreted to be natural, generally representing tree root and other faunal activity during the time the sediments were hardening into stone. However, that is not to say that natural markings are not without significance or attraction to the monument builders. Stone 34 has a marking in the centre closely resembling a cupmark, while 106 is known as the vulva stone for its deep and suggestive cleft. Some markings, as on the smoothed southern entrance stones, were probably caused by axe polishing. Even if not the result of direct human interference, selection on the basis of these natural formations is likely, especially when looking at the pattern of their placement within the monument.



30	Avebury	Beige-grey	
31	Avebury	Pale beige-grey	
32	Avebury	Pale beige-grey (pink tinge)	
33	Avebury	Pale beige-grey (pink tinge)	
34	Avebury	Very pale beige grey	
35	Avebury	Pale beige-grey/pink tinge	
36	Avebury	Pale beige-grey	
40	Avebury	Pale grey	
41	Avebury	Dark beige-grey	
42	Avebury	Pale beige-grey	
44	Avebury	Very pale beige grey	
45	Avebury	Dark beige-grey	
Il cove Avebury			"Swindon Stone" - F covered in pitting of root holes, natural texture, some large holes. B pitting to top but smoother to lower, and reddish brown patches of iron deposits. R side rugged to left, possibly smoothed to right.
Loove Avebury			
206	Avebury	Mid beige-grey	
201	Avebury	Dark beige-grey	
50	Avebury	Dark beige-grey	
68	Avebury	Very pale beige grey	
98	Avebury	Dark beige-grey	
1	Avebury	Dark beige-grey	
101	Avebury	Mid beige-grey	
102	Avebury	Very pale beige grey	
103	Avebury	Dark beige-grey	
105	Avebury	Very pale beige grey	
106	Avebury	Pale beige-grey (pink tinge)	
4	Avebury	Very pale beige grey	Holes (fossilised tree roots) to B (inside circle), large cleft upper B. Both sides dressed flat and smooth.
5	Avebury	Very pale beige grey	bulbous undulating surface, almost like a face. R side and B smooth, which accentuates pale colour. L side remains craggy and natural.
6	Avebury	Beige grey	F surface rough with vague lozenge shape - perhaps chosen rather than shaped? R side V craggy, deep root holes, some holes to top, bottom smoother. L relatively smooth.
7	Avebury	Very pale beige grey	V tall, thin profile. F relatively smooth, natural trench to bottom L. hole to bottom R. R side has a gentle curved shape, retaining natural shapes. B rugged with diagonal horizontal ridges in rock surface.
8	Avebury	Pale Beige grey	Squat in shape, high contrast to previous stone. F rough and craggy, especially to top. R, L sides and B hard to determine as the shape overall is more like a squashed cylinder. B smooth, with deep ridge/wave.
9	Avebury	Dark beige grey	F dark, smooth, with deep root holes. R smooth, with point 1/2 way up. B V pale, flat though retaining some natural crags and a diagonal pattern on rock, some holes to middle and top right.
10	Avebury	Pale beige grey	Very unusual. F has top half with "root holes, bottom half possibly broken off? Is very smooth and c.4" deeper than top. R flat, but retaining many crags. B V square, smooth to bottom with natural features to top.
12	Avebury	Beige grey	Shape is a mirror of stone 9. F smooth. R shaped to some degree. B much less smooth than F, with natural crags to lower R, and hole to bottom L. Surface feels coarse.
14	Avebury	Pale beige grey	F has a definite point and smooth texture. R craggy. B appears square and is darker in colour and finer grained than B.
16	Avebury	Pale beige grey	F interesting hourglass/stop heavy triangle shape - much surface pollution but it is a pale colour. Flattened top. B pitted with many small holes.
24	Avebury	Deep beige grey	Clearly damaged, top appears shorn off. Possibly at one time lozenge shaped. F smooth.
iii	Avebury	Very pale beige-grey	
iv	Avebury	orange red with some deep beige	This "row" of stones have natural, rugged, rippling surface. Red colour to some degree on all of them, unusual for boulders of this size (usually much smaller). Rounded shape to side?
v	Avebury	orange red	Short in stature, likely limited by size of stone available in this red colour.
vi	Avebury	orange red	Shaped - point, with a notch to L (north facing) side.
vii	Avebury	red-brown with deep beige	
viii	Avebury	red-brown with deep beige	

Table 31. Avebury stones texture notes

As figure 5.60 shows, the rough, pitted, holed texture is most frequently found on the outer surface of the stones, and smoother, sometimes polished, flatter sides are placed on the inner side. For the outlying stones that do not conform to this pattern, there is likely either a significant reason on the part of the builders to place them this way (perhaps significant patterns on the surface, or some significance in the way the rock was lying when it was found or even something to do with the place it came from originally), or they have been re-erected inaccurately. When compared to the correlations between colour and shape, the complex nature of stone selection and deposition becomes clearer - their placement was not a random act, and is in fact the visible extant evidence of the nature of intersection between aesthetic and cosmology in the Neolithic peoples of this region.

### *The Z feature*

Now surviving as a row of stones within the southern stone circle, this smaller monument is made from stone of interesting shapes and stature in comparison with other monuments in the locality. These stones are strikingly different in colour and texture to their nearby massive neighbours - all feature a red surface to some degree, due to small percentage of iron content in the rock. Boulders of this colour do occur in the Sarsen bearing plains of Wessex but are very unusual; stones are usually much smaller, so to choose this colour and make the effort to find boulders of a sufficient size is clearly significant.

The feature sits on a roughly NNW - SSE alignment, and the location of the southernmost stone (now represented by a concrete bollard) makes an interesting alignment with the location of a further stone within the southern circle, a stone in the great circle, and to the flat peak of Silbury Hill to the south. Although interpretation is rendered difficult by the loss of stone and alteration in height of landscape features since construction, it does appear to have facilitated some kind of performative landscape interaction.

#### **4.4.5 West Kennet Long Barrow**

This site was surveyed in December 2016 and March 2018. On the first visit conditions were bright a clear, but the day was short and daylight noticeably faltered around mid afternoon - though most of the surveying took place within the monument so was unaffected by the level of daylight.

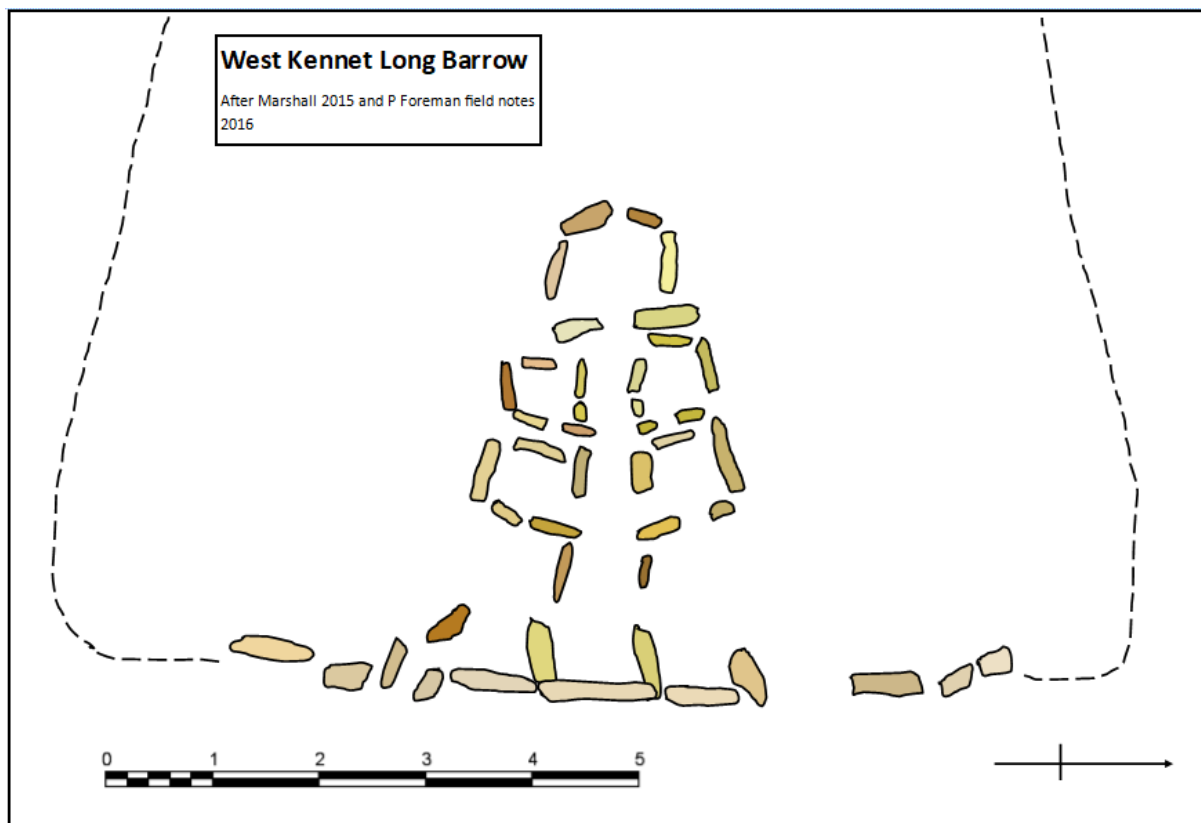
Dramatically sitting on a chalk ridge in the Avebury landscape, close to the brooding form of Silbury Hill, West Kennet is a much-visited and much analysed long barrow of the Severn-

Cotswold type. It was an extremely short-lived ritual funerary site, constructed around the time of the settlement site at Windmill Hill, with some studies placing it as seeing some scant hundred years of fitful funerary ritual activity, from 3640 to 3610 calBC (Bayliss et al 2007). Despite the short term primary use phase, its continued survival in the landscape and its location within the wider Avebury complex has secured its place in archaeological and folkloric canon. It has continued to capture the imagination - folkloric, academic, archaeological - from Aubrey's seventeenth century observations to modern studies of the possibility of ritual acoustics within the barrow (Marshall 2016). Though its prominence in both landscape and imagination has lead to significant disturbance of the barrow's mound, more official and rigorous excavation by Stuart Piggott and Richard Atkinson in the 1950s found the remains of at least 46 individuals, mixed ages and sexes, who died in a relatively short period of time, and whose remains were disarticulated enough to suggest deliberate and repeated exhumation (Piggott 1962). It is extremely likely that significant amounts of skeletal matter have, however, been lost - rendering our understanding of the longevity of funerary ritual at the site more difficult - most notoriously, remains were removed by one Dr Toope in the seventeenth century and used in various lurid potions and cures. Surviving finds have ranged from Grooved Ware to fine Beaker pottery (the depositors of which are assumed to have finally sealed the tomb) (Piggott 1958).

Though the stone-constructed chambers themselves appear huge and imposing, they are dwarfed by the massive scale of the mound itself, at over a hundred meters long. It is on a definite east-west alignment, and some studies have been conducted into the possibilities of seasonal solar alignments. In turn the entire monument is dwarfed by the later Silbury Hill, and again by the simply massive scale of the Avebury circle itself - when it came to the people of this region and their projects, they clearly thought *big*.

Raw material sourcing and transportation is a significant challenge for a hillside-perched site like West Kennet - the huge Sarsens are likely sourced from Marlborough Down, and the estimated one tonne of oolitic limestone used as dry stone walling had a closest possible source of some 25 miles away near modern Frome (Piggott 1958). Every part of this construction is an incredible achievement - from the imagination to build it, the effort of the earth removal from ditch to mound, to moving the massive Sarsens, to sourcing and transporting suitable limestone material that would keep the chamber dry - it is a truly monumental in its scope and execution. It is not a huge leap in logic, then, to accept that stone selected for use at the site had material as well as cosmological properties - when such efforts are being made to develop a complex funerary ritual arena as West Kennet, then every detail must be considered to be significant.

Texture and colour feature prominently in the stones selected for the site - most immediately obvious is the use of an axe polishing stone as the first chamber stone to the left of the entrance - which bears the deep scars of its past life as the creator of haptically evocative and visually striking stone objects, a known vital trade and exchange mechanism for the peoples of the Neolithic.



*Fig 49. West Kennet site plan in colour*

1	West Kennet Long Barrow	England	SU105677	5140852	-1.850236	Long Barrow	235, 212, 162	240, 214, 158	235, 208, 150	Pale beige
2	West Kennet Long Barrow	England	SU105677	5140852	-1.850236	Long Barrow	227, 207, 163	213, 201, 160	224, 206, 166	Pale beige
3	West Kennet Long Barrow	England	SU105677	5140852	-1.850236	Long Barrow	213, 202, 164	203, 188, 142	217, 198, 158	Pale beige
4	West Kennet Long Barrow	England	SU105677	5140852	-1.850236	Long Barrow	224, 207, 171	214, 193, 165	222, 205, 169	Pale beige
5	West Kennet Long Barrow	England	SU105677	5140852	-1.850236	Long Barrow	224, 203, 175	227, 213, 184	227, 214, 186	Pale beige
6	West Kennet Long Barrow	England	SU105677	5140852	-1.850236	Long Barrow	230, 211, 172	232, 216, 181	227, 213, 182	Pale beige
7	West Kennet Long Barrow	England	SU105677	5140852	-1.850236	Long Barrow	240, 225, 194	235, 218, 183	232, 217, 183	Pale beige
8	West Kennet Long Barrow	England	SU105677	5140852	-1.850236	Long Barrow	196, 175, 130	204, 183, 137	203, 188, 142	Mid beige
9	West Kennet Long Barrow	England	SU105677	5140852	-1.850236	Long Barrow	217, 200, 165	224, 203, 175	217, 200, 165	Pale beige
10	West Kennet Long Barrow	England	SU105677	5140852	-1.850236	Long Barrow	232, 222, 202	237, 224, 197	232, 221, 197	Very pale beige
11	West Kennet Long Barrow	England	SU105677	5140852	-1.850236	Long Barrow	213, 190, 132	224, 197, 133	213, 193, 136	Mid beige
12	West Kennet Long Barrow	England	SU105677	5140852	-1.850236	Long Barrow	222, 212, 126	217, 207, 119	222, 211, 118	Yellow beige
13	West Kennet Long Barrow	England	SU105677	5140852	-1.850236	Long Barrow	219, 203, 116	224, 215, 126	230, 218, 115	Yellow beige
14	West Kennet Long Barrow	England	SU105677	5140852	-1.850236	Long Barrow	181, 122, 27	173, 122, 32	184, 123, 26	Deep beige to orange beige
15	West Kennet Long Barrow	England	SU105677	5140852	-1.850236	Long Barrow	196, 153, 84	194, 154, 89	193, 153, 95	Rich beige
16	West Kennet Long Barrow	England	SU105677	5140852	-1.850236	Long Barrow	148, 108, 44	153, 113, 49	156, 116, 53	Very deep beige brown
17	West Kennet Long Barrow	England	SU105677	5140852	-1.850236	Long Barrow	193, 165, 52	196, 164, 59	201, 163, 60	Deep yellow beige
18	West Kennet Long Barrow	England	SU105677	5140852	-1.850236	Long Barrow	235, 212, 138	224, 203, 135	219, 200, 136	Pale beige
19	West Kennet Long Barrow	England	SU105677	5140852	-1.850236	Long Barrow	230, 210, 147	227, 208, 141	222, 205, 143	Pale beige
20	West Kennet Long Barrow	England	SU105677	5140852	-1.850236	Long Barrow	227, 212, 161	224, 207, 150	224, 208, 153	Pale beige
21	West Kennet Long Barrow	England	SU105677	5140852	-1.850236	Long Barrow	183, 170, 103	191, 174, 117	194, 177, 120	Mid beige
22	West Kennet Long Barrow	England	SU105677	5140852	-1.850236	Long Barrow	227, 197, 100	227, 193, 82	224, 191, 83	Yellow beige
23	West Kennet Long Barrow	England	SU105677	5140852	-1.850236	Long Barrow	183, 168, 38	194, 173, 105	193, 177, 105	Mid beige
24	West Kennet Long Barrow	England	SU105677	5140852	-1.850236	Long Barrow	204, 183, 112	193, 178, 109	207, 185, 114	Mid beige
25	West Kennet Long Barrow	England	SU105677	5140852	-1.850236	Long Barrow	230, 215, 165	224, 210, 164	230, 216, 170	Pale beige
26	West Kennet Long Barrow	England	SU105677	5140852	-1.850236	Long Barrow	217, 190, 102	213, 193, 105	224, 192, 88	Yellow beige
27	West Kennet Long Barrow	England	SU105677	5140852	-1.850236	Long Barrow	196, 153, 114	201, 165, 121	201, 160, 103	Mid beige
28	West Kennet Long Barrow	England	SU105677	5140852	-1.850236	Long Barrow	227, 188, 141	232, 214, 144	224, 207, 137	Pale beige
29	West Kennet Long Barrow	England	SU105677	5140852	-1.850236	Long Barrow	176, 117, 46	176, 119, 49	173, 119, 52	Deep beige brown
30	West Kennet Long Barrow	England	SU105677	5140852	-1.850236	Long Barrow	235, 193, 155	230, 183, 140	222, 185, 140	Pale beige
31	West Kennet Long Barrow	England	SU105677	5140852	-1.850236	Long Barrow	207, 195, 33	212, 200, 35	208, 195, 35	Mid beige yellow
32	West Kennet Long Barrow	England	SU105677	5140852	-1.850236	Long Barrow	214, 200, 71	214, 201, 79	224, 210, 73	Yellow beige
33	West Kennet Long Barrow	England	SU105677	5140852	-1.850236	Long Barrow	196, 183, 59	194, 180, 58	196, 183, 61	Rich yellow beige
34	West Kennet Long Barrow	England	SU105677	5140852	-1.850236	Long Barrow	191, 178, 55	196, 183, 61	193, 185, 64	Rich yellow beige
35	West Kennet Long Barrow	England	SU105677	5140852	-1.850236	Long Barrow	201, 191, 97	196, 186, 94	194, 183, 85	Mid beige yellow
36	West Kennet Long Barrow	England	SU105677	5140852	-1.850236	Long Barrow	201, 188, 66	203, 195, 69	204, 190, 53	Rich yellow beige
37	West Kennet Long Barrow	England	SU105677	5140852	-1.850236	Long Barrow	219, 216, 147	217, 213, 147	212, 208, 146	Pale beige
38	West Kennet Long Barrow	England	SU105677	5140852	-1.850236	Long Barrow	217, 213, 145	224, 220, 146	227, 223, 148	Pale beige
39	West Kennet Long Barrow	England	SU105677	5140852	-1.850236	Long Barrow	237, 235, 185	230, 227, 186	224, 222, 177	Very pale beige
40	West Kennet Long Barrow	England	SU105677	5140852	-1.850236	Long Barrow	224, 220, 135	217, 213, 132	219, 215, 134	Pale beige
41	West Kennet Long Barrow	England	SU105677	5140852	-1.850236	Long Barrow	247, 243, 151	245, 240, 157	250, 246, 167	Very pale beige yellow
42	West Kennet Long Barrow	England	SU105677	5140852	-1.850236	Long Barrow	173, 137, 70	173, 133, 61	176, 133, 65	Deep beige brown
43	West Kennet Long Barrow	England	SU105677	5140852	-1.850236	Long Barrow	204, 163, 112	193, 164, 107	196, 157, 94	Mid beige
44	West Kennet Long Barrow	England	SU105677	5140852	-1.850236	Long Barrow	230, 202, 158	222, 197, 158	217, 194, 155	Pale beige
45	West Kennet Long Barrow	England	SU105677	5140852	-1.850236	Long Barrow				
46	West Kennet Long Barrow	England	SU105677	5140852	-1.850236	Long Barrow				
47	West Kennet Long Barrow	England	SU105677	5140852	-1.850236	Long Barrow	242, 233, 170	240, 231, 171	235, 227, 176	Very pale beige
48	West Kennet Long Barrow	England	SU105677	5140852	-1.850236	Long Barrow				
49	West Kennet Long Barrow	England	SU105677	5140852	-1.850236	Long Barrow				
50	West Kennet Long Barrow	England	SU105677	5140852	-1.850236	Long Barrow				

Table 32. West Kennet data

#### 4.4.6 Stonehenge

Due to constraints of access time at this site, only the accessible sarsens were surveyed (i.e., those at ground level). This was carried out in March 2017. The visit took place at dusk and into darkness of the early evening, so though cloud cover was minimal the light conditions ranged from poor to total darkness.

A site that needs very little in the way of introduction; even a brief summary of the excavation, theorisation, and interpretation of this site would be beyond the requirements of this volume. The most recent interpretation of the site takes into account decades of research into alignments, stone provenancing studies, relationship to important seasonal gathering/feasting sites such as that found at Durrington Walls, analysis of skeletal material of the Stonehenge dead (Darvill 2016). That is not to say that it is case closed for

Stonehenge - the media thirst for more stories continues to facilitate “breaking news” such as the recent reports on the site being essentially one enormous phallic symbol fertility temple (Meaden 2017), and the long-rumbling but now more pressing process of implementing tunnel and road schemes into the landscape has brought on a flurry of publications on the vastly significant, deeply important, nationally vital nature of the Stonehenge and Avebury WHS. All of which brings out a multivocal, sometimes fiercely fought debate into the “true” nature of the site, from the Neolithic through to present day, that is not just a matter of archaeology, but also thick with narratives of identity, political influence over heritage, ownership of the past, modern ritual practices, and the notion of progress vs preservation, where no one is entirely sure of the definition of either.

It is a site that elicits emotional and impassioned responses, with a historical, archaeological, and political position that is difficult to remove from thought when conducting work at the stones.

Excerpt from reflexive journal:

*“At perhaps the most well-studied stones of Neolithic Atlantic Europe, being inside the circle in the growing dusk, at close quarters with the sarsens that are usually kept at the remove of a rope fence and several meters of grass verge, it is easy to feel disorientated - not just by the size, which is admittedly mighty, but by the pressure of the sheer weight of history and emotive experience these stones have witnessed. Every solstice, ancient and modern, that has seen gathering and feasting and fire; every family outing, before the fence was up; every free festival vibrating with a bass deeper than the stones could ever have felt before; every creak of leather and rope as the stones were re-erected in the twentieth century, every spiritual experience of every awestruck or sceptical or passionate visitor - there isn't just a depth of time here, but of feeling. Even in the dark, even with the drone of the road, even in the cold - the stones speak.”*

As referenced in the geology section of this chapter, Sarsen is an intriguing material - dense, hard, left with scars of erosion and weathering, including the distinctive tree-root holes that appear to be deliberately drilled by human hand. Stonehenge is unique in having trilithons of deliberately shaped, delicately and incredibly accurately erected stone - from a stone such as Sarsen, this was an incredibly significant amount of work and effort.

The results of this study find that the Sarsen falls into three clusters - one very pale, one a warmer beige, and one almost brown. Though rendered a uniform grey from the distance of

the path, largely due to extensive lichen cover and the way sarsen weathers, up close they are obviously and distinctly different, both in colour and texture.

Given that sarsen lies in fields (and presumably in the Neolithic, within forested and vegetation-covered regions where it is much less obvious to the casual walker or observer) and is in groups of relatively uniform composition when located close geographically, it is reasonable to assume that the different colours of sarsen came from distinct regions, and their deposition in the circle was a combination of seeking contrasting colours, textures, and extracting stone from certain significant places and reflecting this significance in their positioning.

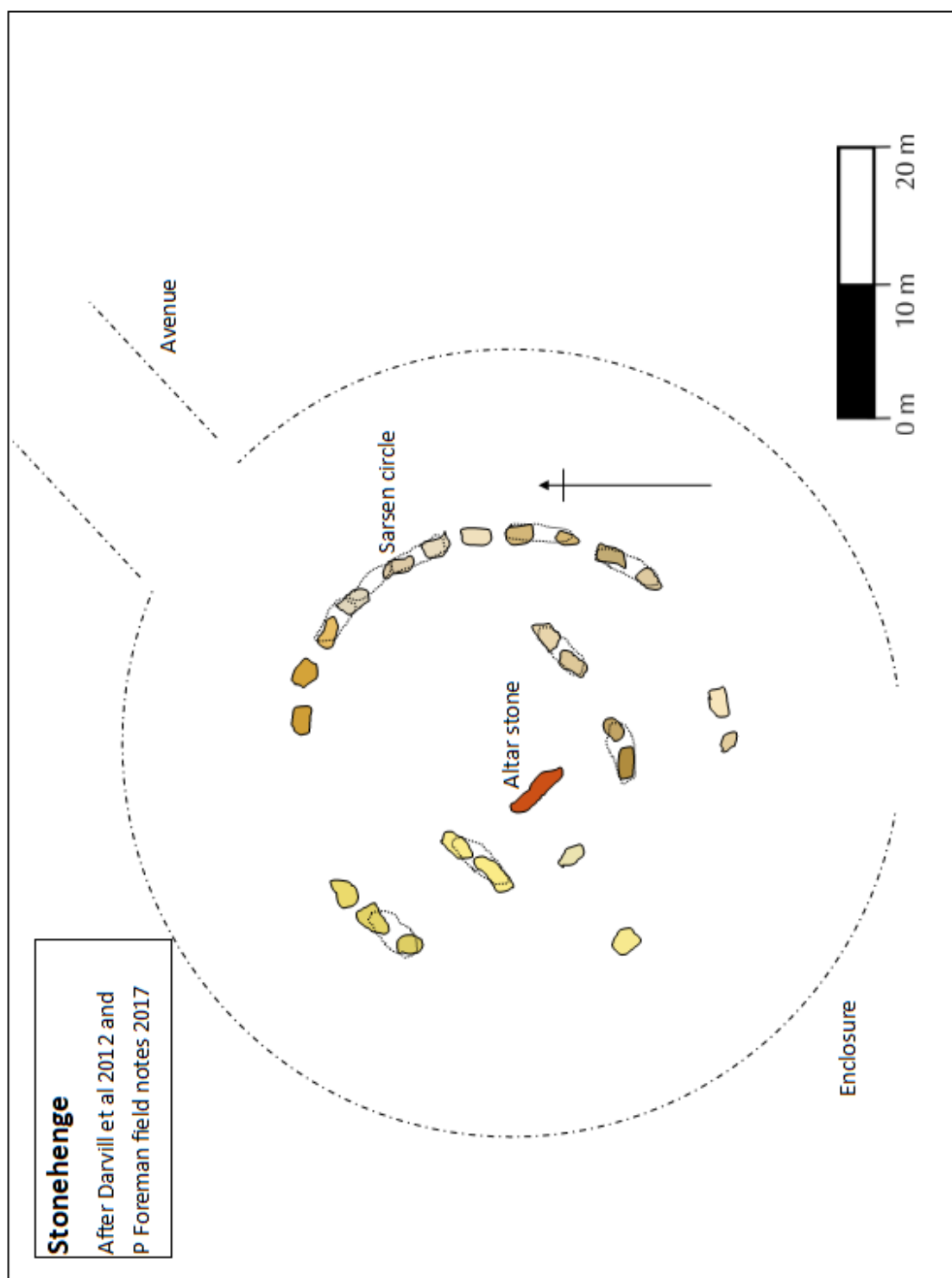


Fig 50. Stonehenge site plan in colour



1	Stonehenge (Sarsens)	England	SU122422	51.1787606	-1.8261506	Stone Circle	237, 220, 107	235, 218, 108	230, 213, 108	Yellow beige
2	Stonehenge (Sarsens)	England	SU122422	51.1787606	-1.8261506	Stone Circle	224, 209, 108	227, 211, 104	230, 212, 102	Yellow beige
3	Stonehenge (Sarsens)	England	SU122422	51.1787606	-1.8261506	Stone Circle	224, 207, 96	222, 206, 100	219, 204, 103	Yellow beige
4	Stonehenge (Sarsens)	England	SU122422	51.1787606	-1.8261506	Stone Circle	247, 233, 139	247, 233, 143	252, 234, 114	Pale yellow beige
5	Stonehenge (Sarsens)	England	SU122422	51.1787606	-1.8261506	Stone Circle	242, 234, 184	235, 227, 176	242, 235, 187	Very pale beige
6	Stonehenge (Sarsens)	England	SU122422	51.1787606	-1.8261506	Stone Circle	252, 236, 131	250, 235, 135	245, 230, 135	Pale yellow beige
7	Stonehenge (Sarsens)	England	SU122422	51.1787606	-1.8261506	Stone Circle	247, 233, 139	250, 235, 137	247, 233, 136	Pale yellow beige
8	Stonehenge (Sarsens)	England	SU122422	51.1787606	-1.8261506	Stone Circle	209, 81, 21	204, 80, 22	211, 84, 22	Deep orange beige / red
9	Stonehenge (Sarsens)	England	SU122422	51.1787606	-1.8261506	Stone Circle	171, 135, 58	176, 140, 62	181, 144, 63	Deep yellow beige to deep beige
10	Stonehenge (Sarsens)	England	SU122422	51.1787606	-1.8261506	Stone Circle	189, 159, 96	194, 164, 101	191, 162, 98	Mid beige
11	Stonehenge (Sarsens)	England	SU122422	51.1787606	-1.8261506	Stone Circle	219, 201, 162	222, 200, 153	232, 212, 169	Very pale beige
12	Stonehenge (Sarsens)	England	SU122422	51.1787606	-1.8261506	Stone Circle	240, 221, 182	232, 213, 172	237, 220, 183	Very pale beige
13	Stonehenge (Sarsens)	England	SU122422	51.1787606	-1.8261506	Stone Circle	219, 199, 156	227, 205, 157	230, 207, 158	Pale beige
14	Stonehenge (Sarsens)	England	SU122422	51.1787606	-1.8261506	Stone Circle	245, 228, 191	247, 229, 188	242, 224, 184	Very pale beige
15	Stonehenge (Sarsens)	England	SU122422	51.1787606	-1.8261506	Stone Circle	222, 200, 153	222, 202, 160	227, 206, 161	Pale beige
16	Stonehenge (Sarsens)	England	SU122422	51.1787606	-1.8261506	Stone Circle	199, 172, 115	194, 171, 116	194, 169, 114	Mid beige
17	Stonehenge (Sarsens)	England	SU122422	51.1787606	-1.8261506	Stone Circle	212, 180, 112	214, 183, 116	219, 187, 118	Mid beige
18	Stonehenge (Sarsens)	England	SU122422	51.1787606	-1.8261506	Stone Circle	214, 183, 116	212, 183, 121	214, 184, 120	Mid beige
19	Stonehenge (Sarsens)	England	SU122422	51.1787606	-1.8261506	Stone Circle	237, 216, 171	240, 224, 189	245, 233, 208	Pale beige
20	Stonehenge (Sarsens)	England	SU122422	51.1787606	-1.8261506	Stone Circle	230, 210, 168	232, 219, 190	237, 224, 197	Very pale beige
21	Stonehenge (Sarsens)	England	SU122422	51.1787606	-1.8261506	Stone Circle	217, 200, 163	222, 202, 160	227, 208, 166	Pale beige
22	Stonehenge (Sarsens)	England	SU122422	51.1787606	-1.8261506	Stone Circle	230, 219, 195	224, 214, 188	235, 227, 211	Very pale beige
23	Stonehenge (Sarsens)	England	SU122422	51.1787606	-1.8261506	Stone Circle	235, 190, 94	232, 190, 100	232, 187, 90	Yellow beige
24	Stonehenge (Sarsens)	England	SU122422	51.1787606	-1.8261506	Stone Circle	217, 166, 56	212, 163, 57	209, 162, 61	Deep yellow beige
25	Stonehenge (Sarsens)	England	SU122422	51.1787606	-1.8261506	Stone Circle	204, 156, 51	207, 158, 54	201, 154, 52	Deep yellow beige

*Table 33. Stonehenge data*

## 4.5 Denmark

### 4.5.1 On sample size and distribution

The following four sites represent a varied sample of the monuments of Møn. The sites in this study were visited in June and July of 2017, when unfortunately some of the monuments are inaccessible due to their position in the middle of active pastoral land, and as such are only open to visitors outside of the growing season. Though the sample size is therefore small, the megaliths on Møn are well preserved, not widely published on in the English language, and as such make an interesting case study for this research.

### 4.5.2 Background



*Fig 51. Tourist sign at Kong Asgers Høj. P Foreman 2017*

Megaliths maintain their poetic names in Denmark: the *Jættestue* are *giant's rooms*. With a dense clustering of surviving passage graves, it is not surprising that the mounds and stones of Neolithic Denmark should hold sway over the popular imagination. There are around 7000 sites currently recognised, with up to 40,000 estimated through past records, and extrapolation from intensive surveying (Sjogren 2015). On Møn, a large proportion of the remaining monuments are classified generally as the oval type (Midgley 1992), though fine examples of other types, including the twin-passaged Klekkendehøj, are also evident. Though these dramatic sites are well preserved and of significant interest to tourists, there is little made of the sites by the local tourist board: other than minimal display boards at the sites themselves, there are no guidebooks or even leaflets in the local tourist office, and the Møn museum in Stege, the largest town on the island, focuses on the medieval history of the region.

Despite this, stone is clearly still evocative and important to the island inhabitants: driving along the major and minor roads, a visitor will see neat gardens built around granite rocks, see churches with foundations made of massive boulders, or even come across the stall of an enterprising local child, painting and selling stones for the princely sum of 5 Krone.



*Fig 52. Handmade stones: in a small village not far from Klekkendehøj, clearly cashing in on stone enthusiasts visiting the region. P Foreman 2017*

Colour plays both obvious and subtle roles in the construction of the megaliths of the region: a common trait of Danish passage graves is a deposit of burnt white flint, used in numerous contexts from passage sealing to mound covering (Westphal 2016). The various contexts it

is found in suggests that it is more than a mere practicality, and that the colour itself (and the process the stone must be put through to achieve it) was significant. There has been limited acknowledgement in the literature of colour of certain stones within chambers being significant in the Danish megaliths; in particular, white or pale “special” stones seem to have been selected for specific stones within construction, usually one of the corner stones of the chamber, the keystone/lintel between passage and chamber, or casing stones (Midgley 2008). From Mon, the most obvious example is the keystone from Klekkendehoj, which contains significant surface quartz inclusions that give it a theatrically shining colour and appearance (see section below). Though antiquarian Freidrich Lisch made the connection between grey granite, red sandstone, and white flint with deliberate colour composition in the nineteenth century, it was not until the very late twentieth century that detailed examinations of colour preference at just one site, Kong Svends Hoj on Lolland, discovered that the desire for a red facade at the monument lead to the use of many different stone types, as opposed to the more usual practice in the region for preferring granite boulders (Dhen et al 1995, Midgley 2008). This rich variation in the way colour was deployed within megalithic construction in Denmark suggests a region-wide set of practices or beliefs around colour. This does not mean, as is commonly asserted (Whittle 2004, Midgley 2008), that the sites must have therefore been left exposed and not hidden beneath a mound, disguising their carefully selected stone - as discussed briefly in the background to this research in chapter one, the materiality of stone itself - the innate properties not immediately obvious to us at several removes of action from the builders - has a large part to play in the choosing and using of raw material. The act of choosing and constructing with “exotic” material, and placing it within a chamber for the dead, is equally as valid as assuming that the material was left exposed for the appreciation of the living; as discussed in the discussion on materiality and assemblage in chapter 3, we need to detach our modern ideals of aesthetics and material beauty and recognise the materiality of stone may have been as much, or more about the building and concealing as for creating something to be viewed and seen.

Midgley suggests that the megaliths of Denmark were intimately connected with places of agriculture, citing three southern Danish examples where agricultural land surface was either scraped away prior to construction (at Klekkendehoj and Jordrhoj on Mon) or left in situ, still displaying plough marks within the chamber (as at Kong Svends Hoj) - and draws parallels between the vast efforts required to clear fields and develop worthwhile agricultural landscapes and the effort of monument building (Midgley 2008).

#### 4.5.3 The Geology of Møn

It could be said that the geology of Møn makes it the tourist destination that it is today - the dramatic white cliffs of Møns Klint and associated “geopark” draw many tourists, artists, and geologists to the island. Interestingly, the densest concentration of Neolithic monuments is on the westerley side of the island, away from the dramatic white cliffs. This eye catching and scientifically intriguing geology is the result of glacial action during the last ice age, during which the great ice sheets first moved across southern Denmark from both southern Scandinavia and eastern Europe, compacting and forcing the chalk upwards, then receded to reveal the sheer cliff faces seen today. This has left the soil of Møn with a distinct chalky character, which amongst numerous agricultural benefits, gives rise to many usual species of plant, and gives the beech trees in the woodlands of the Geocenter Møns Klint a distinctive lime green hue.

The stone used in the monuments surveyed for this study is largely a combination granite and limestone/sandstone types; the same granite as the Drenthe, NL sites, arriving in the same glacial movements down from the northeast - from southern Sweden and Norway (Aber 1979). The limestone and sandstone are “local”, and display very different surface qualities to the glacier-carries igneous rocks - often very fine grained, they give sharp and distinct edges, as compared to the generally more rounded and indistinct granite boulders.

#### 4.5.4 Sprove Kong Asgers Høj

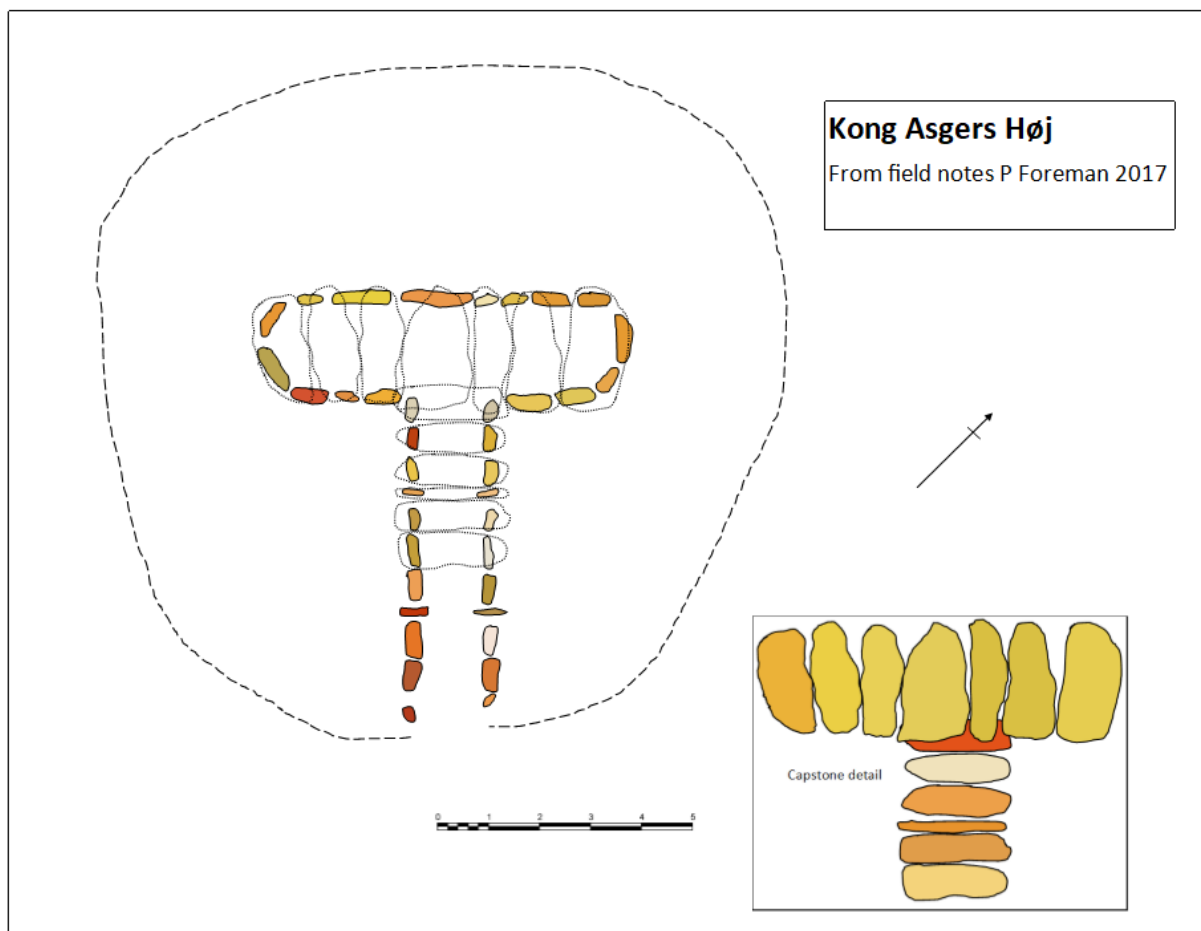


*Fig 53. Through the meadow, to the mound. Kong Asgers Høj. P Foreman 2017*



This impressive site comprises of a chamber and passage contained within a mound of a very well preserved passage grave; so well preserved that the information board on site praises the ingenuity of the builders, “in modern times only very little restoration was needed”. The mound sits just to the north of a low ridge, and the landscape slopes gently to the north down towards the sea, and to the south raises slightly before sloping back down into a shallow valley (nearby monument Sprovedyssen sits on the southern side of this ridge). The entrance passage faces eastwards, away from the coast, and towards the centre of the island.

The chamber is a “true” rectangular shape, 13m long, and without the characteristic pinched-middle “foot” shape of other sites on Mon at Hjelm and Sparresminde (Midgley 2008).



*Fig 54. Kong Asgers Høj site plan in colour*

1	Kong Asgers Høj	Denmark	54.9571445	12.1403955	Passage Grave	176, 53, 23	181, 58, 27	181, 51, 18	Deep rose red
2	Kong Asgers Høj	Denmark	54.9571445	12.1403955	Passage Grave	245, 158, 76	237, 151, 71	242, 155, 73	Pale orange beige
3	Kong Asgers Høj	Denmark	54.9571445	12.1403955	Passage Grave	179, 86, 43	181, 89, 47	194, 102, 60	Deep beige, pink tinge
4	Kong Asgers Høj	Denmark	54.9571445	12.1403955	Passage Grave	212, 118, 51	214, 119, 51	219, 125, 57	Orange beige
5	Kong Asgers Høj	Denmark	54.9571445	12.1403955	Passage Grave	235, 109, 19	230, 117, 37	217, 105, 26	Deep orange beige to orange
6	Kong Asgers Høj	Denmark	54.9571445	12.1403955	Passage Grave	240, 215, 197	245, 228, 215	245, 219, 201	Very pale beige to white
7	Kong Asgers Høj	Denmark	54.9571445	12.1403955	Passage Grave	191, 55, 10	194, 56, 10	196, 58, 12	Deep rust red
8	Kong Asgers Høj	Denmark	54.9571445	12.1403955	Passage Grave	189, 151, 81	181, 144, 76	191, 154, 84	Deep beige
9	Kong Asgers Høj	Denmark	54.9571445	12.1403955	Passage Grave	245, 165, 91	237, 159, 85	242, 162, 87	Pale orange beige
10	Kong Asgers Høj	Denmark	54.9571445	12.1403955	Passage Grave	179, 145, 52	181, 148, 56	184, 150, 59	Deep beige
11	Kong Asgers Høj	Denmark	54.9571445	12.1403955	Passage Grave	191, 156, 57	196, 159, 57	196, 160, 61	Deep beige
12	Kong Asgers Høj	Denmark	54.9571445	12.1403955	Passage Grave	242, 234, 211	232, 226, 209	242, 234, 211	Very pale beige to white
13	Kong Asgers Høj	Denmark	54.9571445	12.1403955	Passage Grave	235, 221, 136	224, 211, 123	227, 214, 129	Mid beige
14	Kong Asgers Høj	Denmark	54.9571445	12.1403955	Passage Grave	189, 147, 58	194, 154, 68	199, 160, 76	Deep beige
15	Kong Asgers Høj	Denmark	54.9571445	12.1403955	Passage Grave	230, 207, 158	237, 216, 171	237, 217, 173	Very pale beige
16	Kong Asgers Høj	Denmark	54.9571445	12.1403955	Passage Grave	227, 159, 75	224, 157, 74	227, 160, 77	Orange beige
17	Kong Asgers Høj	Denmark	54.9571445	12.1403955	Passage Grave	227, 161, 79	230, 163, 83	235, 168, 87	Orange beige
18	Kong Asgers Høj	Denmark	54.9571445	12.1403955	Passage Grave	247, 194, 129	242, 192, 131	237, 191, 135	Pale orange beige
19	Kong Asgers Høj	Denmark	54.9571445	12.1403955	Passage Grave	237, 151, 45	232, 147, 44	242, 158, 56	orange beige to orange
20	Kong Asgers Høj	Denmark	54.9571445	12.1403955	Passage Grave	237, 200, 76	235, 197, 73	237, 199, 74	Yellow beige
21	Kong Asgers Høj	Denmark	54.9571445	12.1403955	Passage Grave	242, 207, 92	232, 200, 93	237, 206, 104	Yellow beige
22	Kong Asgers Høj	Denmark	54.9571445	12.1403955	Passage Grave	247, 164, 74	237, 160, 73	230, 147, 64	Orange beige
23	Kong Asgers Høj	Denmark	54.9571445	12.1403955	Passage Grave	184, 632, 15	189, 64, 15	191, 65, 15	Red brown
24	Kong Asgers Høj	Denmark	54.9571445	12.1403955	Passage Grave	224, 178, 52	219, 175, 53	224, 181, 61	Yellow beige
25	Kong Asgers Høj	Denmark	54.9571445	12.1403955	Passage Grave	237, 220, 173	240, 226, 187	232, 220, 186	Pale beige
26	Kong Asgers Høj	Denmark	54.9571445	12.1403955	Passage Grave	214, 202, 169	219, 209, 180	209, 196, 161	Grey beige
27	Kong Asgers Høj	Denmark	54.9571445	12.1403955	Passage Grave	204, 191, 157	207, 196, 165	209, 200, 174	Grey beige
28	Kong Asgers Høj	Denmark	54.9571445	12.1403955	Passage Grave	224, 81, 25	227, 82, 25	227, 87, 32	Orange red
29	Kong Asgers Høj	Denmark	54.9571445	12.1403955	Passage Grave	227, 193, 82	232, 198, 88	227, 195, 89	Yellow beige
30	Kong Asgers Høj	Denmark	54.9571445	12.1403955	Passage Grave	232, 201, 97	224, 192, 88	227, 192, 77	Yellow beige
31	Kong Asgers Høj	Denmark	54.9571445	12.1403955	Passage Grave	242, 170, 68	232, 166, 74	227, 161, 68	Orange beige
32	Kong Asgers Høj	Denmark	54.9571445	12.1403955	Passage Grave	232, 159, 56	224, 151, 47	230, 154, 48	Orange beige
33	Kong Asgers Høj	Denmark	54.9571445	12.1403955	Passage Grave	219, 149, 50	212, 146, 55	219, 149, 50	Orange beige
34	Kong Asgers Høj	Denmark	54.9571445	12.1403955	Passage Grave	217, 140, 33	227, 154, 52	219, 150, 53	Orange beige
35	Kong Asgers Høj	Denmark	54.9571445	12.1403955	Passage Grave	222, 186, 67	224, 189, 74	230, 195, 80	Yellow beige
36	Kong Asgers Høj	Denmark	54.9571445	12.1403955	Passage Grave	240, 224, 173	242, 226, 174	242, 230, 191	Pale beige
37	Kong Asgers Høj	Denmark	54.9571445	12.1403955	Passage Grave	240, 153, 72	235, 151, 73	230, 145, 67	Orange beige
38	Kong Asgers Høj	Denmark	54.9571445	12.1403955	Passage Grave	237, 202, 62	232, 198, 63	230, 196, 64	Rich yellow beige
39	Kong Asgers Høj	Denmark	54.9571445	12.1403955	Passage Grave	222, 192, 71	227, 197, 75	230, 201, 85	Rich yellow beige
40	Kong Asgers Høj	Denmark	54.9571445	12.1403955	Passage Grave	237, 152, 47	232, 151, 51	235, 153, 54	Orange beige
41	Kong Asgers Høj	Denmark	54.9571445	12.1403955	Passage Grave	173, 151, 62	184, 163, 79	173, 152, 68	Deep beige
42	Kong Asgers Høj	Denmark	54.9571445	12.1403955	Passage Grave	207, 75, 39	212, 82, 47	214, 85, 49	Rose pink red
43	Kong Asgers Høj	Denmark	54.9571445	12.1403955	Passage Grave	219, 138, 61	227, 144, 66	232, 148, 70	Orange beige
44	Kong Asgers Høj	Denmark	54.9571445	12.1403955	Passage Grave	232, 181, 70	230, 174, 53	235, 178, 56	Rich yellow beige
45	Kong Asgers Høj	Denmark	54.9571445	12.1403955	Passage Grave	232, 174, 49	235, 178, 56	235, 181, 55	Rich yellow beige
46	Kong Asgers Høj	Denmark	54.9571445	12.1403955	Passage Grave	232, 204, 65	235, 207, 68	237, 209, 71	Rich yellow beige
47	Kong Asgers Høj	Denmark	54.9571445	12.1403955	Passage Grave	227, 203, 82	232, 208, 86	224, 201, 83	Rich yellow beige
48	Kong Asgers Høj	Denmark	54.9571445	12.1403955	Passage Grave	232, 208, 90	227, 204, 89	224, 199, 72	Rich yellow beige
49	Kong Asgers Høj	Denmark	54.9571445	12.1403955	Passage Grave	227, 201, 73	217, 191, 65	219, 194, 70	Rich yellow beige
50	Kong Asgers Høj	Denmark	54.9571445	12.1403955	Passage Grave	224, 199, 70	217, 192, 67	222, 197, 73	Rich yellow beige
51	Kong Asgers Høj	Denmark	54.9571445	12.1403955	Passage Grave	224, 199, 74	230, 205, 80	224, 199, 72	Rich yellow beige

Table 34. Kong Asgers Høj data

#### 4.5.5

#### Sprovedyssen



*Fig 55. Looking east from Sprovedyssen. P Foreman 2017*

A few hundred metres from Kong Asgers Høj and sitting just over the other slope of the ridge, this oval chambered passage grave is accessed down an uneven footpath at the edge of active farmland. Though overgrown, much of the kerb is visible around what remains of the mound, and the chamber itself is in moderate condition. Though it appears diminutive on the surface, upon entering the chamber it becomes apparent that the chamber is partially subterranean, and spacious enough for several adults to stand inside. Like the nearby Kong Asgers Høj, the passage faces east, into the centre of the island, and down along the southern side of the ridge.

Colour and texture are striking within both the passage and the chamber - with contrasts between both immediately apparent, even with lichen and dust obscuring the stones. The orthostats of the passage are short in stature, but of very regular shape and form, particularly stones 5 and 6, which appear to have been shaped or dressed in some way to form regular, squared appearance - though such alteration of stone is incredibly rare. They are of a sedimentary rock, a fine grained sandstone, rather than the massive granite boulders of the chamber.

Within the chamber, the very back stone (number 18) is the most striking - sharply pointed to the top, its surface rugged, the granite being formed of unusually large crystals of a delicate pink-orange colour, that is immediately distinct to both stones that flank it - to the left a diagonally rippled, rounded, beige and grey striped stone, and to the right a deep orange

beige with a fine-grained texture. The chamber is full of such contrast and richness in geological variety, that could be navigated as easily by sight or by touch.

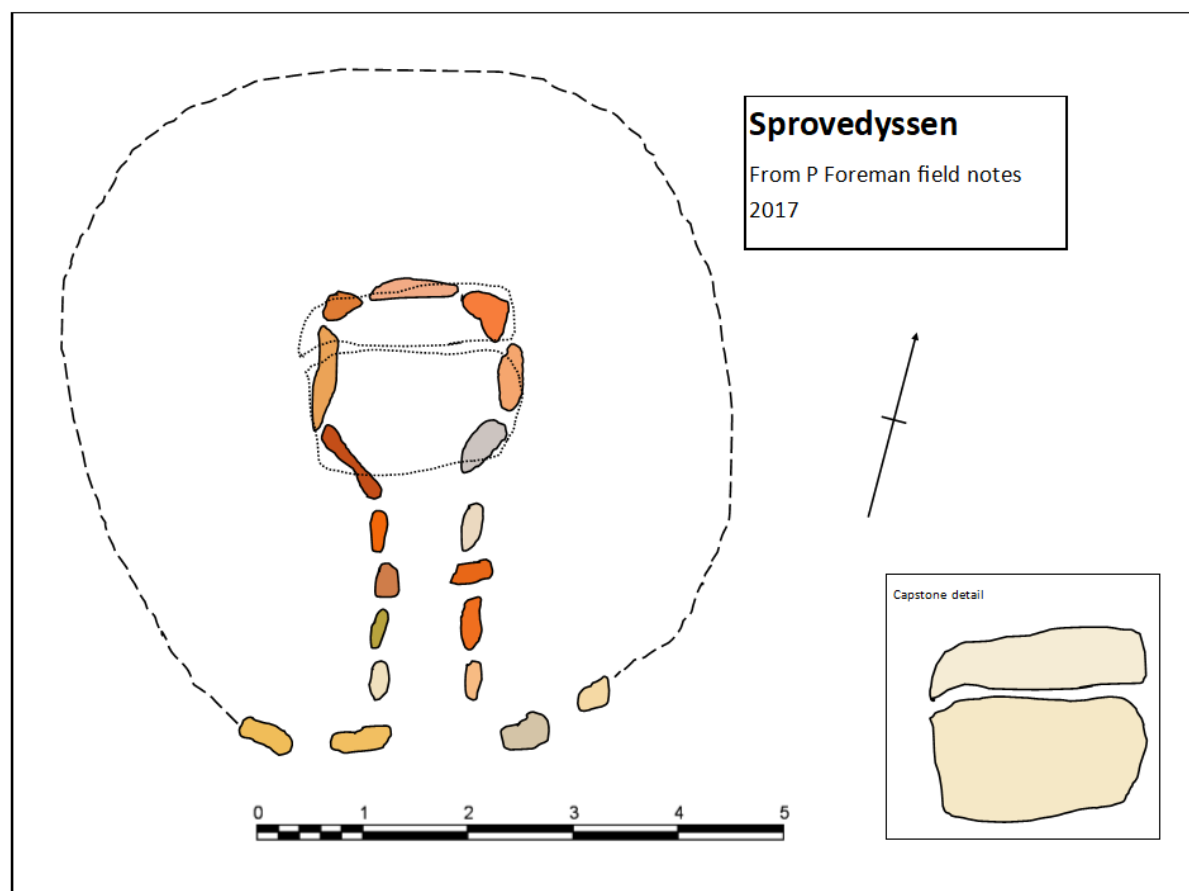


Fig 56. Sprovedyssen site plan in colour

1 Sprovedyssen	Denmark	54.9557861	12.1403741	Passage Grave	247, 192, 89	240, 189, 89	235, 184, 89	Pale orange beige
2 Sprovedyssen	Denmark	54.9557861	12.1403741	Passage Grave	247, 195, 96	242, 191, 97	247, 195, 99	Pale orange beige
3 Sprovedyssen	Denmark	54.9557861	12.1403741	Passage Grave	207, 189, 157	212, 196, 167	204, 189, 161	Grey beige to grey
4 Sprovedyssen	Denmark	54.9557861	12.1403741	Passage Grave	250, 216, 152	245, 217, 164	250, 214, 147	Very pale orange beige
5 Sprovedyssen	Denmark	54.9557861	12.1403741	Passage Grave	247, 231, 200	240, 225, 199	245, 227, 193	Very pale beige
6 Sprovedyssen	Denmark	54.9557861	12.1403741	Passage Grave	252, 183, 119	247, 187, 131	240, 179, 122	Pale orange beige pink tinge
7 Sprovedyssen	Denmark	54.9557861	12.1403741	Passage Grave	186, 168, 78	184, 163, 61	184, 164, 64	Deep beige
8 Sprovedyssen	Denmark	54.9557861	12.1403741	Passage Grave	237, 110, 31	240, 111, 31	227, 104, 27	Orange beige to orange
9 Sprovedyssen	Denmark	54.9557861	12.1403741	Passage Grave	201, 123, 75	207, 125, 74	209, 129, 79	Orange beige to beige
10 Sprovedyssen	Denmark	54.9557861	12.1403741	Passage Grave	224, 100, 22	232, 103, 23	235, 96, 9	Orange
11 Sprovedyssen	Denmark	54.9557861	12.1403741	Passage Grave	247, 102, 12	242, 103, 10	240, 105, 10	Rich orange - brick
12 Sprovedyssen	Denmark	54.9557861	12.1403741	Passage Grave	242, 225, 201	235, 217, 192	230, 214, 193	Very pale beige
13 Sprovedyssen	Denmark	54.9557861	12.1403741	Passage Grave	204, 79, 20	196, 78, 24	209, 78, 17	Rich orange pink tinge
14 Sprovedyssen	Denmark	54.9557861	12.1403741	Passage Grave	194, 182, 176	204, 196, 192	201, 184, 175	Very pale grey
15 Sprovedyssen	Denmark	54.9557861	12.1403741	Passage Grave	240, 168, 91	235, 163, 87	227, 157, 82	Orange beige
16 Sprovedyssen	Denmark	54.9557861	12.1403741	Passage Grave	245, 161, 100	245, 166, 110	235, 157, 101	Pale orange beige, pink tinge
17 Sprovedyssen	Denmark	54.9557861	12.1403741	Passage Grave	230, 126, 53	224, 124, 52	232, 125, 49	Orange beige
18 Sprovedyssen	Denmark	54.9557861	12.1403741	Passage Grave	240, 168, 129	242, 171, 133	237, 168, 130	Pale pink beige
19 Sprovedyssen	Denmark	54.9557861	12.1403741	Passage Grave	242, 121, 56	247, 125, 59	237, 122, 59	Deep orange beige
20 Sprovedyssen	Denmark	54.9557861	12.1403741	Passage Grave	240, 226, 189	245, 232, 198	247, 236, 205	Very pale beige
21 Sprovedyssen	Denmark	54.9557861	12.1403741	Passage Grave	242, 232, 203	245, 236, 213	237, 230, 209	Very pale beige

Table 35. Sprovedyssen data





*Fig 57. Klekkende-Høj, in overgrown summer state. P Foreman 2017*

The double-passaged monument of Klekkende-Høj is an adventure to visit. Both passages are accessible, though they are both narrow and squat, meaning crawling is the best way to traverse them. The two passages lead to a large chamber, that is internally divided by two stones to the centre of the chamber, though modern visitors can peep through gaps in the packing material. The mound is built on the highest point of the surrounding landscape, and commands attention - to the north and east the land is marshland, suggesting the possibility that the site was almost surrounded by water when originally constructed. The chamber is roughly north-south orientated, with the passages facing east-north-easterly, similar to the sites at Kong Asgers Høj and Sprovedyssen; if this sample is representative, monuments here looked into the island.

The northern passage is the most complete, since repairs in the 1980s made the capstones secure, and can be traversed through to the chamber itself.

The southern passage is not fully accessible, as the chamber is now host to a small, sealed exhibit of “typical” burials of the period, complete with a variety of replica grave good and skeletal matter. For this reason, not every stone in the chamber has been recorded.

The stones selected for the chambers, whilst being relatively uniform in colour, follow a contrasting pattern of high and low stature, which is then made uniform height by the use of an unusual second layer of stone of boulder size rather than packing material or corbelling. This “intermediary layer” is a peculiarity of the Danish sites and sets them apart, typologically, from other passage graves across Atlantic Europe (Midgley 2008). The flooring of the chamber is also of interest, with layers of pale limestone slabs covered by a final enclosing layer of burnt white flint (Hansen 1993, Midgley 2008). This would have been a dramatic experience when entering the chamber, a gleaming floor reflecting any light source carried down the passage into the chamber, creating shadows and reflections among the artefacts and remains of the dead within.

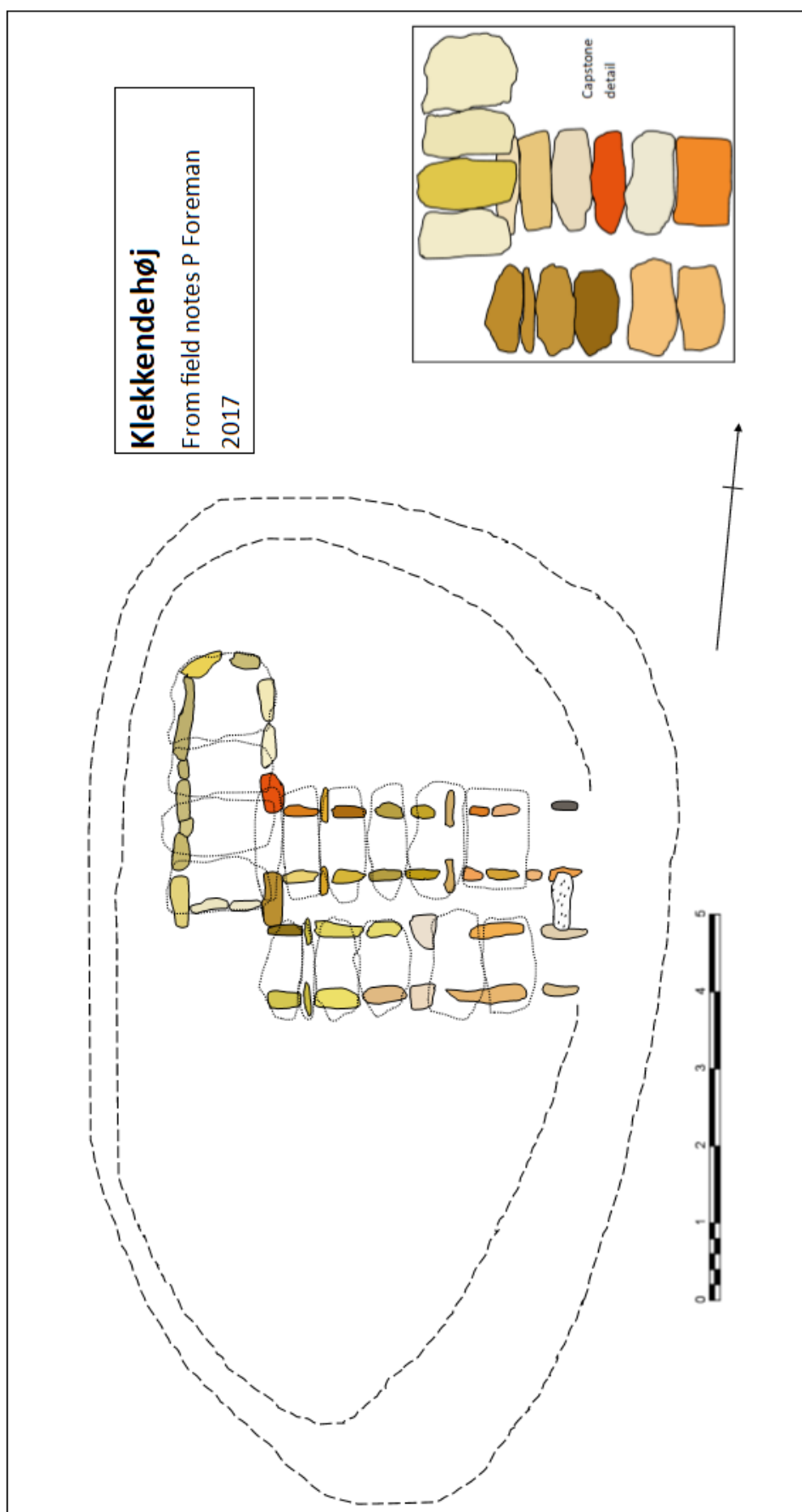


Fig 58. Klekkende-Høj site plan in colour



1	Klekkendehøj	Denmark	54.936188	12.16423	Passage Grave	247, 166, 79	240, 160, 74	235, 157, 75	Orange beige
2	Klekkendehøj	Denmark	54.936188	12.16423	Passage Grave	112, 106, 93	102, 95, 88	107, 100, 93	Deep grey
3	Klekkendehøj	Denmark	54.936188	12.16423	Passage Grave	247, 188, 124	240, 182, 120	234, 178, 117	Pale orange beige
4	Klekkendehøj	Denmark	54.936188	12.16423	Passage Grave	207, 158, 54	214, 163, 54	207, 158, 54	Deep beige
5	Klekkendehøj	Denmark	54.936188	12.16423	Passage Grave	240, 177, 117	235, 178, 124	240, 183, 123	Pale orange beige to pale beige
6	Klekkendehøj	Denmark	54.936188	12.16423	Passage Grave	250, 167, 90	242, 162, 87	250, 172, 100	Pale orange beige
7	Klekkendehøj	Denmark	54.936188	12.16423	Passage Grave	219, 122, 31	224, 126, 34	227, 130, 39	Deep orange beige
8	Klekkendehøj	Denmark	54.936188	12.16423	Passage Grave	250, 139, 35	242, 137, 39	237, 134, 38	Orange beige, more orange, pink tinge
9	Klekkendehøj	Denmark	54.936188	12.16423	Passage Grave	209, 169, 94	214, 173, 96	204, 165, 94	Mid beige
10	Klekkendehøj	Denmark	54.936188	12.16423	Passage Grave	212, 172, 93	209, 173, 105	214, 173, 114	Mid beige
11	Klekkendehøj	Denmark	54.936188	12.16423	Passage Grave				PIEBALD - speckled white and black
12	Klekkendehøj	Denmark	54.936188	12.16423	Passage Grave	219, 188, 129	224, 196, 144	212, 181, 123	Mid beige
13	Klekkendehøj	Denmark	54.936188	12.16423	Passage Grave	217, 197, 160	224, 206, 173	217, 200, 169	Beige
14	Klekkendehøj	Denmark	54.936188	12.16423	Passage Grave	232, 180, 107	232, 182, 111	237, 186, 114	Pale orange beige to pale beige
15	Klekkendehøj	Denmark	54.936188	12.16423	Passage Grave	247, 180, 87	242, 175, 80	247, 180, 87	Pale orange beige
16	Klekkendehøj	Denmark	54.936188	12.16423	Passage Grave	245, 188, 108	242, 188, 111	247, 194, 119	Pale orange beige to pale beige
17	Klekkendehøj	Denmark	54.936188	12.16423	Passage Grave	237, 188, 118	245, 194, 122	245, 183, 110	Pale orange beige to pale beige
18	Klekkendehøj	Denmark	54.936188	12.16423	Passage Grave	245, 225, 198	237, 217, 190	232, 219, 200	Pale beige
19	Klekkendehøj	Denmark	54.936188	12.16423	Passage Grave	240, 226, 206	235, 223, 206	237, 223, 204	Pale beige
20	Klekkendehøj	Denmark	54.936188	12.16423	Passage Grave	219, 178, 121	224, 185, 130	214, 177, 124	Mid beige
21	Klekkendehøj	Denmark	54.936188	12.16423	Passage Grave	237, 225, 111	232, 220, 111	235, 223, 115	Yellow beige
22	Klekkendehøj	Denmark	54.936188	12.16423	Passage Grave	232, 219, 102	237, 224, 109	232, 219, 97	Yellow beige
23	Klekkendehøj	Denmark	54.936188	12.16423	Passage Grave	237, 224, 104	227, 214, 98	232, 218, 88	Yellow beige
24	Klekkendehøj	Denmark	54.936188	12.16423	Passage Grave	193, 185, 62	204, 190, 65	203, 195, 69	Deep yellow beige
25	Klekkendehøj	Denmark	54.936188	12.16423	Passage Grave	204, 190, 67	207, 193, 68	201, 189, 73	Deep yellow beige
26	Klekkendehøj	Denmark	54.936188	12.16423	Passage Grave	207, 194, 78	212, 199, 80	214, 201, 84	Deep yellow beige
27	Klekkendehøj	Denmark	54.936188	12.16423	Passage Grave	145, 116, 17	143, 115, 23	148, 119, 24	Deep beige brown
28	Klekkendehøj	Denmark	54.936188	12.16423	Passage Grave	191, 156, 40	191, 140, 44	196, 145, 49	Deep beige
29	Klekkendehøj	Denmark	54.936188	12.16423	Passage Grave	191, 141, 48	194, 144, 50	196, 148, 53	Deep beige
30	Klekkendehøj	Denmark	54.936188	12.16423	Passage Grave	201, 149, 50	194, 147, 55	196, 152, 63	Deep beige
31	Klekkendehøj	Denmark	54.936188	12.16423	Passage Grave	156, 106, 14	150, 104, 18	150, 107, 21	Deep beige brown
32	Klekkendehøj	Denmark	54.936188	12.16423	Passage Grave	196, 161, 18	191, 157, 21	194, 160, 27	Deep yellow beige
33	Klekkendehøj	Denmark	54.936188	12.16423	Passage Grave	196, 164, 35	196, 165, 39	191, 161, 38	Deep yellow beige
34	Klekkendehøj	Denmark	54.936188	12.16423	Passage Grave	176, 153, 62	181, 158, 65	186, 163, 68	Deep beige
35	Klekkendehøj	Denmark	54.936188	12.16423	Passage Grave	176, 153, 63	184, 160, 66	176, 153, 62	Deep beige
36	Klekkendehøj	Denmark	54.936188	12.16423	Passage Grave	214, 181, 49	214, 182, 56	207, 176, 52	Deep yellow beige
37	Klekkendehøj	Denmark	54.936188	12.16423	Passage Grave	173, 106, 12	173, 108, 17	179, 112, 20	Deep beige brown
38	Klekkendehøj	Denmark	54.936188	12.16423	Passage Grave	227, 169, 34	219, 165, 37	219, 165, 39	Deep yellow beige
39	Klekkendehøj	Denmark	54.936188	12.16423	Passage Grave	227, 171, 41	230, 174, 44	217, 165, 43	Deep beige brown
40	Klekkendehøj	Denmark	54.936188	12.16423	Passage Grave	240, 214, 113	235, 210, 113	242, 217, 116	Pale yellow beige
41	Klekkendehøj	Denmark	54.936188	12.16423	Passage Grave	224, 128, 25	219, 126, 26	217, 129, 35	Deep beige to orange beige
42	Klekkendehøj	Denmark	54.936188	12.16423	Passage Grave	184, 141, 48	186, 143, 48	189, 146, 55	Deep beige
43	Klekkendehøj	Denmark	54.936188	12.16423	Passage Grave	184, 140, 46	186, 143, 48	189, 144, 49	Deep beige
44	Klekkendehøj	Denmark	54.936188	12.16423	Passage Grave	240, 218, 170	242, 223, 182	237, 221, 185	Pale beige
45	Klekkendehøj	Denmark	54.936188	12.16423	Passage Grave	227, 192, 112	232, 198, 123	217, 186, 119	Mid beige
46	Klekkendehøj	Denmark	54.936188	12.16423	Passage Grave	237, 222, 190	232, 217, 186	237, 224, 194	Pale beige
47	Klekkendehøj	Denmark	54.936188	12.16423	Passage Grave	224, 76, 7	230, 82, 14	224, 73, 2	Deep orange
48	Klekkendehøj	Denmark	54.936188	12.16423	Passage Grave	245, 239, 208	237, 232, 209	242, 237, 213	Very pale beige to white
49	Klekkendehøj	Denmark	54.936188	12.16423	Passage Grave	237, 230, 197	237, 231, 202	242, 237, 213	Very pale beige
50	Klekkendehøj	Denmark	54.936188	12.16423	Passage Grave	237, 228, 185	235, 228, 192	242, 235, 196	Pale beige
51	Klekkendehøj	Denmark	54.936188	12.16423	Passage Grave	217, 202, 130	227, 210, 123	222, 205, 120	Mid beige
52	Klekkendehøj	Denmark	54.936188	12.16423	Passage Grave	209, 193, 111	199, 184, 107	201, 187, 117	Mid beige
53	Klekkendehøj	Denmark	54.936188	12.16423	Passage Grave	207, 193, 126	212, 193, 133	207, 195, 134	Mid beige
54	Klekkendehøj	Denmark	54.936188	12.16423	Passage Grave	196, 183, 116	199, 186, 123	204, 191, 126	Mid beige
55	Klekkendehøj	Denmark	54.936188	12.16423	Passage Grave	196, 182, 112	191, 178, 113	194, 181, 118	Mid beige
56	Klekkendehøj	Denmark	54.936188	12.16423	Passage Grave	189, 175, 109	196, 183, 114	191, 178, 113	Mid beige
57	Klekkendehøj	Denmark	54.936188	12.16423	Passage Grave	227, 203, 82	235, 210, 84	230, 205, 83	Yellow beige to yellow
58	Klekkendehøj	Denmark	54.936188	12.16423	Passage Grave	207, 192, 118	201, 188, 119	207, 193, 126	Mid beige
59	Klekkendehøj	Denmark	54.936188	12.16423	Passage Grave	247, 233, 161	242, 232, 162	237, 229, 190	Pale beige to beige
60	Klekkendehøj	Denmark	54.936188	12.16423	Passage Grave	242, 234, 191	247, 240, 203	240, 233, 201	Pale beige to beige
61	Klekkendehøj	Denmark	54.936188	12.16423	Passage Grave	240, 232, 194	242, 235, 201	237, 231, 199	Pale beige to beige
62	Klekkendehøj	Denmark	54.936188	12.16423	Passage Grave	217, 194, 74	224, 199, 74	232, 205, 72	Deep yellow beige
63	Klekkendehøj	Denmark	54.936188	12.16423	Passage Grave	242, 231, 177	237, 228, 180	240, 232, 192	Pale beige
64	Klekkendehøj	Denmark	54.936188	12.16423	Passage Grave	235, 227, 188	242, 235, 196	240, 230, 180	Pale beige

Table 36. Klekkende-Høj data



*Fig 59. The broken giant: smashed, robbed, steel-skeletoned Sømarksdyssen. P Foreman  
2017*

This is the most ruined and damaged megalith in this case study, having suffered repeated acts of vandalism, official and otherwise. The kerb and mound had already been robbed for building stone when the site was first recorded by the National Museum in the 1880s (source: visitor panel), and the main capstone smashed. Though it looks impressive from a distance, sitting atop the hill with views that can only be described as commanding, up close the monument is in a sorry state, full of steel girders and anchoring points, kept together in a thoroughly modern fashion, in a decidedly un-aesthetically pleasing manner. The contrast between industrial modern and monumental ancient is stark. Despite this, there is an atmosphere of stillness at the site - helped by the rural location and the summer quiet of surrounding wheatfields.

*“...the cool stillness within, and the calm power of the panoramic views over the fertile fields and out to the distant sea, have power in them.” - From the reflexive journal, 27.06.2017*

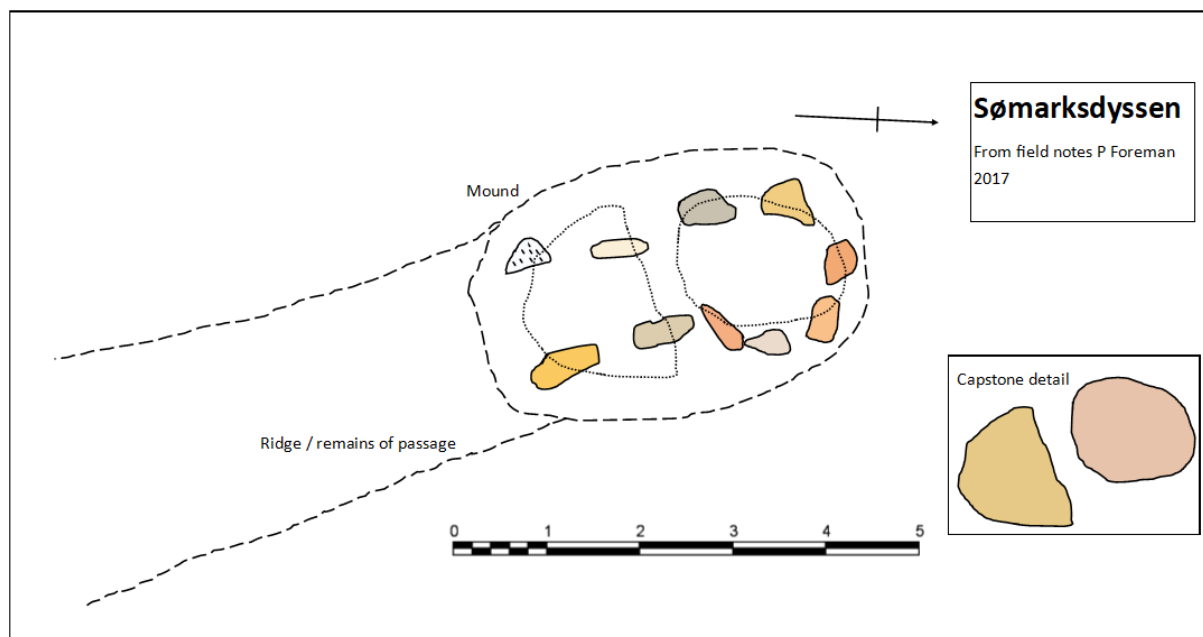


The small circular or perhaps oval chamber has a short passage, facing east as with other monuments extant on the island. This gives it views across the rolling arable land across to just-visible sea.



*Fig 60. Surface of the passage capstone, covered in cupmarks. P Foreman 2017*

The passage capstone is covered in cupmarks, pock marking the entire upper surface and giving it a toad like appearance - there are cupmarks on both the main chamber capstone and one of the orthostats, though the latter are far less numerous. As with most cupmark features, this is interpreted as a Bronze Age addition to the site, and it is generally concluded that this stone, at least, must have been exposed by design to facilitate such rock art modification to the surface.



*Fig 61. Sømarksdyssen site plan in colour*

1	Sømarksdyssen	Denmark	54.9911278	12.5009466	Passage Grave					Piebald - white and black and sparkly
2	Sømarksdyssen	Denmark	54.9911278	12.5009466	Passage Grave	245, 198, 95	250, 201, 95	240, 193, 91		Pale orange beige
3	Sømarksdyssen	Denmark	54.9911278	12.5009466	Passage Grave	245, 232, 203	250, 239, 215	240, 230, 209		Very pale beige to white
4	Sømarksdyssen	Denmark	54.9911278	12.5009466	Passage Grave	217, 200, 163	219, 205, 173	217, 203, 173		Grey beige
5	Sømarksdyssen	Denmark	54.9911278	12.5009466	Passage Grave	235, 203, 136	230, 200, 135	235, 200, 127		Pale beige orange tint
6	Sømarksdyssen	Denmark	54.9911278	12.5009466	Passage Grave	196, 186, 165	201, 193, 175	207, 199, 184		Pale grey
7	Sømarksdyssen	Denmark	54.9911278	12.5009466	Passage Grave	240, 204, 127	240, 205, 129	247, 206, 116		Very pale orange beige
8	Sømarksdyssen	Denmark	54.9911278	12.5009466	Passage Grave	247, 171, 116	242, 169, 116	240, 161, 105		Pink beige
9	Sømarksdyssen	Denmark	54.9911278	12.5009466	Passage Grave	245, 187, 132	250, 192, 137	250, 180, 115		Pale orange beige
10	Sømarksdyssen	Denmark	54.9911278	12.5009466	Passage Grave	242, 226, 211	235, 219, 204	247, 231, 215		Very pale beige to white
11	Sømarksdyssen	Denmark	54.9911278	12.5009466	Passage Grave	250, 176, 122	245, 178, 130	247, 182, 136		Orange beige with pink tinge
12	Sømarksdyssen	Denmark	54.9911278	12.5009466	Passage Grave	237, 198, 171	230, 195, 170	232, 198, 174		Pale orange beige with pink tinge

*Table 37. Sømarksdyssen data*

## 4.6 Sweden

### 4.6.1 On sample size and distribution

The Falbygdens region, centered around the town of Falköping, is dense with megaliths. They cluster along the landscape as suspicious mounds, in suburban gardens serving as exotic rockeries, and loiter by roadsides. The following ten sites were selected for either ease of access (several form a trail that winds around the town from the museum at its centre), for their significance, and for their levels of preservation. They are from urban, suburban and rural locations, and have been subject to a variety of interference and reconstruction, though most is carefully noted in the literature.

### 4.6.2 Background

The Fabygdens region in Västergötland, Sweden, has a landscape that demands to be noticed - table mountains, rich valleys, wetlands that play host to magnificent bird migration displays. It is recognisably and tangibly different from surrounding regions - a difference that may go some way to explaining the proliferation of passage grave type monuments. Falbygdens is densely populated with surviving megaliths - some 250 of Sweden's 300 passage graves can be found here, making it an extremely significant hub of funerary and ritual activity during the middle Neolithic / TRB of Sweden, over a relatively short time period from 3300-2700 BC (Larsson 2014). Using the group at Karleby as a case study, Sjögren found that settlement and monument were spatially very separate entities in the landscape, close but not intervisible; suggestive of an important, necessary, but possibly dangerous belief when it came to the ancestors (Sjögren 2011). The passage graves of the region typically feature a N-S orientated rectangular chamber, that contained separate cell-like

structures, or niches, that contained individuals or groups of individuals (Tilley 1999). They are frequently constructed in dense clusters, on natural ridges in the landscape, though not on prominent high points or those with the best visibility of the natural features. The relative uniformity of passage graves in this region contrasts with the more variable forms found in coastal regions of Skåne and Bohuslän (Sjögren 2011), similar to the Pembrokeshire monuments and their rich architectural variance as compared to inland British sites.

For a region so rich in megalithic remains, there has been little systematic or rigorous excavation - though several inventories and small scale excavations have occurred - and a number of passage graves have been destroyed, altered, rebuilt or remodelled due to the expansion of housing, industry, and transport infrastructure. It is through such destruction, of a series of five passage graves at Axvalla that were destroyed to make way for a military training ground in 1803, that the earliest (surviving) details of Västergötland style passage grave construction and contents were recorded by Anders Lindgren, not to be surpassed or scientifically superseded for some fifty years, and still evocative today in their depiction of remains and orderly, neat stone construction (Tilley 1999). Though there was a flurry of archaeological activity in the region in the late 19th and early 20th century, the subsequent findings and research (particularly that of Montelius and Retzius) were less than scientifically rigorous and were alarmingly dominated by theorising upon race and racial characteristics, skull measurements and related unpalatable discussions (Tilley 1999, Axelsson et al 2003).

There followed an extended period of hiatus on excavation in the region, where archaeological excavations were few, and any studies were limited to surveying and cataloguing the region's sites (Tilley 1999). There were some exceptions: Cullberg's examination of the Rössberga passage grave is the most in depth, (though as this study was conducted in 1962, it is fair to say that the region's sites have been neglected by more recent archaeological attention). His findings at this site tie in to common practices in southern Sweden and Denmark, that is, the deposition of highly decorated but broken pottery in the entrance, and an extended period of use (Cullberg 1963, Larsson 2014). More recent osteological research into skeletal material taken from the site revealed a large number of individuals, who largely were born in the local area (though at 25%, the population that migrated in from elsewhere was not insignificant) eating local, land-based foods and suffered high infant mortality, with very few individuals surviving past 60 (Larsson 2014). From evidence at this site, the Falbygden region was subject to significant migration, likely from the regions to the west and south west, suggesting a sustained and large scale social exchange was taking place; though from current isotopic and genetic analysis of remains, this exchange was not one based upon marriage as all ages and genders, with a slight bias



towards older individuals, are present in equal numbers (Sjögren 2011). Intriguingly, cattle bones analysed alongside the human ones indicate they too were bought in, from even greater diversity of origin, suggesting the network of cattle trade was a complex industry at the time (Sjögren 2011). A lack of comparatively thorough and scientifically rigorous studies of other passage graves from the region makes it difficult to extrapolate if this is a representative of the region as a whole, though the extended period of use suggests a long-standing, well established ritual routine that is unlikely to be hyper-localised and unique. From 1985 onwards, the “Passage Graves of Central Västergötland and their Background” attempted to rectify the lack of thorough excavation, and conducted work at nine passage graves as well as re-examining material from previous excavations, examining in particular the passage entrances for signs of ritual deposition, and surveying surrounding areas for the location of related settlements (Sjögren 1995a, 1995b).

There has been limited research into the possibility of colour significance in the monuments of this region. As can be most clearly seen at the site of Girommen at Ekornavallen, red limestone slabs can be found as packing material around (and now, fallen into) the chamber and passage within the original mound. Although this could be initially dismissed as modern (or at least, not middle Neolithic) deposition, recent excavations into three megalithic sites in the Falbygdens region found that the packing material used closest to the chamber and passage within the mound was similar red limestone slabs, causing a similarly instantly recognisable and striking contrast with the rest of the (grey) mound material (Axelsson & Jankavs 2013). Although Axelsson and Jankavs float the idea that this was used as a sort of sealant due to the soft, almost malleable nature of the red limestone that can be melded together to form a sort of capping over the chamber, the existence of limited symmetrical patterning in the stones at these sites and the deliberate use of split “twin” stones in the passage at Falköping Ostra 1 suggests deliberate and careful acts of choosing and placing that bely a merely mundane explanation for the red stones (Axelsson & Jankavs 2013).

Between 1996 and 1998 efforts were made to emphasise the importance of the region’s passage graves, and record the condition of remaining monuments in a “damage inventory” - 269 site visits were made to photograph, describe, and eventually design preservation plans for each site (Axelsson et al 2003). The project found that over half of sites face ongoing damage at a moderate to severe level, mostly as a result of farming related activities including ploughing and the modern deposition of stone on top of the existing sites as a form of waste disposal (Axelsson et al 2003). Though Axelsson’s report found a number of deficiencies in the way sites were preserved, signposted, and treated by the local community, the fieldwork undertaken for this thesis, in the July of 2017, found an altogether

more positive outlook - with a Falköping town trail highlighting prominent sites to visitors, the best preserved sites being signposted, and the Karleby group being cared for by locals with its own visitors book, notice and information board, and locals even mowing the grass on the footpath; the project has clearly had a degree of impact.

The region's capital, Falköping, is populated with thoroughly domesticated passage graves that can be found in suburban gardens, industrial estates, and communal parkland. The town is also home to the Falbygdens Museum, which is both free and engagingly designed, and contains displays on the prehistory of the region as well as providing free maps for trails around the suburbs and wider region to visit the best preserved megaliths.

These surveying visits took place in July 2017, a period when vegetation around the sites is at its peak, though most (particularly suburban and industrial estate sites) are mown and maintained by either the local authority or the resident whose property the monument sits within.



*Fig 62. Thoroughly domesticated megaliths/rockeries in the gardens of Falköping. P Foreman 2017*

#### 4.6.3 Geology of Falbygdens

As well as being a significant area of Neolithic activity, the Falbygdens region has “been claimed to be the most distinctive natural landscape in Sweden”, with igneous rock mountains and limestone/sandstone valleys (Tilley 1999, 143). There is a rich variety of stone in the locality, including dolerite, shale, limestone, alum shale, and sandstone, the result of serial deposition on the seabed present in this region during the Cambrian, Ordovician, and Silurian periods; this richness of stone appears to have drawn the attention of the monument builders, with clusters of passage graves constructed in regions where rock types meet (Axelsson et al 2003). The dramatic flat-topped mountain vistas that border this region - Mösseberg, Ålleberg, Geumsberget, and Billingen - are volcanic masses, adding further richness to the geological makeup (Axelsson & Jankavs 2013). The monument builders made use of this wealth of source material, generally choosing the sedimentary rocks as the orthostats and igneous rocks as capstones - though not universally so.

The region's calcareous boulder clay is a fertile agricultural zone (Larsson 2014), and as such has been a population centre as well as a ritual one since the first farmers. This lime-rich geology is fortunate, archaeologically speaking, as it means skeletal remains are preserved in quantities not seen in much of Sweden due to the proliferation of acidic, sandy soils (Axelsson et al 2003).

#### 4.6.4 Kyrkerör



*Fig 63. Kyrkerör, complete with adjacent construction work. P Foreman 2017*



Kyrkerör acts as a gateway passage grave to the Neolithically curious tourist (or archaeologist) in Falköping. It stands at the side of the road, at the edge of Plantis Park, a few hundred metres from the Falbygden's Museum. Heavily moss covered, it has seen a number of modern interventions over the years, from the removal of its mound and fill material for use in road building, to proposals for destruction via dynamite that went as far as drilling holes in the capstones, to preservation and "reconstruction" in 1928 (Tilley 1999). It is a monument full of character: it bears the scars of ancient and modern hands.

Rugged limestone and smoother granite, contrasting deep red and paler grey-pink, make up the fabric of the monument. One of the passage orthostats has a large fossil inclusion that almost invites touch - undoubtedly a deliberate choice on the part of the monument builders, and one that begs the question of the tactile experience of these monuments - was the way in seen by light (sun, torch, moon) or *felt*?



*Fig 64. Passage upright at Kyrkerör with fossil inclusion on inner surface. P Foreman 2017*

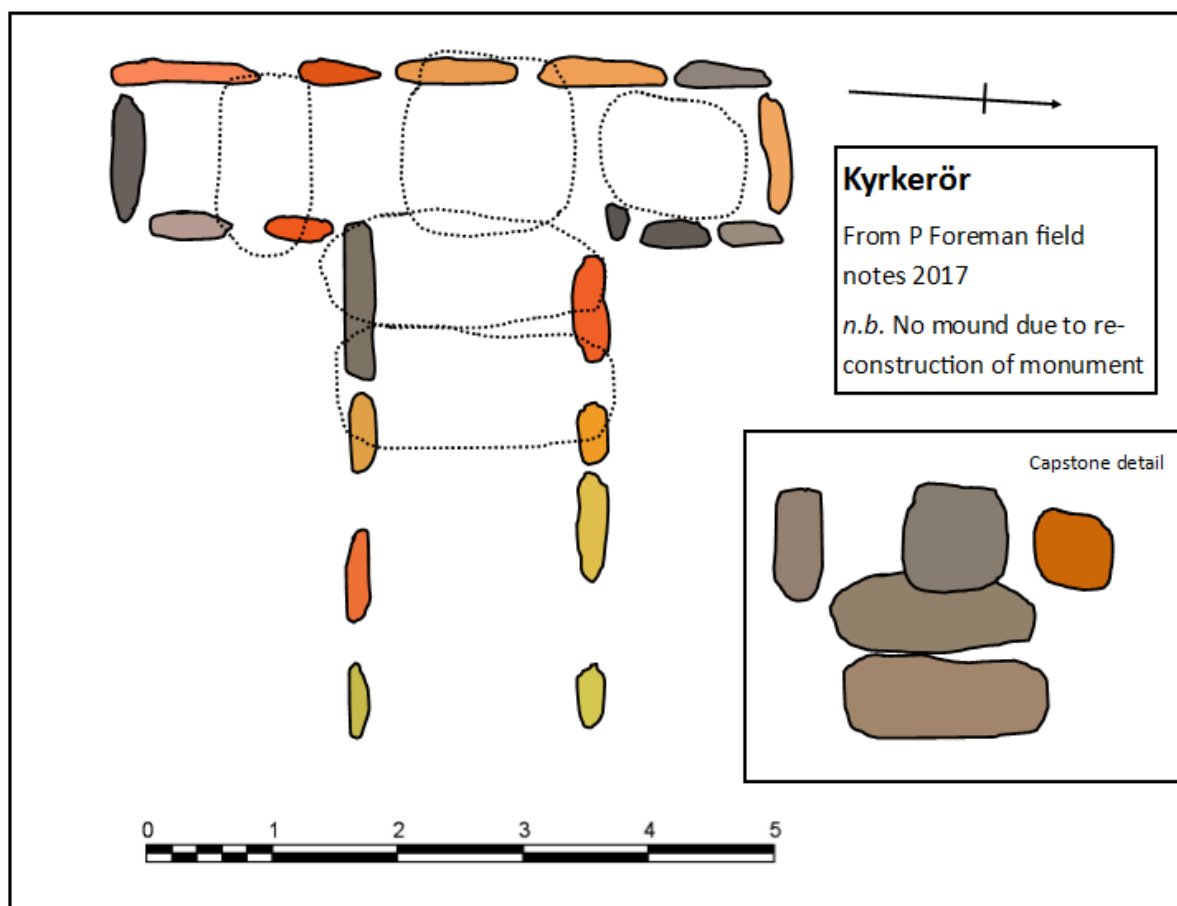


Fig 65. Kyrkerör site plan in colour

1 Kyrkerör	Sweden	58.1670133	13.5529811	Passage Grave	199, 186, 74	201, 189, 81	204, 191, 75	Yellow beige
2 Kyrkerör	Sweden	58.1670133	13.5529811	Passage Grave	209, 196, 73	212, 199, 80	217, 203, 80	Yellow beige
3 Kyrkerör	Sweden	58.1670133	13.5529811	Passage Grave	235, 108, 49	237, 112, 55	232, 107, 49	Orange pink
4 Kyrkerör	Sweden	58.1670133	13.5529811	Passage Grave	224, 190, 76	219, 184, 68	227, 194, 86	Yellow beige
5 Kyrkerör	Sweden	58.1670133	13.5529811	Passage Grave	230, 162, 67	224, 160, 70	230, 163, 69	Orange beige
6 Kyrkerör	Sweden	58.1670133	13.5529811	Passage Grave	237, 154, 38	240, 155, 36	232, 148, 30	orange beige to orange
7 Kyrkerör	Sweden	58.1670133	13.5529811	Passage Grave	156, 135, 106	161, 139, 109	163, 141, 109	grey beige to mid grey
8 Kyrkerör	Sweden	58.1670133	13.5529811	Passage Grave	122, 112, 97	125, 115, 101	120, 109, 93	Deep grey
9 Kyrkerör	Sweden	58.1670133	13.5529811	Passage Grave	143, 126, 103	145, 129, 106	150, 135, 113	Mid deep grey
10 Kyrkerör	Sweden	58.1670133	13.5529811	Passage Grave	242, 102, 56	240, 96, 38	237, 98, 43	Deep orange beige, pink tinge
11 Kyrkerör	Sweden	58.1670133	13.5529811	Passage Grave	237, 81, 19	240, 89, 29	240, 95, 38	Orange-red and pale orange red
12 Kyrkerör	Sweden	58.1670133	13.5529811	Passage Grave	179, 153, 143	181, 155, 145	184, 159, 149	Mid grey
13 Kyrkerör	Sweden	58.1670133	13.5529811	Passage Grave	112, 99, 94	105, 96, 92	99, 89, 86	Deep grey
14 Kyrkerör	Sweden	58.1670133	13.5529811	Passage Grave	250, 133, 87	242, 129, 85	242, 136, 94	Pale red-orange
15 Kyrkerör	Sweden	58.1670133	13.5529811	Passage Grave	219, 80, 15	224, 85, 20	227, 87, 23	Orange-red / tan
16 Kyrkerör	Sweden	58.1670133	13.5529811	Passage Grave	143, 120, 110	148, 128, 112	145, 128, 121	Mid grey
17 Kyrkerör	Sweden	58.1670133	13.5529811	Passage Grave	232, 152, 77	235, 155, 80	240, 159, 84	Pale orange/tan
18 Kyrkerör	Sweden	58.1670133	13.5529811	Passage Grave	235, 156, 82	240, 160, 86	237, 155, 78	Pale orange/tan
19 Kyrkerör	Sweden	58.1670133	13.5529811	Passage Grave	140, 127, 115	135, 123, 112	138, 124, 112	Mid grey
20 Kyrkerör	Sweden	58.1670133	13.5529811	Passage Grave	138, 127, 117	143, 132, 123	145, 134, 124	Mid grey
21 Kyrkerör	Sweden	58.1670133	13.5529811	Passage Grave	247, 169, 96	242, 167, 97	245, 171, 103	Pale orange
22 Kyrkerör	Sweden	58.1670133	13.5529811	Passage Grave	212, 109, 13	204, 103, 8	201, 103, 10	Deep orange/tan
23 Kyrkerör	Sweden	58.1670133	13.5529811	Passage Grave	153, 140, 127	153, 139, 125	148, 133, 118	Mid grey
24 Kyrkerör	Sweden	58.1670133	13.5529811	Passage Grave	92, 84, 77	99, 92, 86	89, 83, 77	Deep grey
25 Kyrkerör	Sweden	58.1670133	13.5529811	Passage Grave	89, 83, 78	89, 84, 79	79, 71, 64	Deep grey

Table 38. Kyrkerör data



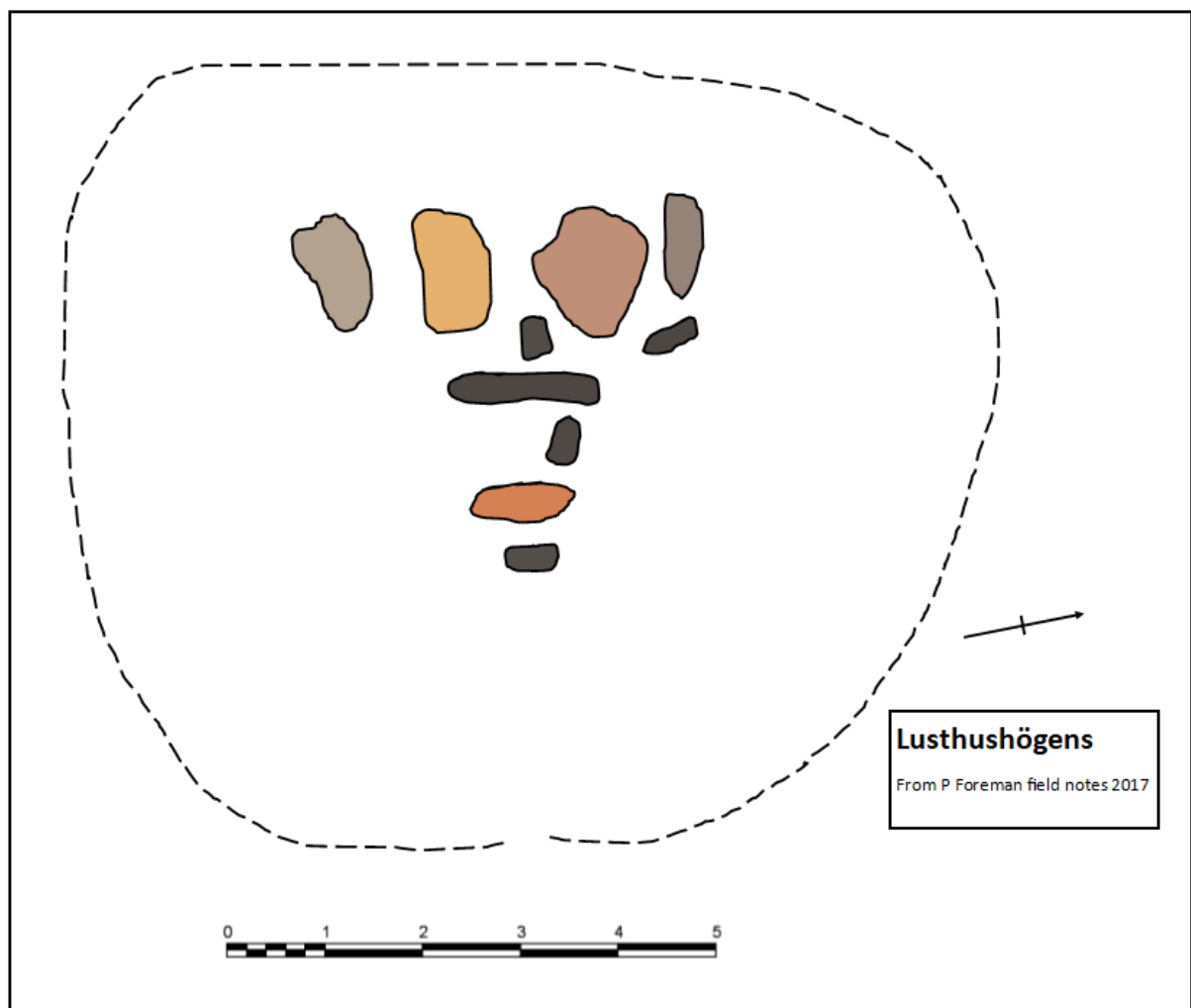
#### 4.6.5 Lusthushögens

Archaeologists, or those with a keen eye for suspicious mounds, may drive past this impressive mound and pick up on its megalithic nature, but it would be easy at first glance to miss it: the remaining orthostats and capstones are largely buried. At the top of the mound, the monumental nature is more obvious, especially if the grass has recently been mown.



*Fig 66. View from the top of Lusthushögens passage grave, which makes an excellent roundabout. P Foreman 2017*

The stones visible today are mostly the granite capstones, rounded and grey, of which the ones in the central part of the chamber are particularly large and impressive. The information panel gives a brief outline of passage graves in the Swedish Neolithic, as well as some line drawings of finds from the 1868 excavation, though puzzlingly for the reader the image of the passage grave does not seem to correspond to the stones here: it displays an asymmetric style only seen in the Karleby group (see later in this chapter).



1	Lusthushögens	Sweden	58.1730134	13.5506512	Passage Grave	82, 74, 68	84, 78, 72	87, 81, 75	Deep grey
2	Lusthushögens	Sweden	58.1730134	13.5506512	Passage Grave	219, 132, 86	214, 129, 84	217, 132, 87	Mid beige, pink tinge
3	Lusthushögens	Sweden	58.1730134	13.5506512	Passage Grave	74, 68, 65	79, 72, 69	74, 67, 64	Deep grey
4	Lusthushögens	Sweden	58.1730134	13.5506512	Passage Grave	71, 66, 63	79, 72, 68	77, 70, 67	Deep grey
5	Lusthushögens	Sweden	58.1730134	13.5506512	Passage Grave	74, 68, 65	82, 76, 73	89, 83, 79	Deep grey
6	Lusthushögens	Sweden	58.1730134	13.5506512	Passage Grave	87, 80, 76	82, 75, 72	77, 71, 67	Deep grey
7	Lusthushögens	Sweden	58.1730134	13.5506512	Passage Grave	148, 128, 117	150, 131, 120	156, 135, 124	Mid grey
8	Lusthushögens	Sweden	58.1730134	13.5506512	Passage Grave	196, 144, 116	191, 144, 119	194, 146, 120	Orange grey
9	Lusthushögens	Sweden	58.1730134	13.5506512	Passage Grave	158, 132, 119	163, 137, 122	168, 142, 128	Mid grey
10	Lusthushögens	Sweden	58.1730134	13.5506512	Passage Grave	235, 179, 110	230, 176, 110	234, 182, 117	Pale orange-beige
11	Lusthushögens	Sweden	58.1730134	13.5506512	Passage Grave	179, 161, 139	179, 162, 143	163, 151, 135	Mid grey

*Table 38. Lusthushögens data*

#### 4.6.6 Glasthall/Kung Björns Grav



*Fig 69. The massive red limestone capstone, unusual in its uniformity with other stones in the monument. P Foreman 2017*

It is difficult to accurately depict the scale and impressiveness of this monument: the enormous red limestone blocks used in construction are largely occluded by the massive capstone and the remaining mound, and it is only on climbing inside the remains of the chamber that the scale of the orthostats can be appreciated. Unlike other passage graves in the immediate region, this one is constructed entirely from red limestone blocks, rich and deep red, and mostly of a squared and regular appearance. Now sitting incongruously between two houses in a small residential estate, it has a brooding appearance, perched in the remains of its mound, with a sad and vandalised “information” sign that (from what



remains of the text) talks about “stone age life” rather than the specifics of this intriguing tomb.

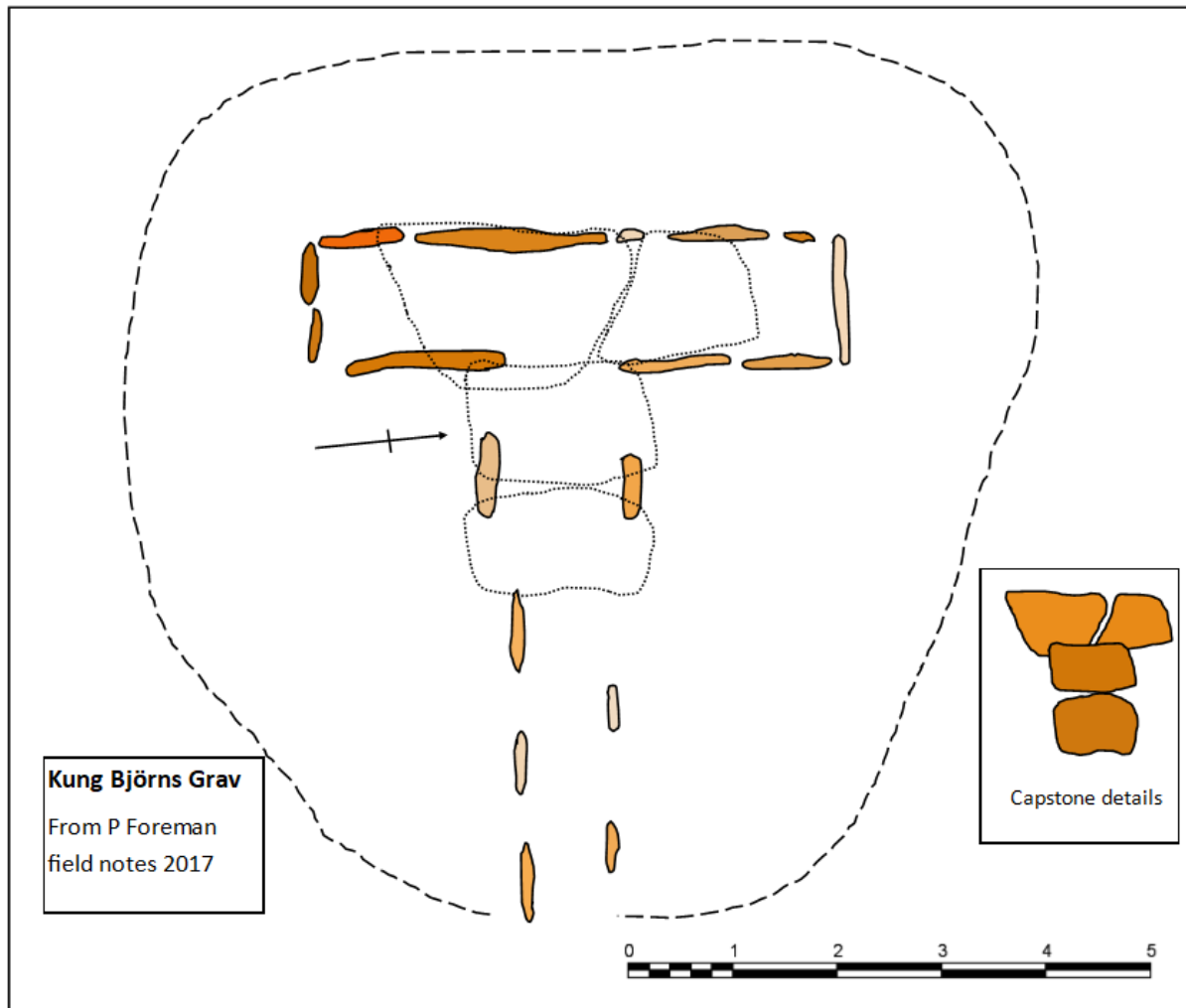


Fig 70. Kung Björns Grav site plan in colour

1	Kung Björns Grav	Sweden	58.1707961	13.5395245	Passage Grave	252, 173, 76	247, 172, 79	242, 169, 80	Pale orange
2	Kung Björns Grav	Sweden	58.1707961	13.5395245	Passage Grave	250, 176, 85	242, 171, 85	242, 172, 87	Pale orange
3	Kung Björns Grav	Sweden	58.1707961	13.5395245	Passage Grave	247, 216, 178	240, 212, 177	242, 212, 174	Pale beige
4	Kung Björns Grav	Sweden	58.1707961	13.5395245	Passage Grave	252, 180, 91	247, 178, 94	245, 171, 81	Pale orange
5	Kung Björns Grav	Sweden	58.1707961	13.5395245	Passage Grave	247, 225, 198	240, 219, 194	245, 225, 201	Pale beige
6	Kung Björns Grav	Sweden	58.1707961	13.5395245	Passage Grave	201, 114, 5	207, 120, 14	214, 121, 6	Deep orange-tan
7	Kung Björns Grav	Sweden	58.1707961	13.5395245	Passage Grave	237, 192, 138	232, 189, 137	237, 196, 145	Pale beige
8	Kung Björns Grav	Sweden	58.1707961	13.5395245	Passage Grave	250, 171, 75	242, 166, 73	247, 171, 77	Pale orange
9	Kung Björns Grav	Sweden	58.1707961	13.5395245	Passage Grave	207, 116, 6	209, 119, 8	207, 120, 14	Deep orange-tan
10	Kung Björns Grav	Sweden	58.1707961	13.5395245	Passage Grave	209, 118, 5	214, 121, 6	207, 118, 10	Deep orange-tan
11	Kung Björns Grav	Sweden	58.1707961	13.5395245	Passage Grave	204, 119, 14	207, 122, 19	209, 122, 16	Deep orange-tan
11a	Kung Björns Grav	Sweden	58.1707961	13.5395245	Passage Grave	207, 114, 2	194, 109, 6	201, 114, 8	Deep orange-tan
12	Kung Björns Grav	Sweden	58.1707961	13.5395245	Passage Grave	237, 100, 2	240, 105, 10	235, 103, 9	Deep orange
13	Kung Björns Grav	Sweden	58.1707961	13.5395245	Passage Grave	217, 130, 24	219, 132, 26	219, 133, 29	Pale orange tan
14	Kung Björns Grav	Sweden	58.1707961	13.5395245	Passage Grave	237, 210, 178	240, 214, 182	235, 212, 185	Pale beige
15	Kung Björns Grav	Sweden	58.1707961	13.5395245	Passage Grave	214, 153, 77	219, 159, 86	222, 163, 91	Pale orange tan
16	Kung Björns Grav	Sweden	58.1707961	13.5395245	Passage Grave	217, 129, 22	217, 130, 24	224, 131, 18	Orange tan
17	Kung Björns Grav	Sweden	58.1707961	13.5395245	Passage Grave	240, 211, 175	245, 217, 184	237, 210, 178	Pale beige
18	Kung Björns Grav	Sweden	58.1707961	13.5395245	Passage Grave	222, 153, 69	227, 159, 75	230, 162, 80	Pale orange tan
19	Kung Björns Grav	Sweden	58.1707961	13.5395245	Passage Grave	235, 166, 82	240, 172, 89	235, 160, 68	Pale orange tan
20	Kung Björns Grav	Sweden	58.1707961	13.5395245	Passage Grave	232, 138, 23	227, 135, 23	230, 137, 23	Orange tan
21	Kung Björns Grav	Sweden	58.1707961	13.5395245	Passage Grave	230, 137, 25	235, 142, 28	230, 140, 30	Orange tan
22	Kung Björns Grav	Sweden	58.1707961	13.5395245	Passage Grave	240, 214, 182	235, 210, 181	232, 213, 190	Pale beige

Table 40. Kung Björns Grav data

#### 4.6.7 Ängshögen, södra



*Fig 71. Mounds and topiary. P Foreman, 2017*

A thoroughly domesticated, manicured mound and monument, perching by the road in the suburbs, and carefully balanced by some topiary in the garden immediately behind it. It belongs in this place, blending in so fully that Tilley (1999) mused it “might be mistaken for a roundabout” - it feels part of the town planning, a piece of municipal art installation. Another monument earmarked for destruction in the wake of the town’s rail line expansion, it was granted reprieve when the line was redirected, and subsequent house building, road planning have been woven around it rather than through it.

The monument is very close to at least two others, namely Lusthushögens and Trädgårdens, the survivors of a regionally characteristic cluster of funerary monuments.

The remaining stones follow a similar pattern to others in the region - passage and chamber orthostats of red sandstone, capstones of granite (generally grey but with peach/pale orange inclusions when examined closely), with the two limestone blocks now collapsed into the chamber probably being fallen capstones. The keystone and final capstone of the passage are split in two, probably due to being handled poorly during “preservation”. As with Kyrkerör, the contrast in colour and texture between passage/chamber orthostats and the capstones is immediate and affecting.

1	Ångshögen	Sweden	58.1751361	13.5460748	Passage Grave	245, 208, 122	240, 205, 125	247, 213, 134	Yellow beige with pink tinge
2	Ångshögen	Sweden	58.1751361	13.5460748	Passage Grave	242, 209, 131	245, 213, 140	242, 212, 143	Yellow beige with pink tinge
3	Ångshögen	Sweden	58.1751361	13.5460748	Passage Grave	252, 184, 101	245, 182, 105	247, 187, 114	Pale orange beige
4	Ångshögen	Sweden	58.1751361	13.5460748	Passage Grave	242, 183, 111	245, 183, 108	252, 184, 101	Pale orange beige
5	Ångshögen	Sweden	58.1751361	13.5460748	Passage Grave	222, 190, 151	222, 192, 155	214, 188, 156	Grey beige
6	Ångshögen	Sweden	58.1751361	13.5460748	Passage Grave	217, 190, 158	222, 194, 160	227, 199, 166	Grey beige
7	Ångshögen	Sweden	58.1751361	13.5460748	Passage Grave	219, 196, 167	224, 202, 175	217, 196, 171	Grey beige
8	Ångshögen	Sweden	58.1751361	13.5460748	Passage Grave	214, 195, 171	209, 191, 169	217, 197, 173	Grey beige
9	Ångshögen	Sweden	58.1751361	13.5460748	Passage Grave	219, 198, 171	214, 195, 171	209, 192, 171	Grey beige
10	Ångshögen	Sweden	58.1751361	13.5460748	Passage Grave	217, 196, 171	219, 203, 182	227, 208, 184	Grey beige
11	Ångshögen	Sweden	58.1751361	13.5460748	Passage Grave	232, 186, 79	240, 192, 79	237, 190, 81	Deep yellow beige pink tinge

*Table 41. Ångshögen data*

#### 4.6.8 Åttagården



*Fig 72. Åttagården, with the housing development to the north, featuring houses with a pleasingly similar profile to the main capstone. P Foreman 2017*

Quite distinct from most other passage graves in the region, Åttagården is a relatively small, oval-chambered monument, now sitting at the edge of a small industrial estate. The chamber is orientated east-west rather than the more common north-south, and all remaining stones are varying shades of granite. It is more reminiscent of the smaller oval tombs viewed on



Mon, Denmark, than of the other passage graves surveyed in this region. These striking differences may suggest the influence of some of the migrant population to the region, though without any skeletal evidence to analyse, it is not possible to determine the genetic and geographical profile of those interred within, or indeed the original designers and builders.

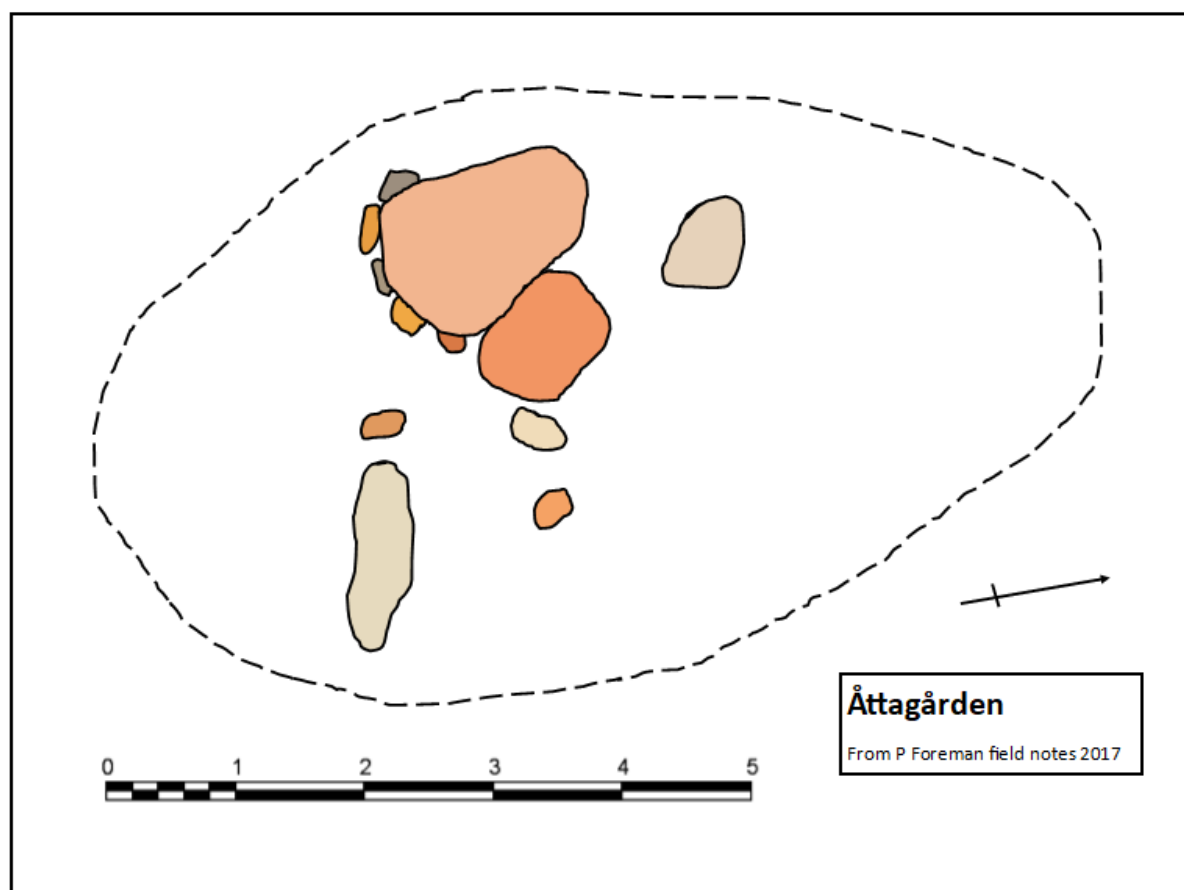


Fig 73. Åttagården site plan in colour

1	Åttagården	Sweden	58.1676078	13.5769121	Passage Grave	237, 223, 190	230, 218, 190	237, 226, 199	Pale beige
2	Åttagården	Sweden	58.1676078	13.5769121	Passage Grave	217, 148, 91	224, 153, 94	217, 148, 91	Deep orange beige
3	Åttagården	Sweden	58.1676078	13.5769121	Passage Grave	247, 171, 109	245, 162, 100	242, 157, 97	Pale orange beige
4	Åttagården	Sweden	58.1676078	13.5769121	Passage Grave	237, 216, 178	240, 220, 185	240, 220, 182	Pale beige
5	Åttagården	Sweden	58.1676078	13.5769121	Passage Grave	247, 152, 101	242, 149, 99	237, 149, 102	Orange beige with pink tinge
6	Åttagården	Sweden	58.1676078	13.5769121	Passage Grave	212, 118, 68	217, 121, 69	224, 127, 74	Deep orange beigewith pink tinge
7	Åttagården	Sweden	58.1676078	13.5769121	Passage Grave	237, 167, 69	240, 168, 67	235, 164, 66	Orange beige
8	Åttagården	Sweden	58.1676078	13.5769121	Passage Grave	166, 148, 123	168, 151, 126	173, 157, 134	Grey
9	Åttagården	Sweden	58.1676078	13.5769121	Passage Grave	230, 155, 64	232, 157, 65	235, 154, 56	Orange beige
10	Åttagården	Sweden	58.1676078	13.5769121	Passage Grave	161, 146, 129	156, 142, 126	158, 146, 131	Grey
11	Åttagården	Sweden	58.1676078	13.5769121	Passage Grave	237, 174, 135	242, 181, 143	237, 180, 145	Pale beige with pink tinge
12	Åttagården	Sweden	58.1676078	13.5769121	Passage Grave	224, 204, 180	230, 210, 186	230, 212, 190	Pale beige grey

Table 42. Åttagården data



*Fig 74. Hjelmsrör- the boulders used in construction seem naturalistic, chaotic than the more typical rectangular chambered tombs in the region. P Foreman 2017*

A few hundred metres down the road from Attagårdens, Hjelmsrör shares some of the oddities, making it clear that this grouping of monuments (and its builders) were doing things a little differently. It too is an oval chamber, though it is significantly larger than Åttagården, and it shares the same east-west alignment. In this case there is skeletal matter, from the 1868 excavation; this formed part of recent isotopic analysis into the populations represented within Falbygdens passage graves, finding that three of the individuals were “non local” (Sjögren et al 2009). This study found that approximately 25% of individuals from four sites across the region were not born and did not grow up in the immediate region. This significant proportion of migrants could have manifested in the different monument construction, particularly if they came from Western regions around Bohuslän with its flourishing of different strands of monument construction techniques.

The stones here are largely granite, but are not uniform in colour - they range from pale grey-beige to rich, deep orange-red, almost the colour of the local red limestone seen at Kung Björns Grav.

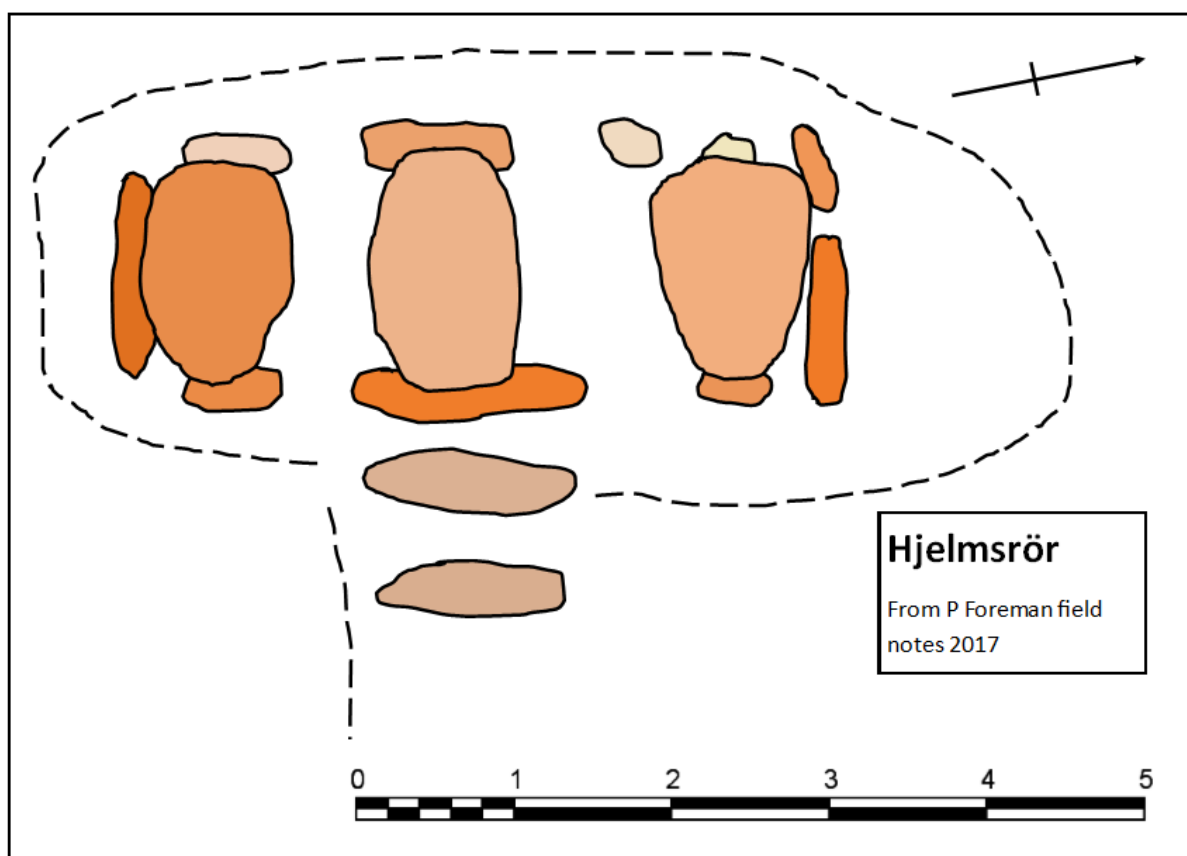


Fig 75. Hjelmsrör site plan in colour

1	Hjelmsrör	Sweden	58.1697371	13.5780492	Passage Grave	247, 222, 190	240, 218, 192	242, 224, 201	Pale beige
2	Hjelmsrör	Sweden	58.1697371	13.5780492	Passage Grave	240, 229, 187	240, 230, 189	235, 226, 190	Pale beige
3	Hjelmsrör	Sweden	58.1697371	13.5780492	Passage Grave	240, 147, 81	240, 150, 86	240, 153, 91	Orange beige
4	Hjelmsrör	Sweden	58.1697371	13.5780492	Passage Grave	237, 120, 36	240, 122, 38	240, 126, 46	Deep orange beige
5	Hjelmsrör	Sweden	58.1697371	13.5780492	Passage Grave	227, 141, 79	235, 148, 87	237, 151, 90	Orange beige
6	Hjelmsrör	Sweden	58.1697371	13.5780492	Passage Grave	250, 177, 125	242, 174, 126	250, 181, 132	Pale orange beige
7	Hjelmsrör	Sweden	58.1697371	13.5780492	Passage Grave	212, 168, 138	217, 174, 143	212, 170, 140	Grey beige, orange tint
8	Hjelmsrör	Sweden	58.1697371	13.5780492	Passage Grave	219, 177, 147	222, 180, 151	224, 184, 155	Grey beige, orange tint
9	Hjelmsrör	Sweden	58.1697371	13.5780492	Passage Grave	235, 122, 42	240, 125, 43	224, 113, 34	Deep orange beige to orange
10	Hjelmsrör	Sweden	58.1697371	13.5780492	Passage Grave	232, 140, 74	235, 139, 70	230, 140, 76	Orange beige
11	Hjelmsrör	Sweden	58.1697371	13.5780492	Passage Grave	232, 116, 32	224, 112, 31	232, 118, 37	Deep orange beige
12	Hjelmsrör	Sweden	58.1697371	13.5780492	Passage Grave	245, 211, 186	240, 208, 185	242, 210, 187	Pale beige
13	Hjelmsrör	Sweden	58.1697371	13.5780492	Passage Grave	237, 162, 109	235, 161, 108	230, 159, 108	Orange beige
14	Hjelmsrör	Sweden	58.1697371	13.5780492	Passage Grave	245, 185, 142	237, 179, 138	237, 180, 140	Pale orange beige
15	Hjelmsrör	Sweden	58.1697371	13.5780492	Passage Grave	227, 137, 73	232, 140, 74	237, 142, 74	Orange beige

Table 43. Hjelmsrör data



#### 4.6.10 Girommen, Ekornavallen



*Fig 76. Girommen passage grave, in the funerary landscape of Ekornavallen. P Foreman 2017*

The landscape of Ekornavallen has been home to the dead for a long time: monuments from Neolithic to the Iron Age can be found in close proximity, so the fields played host to the rituals of the dead and the ancestors for some 3000 years (Tilley 1999). Girommen is the largest of four passage graves remaining in the landscape; its cairn is now overgrown and denuded of stone material, and the chamber is much collapsed. The chamber itself sits in the distinctive Västergötland N-S alignment, with the passage sloping downhill to the east. Constructed largely of flat, sandstone slabs of varying textures, the monument's keystone, positioned at the liminal spot between passage and chamber, is in stark contrast with its glistening and hard granite surface.

Within the remains of the chamber and the very upper section on the passage, several flat red slabs of limestone are present, extremely distinct and striking from the main construction material of the site. From evidence at recently excavated megaliths in the region (Axelsson & Jankavs 2013), this is likely material from the immediate surrounding mound collapsed into the chamber.

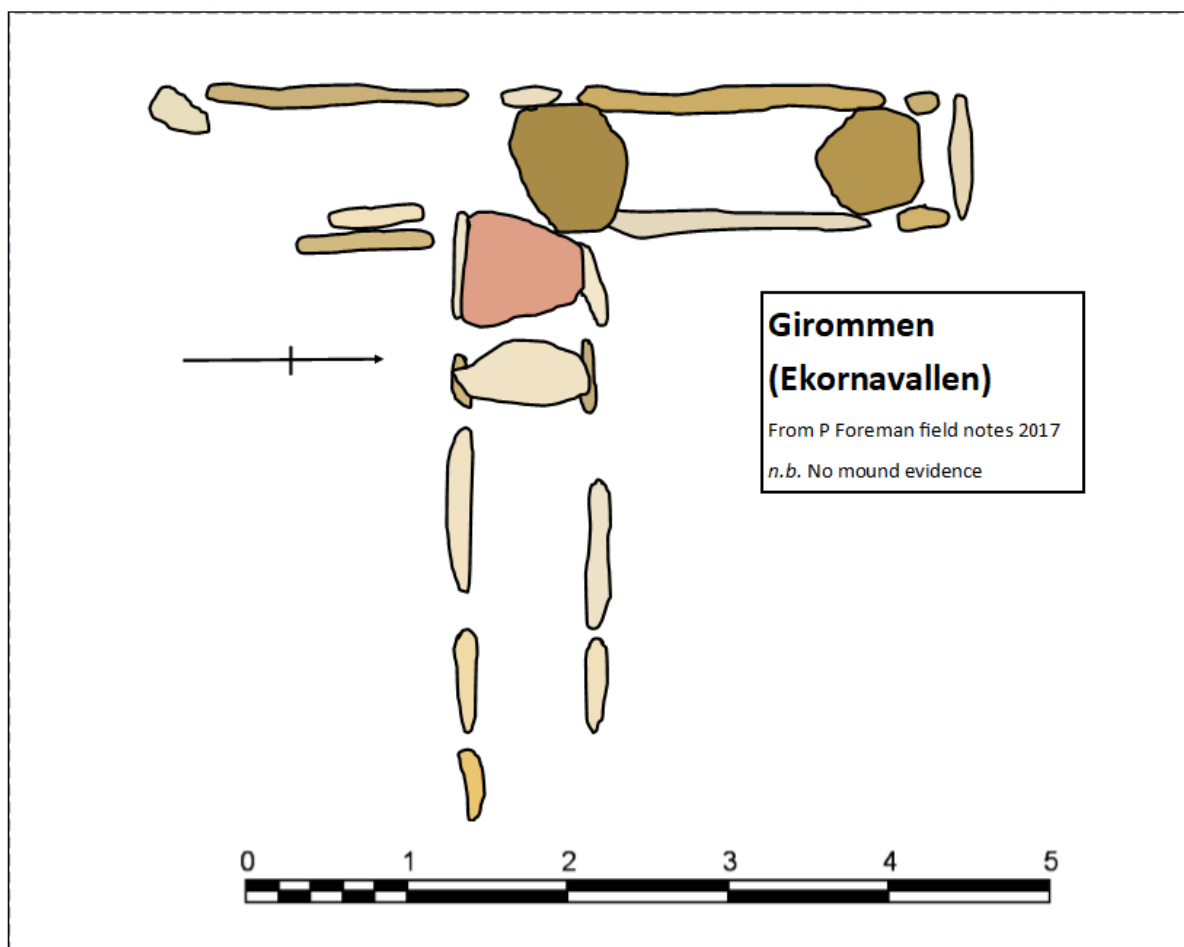


Fig 77. Girommen site plan in colour

1	Girommen (Ekornavallen)	Sweden	58.2794522	13.6026831	Passage Grave	240, 204, 120	235, 198, 113	237, 202, 121	Pale yellow beige
2	Girommen (Ekornavallen)	Sweden	58.2794522	13.6026831	Passage Grave	242, 216, 155	240, 218, 168	245, 224, 176	Pale beige
3	Girommen (Ekornavallen)	Sweden	58.2794522	13.6026831	Passage Grave	247, 230, 188	240, 224, 187	242, 227, 191	Pale beige
4	Girommen (Ekornavallen)	Sweden	58.2794522	13.6026831	Passage Grave	247, 233, 198	240, 226, 194	242, 229, 199	Pale beige
5	Girommen (Ekornavallen)	Sweden	58.2794522	13.6026831	Passage Grave	242, 227, 191	237, 226, 199	240, 228, 201	Pale beige
6	Girommen (Ekornavallen)	Sweden	58.2794522	13.6026831	Passage Grave	212, 186, 125	207, 182, 126	199, 178, 129	Mid beige
7	Girommen (Ekornavallen)	Sweden	58.2794522	13.6026831	Passage Grave	191, 171, 124	194, 173, 124	196, 176, 130	Mid beige
8	Girommen (Ekornavallen)	Sweden	58.2794522	13.6026831	Passage Grave	242, 228, 196	240, 227, 197	242, 231, 206	Pale beige
9	Girommen (Ekornavallen)	Sweden	58.2794522	13.6026831	Passage Grave	237, 226, 202	240, 230, 206	242, 234, 213	Pale beige
10	Girommen (Ekornavallen)	Sweden	58.2794522	13.6026831	Passage Grave	247, 235, 205	242, 231, 203	240, 230, 206	Pale beige
11	Girommen (Ekornavallen)	Sweden	58.2794522	13.6026831	Passage Grave	227, 157, 134	222, 159, 138	224, 164, 144	Pink beige
12	Girommen (Ekornavallen)	Sweden	58.2794522	13.6026831	Passage Grave	204, 174, 104	207, 178, 112	209, 182, 119	Mid beige
13	Girommen (Ekornavallen)	Sweden	58.2794522	13.6026831	Passage Grave	204, 179, 120	209, 185, 128	214, 190, 133	Mid beige
14	Girommen (Ekornavallen)	Sweden	58.2794522	13.6026831	Passage Grave	237, 219, 178	240, 224, 187	237, 222, 187	Pale beige
15	Girommen (Ekornavallen)	Sweden	58.2794522	13.6026831	Passage Grave	237, 224, 194	232, 222, 187	237, 227, 204	Pale beige
16	Girommen (Ekornavallen)	Sweden	58.2794522	13.6026831	Passage Grave	199, 174, 117	201, 177, 121	207, 182, 126	Mid beige
17	Girommen (Ekornavallen)	Sweden	58.2794522	13.6026831	Passage Grave	230, 216, 184	235, 222, 192	230, 218, 193	Pale beige
18	Girommen (Ekornavallen)	Sweden	58.2794522	13.6026831	Passage Grave	207, 174, 97	204, 173, 102	199, 171, 105	Mid beige
19	Girommen (Ekornavallen)	Sweden	58.2794522	13.6026831	Passage Grave	201, 174, 111	201, 176, 117	194, 171, 116	Mid beige
20	Girommen (Ekornavallen)	Sweden	58.2794522	13.6026831	Passage Grave	235, 218, 178	230, 214, 177	232, 217, 181	Pale beige
21	Girommen (Ekornavallen)	Sweden	58.2794522	13.6026831	Passage Grave	204, 176, 110	209, 179, 110	209, 183, 121	Mid beige
22	Girommen (Ekornavallen)	Sweden	58.2794522	13.6026831	Passage Grave	230, 214, 179	222, 209, 180	227, 215, 188	Pale beige
23	Girommen (Ekornavallen)	Sweden	58.2794522	13.6026831	Passage Grave	176, 145, 72	181, 150, 78	173, 142, 69	Deep beige
24	Girommen (Ekornavallen)	Sweden	58.2794522	13.6026831	Passage Grave	166, 136, 68	168, 139, 71	168, 140, 74	Deep beige

Table 44. Girommen data





Fig 78. Klövagårdens, the southernmost of the group of four passage graves, now better signposted and cared for by local community. P Foreman 2017

Klövagårdens is the southernmost of four intervisible passage graves, “undoubtedly the most impressive surviving cemetery of megalithic graves in Sweden” (Tilley 1999, 159). It is not difficult to slip into hyperbole here - the Karleby grouping have an atmosphere, of stillness and contemplation.

This tomb is relatively well preserved, with a still-navigable passage (with two sets of “blocking” door like structures along it) and most of the limestone uprights and capstones are still in evidence. The passage somewhat unusually is not central to the chamber, but juts off from the northern edge; perhaps indicative of a later extension of the chamber to the south. Excavated in 1872, some 80 individuals in the characteristic niches were found, though in an unusual double layered construction (Tilley 1999).

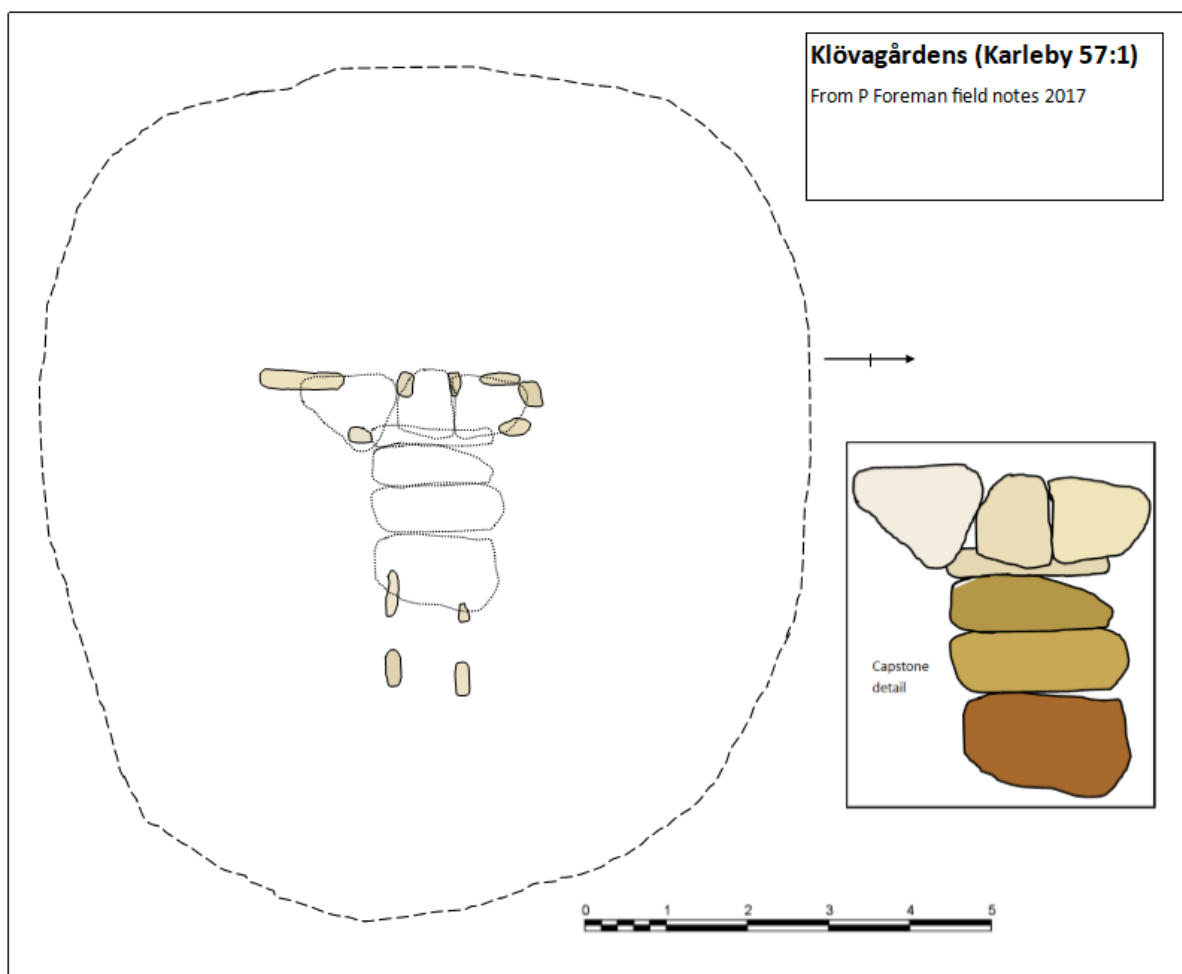


Fig 79. Klövagårdens site plan in colour

1	Klövagårdens (Karleby 57:1) Sweden	58.1528667	13.6377397	Passage Grave	230, 214, 179	224, 211, 180	227, 214, 184	Pale beige
2	Klövagårdens (Karleby 57:1) Sweden	58.1528667	13.6377397	Passage Grave	232, 218, 186	237, 225, 197	235, 223, 197	Pale beige
3	Klövagårdens (Karleby 57:1) Sweden	58.1528667	13.6377397	Passage Grave	237, 226, 199	240, 230, 206	230, 219, 195	Pale beige
4	Klövagårdens (Karleby 57:1) Sweden	58.1528667	13.6377397	Passage Grave	235, 221, 190	235, 223, 195	230, 218, 190	Pale beige
5	Klövagårdens (Karleby 57:1) Sweden	58.1528667	13.6377397	Passage Grave	166, 101, 40	168, 105, 45	168, 108, 52	Deep beige-brown
6	Klövagårdens (Karleby 57:1) Sweden	58.1528667	13.6377397	Passage Grave	194, 163, 78	199, 168, 84	191, 162, 80	Deep beige
7	Klövagårdens (Karleby 57:1) Sweden	58.1528667	13.6377397	Passage Grave	179, 149, 66	181, 152, 71	186, 156, 74	Deep beige
8	Klövagårdens (Karleby 57:1) Sweden	58.1528667	13.6377397	Passage Grave	230, 216, 179	224, 212, 177	230, 218, 186	Pale beige
9	Klövagårdens (Karleby 57:1) Sweden	58.1528667	13.6377397	Passage Grave	240, 233, 216	242, 237, 223	237, 231, 213	Very pale beige
10	Klövagårdens (Karleby 57:1) Sweden	58.1528667	13.6377397	Passage Grave	240, 224, 180	235, 221, 185	232, 220, 186	Pale beige
11	Klövagårdens (Karleby 57:1) Sweden	58.1528667	13.6377397	Passage Grave	235, 221, 185	240, 228, 187	240, 228, 197	Pale beige
12	Klövagårdens (Karleby 57:1) Sweden	58.1528667	13.6377397	Passage Grave	232, 221, 190	232, 224, 202	237, 230, 211	Pale beige
13	Klövagårdens (Karleby 57:1) Sweden	58.1528667	13.6377397	Passage Grave	237, 226, 194	232, 220, 186	227, 215, 184	Pale beige
14	Klövagårdens (Karleby 57:1) Sweden	58.1528667	13.6377397	Passage Grave	222, 209, 173	214, 202, 169	224, 212, 177	Pale beige
15	Klövagårdens (Karleby 57:1) Sweden	58.1528667	13.6377397	Passage Grave	230, 217, 181	227, 216, 186	230, 219, 190	Pale beige
16	Klövagårdens (Karleby 57:1) Sweden	58.1528667	13.6377397	Passage Grave	224, 215, 191	227, 215, 184	230, 220, 193	Pale beige
17	Klövagårdens (Karleby 57:1) Sweden	58.1528667	13.6377397	Passage Grave	237, 229, 206	227, 217, 191	230, 218, 188	Pale beige
18	Klövagårdens (Karleby 57:1) Sweden	58.1528667	13.6377397	Passage Grave	232, 221, 190	237, 225, 190	230, 217, 181	Pale beige

Table 45. Klövagårdens data



#### 4.6.12 Ragnvalds Kull



*Fig 80. Ragnvalds Kull - largely infilled and the chamber inaccessible, disguising the true scale of the monument. P Foreman 2017*

The largest and best preserved passage grave in Sweden (Tilley 1999), though lacking in the immediacy of impact of other sites such as Girommen due to its overgrown and partially buried features. Through ploughing, the mound is somewhat denuded and merges with the surrounding topography, which belies its true size. The accompanying information panel displays a lively imagining of ritual behaviour at the site - and suggests that the cupmarks visible on one or more of the capstones were “used in sacrifices”.

Colour here is bold and striking: the chamber orthostats are of rich, warm red sandstone, while the capstones in contrast are rugged, grey and pale - and all stones are massive in proportion. This is a monument making a bold statement.

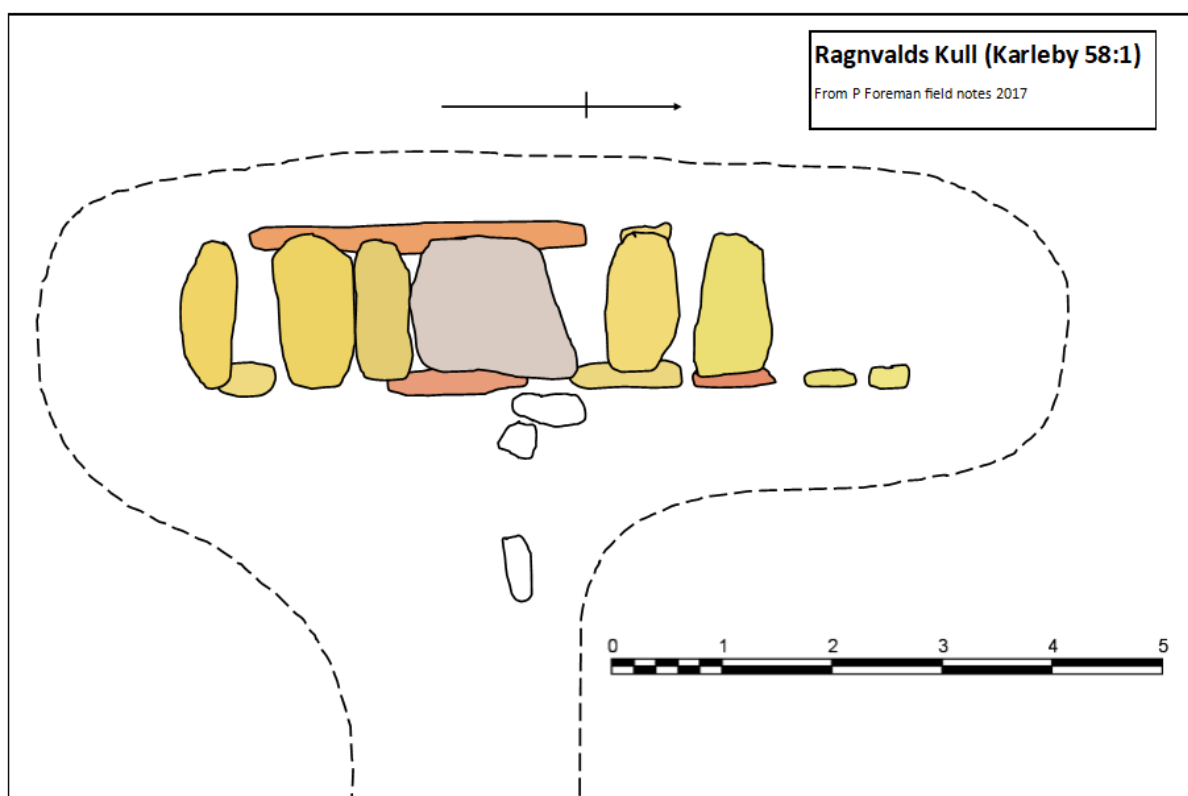
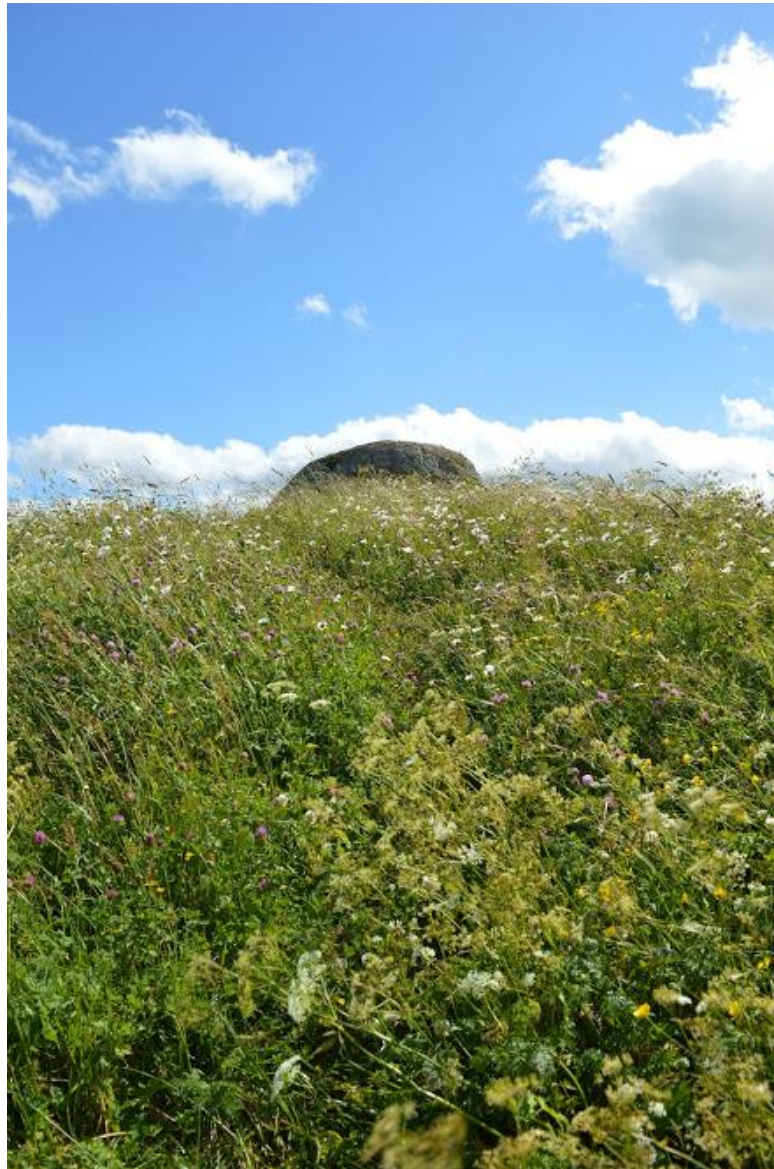


Fig 81. Ragnvalds Kull site plan in colour

1 Ragnvalds Kull (Karleby 58: Sweden	58.1536706	13.6377826	Passage Grave				
2 Ragnvalds Kull (Karleby 58: Sweden	58.1536706	13.6377826	Passage Grave				
3 Ragnvalds Kull (Karleby 58: Sweden	58.1536706	13.6377826	Passage Grave				
4 Ragnvalds Kull (Karleby 58: Sweden	58.1536706	13.6377826	Passage Grave	237, 158, 121	232, 156, 121	235, 159, 124	Pink beige
5 Ragnvalds Kull (Karleby 58: Sweden	58.1536706	13.6377826	Passage Grave	245, 221, 127	240, 218, 129	242, 215, 104	Pale yellow beige
6 Ragnvalds Kull (Karleby 58: Sweden	58.1536706	13.6377826	Passage Grave	235, 206, 94	240, 212, 101	245, 215, 95	Pale yellow beige
7 Ragnvalds Kull (Karleby 58: Sweden	58.1536706	13.6377826	Passage Grave	242, 215, 104	237, 210, 100	240, 213, 108	Pale yellow beige
8 Ragnvalds Kull (Karleby 58: Sweden	58.1536706	13.6377826	Passage Grave	235, 210, 110	227, 204, 113	232, 206, 102	Pale yellow beige
9 Ragnvalds Kull (Karleby 58: Sweden	58.1536706	13.6377826	Passage Grave	245, 162, 103	237, 160, 104	242, 157, 97	Pink beige
10 Ragnvalds Kull (Karleby 58: Sweden	58.1536706	13.6377826	Passage Grave	212, 199, 190	217, 203, 193	209, 194, 184	Pale grey
11 Ragnvalds Kull (Karleby 58: Sweden	58.1536706	13.6377826	Passage Grave	240, 216, 122	237, 215, 126	240, 218, 129	Pale yellow beige
12 Ragnvalds Kull (Karleby 58: Sweden	58.1536706	13.6377826	Passage Grave	245, 218, 110	242, 218, 119	237, 211, 104	Pale yellow beige
13 Ragnvalds Kull (Karleby 58: Sweden	58.1536706	13.6377826	Passage Grave	245, 220, 122	242, 219, 126	240, 214, 110	Pale yellow beige
14 Ragnvalds Kull (Karleby 58: Sweden	58.1536706	13.6377826	Passage Grave	224, 131, 94	230, 139, 103	224, 138, 103	Pink beige
15 Ragnvalds Kull (Karleby 58: Sweden	58.1536706	13.6377826	Passage Grave	242, 230, 121	235, 223, 115	230, 218, 117	Pale yellow beige
16 Ragnvalds Kull (Karleby 58: Sweden	58.1536706	13.6377826	Passage Grave	240, 228, 120	235, 223, 120	237, 226, 123	Pale yellow beige
17 Ragnvalds Kull (Karleby 58: Sweden	58.1536706	13.6377826	Passage Grave	247, 235, 129	240, 229, 132	242, 232, 138	Pale yellow beige
18 Ragnvalds Kull (Karleby 58: Sweden	58.1536706	13.6377826	Passage Grave	235, 225, 134	245, 234, 132	245, 234, 135	Pale yellow beige

Table 46. Ragnvalds Kull data





*Fig 82. Logårds Kulle, rising from the surrounding farmland, and garlanded in wildflowers. P Foreman 2017*

Of the Karleby cluster of passage graves, Logårds Kulle is perhaps the most visually striking and affecting: its mound has retained the steep slope and round profile that raises it from the surrounding fields, and in the height of Swedish summer when this research was conducted, it is swathed in dozens of varieties of wildflowers, alpine plants and lichens. It is only at the top of the mound that the massive nature of the surviving stones and chamber construction can be appreciated. Similarly to Ragnvalds Kull, the orthostats are large slabs of red sandstone, capped by granite boulders.

Excavation has not been conducted here since 1874; at that time, significant amounts of skeletal material was recovered, in characteristic niches, and in layered fashion similar to that of Klövagårdens some 150m to the south (Tilley 1999).

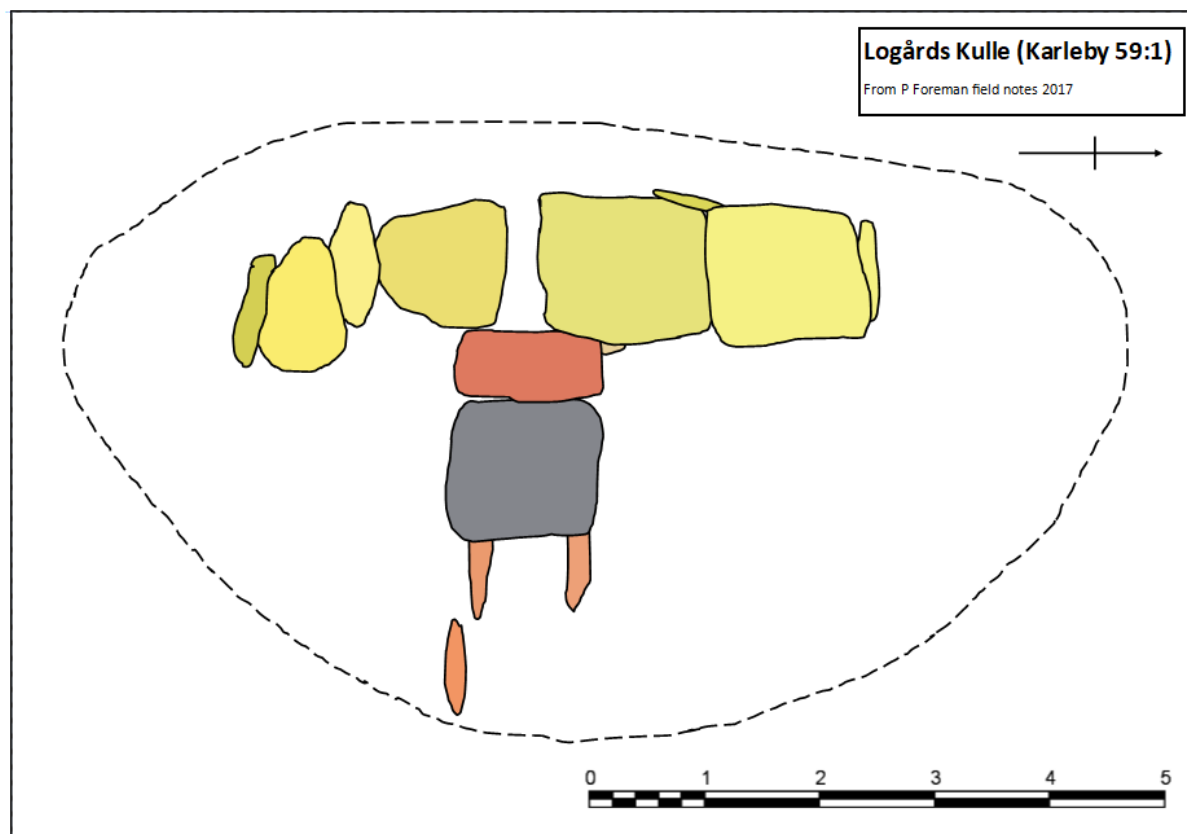


Fig 83. Logårds Kulle site plan in colour

1 Logårds Kulle (Karleby 59:1) Sweden	58.1546782	13.6381689	Passage Grave	237, 148, 100	242, 149, 99	235, 145, 96	Pink beige
2 Logårds Kulle (Karleby 59:1) Sweden	58.1546782	13.6381689	Passage Grave	230, 147, 103	235, 154, 110	232, 155, 114	Pink beige
3 Logårds Kulle (Karleby 59:1) Sweden	58.1546782	13.6381689	Passage Grave	242, 160, 116	237, 160, 119	230, 155, 115	Pink beige
4 Logårds Kulle (Karleby 59:1) Sweden	58.1546782	13.6381689	Passage Grave	124, 128, 135	132, 134, 140	129, 133, 143	Blue grey
5 Logårds Kulle (Karleby 59:1) Sweden	58.1546782	13.6381689	Passage Grave	217, 123, 100	222, 121, 95	214, 118, 94	Pink beige
6 Logårds Kulle (Karleby 59:1) Sweden	58.1546782	13.6381689	Passage Grave	240, 216, 165	232, 208, 155	227, 205, 157	Pale beige
7 Logårds Kulle (Karleby 59:1) Sweden	58.1546782	13.6381689	Passage Grave	242, 229, 114	235, 222, 113	242, 229, 107	Yellow beige
8 Logårds Kulle (Karleby 59:1) Sweden	58.1546782	13.6381689	Passage Grave	247, 235, 129	250, 239, 137	242, 232, 136	Pale yellow beige
9 Logårds Kulle (Karleby 59:1) Sweden	58.1546782	13.6381689	Passage Grave	250, 239, 145	250, 236, 110	250, 237, 122	Pale yellow beige
10 Logårds Kulle (Karleby 59:1) Sweden	58.1546782	13.6381689	Passage Grave	207, 202, 81	212, 207, 83	212, 208, 89	Yellow beige
11 Logårds Kulle (Karleby 59:1) Sweden	58.1546782	13.6381689	Passage Grave	237, 233, 114	230, 226, 122	237, 234, 130	Pale yellow beige
12 Logårds Kulle (Karleby 59:1) Sweden	58.1546782	13.6381689	Passage Grave	237, 234, 142	245, 241, 132	237, 234, 128	Pale yellow beige
13 Logårds Kulle (Karleby 59:1) Sweden	58.1546782	13.6381689	Passage Grave	247, 234, 129	245, 241, 130	240, 236, 129	Pale yellow beige
14 Logårds Kulle (Karleby 59:1) Sweden	58.1546782	13.6381689	Passage Grave	214, 210, 77	219, 215, 88	219, 220, 99	Yellow beige

Table 47. Logårds Kulle data

## 4.7 Netherlands

### 4.7.1 On sample size and distribution

The following twelve megalithic sites represent locations across the Drenthe region, and are a mixture of heavily reconstructed and more “natural” monuments - some suburban, some rural. These monuments have in recent years seen significant increase in visitor numbers and footfall due to the development of the Megalithic Routes project.

The sites in this case study were all visited in June of 2017, during a heat wave in the region which saw much of the usual vegetation dieback, allowing good access to all sites, though there was considerable public footfall often extending the time period taking to survey each site. The first, D27, was visited on the day of the summer solstice (though it is now situated within a wooded glade, making any astronomical and solar alignments difficult to ascertain). Every *hunebed* in the region is part of a cultural trail designed to be walked or cycled along, and each features modern and engagingly designed information boards. Not usually directly about the *hunebed* they accompany, they impart theories on life in the Neolithic's new farming culture, methods of monument construction, and how the *hunebedden* have features in local Dutch life through history.



*Fig 84. The information board at suburban megalith D47, with ethnographic musings on monument construction. P Foreman 2017*



#### 4.7.2 Background



*Fig 85. People of the Funnel Beaker Culture, reconstructed from skeletal evidence at the Hunebedcentrum, Borger, NL. P Foreman 2017*

The Drenthe region of the Netherlands is the location of a dense concentration of large chambered tombs, constructed during the middle Neolithic around 3400-2850 BC, and forms part of what is considered to be the “Neolithic West Group” of the TRB (Bakker 1992). There are 52 monuments still standing within the region, which today form a well-trodden tourist trail (due in no small part to the excellent state of public cycle and hiking routes, and the quality of the information boards and signposts at each site). The monuments are called *hunebedden*; giants’ beds. It is easy to see how this nomenclature stuck: the general form of megaliths in the region is long, rectangular, squat in form, like vast firm divans. The megaliths of Drenthe are considered in the literature to be of a largely uniform style; that is, long chambered passage tombs with entrances on the right of the centre on the southern or eastern long sides, slightly wider chamber shape to the left of the entrance, have uneven “cobbled” flooring covered in burnt granite grit within the chamber, feature sillstones at the entrances, and are constructed of a series of “trilithons” - paired boulders with a capstone perched atop them (Bakker 1992). The megaliths are not located at the highest, and therefore most visible, points in the landscape: these are reserved for habitation sites, suggestive of not only practical concerns of raising dwellings above the damp, wetland

lowlands, but also having megaliths act as an intermediary and liminal guardian space between living-land and dead-space (Rap, in press).

There have been numerous waves of academic interest and excavation of the sites in the region, most notably by Van Giffen in the early part of the 20th century and by Jan Bakker in the later part. Though Van Giffen excavated some 30 sites, the approach to small finds was poor, with no sieving and excavations conducted at speeds not conducive to careful working practices - though later excavations did act with greater care and diligence, there is currently a ban on the excavation of extant hunebedden as “excavation techniques have little developed since 1912...only revolutionary new techniques may improve our understanding of *hunebeds* in the distant future” (Bakker 2013, 16). The predominant find type recorded at sites that have been excavated is sherds of pottery, numbering in some cases in the several thousand, and with a range of typologies suggestive of not only multiple types of activity such as ritual feasting and offering-giving, but also an extended period of use of up to 400 years (Brindley 2003). Archaeological interpretation and theorising in this region is based predominantly upon the study of the pottery assemblage, with pottery chronologies and complex typological treatises being the most common research output. The conclusions from these, however, are not always immediately comprehensible - for example, Bakker extrapolates that fine TRB ware, and by extension “probably also more robust pots”, was made by housewives due to the existence of nail marks and “elegant pinch marks” upon one decorated bowl - an example of the often entrenched notions of Neolithic concepts of society, gender, and work that exist in the literature (Bakker 2013, 18).

The monuments do show some variation in the construction of their kerbs and mounds, though significant ploughing and other agricultural, antiquarian, and general erosion has left these difficult to confidently interpret. Preservation of skeletal material is poor due to the acidic soils, so there is little in the way of data on number, sex, or age of individuals interred within the monuments.

Central to the region is the small town of Borger, home to a museum dedicated to the TRB monuments and archaeology of the region, the *Hunebedcentrum*. Stone is the figurative and literal bedrock of the town - the streets are lined with boulders of various sizes and colours, gardens are constructed around them, and the museum itself has a magnificent “boulder garden” where geologist Jannes van Echten collected stones of every type found in the Drenthe region, donated by the people of the region, and created a vast community-curated collection of stones that displays the wealth of glacier-gifted rocks.

### 4.7.3 Geology of Drenthe



*Fig 86. The Boulder Garden at the Hunebedcentrum, Borger. Collected here are examples of every stone type found in the region. P Foreman 2017*

The richness of stone material in the Drenthe region has one cause: glaciation. Scandinavian granite, gneiss, and other rock types were deposited here during the penultimate ice age in northern Europe some 150,000 years ago, leaving vast boulder fields full of richly coloured, textured, and shaped stones that caught the eye of the monument builders. These granite boulders, subject to glacial forces that flattened one side, were selected and placed with said flat side facing into the chamber, with the more natural, rugged, textured surfaces facing out.

The monuments are generally constructed on ridges and slopes (as far as they are present in the typically flat, low-lying topography of the region), and Bakker believes the stones used in construction would have been extremely locally sourced, no more than 350-450 metres (Bakker 1992, 36). It should be noted, however, that Bakker is sceptical on the matter of the ability of Neolithic tomb builders to transport stone over any great distance, and they are dismissive of the (now well established) Preseli to Stonehenge vector for the bluestones, and indeed any transportation over 5km; it is in fact eminently possible that greater distances were covered to bring just the “right” stone to the site of construction. With such particular shapes and forms being sought out for the Drenthe *hunebedden*, it seems likely that they were not all fortuitous hyper-local discoveries.





*Fig 87. D27, sitting in the dappled midsummer sunlight in its wooded glade. P Foreman 2017*

This is the largest tomb in Drenthe, and sits within the grounds of the *Hunebedcentrum*. Since it was bought by the government and came under its protection in 1869, it has been a popular leisure spot and has been variously planted as an “English garden”, and pine trees were felled to make way for broadleaf species such as chestnut to “beautify” the area around the turn of the 20th century (van der Sanden, 2017). It is well visited and many of the boulders with easily accessible foot and handholds show signs of repeated climbing and exploration. Though a section was excavated in 1685, the majority has not been formally archaeologically excavated and the matter of investigation vs preservation remains the subject of debate.

As well as its massive size, the chamber is notable for featuring a two capstones that are actually one boulder cleft in two (Bakker 1992, 25). Bakker discusses many ways this could have been achieved by the builders themselves, though it seems likely the boulders were discovered in this state and then utilised, rather than a deliberate act.

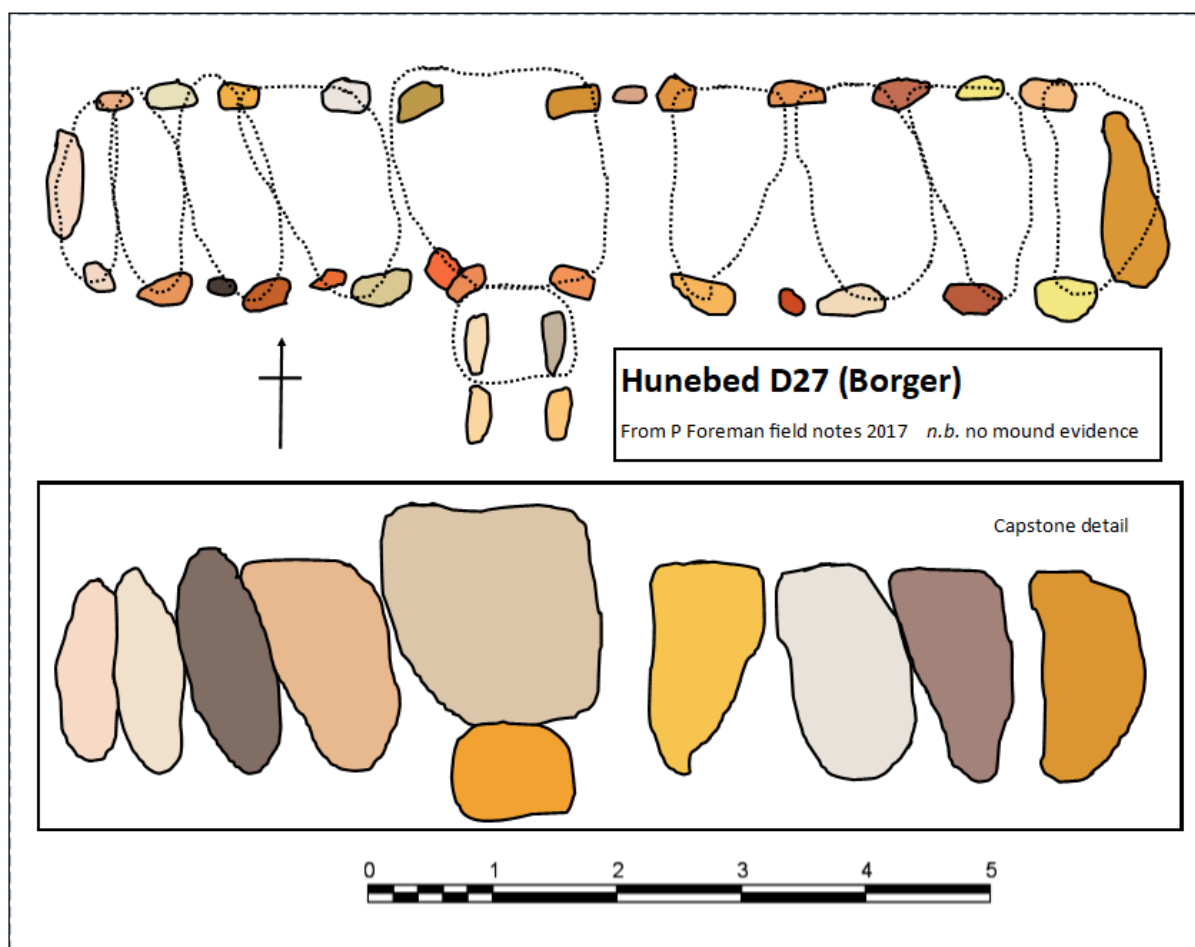


Fig 88. D27 site plan in colour



1	Hunebed D27	Netherlands	52.930198	6.7974633	Passage Grave	207, 145, 60	219, 150, 53	230, 155, 50	Yellow-orange Beige
2	Hunebed D27	Netherlands	52.930198	6.7974633	Passage Grave	240, 188, 132	245, 189, 130	240, 186, 129	Pink-tinged beige
3	Hunebed D27	Netherlands	52.930198	6.7974633	Passage Grave	240, 228, 216	235, 223, 211	232, 220, 207	Very pale grey to white
4	Hunebed D27	Netherlands	52.930198	6.7974633	Passage Grave	194, 64, 54	191, 63, 54	191, 56, 46	Deep pink to red colour
5	Hunebed D27	Netherlands	52.930198	6.7974633	Passage Grave	242, 230, 116	242, 231, 128	242, 230, 121	pale yellow-beige
6	Hunebed D27	Netherlands	52.930198	6.7974633	Passage Grave	189, 107, 79	194, 109, 81	189, 107, 79	Deep pink with pale inclusions
7	Hunebed D27	Netherlands	52.930198	6.7974633	Passage Grave	184, 94, 64	184, 91, 61	176, 88, 58	Deep pink
8	Hunebed D27	Netherlands	52.930198	6.7974633	Passage Grave	158, 127, 117	163, 131, 121	150, 118, 107	Mid grey, pale inclusions
9	Hunebed D27	Netherlands	52.930198	6.7974633	Passage Grave	242, 148, 70	232, 150, 84	230, 141, 69	Orange-beige
10	Hunebed D27	Netherlands	52.930198	6.7974633	Passage Grave	240, 216, 182	242, 218, 184	242, 15, 177	Very very pale beige approaching white
11	Hunebed D27	Netherlands	52.930198	6.7974633	Passage Grave	230, 224, 216	232, 226, 218	227, 220, 211	Very very pale grey approaching white
12	Hunebed D27	Netherlands	52.930198	6.7974633	Passage Grave	199, 72, 30	204, 74, 31	209, 79, 36	Deep orange-red
13	Hunebed D27	Netherlands	52.930198	6.7974633	Passage Grave	212, 138, 59	227, 148, 64	232, 149, 60	Deep orange beige
14	Hunebed D27	Netherlands	52.930198	6.7974633	Passage Grave	247, 205, 106	247, 197, 79	242, 196, 87	pale yellow-beige
15	Hunebed D27	Netherlands	52.930198	6.7974633	Passage Grave	250, 175, 70	247, 182, 92	240, 176, 86	pale orange beige
16	Hunebed D27	Netherlands	52.930198	6.7974633	Passage Grave	219, 150, 53	212, 145, 51	217, 143, 39	orange beige, more orange
17	Hunebed D27	Netherlands	52.930198	6.7974633	Passage Grave	212, 163, 138	217, 165, 137	222, 170, 142	pink tinged beige
18	Hunebed D27	Netherlands	52.930198	6.7974633	Passage Grave	232, 137, 86	242, 148, 87	245, 141, 86	orange beige, more orange
19	Hunebed D27	Netherlands	52.930198	6.7974633	Passage Grave	240, 134, 91	235, 139, 87	230, 139, 90	orange beige, more orange
20	Hunebed D27	Netherlands	52.930198	6.7974633	Passage Grave	224, 200, 166	219, 198, 169	227, 209, 184	Grey-beige
21	Hunebed D27	Netherlands	52.930198	6.7974633	Passage Grave	247, 227, 198	247, 220, 181	247, 209, 156	Pale beige
22	Hunebed D27	Netherlands	52.930198	6.7974633	Passage Grave	186, 171, 149	194, 178, 155	191, 175, 153	Mid grey BUT NOTABLE INCLUSIONS
23	Hunebed D27	Netherlands	52.930198	6.7974633	Passage Grave	240, 159, 46	242, 162, 48	237, 160, 52	Speckled - orange/deep grey/white
24	Hunebed D27	Netherlands	52.930198	6.7974633	Passage Grave	252, 220, 174	252, 214, 169	247, 210, 158	very pale orange beige
25	Hunebed D27	Netherlands	52.930198	6.7974633	Passage Grave	245, 191, 115	252, 198, 121	247, 194, 129	pale orange beige
26	Hunebed D27	Netherlands	52.930198	6.7974633	Passage Grave	242, 110, 65	247, 106, 59	247, 110, 64	Deep pink with orange tinge
27	Hunebed D27	Netherlands	52.930198	6.7974633	Passage Grave	209, 193, 140	217, 200, 145	227, 209, 150	Grey-beige
28	Hunebed D27	Netherlands	52.930198	6.7974633	Passage Grave	227, 178, 138	232, 184, 142	227, 186, 145	pink tinged beige
29	Hunebed D27	Netherlands	52.930198	6.7974633	Passage Grave	237, 231, 225	235, 228, 223	227, 222, 218	Very pale grey to white
30	Hunebed D27	Netherlands	52.930198	6.7974633	Passage Grave	184, 150, 72	189, 154, 74	196, 159, 73	Deep beige
31	Hunebed D27	Netherlands	52.930198	6.7974633	Passage Grave	247, 179, 69	242, 176, 70	235, 172, 70	orange beige (INT) / pale grey (EXT)
32	Hunebed D27	Netherlands	52.930198	6.7974633	Passage Grave	230, 107, 50	235, 110, 52	240, 114, 55	Deep red-beige
33	Hunebed D27	Netherlands	52.930198	6.7974633	Passage Grave	204, 90, 29	196, 96, 41	201, 93, 44	Deep orange-red beige
34	Hunebed D27	Netherlands	52.930198	6.7974633	Passage Grave	122, 105, 95	128, 110, 101	133, 117, 109	Deep grey
35	Hunebed D27	Netherlands	52.930198	6.7974633	Passage Grave	82, 67, 59	74, 61, 55	71, 59, 52	Very deep grey to black, deep orange-beige patches
36	Hunebed D27	Netherlands	52.930198	6.7974633	Passage Grave	235, 223, 185	232, 221, 186	237, 226, 187	Very pale beige to white
37	Hunebed D27	Netherlands	52.930198	6.7974633	Passage Grave	230, 160, 110	224, 151, 99	217, 147, 98	Orange beige
38	Hunebed D27	Netherlands	52.930198	6.7974633	Passage Grave	224, 145, 88	232, 149, 90	227, 146, 89	Orange beige
39	Hunebed D27	Netherlands	52.930198	6.7974633	Passage Grave	242, 177, 131	237, 176, 133	235, 178, 138	pale orange beige
40	Hunebed D27	Netherlands	52.930198	6.7974633	Passage Grave	237, 214, 197	242, 215, 196	247, 218, 198	Pale beige
41	Hunebed D27	Netherlands	52.930198	6.7974633	Passage Grave	250, 218, 195	247, 218, 198	247, 226, 210	Very very pale orange-beige
42	Hunebed D27	Netherlands	52.930198	6.7974633	Passage Grave	235, 220, 192	240, 224, 204	247, 234, 210	very pale beige

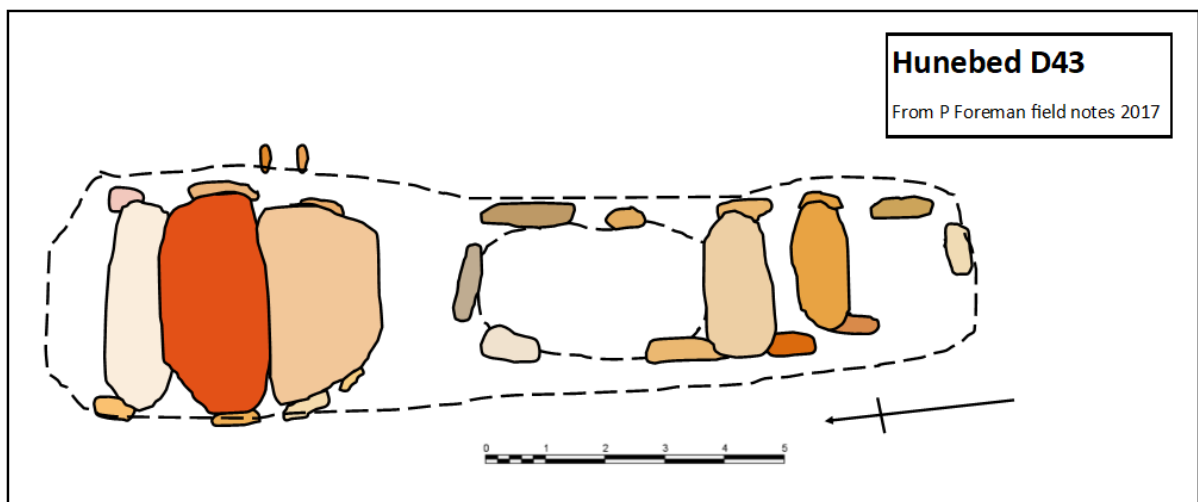
Table 48. D27 data

#### 4.7.5 D43 - Schimmeres



Fig 89. View along the western side of the kerb at Schimmeres. P Foreman 2017

Largely “reconstructed” by Van Giffen in 1960, so original layout of the stones may not be reflected in their current positions. In particular, the cobbling between the kerbstones is a modern insert; originally this was packed with flat slabs (Bakker 1992). This megalith is unusual in the region, and of the surviving monuments is the only one where two (presumably) separate passage graves are constructed within one long mound (Bakker 1992) - in appearance, it is a strange amalgamation of long barrows and smaller oval chambered monuments. Unfortunately, the total lack of skeletal material makes analysing where the individuals interred within were born and lived in early life is impossible, and so drawing definitive connections to other regions and their monument building traditions is challenging.



*Fig 90. D43 site plan in colour*



1	Hunebed D43 (kerb)	Netherlands	52.793234	6.8871087	Passage Grave	235, 205, 150	237, 208, 154	232, 204, 151	Beige
2	Hunebed D43 (kerb)	Netherlands	52.793234	6.8871087	Passage Grave	232, 75, 121	227, 172, 120	232, 177, 125	Orange beige
3	Hunebed D43 (kerb)	Netherlands	52.793234	6.8871087	Passage Grave	227, 171, 118	224, 170, 119	230, 170, 115	orange beige
4	Hunebed D43 (kerb)	Netherlands	52.793234	6.8871087	Passage Grave	230, 220, 156	224, 215, 150	230, 220, 156	beige
5	Hunebed D43 (kerb)	Netherlands	52.793234	6.8871087	Passage Grave	219, 185, 129	214, 181, 129	219, 186, 132	Deep beige
6	Hunebed D43 (kerb)	Netherlands	52.793234	6.8871087	Passage Grave	240, 181, 86	232, 176, 86	235, 180, 91	orange beige
7	Hunebed D43 (kerb)	Netherlands	52.793234	6.8871087	Passage Grave	230, 202, 158	224, 197, 153	230, 203, 161	beige
8	Hunebed D43 (kerb)	Netherlands	52.793234	6.8871087	Passage Grave	242, 185, 92	237, 182, 92	240, 185, 96	orange beige
9	Hunebed D43 (kerb)	Netherlands	52.793234	6.8871087	Passage Grave	212, 186, 146	207, 183, 145	212, 187, 148	beige
10	Hunebed D43 (kerb)	Netherlands	52.793234	6.8871087	Passage Grave	232, 180, 97	227, 175, 91	230, 178, 96	orange-beige
11	Hunebed D43 (kerb)	Netherlands	52.793234	6.8871087	Passage Grave	242, 173, 61	237, 168, 57	240, 171, 60	deep orange beige
12	Hunebed D43 (kerb)	Netherlands	52.793234	6.8871087	Passage Grave	196, 159, 100	199, 162, 101	201, 164, 105	Deep beige
13	Hunebed D43 (kerb)	Netherlands	52.793234	6.8871087	Passage Grave	207, 163, 106	201, 164, 103	199, 159, 95	Deep beige
14	Hunebed D43 (kerb)	Netherlands	52.793234	6.8871087	Passage Grave	242, 214, 170	242, 219, 182	237, 214, 175	Pale beige
15	Hunebed D43 (kerb)	Netherlands	52.793234	6.8871087	Passage Grave	250, 237, 217	242, 229, 208	245, 233, 213	Very pale beige
16	Hunebed D43 (kerb)	Netherlands	52.793234	6.8871087	Passage Grave	250, 239, 222	242, 231, 213	247, 236, 218	Very pale beige
17	Hunebed D43 (kerb)	Netherlands	52.793234	6.8871087	Passage Grave	214, 185, 137	219, 189, 140	224, 194, 146	Beige
18	Hunebed D43 (kerb)	Netherlands	52.793234	6.8871087	Passage Grave	242, 233, 218	247, 238, 223	242, 232, 216	Very pale beige
19	Hunebed D43 (kerb)	Netherlands	52.793234	6.8871087	Passage Grave	212, 184, 140	219, 182, 149	214, 190, 150	Beige
20	Hunebed D43 (kerb)	Netherlands	52.793234	6.8871087	Passage Grave	212, 185, 142	214, 185, 139	207, 179, 134	Beige
21	Hunebed D43 (kerb)	Netherlands	52.793234	6.8871087	Passage Grave	242, 228, 206	237, 224, 202	245, 234, 215	Very very pale beige
22	Hunebed D43 (kerb)	Netherlands	52.793234	6.8871087	Passage Grave				COFFIN RECORD
23	Hunebed D43 (kerb)	Netherlands	52.793234	6.8871087	Passage Grave	212, 182, 135	207, 178, 132	204, 177, 135	Beige
24	Hunebed D43 (kerb)	Netherlands	52.793234	6.8871087	Passage Grave	230, 214, 188	227, 211, 186	230, 215, 190	Pale beige
25	Hunebed D43 (kerb)	Netherlands	52.793234	6.8871087	Passage Grave	204, 169, 112	199, 168, 117	196, 166, 116	Beige
26	Hunebed D43 (kerb)	Netherlands	52.793234	6.8871087	Passage Grave	247, 195, 111	247, 196, 114	242, 196, 121	pale orange beige
27	Hunebed D43 (kerb)	Netherlands	52.793234	6.8871087	Passage Grave	252, 241, 222	247, 238, 223	242, 235, 223	Very pale beige to white
28	Hunebed D43 (kerb)	Netherlands	52.793234	6.8871087	Passage Grave	247, 234, 235	247, 237, 20	252, 239, 217	Very pale beige to white
29	Hunebed D43 (kerb)	Netherlands	52.793234	6.8871087	Passage Grave	214, 90, 13	217, 94, 17	219, 93, 24	Deep orange
30	Hunebed D43 (kerb)	Netherlands	52.793234	6.8871087	Passage Grave	247, 208, 183	242, 216, 167	247, 220, 168	Pale beige
31	Hunebed D43 (kerb)	Netherlands	52.793234	6.8871087	Passage Grave	237, 173, 83	237, 176, 90	240, 179, 93	Orange beige
32	Hunebed D43 (kerb)	Netherlands	52.793234	6.8871087	Passage Grave	242, 197, 133	237, 194, 133	240, 194, 129	pale orange beige
33	Hunebed D43 (kerb)	Netherlands	52.793234	6.8871087	Passage Grave	245, 216, 176	240, 211, 170	245, 219, 184	Pale beige
34	Hunebed D43 (kerb)	Netherlands	52.793234	6.8871087	Passage Grave	250, 193, 112	245, 191, 115	247, 197, 126	pale orange beige
35	Hunebed D43 (kerb)	Netherlands	52.793234	6.8871087	Passage Grave	191, 159, 115	189, 159, 117	194, 164, 122	beige
36	Hunebed D43 (kerb)	Netherlands	52.793234	6.8871087	Passage Grave	232, 166, 74	235, 172, 84	237, 171, 78	Orange beige
37	Hunebed D43 (kerb)	Netherlands	52.793234	6.8871087	Passage Grave	240, 159, 46	235, 158, 52	227, 153, 50	Deep orange beige
38	Hunebed D43 (kerb)	Netherlands	52.793234	6.8871087	Passage Grave	235, 172, 84	240, 175, 84	235, 171, 82	Orange beige
39	Hunebed D43 (kerb)	Netherlands	52.793234	6.8871087	Passage Grave	230, 168, 83	227, 166, 82	232, 171, 86	Orange beige
40	Hunebed D43 (kerb)	Netherlands	52.793234	6.8871087	Passage Grave	250, 209, 152	245, 207, 154	240, 204, 153	pale orange beige
41	Hunebed D43 (kerb)	Netherlands	52.793234	6.8871087	Passage Grave	227, 152, 48	224, 153, 54	227, 157, 59	Deep orange beige
42	Hunebed D43 (kerb)	Netherlands	52.793234	6.8871087	Passage Grave	207, 133, 29	204, 133, 33	207, 136, 37	orange beige with a brown tinge
43	Hunebed D43 (kerb)	Netherlands	52.793234	6.8871087	Passage Grave	242, 170, 68	245, 173, 73	240, 170, 72	orange beige
44	Hunebed D43 (kerb)	Netherlands	52.793234	6.8871087	Passage Grave	232, 165, 72	237, 170, 76	235, 169, 77	orange beige
45	Hunebed D43 (kerb)	Netherlands	52.793234	6.8871087	Passage Grave	242, 188, 111	242, 192, 121	237, 188, 119	pale orange beige
46	Hunebed D43 (kerb)	Netherlands	52.793234	6.8871087	Passage Grave	235, 165, 68	240, 171, 74	235, 168, 75	orange beige with orange tint
47	Hunebed D43 (kerb)	Netherlands	52.793234	6.8871087	Passage Grave	232, 166, 74	235, 166, 70	237, 170, 76	orange beige with orange tint
48	Hunebed D43 (kerb)	Netherlands	52.793234	6.8871087	Passage Grave	181, 143, 91	189, 152, 100	184, 148, 99	Deep beige
49	Hunebed D43 (kerb)	Netherlands	52.793234	6.8871087	Passage Grave	245, 198, 132	247, 203, 141	245, 203, 144	pale orange beige
50	Hunebed D43 (kerb)	Netherlands	52.793234	6.8871087	Passage Grave	230, 96, 14	230, 101, 21	235, 107, 28	Deep rose orange
51	Hunebed D43 (kerb)	Netherlands	52.793234	6.8871087	Passage Grave	240, 161, 113	235, 161, 115	240, 164, 117	orange beige with orange tint
52	Hunebed D43 (kerb)	Netherlands	52.793234	6.8871087	Passage Grave	240, 158, 108	240, 154, 101	242, 162, 111	orange beige with orange tint
53	Hunebed D43 (kerb)	Netherlands	52.793234	6.8871087	Passage Grave	232, 165, 84	237, 170, 88	242, 176, 94	orange beige

Table 49. D43 data

#### 4.7.6 D47 Angelslo - Z (south)

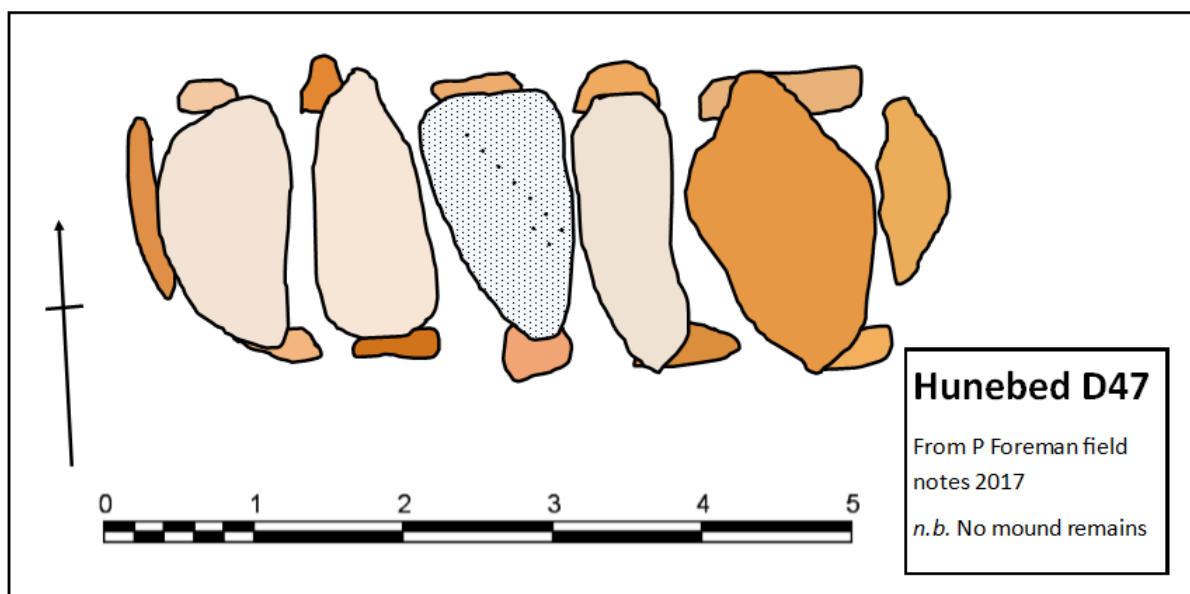


Fig 91. D 47 - Hunebed in a housing estate. P Foreman 2017

Along with close neighbour D46, this monument went from rural idyll to suburban park furniture in the 1960s, when the town of Emmen expanded rapidly and housing estates sprang up, subsuming the ancient monuments within them. Despite the mundane surroundings, the monument retains an atmosphere of calm, and a sense of separation from the modern life that has closed in upon it - possibly due to the fact it sits within a protective circle of oak trees that act as a buffer from the sound of droning mopeds, children playing, and distant traffic on the major roads through Emmen. The monument wears the indignities of obvious graffiti and evidence of the less-than-ritual-sacred deposition well, and despite the assemblage of bottle lids, cigarette butts and broken glass, the sheer presence of the stones and their persistence despite the encroachment of everyday life lends it an impressive air.

The monument sits on a north-south alignment, with the entrance location unclear. Reconstructed in 1997, two of the capstones are in fact modern additions, hauled into place by crane (van der Sanden 1997); therefore the capstones must be discounted in any interpretation of the original builders' intent, but it does make an interesting new chapter in the life story of the monument itself. Photographs of the monument in its denuded state before reconstruction show it to be extremely ruinous; the modern stone placement must be viewed with caution, and with limited and poor photography of the site pre reconstruction, identifying the new stone is significantly challenging.

The stones originally selected here show a broad range of colours, from palest beige to a rich burnt orange-red.



*Fig 92. D47 site plan coloured*



1 Hunebed D47	Netherlands	52.781781	6.9333625	Passage Grave	237, 172, 92	235, 173, 99	237, 177, 104	orange beige
2 Hunebed D47	Netherlands	52.781781	6.9333625	Passage Grave	237, 170, 88	242, 175, 92	237, 171, 90	orange beige
3 Hunebed D47	Netherlands	52.781781	6.9333625	Passage Grave	237, 184, 128	232, 179, 123	230, 178, 124	orange beige with a pink tinge
4 Hunebed D47	Netherlands	52.781781	6.9333625	Passage Grave	232, 151, 65	230, 152, 69	232, 156, 74	deep orange beige
5 Hunebed D47	Netherlands	52.781781	6.9333625	Passage Grave	230, 150, 64	219, 142, 59	224, 144, 58	deep orange beige
6 Hunebed D47	Netherlands	52.781781	6.9333625	Passage Grave	247, 233, 218	240, 226, 211	247, 234, 220	Very pale beige to white
7 Hunebed D47	Netherlands	52.781781	6.9333625	Passage Grave	232, 161, 86	240, 170, 96	235, 167, 94	orange beige
8 Hunebed D47	Netherlands	52.781781	6.9333625	Passage Grave	242, 163, 114	242, 165, 116	237, 161, 114	pale orange beige with pink tinge
9 Hunebed D47	Netherlands	52.781781	6.9333625	Passage Grave				PIEBALD - speckled white and black
10 Hunebed D47	Netherlands	52.781781	6.9333625	Passage Grave	235, 169, 108	237, 171, 109	240, 173, 110	Pale orange beige
11 Hunebed D47	Netherlands	52.781781	6.9333625	Passage Grave	207, 112, 23	209, 115, 27	217, 116, 22	Deep orange brown
12 Hunebed D47	Netherlands	52.781781	6.9333625	Passage Grave	247, 226, 205	247, 229, 213	242, 223, 206	Very pale beige
13 Hunebed D47	Netherlands	52.781781	6.9333625	Passage Grave	227, 132, 43	227, 135, 50	222, 130, 44	Rich orange beige, orange
14 Hunebed D47	Netherlands	52.781781	6.9333625	Passage Grave	245, 179, 118	242, 182, 126	237, 172, 111	Pale orange beige
15 Hunebed D47	Netherlands	52.781781	6.9333625	Passage Grave	247, 227, 208	242, 227, 213	250, 237, 225	Very pale beige to white
16 Hunebed D47	Netherlands	52.781781	6.9333625	Passage Grave	247, 204, 163	242, 201, 162	247, 208, 171	Pale orange beige
17 Hunebed D47	Netherlands	52.781781	6.9333625	Passage Grave	219, 140, 66	224, 144, 70	227, 145, 69	Deep orange beige

*Table 50. D47 data*

#### 4.7.7 D46 Angelslo - N (north)



*Fig 93. The eastern side of the hunebed D46, showing just how close it lies to the modern housing. P Foreman 2017*

Unlike the other suburban megalith D47, there is no circle of protective oaks here to lend a supernatural feeling of calm. Instead, it sits at the centre of many converging foot and cycle paths, perhaps designed to act as a hub to draw attention to the historical and cultural features of the housing estate. The site has not been excavated, and was subject to restoration in 1960 (at the time of the housing estate's initial construction) and in 1997 (van

der Sanden, 2017); photos of the monument's state before the housing development show the capstones were scattered, meaning their modern placement is purely speculative.

The capstones here are notably large and impressive looking, and both they and the remaining orthostats are more imposing than at D47. It follows the region's common north-south alignment, though the entrance location is not obvious in its current state. The same spectrum of contrasting colours is present.

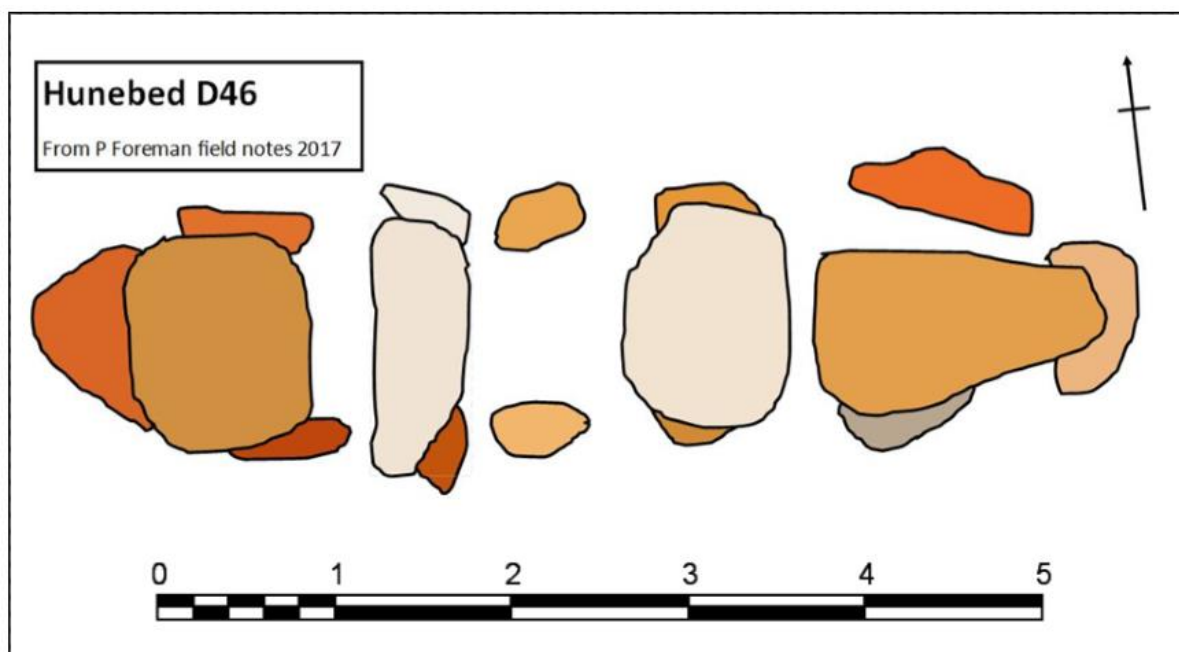


Fig 94. D43 coloured site plan

1 Hunebed D46	Netherlands	52.783849	6.9356675	Passage Grave	245, 187, 132	237, 181, 128	245, 185, 130	Pale orange beige
2 Hunebed D46	Netherlands	52.783849	6.9356675	Passage Grave	240, 107, 36	237, 108, 38	235, 110, 42	Deep red orange
3 Hunebed D46	Netherlands	52.783849	6.9356675	Passage Grave	222, 154, 71	227, 153, 75	230, 157, 69	Orange beige
4 Hunebed D46	Netherlands	52.783849	6.9356675	Passage Grave	179, 162, 141	184, 166, 145	186, 170, 151	Mid grey, orange beige striations
5 Hunebed D46	Netherlands	52.783849	6.9356675	Passage Grave	224, 147, 52	230, 152, 57	224, 151, 61	Rich orange beige
6 Hunebed D46	Netherlands	52.783849	6.9356675	Passage Grave	237, 221, 202	242, 227, 208	237, 223, 206	Very pale beige
7 Hunebed D46	Netherlands	52.783849	6.9356675	Passage Grave	212, 140, 53	209, 139, 54	214, 148, 66	Deep orange beige
8 Hunebed D46	Netherlands	52.783849	6.9356675	Passage Grave	230, 160, 76	235, 166, 82	230, 161, 78	Orange beige
9 Hunebed D46	Netherlands	52.783849	6.9356675	Passage Grave	240, 184, 115	242, 182, 109	240, 180, 108	Pale orange beige
10 Hunebed D46	Netherlands	52.783849	6.9356675	Passage Grave	237, 226, 213	242, 234, 223	242, 229, 213	Very pale beige
11 Hunebed D46	Netherlands	52.783849	6.9356675	Passage Grave	237, 225, 211	240, 227, 211	235, 223, 209	very pale beige to white
12 Hunebed D46	Netherlands	52.783849	6.9356675	Passage Grave	196, 80, 8	194, 84, 14	201, 88, 18	Deep orange
13 Hunebed D46	Netherlands	52.783849	6.9356675	Passage Grave	219, 110, 42	224, 114, 45	219, 112, 46	Deep orange beige
14 Hunebed D46	Netherlands	52.783849	6.9356675	Passage Grave	207, 141, 62	209, 144, 65	209, 137, 48	Orange beige
15 Hunebed D46	Netherlands	52.783849	6.9356675	Passage Grave	186, 65, 9	191, 70, 13	196, 73, 16	Deep orange red
16 Hunebed D46	Netherlands	52.783849	6.9356675	Passage Grave	212, 99, 38	217, 101, 39	209, 99, 40	Deep orange beige

Table 51. D46 data

#### 4.7.8

#### D38 Emmerveld - N



*Fig 95. The slanting capstone of D38. Though lichen cover is significant here, the striking colour of these stones is still visible. P Foreman 2017*

The Emmerveld megaliths sit in heathland, rural but not totally isolated - the monument trail is a popular one and the cyclists and hikers numerous. D38's current form was reconstructed in 1960, and it has not been excavated (van der Sanden 2017). Two capstones remain, one fallen to a slant, and most of the other stones. It sits on the same nne-ssw alignment as D39 to the north.

Colour and texture are immediately striking here. Even without the colour sensor, the rich pinkness in contrast with deep greys of the chosen granites are eye catching, weathered and be-lichened as they are today.

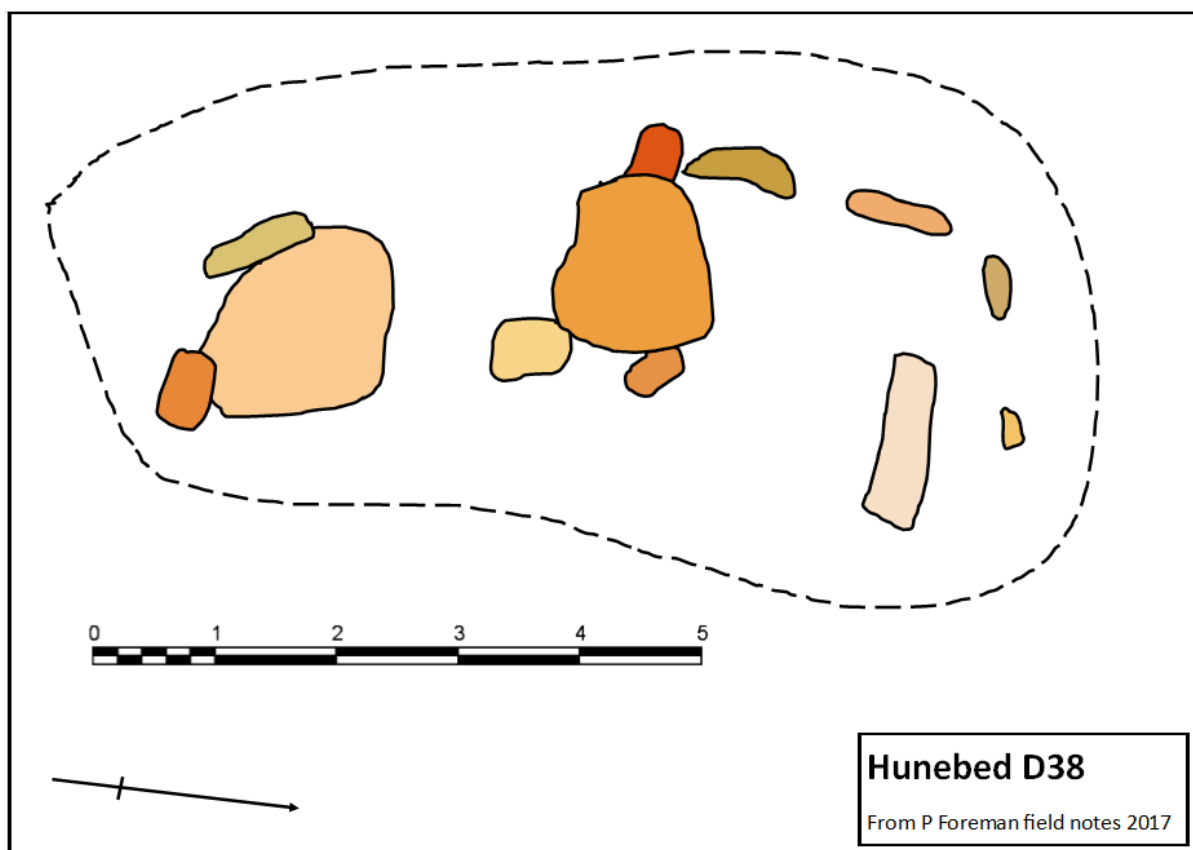


Fig 96. D38 coloured site plan

1 Hunebed D38	Netherlands	52.811326	6.8875515	Passage Grave	235, 134, 52	232, 135, 56	224, 131, 54	Orange beige
2 Hunebed D38	Netherlands	52.811326	6.8875515	Passage Grave	222, 201, 118	217, 196, 115	219, 199, 118	Beige
3 Hunebed D38	Netherlands	52.811326	6.8875515	Passage Grave	252, 201, 139	250, 203, 145	247, 203, 148	Very pale beige orange
4 Hunebed D38	Netherlands	52.811326	6.8875515	Passage Grave	250, 213, 132	247, 212, 136	242, 208, 133	Very pale beige orange
5 Hunebed D38	Netherlands	52.811326	6.8875515	Passage Grave	242, 160, 31	237, 159, 64	240, 160, 62	Orange beige
6 Hunebed D38	Netherlands	52.811326	6.8875515	Passage Grave	194, 153, 58	199, 158, 64	201, 161, 66	Deep beige
7 Hunebed D38	Netherlands	52.811326	6.8875515	Passage Grave	232, 151, 74	230, 146, 69	232, 148, 70	Orange beige
8 Hunebed D38	Netherlands	52.811326	6.8875515	Passage Grave	242, 173, 109	240, 172, 108	242, 173, 109	Pale orange beige
9 Hunebed D38	Netherlands	52.811326	6.8875515	Passage Grave	240, 212, 187	247, 222, 198	240, 217, 197	Very pale beige
10 Hunebed D38	Netherlands	52.811326	6.8875515	Passage Grave	204, 171, 110	207, 171, 105	204, 170, 106	Beige
11 Hunebed D38	Netherlands	52.811326	6.8875515	Passage Grave	250, 200, 107	245, 195, 103	247, 199, 109	Pale orange beige
12 Hunebed D38	Netherlands	52.811326	6.8875515	Passage Grave	219, 80, 15	222, 84, 20	217, 79, 15	Very deep orange red

Table 52. D38 data



#### 4.7.9

#### D39 Emmerveld - ZW (south west)



*Fig 97. D39, slowly being overtaken by the forest to the west. P Foreman 2017.*

Van Giffen dug a series of test trenches here in 1925 (though any finds are not recorded), that were then re-examined by Lanting in 1984; along with D38 it was reconstructed in 1960 (van der Sanden 2017). On a nne-ssw alignment, the passage stones do not survive so the entrance is difficult to place with certainty. Only one capstone survives, and has been placed over the centre of the chamber during reconstruction.

Though diminutive, the colour of the stones chosen here is striking. The texture is also interesting - in contrast with the huge boulder capstones of D40, here the stones chosen are relatively smooth, in finely defined shapes - the overall impression is one of careful and considered curation of material.



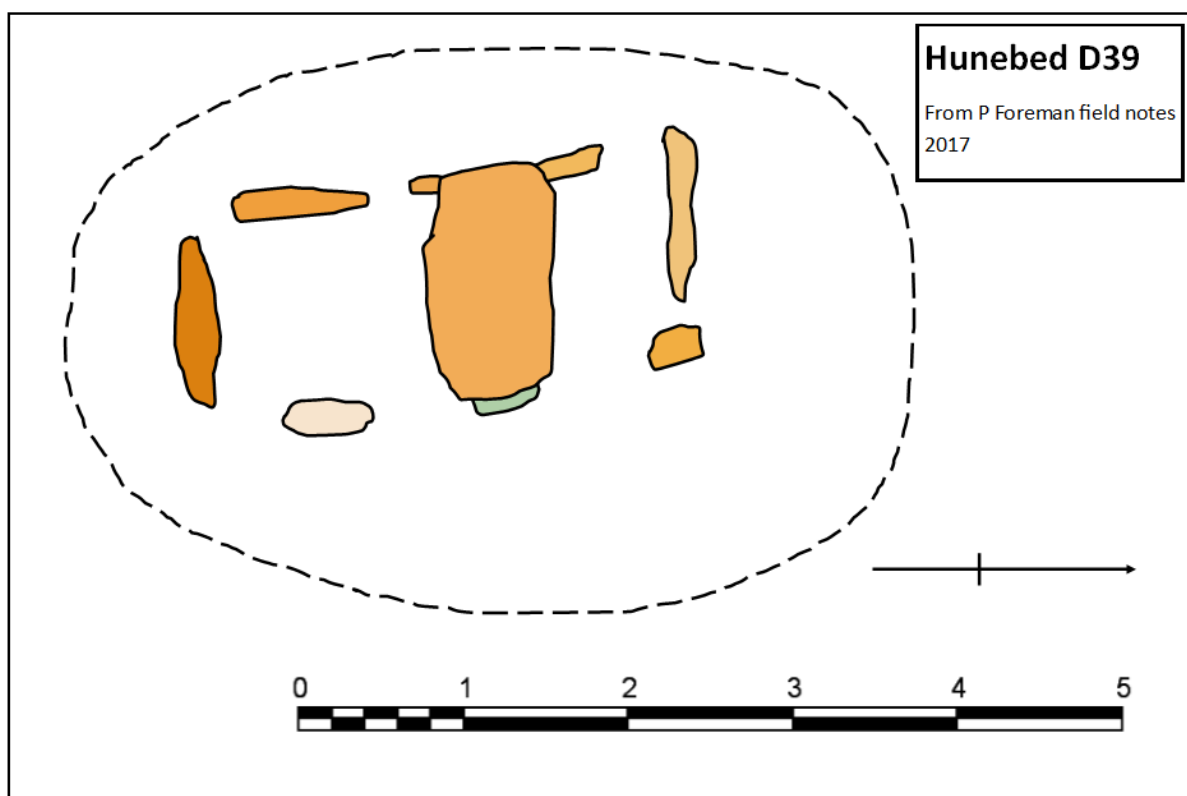


Fig 98. D39 coloured site plan

1 Hunebed D39	Netherlands	52.811079	6.8874942	Passage Grave	219, 128, 15	219, 128, 15	209, 127, 27	deep orange beige
2 Hunebed D39	Netherlands	52.811079	6.8874942	Passage Grave	237, 157, 59	240, 153, 60	242, 162, 63	orange beige to orange
3 Hunebed D39	Netherlands	52.811079	6.8874942	Passage Grave	250, 231, 207	247, 228, 205	242, 224, 201	Very pale beige to white
4 Hunebed D39	Netherlands	52.811079	6.8874942	Passage Grave	240, 166, 77	237, 166, 78	240, 170, 84	Orange beige
5 Hunebed D39	Netherlands	52.811079	6.8874942	Passage Grave	237, 170, 88	242, 172, 87	245, 178, 95	Orange beige
6 Hunebed D39	Netherlands	52.811079	6.8874942	Passage Grave	172, 201, 165	175, 207, 167	177, 209, 169	Green grey
7 Hunebed D39	Netherlands	52.811079	6.8874942	Passage Grave	240, 181, 86	242, 185, 92	240, 181, 86	Orange beige
8 Hunebed D39	Netherlands	52.811079	6.8874942	Passage Grave	237, 196, 130	240, 195, 122	235, 188, 113	pale orange beige
9 Hunebed D39	Netherlands	52.811079	6.8874942	Passage Grave	204, 171, 60	242, 174, 65	247, 181, 74	orange beige to orange

Table 53. D39 data

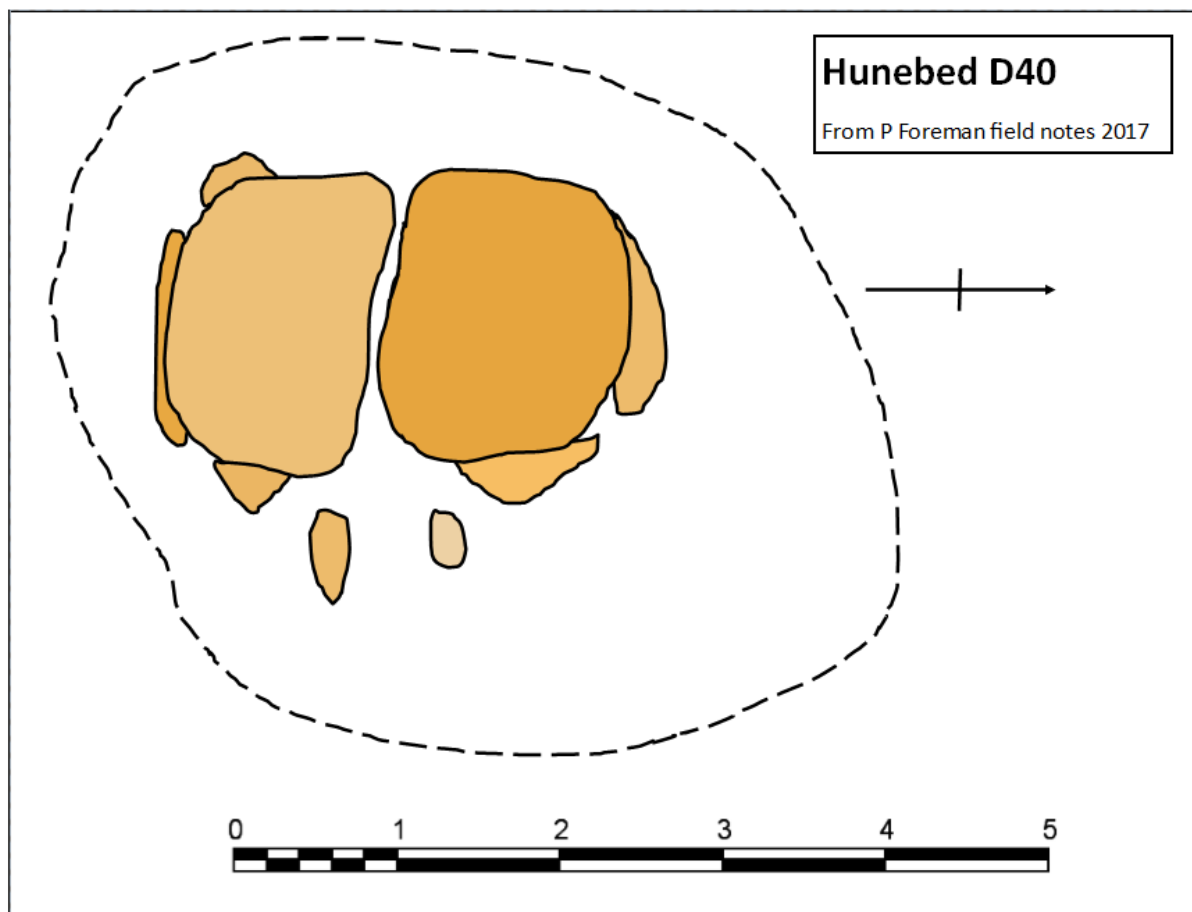
#### 4.7.10 D40 Emmerveld - ZO (south east)



Fig 99. D40, reconstructed with its capstones somewhat awkwardly set. P Foreman 2017

Van Giffen undertook excavations here in 1918 and 1921, and like D39 it was re-examined by Lanting in 1987; this time finds were recorded, and in 1918 the chamber was found to contain 60-80 TRB horizon 3 pots, and was therefore dated to between 3250 and 3125BC (van der Sanden 2017). The diminutive orthostats are probably slightly occluded by the remaining mound. It is on an unusually roughly north-south alignment (not quite in parallel with D38 or D39), with entrance on the eastern side.

Of the three in this group, D40 benefits from sitting on a slight raise in the landscape (possibly the remains of its mound) in the centre of the clearing, which both draws the eye and keeps it above the boggy ground level. This does make it the resting place of choice for travellers on the cycle path adjacent, and the evidence of their rest - litter, cigarette butts, and worn patches on the most ergonomic spots on the stones - is all around this monument.



*Fig 100. D40 site plan in colour*

1 Hunebed D40	Netherlands	52.810866	6.8882136	Passage Grave	232, 172, 74	232, 168, 65	227, 164, 64	Orange beige
2 Hunebed D40	Netherlands	52.810866	6.8882136	Passage Grave	240, 187, 103	235, 185, 106	235, 183, 101	Pale orange beige
3 Hunebed D40	Netherlands	52.810866	6.8882136	Passage Grave	240, 185, 96	235, 182, 99	235, 184, 103	Pale orange beige
4 Hunebed D40	Netherlands	52.810866	6.8882136	Passage Grave	240, 192, 115	237, 192, 119	235, 191, 120	Pale orange beige
5 Hunebed D40	Netherlands	52.810866	6.8882136	Passage Grave	230, 187, 119	237, 187, 107	232, 185, 109	Pale orange beige
6 Hunebed D40	Netherlands	52.810866	6.8882136	Passage Grave	240, 209, 161	237, 209, 164	240, 216, 177	Pale beige
7 Hunebed D40	Netherlands	52.810866	6.8882136	Passage Grave	247, 187, 89	247, 190, 99	250, 195, 107	Pale orange beige
8 Hunebed D40	Netherlands	52.810866	6.8882136	Passage Grave	230, 162, 53	230, 165, 62	232, 169, 67	Orange beige
9 Hunebed D40	Netherlands	52.810866	6.8882136	Passage Grave	240, 187, 103	237, 187, 107	232, 182, 102	Pale orange beige

*Table 54. D40 data*

#### 4.7.11 D21 Bronneger - W



*Fig 101. D21, grown through by oak. P Foreman 2017*

Away from the noise of any major road, but sitting directly on a minor gravel trackway amidst fields, D21 and very close neighbour D22 make for atmospheric and romantic stops for many tourists, cyclists, megalith enthusiasts, and during the recording of this survey, a photoshoot for a social media fashion campaign. It is easy to see why - a mighty beech tree now grows through the south western corner of the monument, scarred several metres up the trunk with the initials of past visitors making their mark.

Excavated in 1921 by Van Giffen, pottery from TRB horizon 1 including a “strikingly decorated” urn was found of the style more associated with northern group TRB sites (van der Sanden 2017).

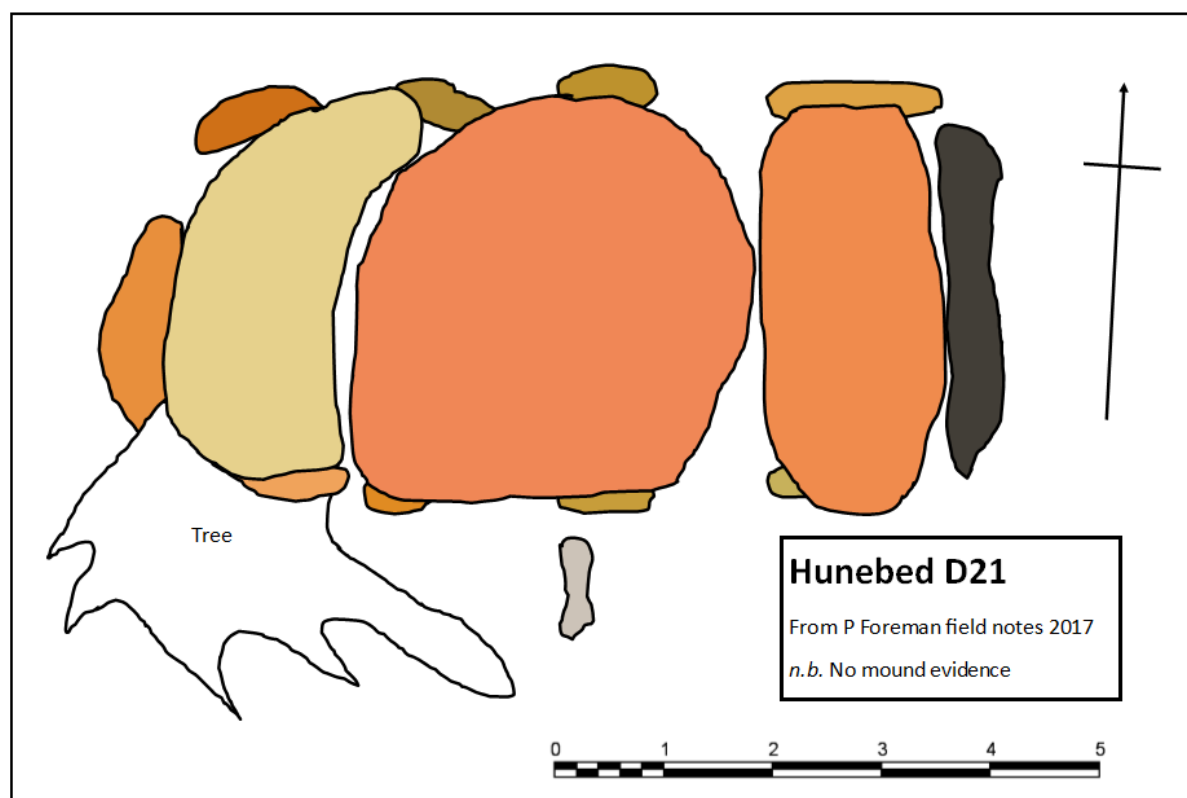


Fig 102. D21 coloured site plan

1 Hunebed D21	Netherlands	52.944238	6.8001207	Passage Grave	71, 66, 58	66, 62, 55	64, 59, 52	Deep grey to black
2 Hunebed D21	Netherlands	52.944238	6.8001207	Passage Grave	227, 164, 64	222, 163, 69	227, 168, 73	Orange beige
3 Hunebed D21	Netherlands	52.944238	6.8001207	Passage Grave	201, 179, 91	193, 177, 91	204, 182, 92	Deep beige
4 Hunebed D21	Netherlands	52.944238	6.8001207	Passage Grave	204, 138, 74	240, 139, 77	235, 136, 75	Orange beige with pink tinge
5 Hunebed D21	Netherlands	52.944238	6.8001207	Passage Grave	196, 155, 57	193, 157, 58	191, 151, 55	Deep beige
6 Hunebed D21	Netherlands	52.944238	6.8001207	Passage Grave	224, 137, 29	224, 139, 34	219, 137, 37	Deep orange beige to orange
7 Hunebed D21	Netherlands	52.944238	6.8001207	Passage Grave	204, 193, 180	204, 195, 184	204, 196, 186	Pale grey
8 Hunebed D21	Netherlands	52.944238	6.8001207	Passage Grave	240, 130, 79	240, 135, 86	242, 125, 70	Orange beige with pink tinge
9 Hunebed D21	Netherlands	52.944238	6.8001207	Passage Grave	247, 166, 89	240, 163, 91	240, 164, 93	Pale orange beige
10 Hunebed D21	Netherlands	52.944238	6.8001207	Passage Grave	230, 209, 140	235, 213, 141	240, 217, 144	Pale beige
11 Hunebed D21	Netherlands	52.944238	6.8001207	Passage Grave	227, 135, 50	232, 143, 60	227, 135, 50	Orange beige
12 Hunebed D21	Netherlands	52.944238	6.8001207	Passage Grave	212, 112, 19	207, 112, 23	209, 115, 27	Deep orange beige
13 Hunebed D21	Netherlands	52.944238	6.8001207	Passage Grave	184, 144, 53	176, 138, 51	181, 142, 53	Deep beige
14 Hunebed D21	Netherlands	52.944238	6.8001207	Passage Grave	186, 146, 52	189, 146, 45	186, 140, 34	Deep beige

Table 55. D21 data



#### 4.7.12

#### D22 Bronneger - O (east)

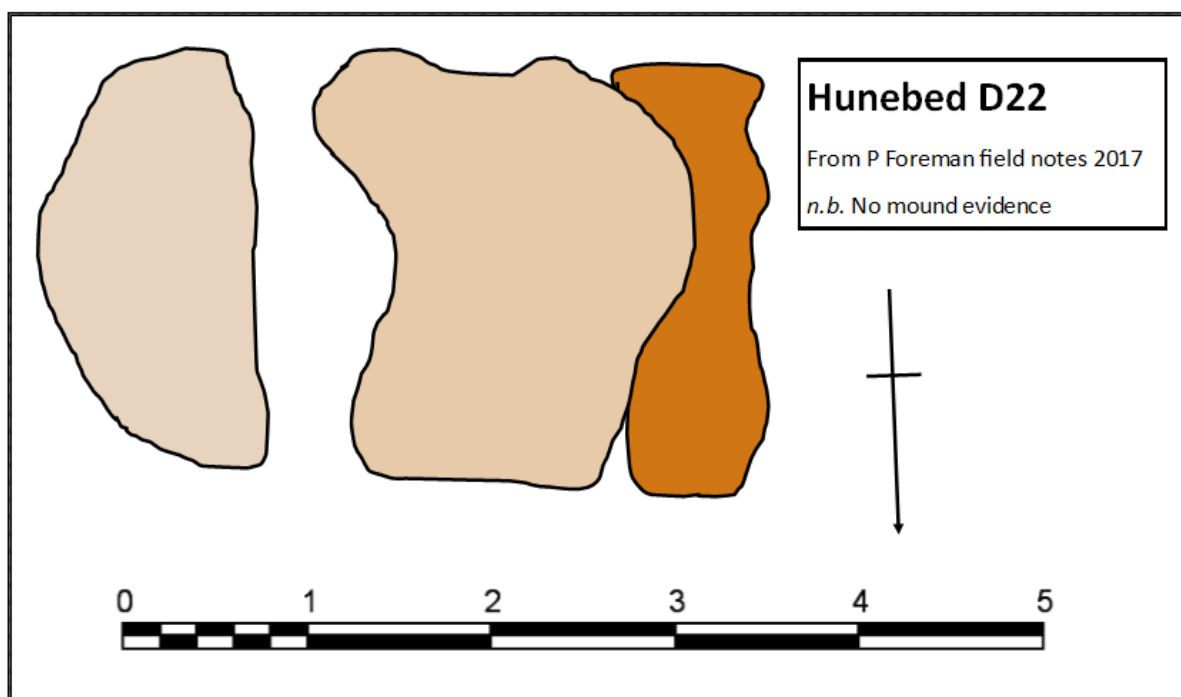


*Fig 103. D22, a haunting hunebed. P Foreman 2017*

Diminutive compared to its nearest neighbour D21, this is nevertheless an interesting small monument - rendered even more so to the modern visitor by the fact the oak tree growing through the two central capstones, at the time of writing, had recently been burnt by lightning strike or deliberate arson, lending the site the air of a magical, if not entirely safe, portal to another realm.

Van Giffen excavated here in the same year as D21, finding a larger quantity of pottery than at the larger megalith (van der Sanden 2017). Though it is in poor condition, the very proximity to the larger D21 is of interest, as pottery finds here are suggestive of a later date of active use (Bakker 1992, 70) - perhaps making the smaller D22 a later, lesser satellite to the more impressive D21. The sites, taken together, present a microcosm of Neolithic funerary ritual in the region - displaying change in monument style, pottery type, and attitudes to death and burial over time.

Both sites D21 and D22 were “reconstructed” by Van Giffen in 1960-1 (van der Sanden 2017).



*Fig 104. D22 coloured site plan*

1 Hunebed D22	Netherlands	52.944264	6.8003713	Passage Grave	207, 117, 21	209, 118, 21	212, 122, 25	Deep orange beige to orange
2 Hunebed D22	Netherlands	52.944264	6.8003713	Passage Grave	232, 202, 169	230, 202, 172	235, 207, 178	Very pale beige
3 Hunebed D22	Netherlands	52.944264	6.8003713	Passage Grave	230, 207, 184	232, 212, 190	235, 216, 197	Very pale beige

*Table 56. D22 data*

#### 4.7.13 D23 Bronneger - N (north)

Another popular stop along the Drenthe megalithic cycle trail, D23-25 are an impressive group of megaliths that now stand in a wooded glade near Bronneger. There are no records of excavation at any of the three sites, though they were reconstructed by Van Giffen in 1960-61 (van der Sanden 2017).



*Fig 105. The eastern end of D23, capstone showing large quartz inclusions.*



The northernmost of the three in this group, lying on an east-west axis. Only the east end of the chamber survives (though as the site was reconstructed by Van Giffen in 1960, this could be a modern interpretation), with the rest of the stone being disturbed, fallen, or missing. The entrance location is not clear.

The capstone is relatively flat, with large quartz inclusions to the inner edge.

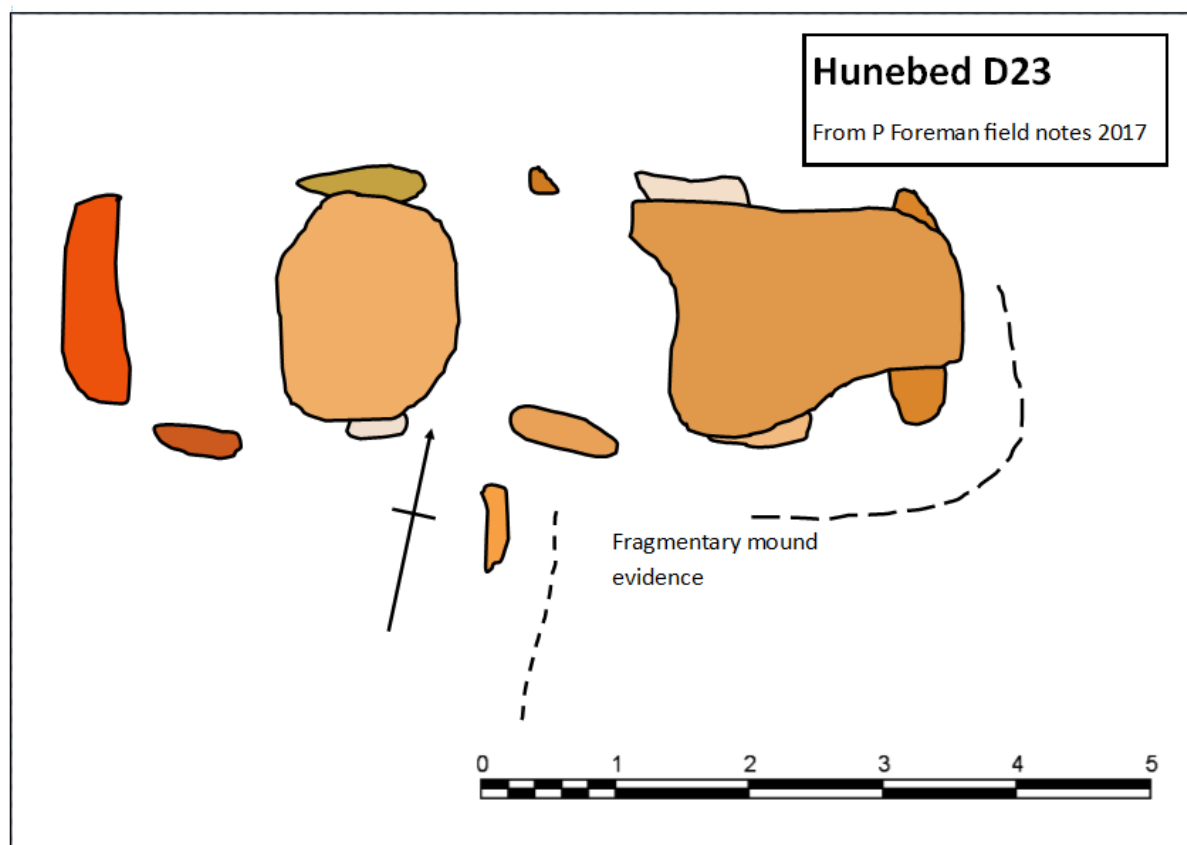


Fig 106. D23 coloured site plan

1 Hunebed D23	Netherlands	52.944576	6.8022429	Passage Grave	214, 126, 32	219, 133, 42	224, 140, 49	Deep orange beige
2 Hunebed D23	Netherlands	52.944576	6.8022429	Passage Grave	230, 155, 76	224, 152, 74	230, 156, 78	Orange beige
3 Hunebed D23	Netherlands	52.944576	6.8022429	Passage Grave	235, 177, 115	242, 186, 126	245, 189, 130	Pale orange beige
4 Hunebed D23	Netherlands	52.944576	6.8022429	Passage Grave	240, 219, 197	242, 222, 201	235, 212, 188	Pale beige
5 Hunebed D23	Netherlands	52.944576	6.8022429	Passage Grave	227, 155, 77	232, 161, 86	235, 164, 89	Orange beige
6 Hunebed D23	Netherlands	52.944576	6.8022429	Passage Grave	252, 158, 56	247, 160, 67	250, 163, 70	Pale orange
7 Hunebed D23	Netherlands	52.944576	6.8022429	Passage Grave	207, 121, 29	207, 123, 33	212, 126, 34	Deep orange beige
8 Hunebed D23	Netherlands	52.944576	6.8022429	Passage Grave	237, 218, 197	240, 223, 206	242, 227, 211	Very pale beige
9 Hunebed D23	Netherlands	52.944576	6.8022429	Passage Grave	247, 178, 104	240, 174, 103	235, 171, 103	Orange beige
10 Hunebed D23	Netherlands	52.944576	6.8022429	Passage Grave	194, 160, 66	196, 161, 65	189, 155, 62	Deep beige
11 Hunebed D23	Netherlands	52.944576	6.8022429	Passage Grave	209, 86, 29	204, 89, 29	207, 87, 31	orange beige with a pink tinge
12 Hunebed D23	Netherlands	52.944576	6.8022429	Passage Grave	237, 80, 7	237, 82, 9	237, 83, 12	Deep orange beige, brick coloured

Table 57. D23 data

4.7.14

D24 Bronneger - ZW (south west)



*Fig 107. Overgrown and ruinous D24, but the distinctive flat-interior shape of the stone used gives an idea of the original layout and size. P Foreman 2017*

Like D23 this sits on an approximate east-west axis, and is highly damaged, making interpretation challenging. More capstones and uprights survive, and the shape of stones on the northern side of the passage suggests the entrance was on the southern side.

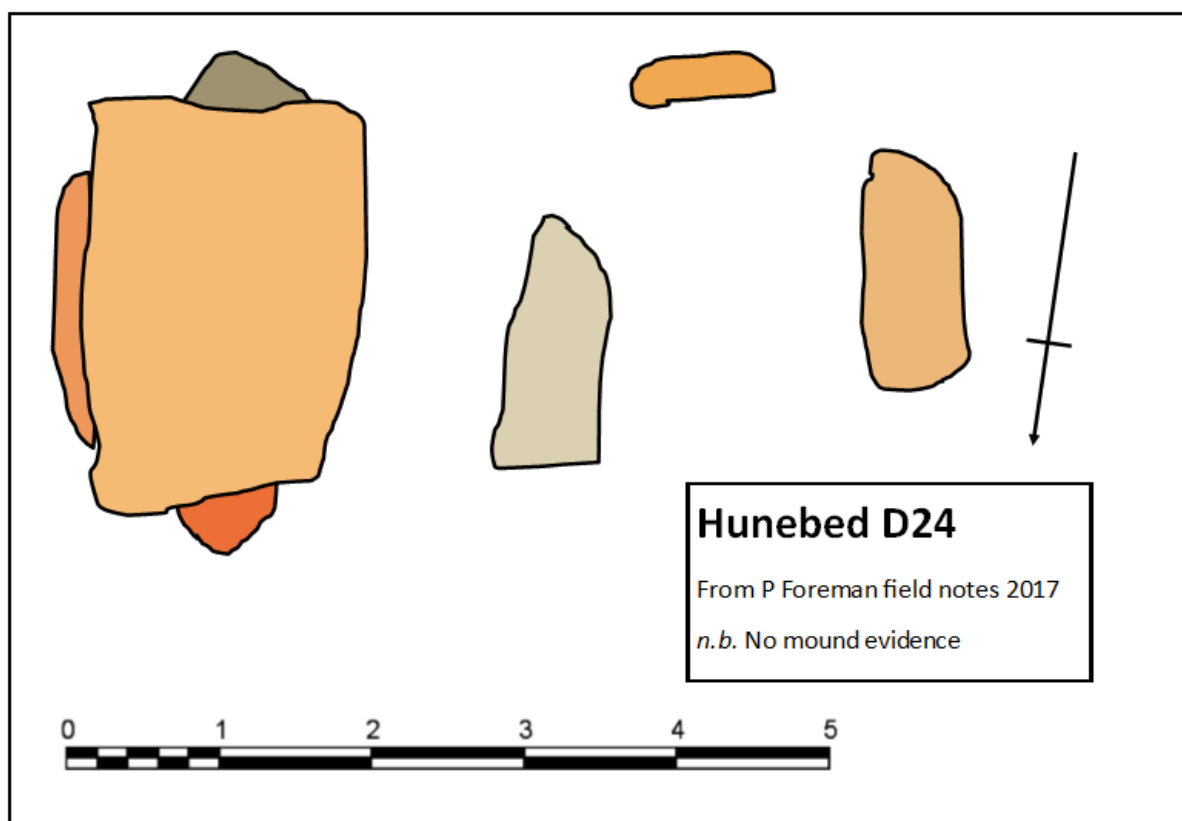


Fig 108. D24 coloured site plan

1 Hunebed D24	Netherlands	52.944751	6.8024427	Passage Grave	232, 108, 51	235, 111, 54	235, 113, 56	orange beige to orange
2 Hunebed D24	Netherlands	52.944751	6.8024427	Passage Grave	240, 153, 91	237, 151, 90	242, 157, 97	Pale orange beige
3 Hunebed D24	Netherlands	52.944751	6.8024427	Passage Grave	156, 143, 107	158, 146, 112	161, 150, 120	Deep grey beige
4 Hunebed D24	Netherlands	52.944751	6.8024427	Passage Grave	250, 190, 117	245, 186, 115	242, 184, 114	Pale orange beige
5 Hunebed D24	Netherlands	52.944751	6.8024427	Passage Grave	214, 194, 169	219, 201, 178	214, 197, 176	Pale grey beige
6 Hunebed D24	Netherlands	52.944751	6.8024427	Passage Grave	247, 173, 82	240, 169, 81	235, 166, 82	Orange beige
7 Hunebed D24	Netherlands	52.944751	6.8024427	Passage Grave	240, 186, 120	235, 184, 122	245, 194, 132	Pale orange beige

Table 58. D24 data

#### 4.7.15 D25 Bronneger - ZO (south east)



*Fig 109. D25, with its spectrum of capstone shapes, textures, and colours. P Foreman 2017*

D25 is the most impressive of the trio, and the one in the most obviously “classic” TRB Western group style. It is a popular stop-off point, and as such is difficult to photograph without accompanying bikes, resting cyclists, or collections of plastic drinks bottles.

The stone used here is several order of magnitude greater than D23 and D24 - with dating evidence scant, it is difficult to pin down a chronology to say if the smaller monuments are copycat apprentice pieces to the larger, or if they were prototypes before D25’s grand finale. Like D23 and D24, D25 sits on an east-west alignment. The capstones display the range of available stone in the region - showcasing the variety of surface texture and colour that is typical of the region. The orthostats, appearing less dramatic in stature, are somewhat obscured by the remains of the mound.

Although not subject to formal archaeological excavation, Lukis and Dryden dug into the monument on their Drenthe megalith survey in 1878 and found a quantity of pottery and burnt human bone fragments, now at the British museum (van der Sanden 2015).



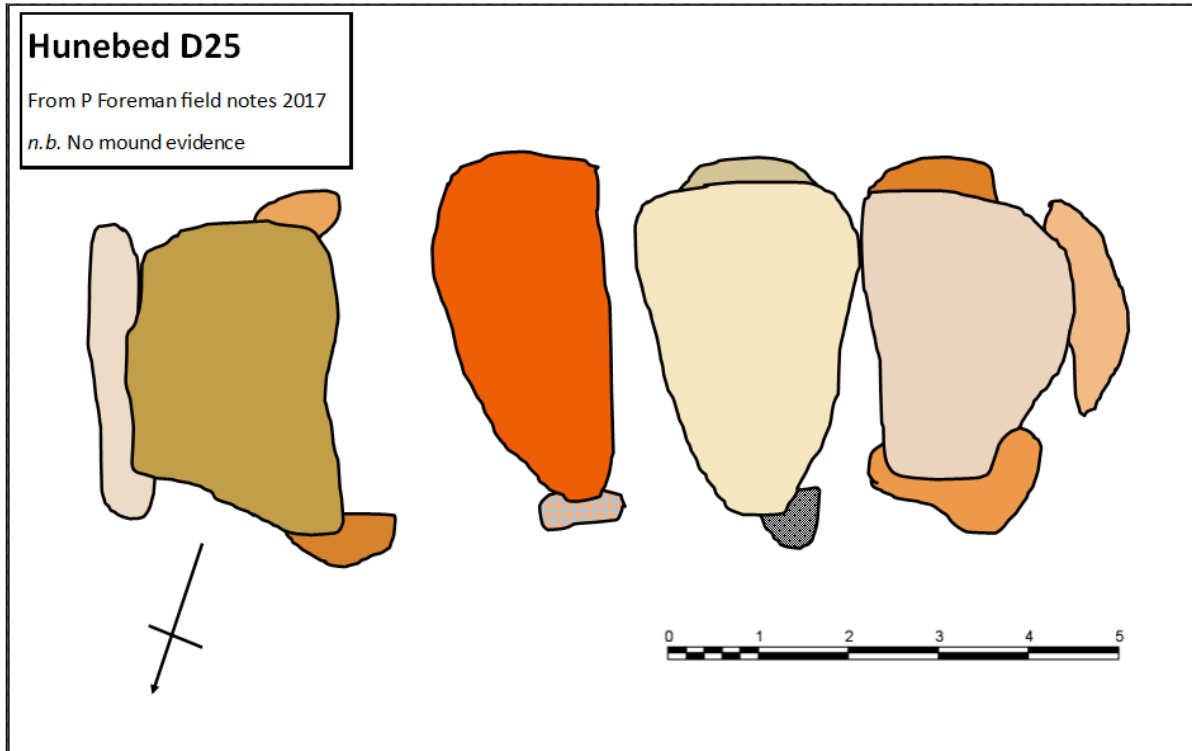


Fig 110. D25 coloured site plan

1 Hunebed D25	Netherlands	52.944419	6.8028442	Passage Grave	242, 224, 201	237, 213, 197	240, 228, 213	Very pale beige to white
2 Hunebed D25	Netherlands	52.944419	6.8028442	Passage Grave	131, 155, 71	194, 158, 74	199, 163, 80	Deep beige
3 Hunebed D25	Netherlands	52.944419	6.8028442	Passage Grave	212, 132, 47	214, 131, 43	219, 137, 48	Deep orange beige
4 Hunebed D25	Netherlands	52.944419	6.8028442	Passage Grave	237, 165, 88	235, 165, 91	240, 167, 89	Orange beige
5 Hunebed D25	Netherlands	52.944419	6.8028442	Passage Grave	245, 170, 91	242, 168, 90	235, 163, 87	Orange beige
6 Hunebed D25	Netherlands	52.944419	6.8028442	Passage Grave	242, 96, 5	237, 94, 5	232, 96, 12	Deep orange beige, brick coloured
7 Hunebed D25	Netherlands	52.944419	6.8028442	Passage Grave				Complex grey/beige/orange mix
8 Hunebed D25	Netherlands	52.944419	6.8028442	Passage Grave				Mottled black and white
9 Hunebed D25	Netherlands	52.944419	6.8028442	Passage Grave	240, 227, 132	245, 230, 191	242, 223, 194	Very pale beige
10 Hunebed D25	Netherlands	52.944419	6.8028442	Passage Grave	209, 192, 144	212, 195, 148	212, 198, 161	Grey beige
11 Hunebed D25	Netherlands	52.944419	6.8028442	Passage Grave	227, 132, 43	224, 123, 40	230, 136, 48	Orange beige to orange
12 Hunebed D25	Netherlands	52.944419	6.8028442	Passage Grave	237, 213, 190	235, 212, 190	247, 226, 205	Pale beige
13 Hunebed D25	Netherlands	52.944419	6.8028442	Passage Grave	235, 143, 68	237, 153, 74	240, 157, 79	Orange beige
14 Hunebed D25	Netherlands	52.944419	6.8028442	Passage Grave	247, 183, 124	242, 186, 133	240, 184, 132	pale orange beige

Table 59. D43 data

## 4.8 Summary

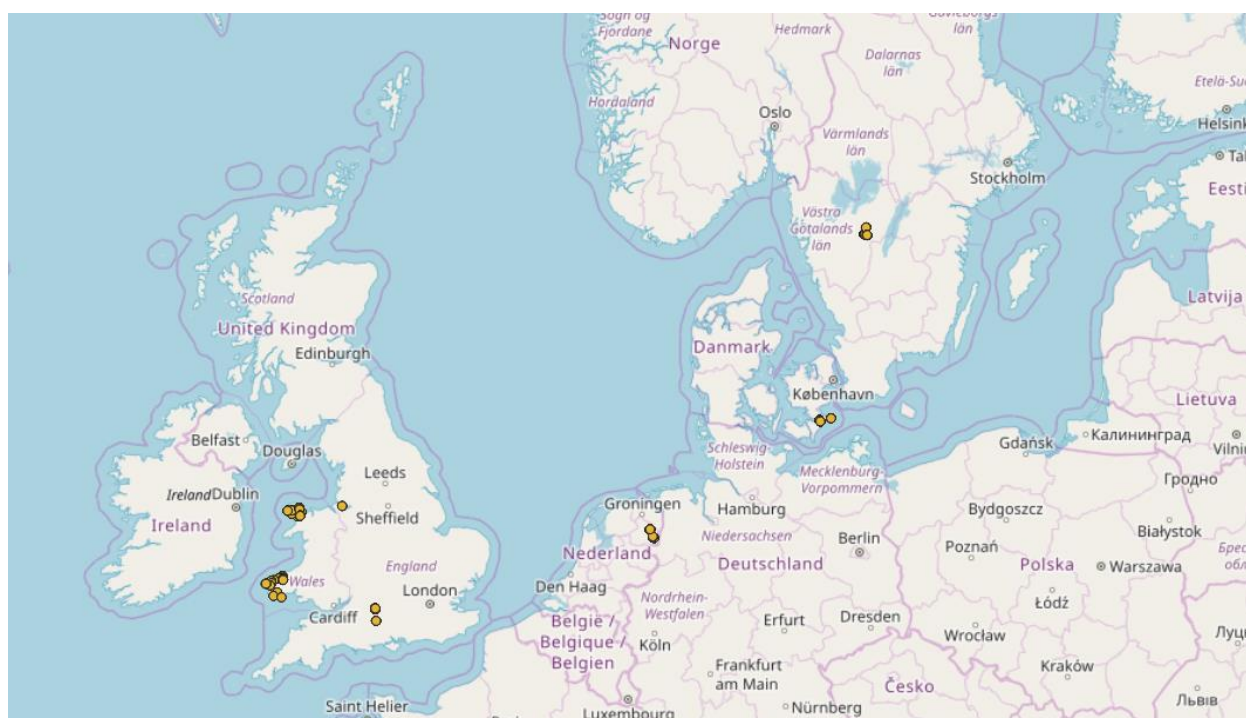
Though only a fraction of extant sites across Atlantic Europe, these data provide a glimpse into the ways colour was selected and utilised at monuments across the region. Clustered around regions of geological interest and existing in theatrical, often playful intersects with the landscape, the sites use colour in ways that enhances both the experience and appearance of the monuments.

The next chapter develops these data from raw numbers to a series of visual aids in the form of maps – the first stage in the process of developing catalogue into interpretation. Using QGIS as a means of processing map data, they form quick guides to the ways colours are used in particular parts of the monuments – and how this changes regionally.



## 5. Mapping similarity, difference, and significance : Results

In order to develop an understanding of the place of colour in Neolithic cosmology, the data must progress from raw figures to usable depictions of patterns and significant similarities. This paves the way for theoretical interpretations to develop. In this instance, the colour readings for individual stones across the region were mapped to focus on particular phenomena – detailed below. Though other patterns could have been examined, these were the most commonly noted, and a detailed evaluation of every specific pattern would prove both unwieldy and time consuming. However, the raw data exists in an easily shared and accessible form, so any further study examining different combinations of place/colour/texture/shape etc. can be modelled.



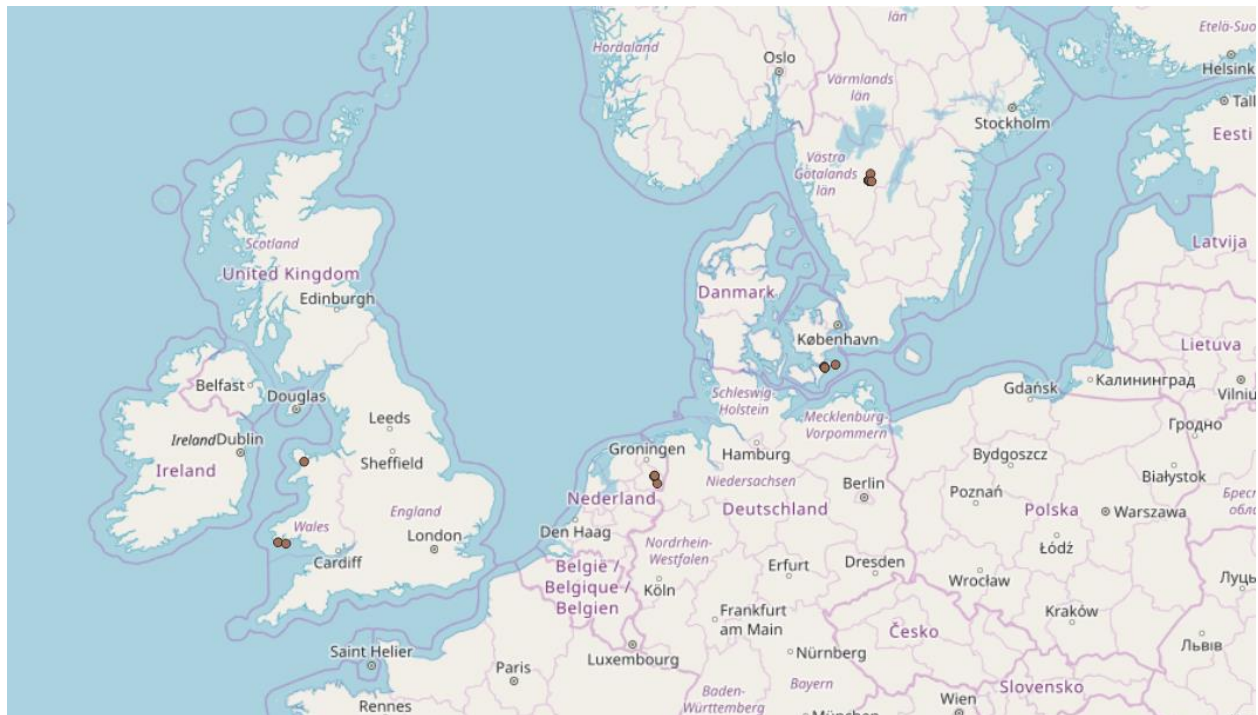
*Fig 111. Map of sites covered in this research. Maps from OpenStreetMaps and QGIS. P Foreman 2018*

### 5.1 QGIS generated maps

Certain characteristics of sites, and individual stones within them, seem to be repeated or at least closely followed locally, regionally, and across very wide distances. This section maps some of the key commonalities noticed over the progress of this research, with a focus upon

the key colour triad of red/white/black, and how this manifests across each case study region.

### Sites with red capstones

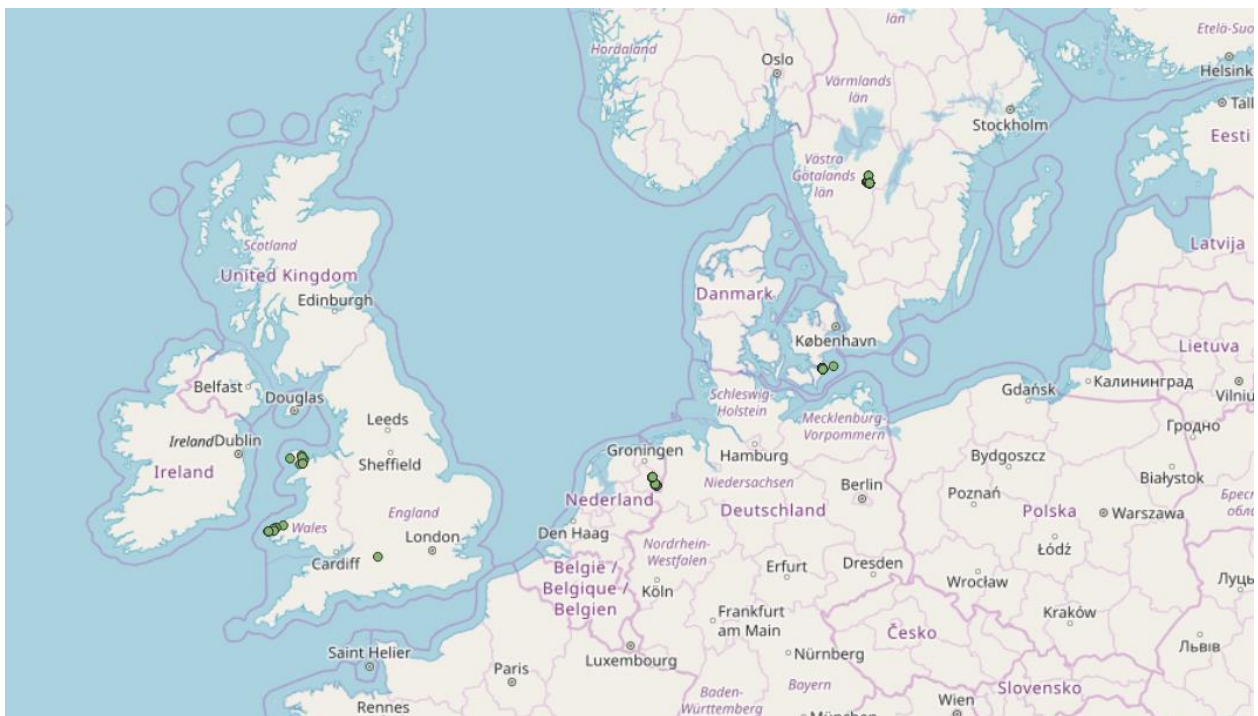


*Fig 112. Map of sites with red capstones. Maps from OpenStreetMaps and QGIS. P Foreman 2018*

Red capstones are a relatively uncommon phenomenon - seen across the region, but infrequently, and generally in specific circumstances. The sites highlighted in Pembrokeshire, for example, are those comprised entirely of red stone, so the capstones being red is not a significant or stand out feature. The exception to this are the sites in Denmark and Sweden, which feature red capstones in the region of sites that corresponds to where passage meets chamber - sometimes in the “keystone” location where there is a stack of two or three capstones forming a complex structure of layered capstones that marks the start of the chamber. Here, red stone is used - most notably at Swedish sites Girommen and Kung Björns Grav, where the red stones are prominently and obviously different. This deliberate demarcation of space suggests that the red stone acts as a visible, tangible barrier between different kinds of space within the monument - emphasising the different

purpose or meaning between outside/inside, or passage/chamber. Given that this differentiation of space is already obvious - the chamber being clearly a different space to what lies outside it, even allowing for cultural differences in attitudes to space, place, and dichotomies such as natural vs non-natural and inside vs outside places - the deliberate selection of red stone to emphasise this must mean the red colour is particularly significant and an important concept within the wider cosmological framework around monument construction.

### Sites with pale capstones

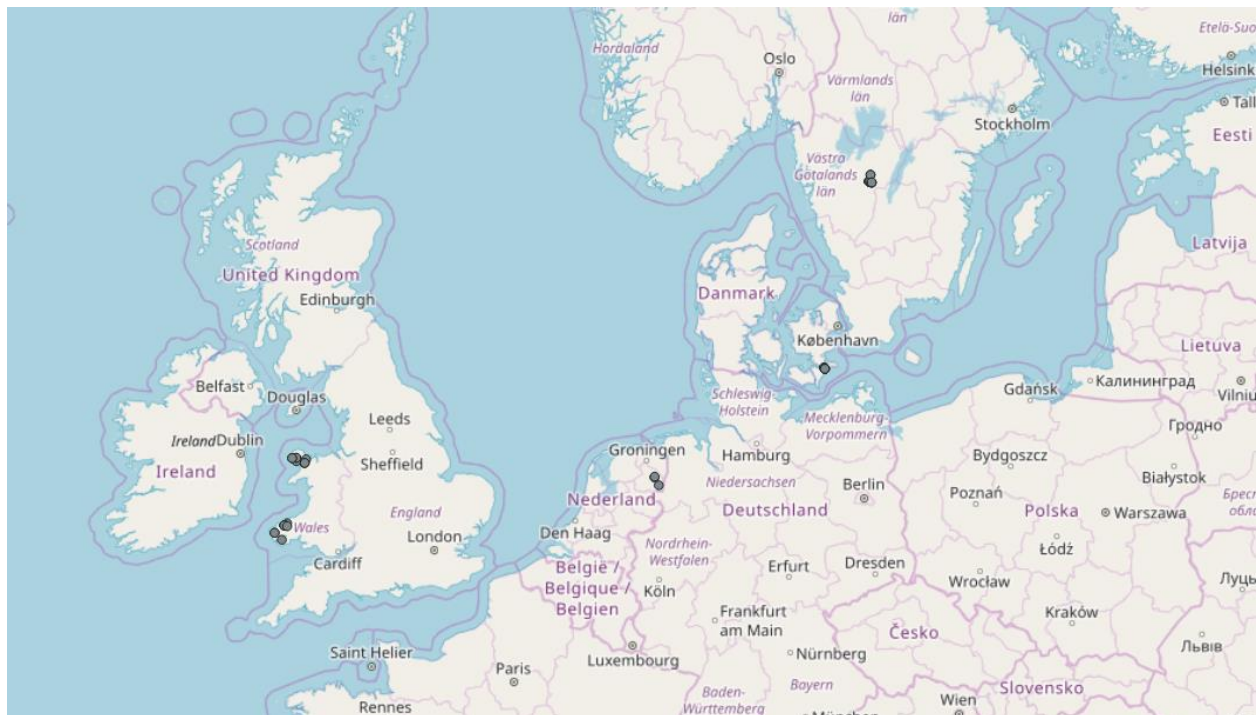


*Fig 113. Map of sites with pale capstones. Maps from OpenStreetMaps and QGIS. P Foreman 2018*

Far more commonly than red capstones, pale stones are selected as capstones very frequently, seen in each case study, and not limited to the very specific circumstances of the red ones. Even sites with relatively uniform stone colour - like the Pembrokeshire grouping - see pale stones in use as capstones, even if the difference is very slight. This could be the manifestation of any number of cosmological associations - with light, with life, with heaven - any number of which turn up repeatedly in association with white and pale colours in examinations of the language of colour (see chapter 7 and 8 for further details).



## Sites with dark capstones



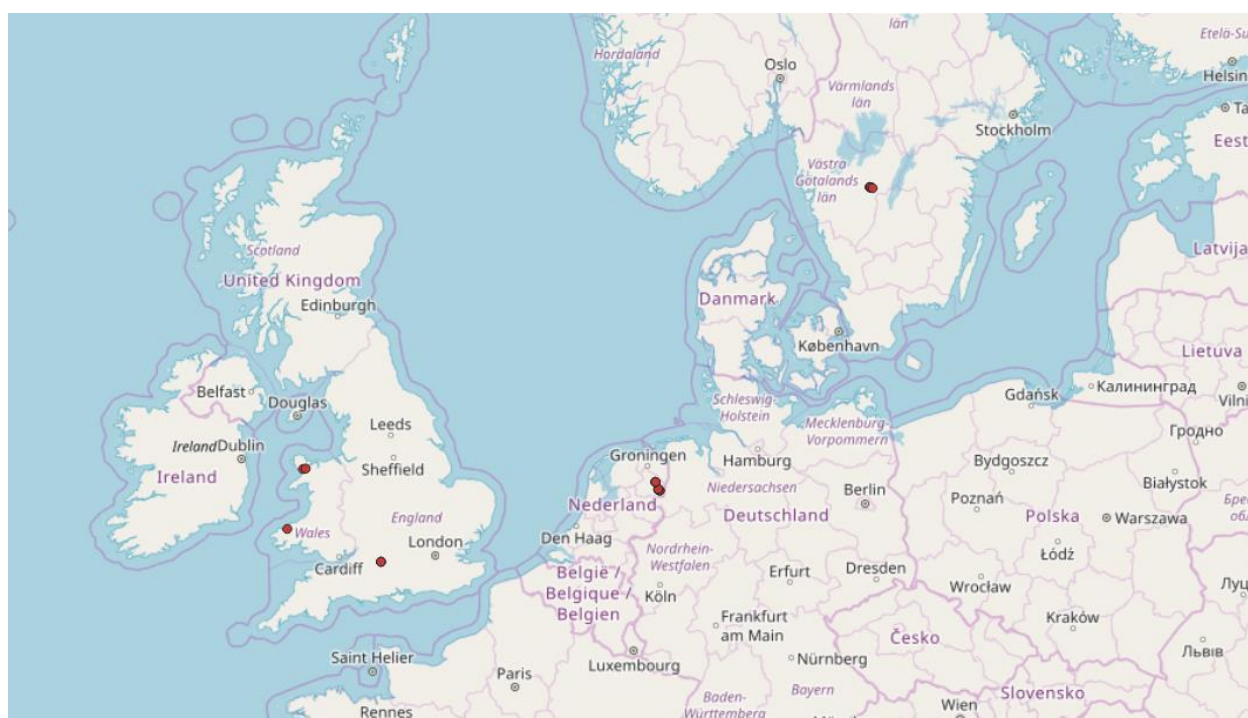
*Fig 114. Map of sites with dark capstones. Maps from OpenStreetMaps and QGIS. P Foreman 2018*

Dark capstones are far fewer than pale ones - and are generally limited to sites where the stone is relatively uniform in colour. They are most commonly seen in gallery grave types - several of the Swedish sites, the two larger sites studied on Møn, and several in the Netherlands - where there is usually a wide variety of coloured used in construction. Anglesey is also a hot spot for the use of dark capstones - similarly to the Scandinavian sites where sites are very colourful in nature and a wide variety of stones are on display.

Both pale and dark capstones are used in several different locations within monuments rather than an obviously grouped pattern like the red keystones - though generally they are placed next to capstones of contrasting colour in sites where there are multiple capstones. This suggests that the pairing or contrasting of colours is what matters rather than the colour itself in isolation - that there needs to be a display of the contrast to contextualise both colours within the site. Suggestive of symbolism of important dualities, this contrast of colours is also seen in orthostats and stone circles (discussed later in this chapter) in areas

across the region; as if colour in isolation is not communicative enough of particular concepts, but requires a contrast in colours to symbolise particular cosmological concepts. Consider the main themes in many religions, myths, folklore and stories - good and evil, night and day, rich and poor, magic and mundane - duality and the drive to categorise things in such a literally black and white divide is a near constant in human cultures, so it follows logically that cosmological concepts should be visualised in such a visually striking way.

### Sites with dark backstones



*Fig 115. Map of sites with dark backstones. Maps from OpenStreetMaps and QGIS. P  
Foreman 2018*

Backstones - the stone at the rear of the chamber, generally opposite the entrance - are not always simple to identify. In the case of portal tombs and related types, it is generally the stone the capstone slopes to rest upon. For the purposes of this research, backstones are defined as the stone or stones that mark the end of the chamber - so in the case of chambered tombs, and those broadly defined as passage graves, this is the stone opposite the passage entrance, and in the case of gallery grave types like the Dutch *hunebed* it is the stones at the ends of the gallery that mark the two ends of the chamber.

Dark backstones occur sporadically - in all areas studied (other than Denmark), but infrequently.

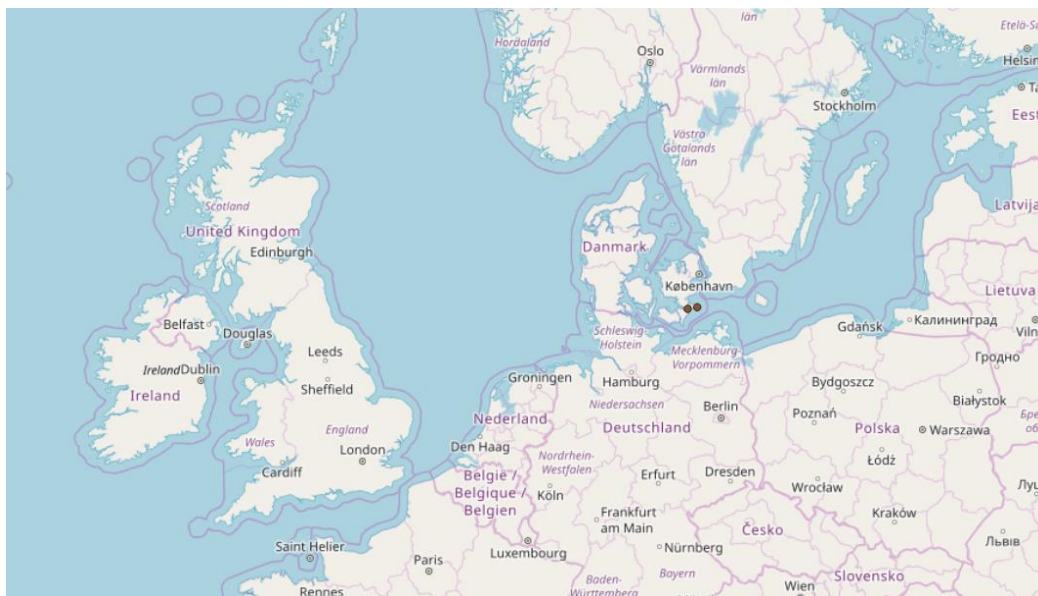
## Sites with pale backstones



*Fig 116. Map of sites with pale backstones. Maps from OpenStreetMaps and QGIS. P  
Foreman 2018*

Similarly to the spread of dark backstones, pale ones occur in all regions other than Denmark, and slightly less frequently.

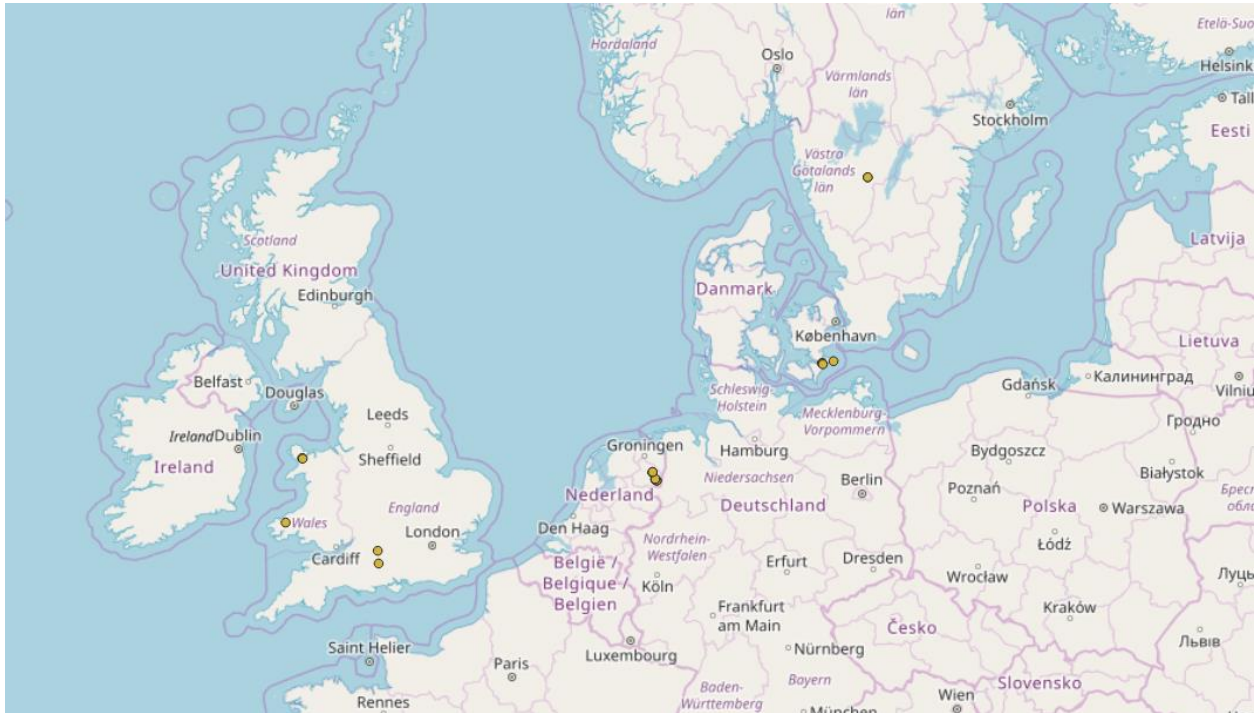
## Sites with red backstones



*Fig 117. Map of sites with red backstones. Maps from OpenStreetMaps and QGIS. P  
Foreman 2018*



Red backstones are a rare phenomenon, and interestingly only occur in Denmark where dark and pale ones are not evident in the sites studied. They are seen in the two sites that can be classed as passage graves - Sprovedyssen and Sømarksdyssen - rather than the larger gallery grave types.



As already noted in the examination of capstone colours, contrasting pairs of stones next to each other is a common trope, one suggestive of the need to represent natural and perceived dualities in ritual and everyday life. Following this trend, pairs of stones are often seen together that display contrasting colours (and textures - beyond the remit of this research, but included in the wider dataset for further research and sharing with other researchers as open data).

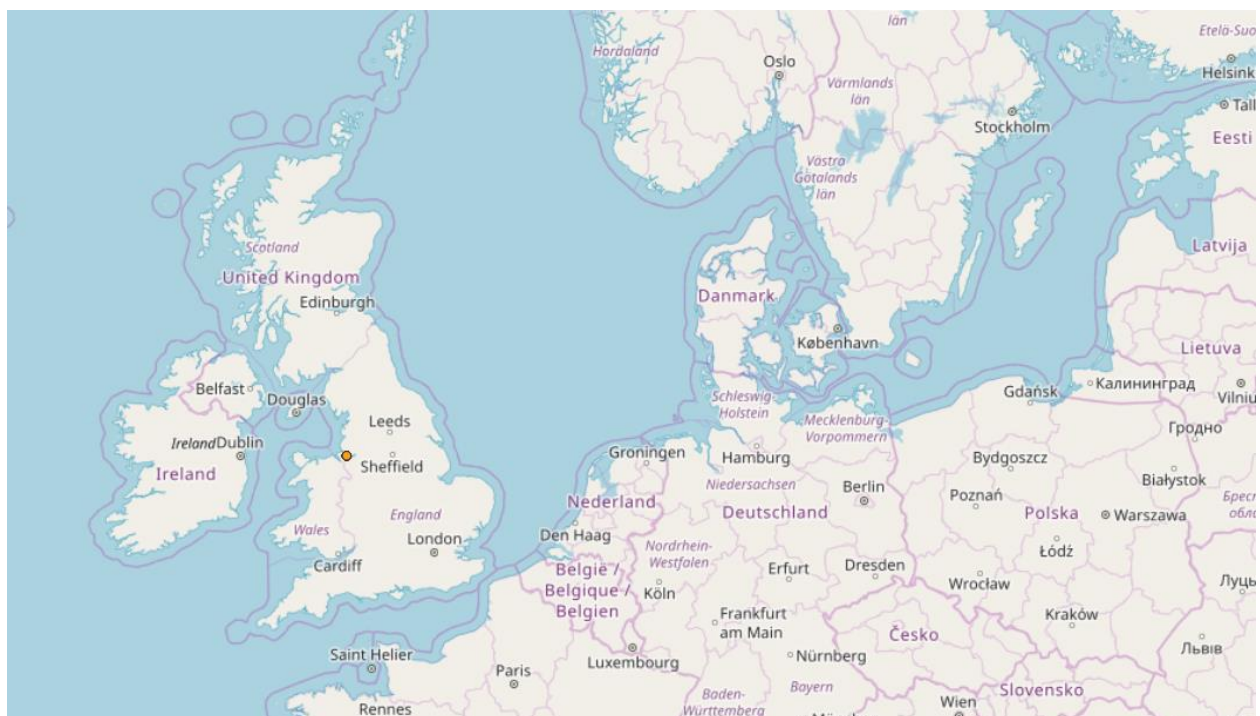
A close examination of both Avebury and Stonehenge's sarsens shows that the stones are often paired with contrasting coloured ones, that is less evident to modern visitors due to sarsen's propensity to weather into a grey beige, but must have been very evident to contemporaries of the construction and use, particularly at Stonehenge where the sarsens were subject to modification and surface dressing, a highly unusual phenomenon.

## 5.2 Art and colour - is there a connection?

A small number of sites in this study have elements of rock art within them - though none to a significant degree such as the decorated stones of Barclodiad y Gawres in Anglesey or many of the large tombs in the Boyne Valley. Sites generally featured cupmarks and other difficult to closely and conclusively date art forms, and the site with the most prominent rock art, the Calderstones in Liverpool, served only as a colour testing case study due to its total divorce from original context and location.

With that in mind, these maps demonstrate where rock art is in conjunction with particular colours of stone.

### Rock art and red stones



*Fig 119. Map of sites where red stones feature rock art. Maps from OpenStreetMaps and QGIS. P Foreman 2018*

Limited to the Calderstones case study site, the use of red stone for rock art is due to the fact that each (surviving) stone is red and likely from the same source. It is interesting that no other site used red stone for art - even those where the art is considered to be later Bronze Age modifications such as the cupmarks on some Anglesey sites and those covering the capstone at Sørmarksdyssen, Denmark.

## Rock art and dark stones



*Fig 120. Map of sites where dark stones feature rock art. Maps from OpenStreetMaps and QGIS. P Foreman 2018*

Slightly more prevalent than red stone, rock art is seen on dark stones at a few sites, but not in a number great enough to be a significant pattern.

## Rock art and pale stones



*Fig 121. Map of sites where pale stones feature rock art. Maps from OpenStreetMaps and QGIS. P Foreman 2018*

Similarly to dark stones, there is a broad but sporadic spread of rock art across the research area. However, it is interesting to note that it does not appear in any of the Welsh sites - despite several Anglesey sites having significant rock art, particularly cupmarked capstones, none of these are on pale stones.



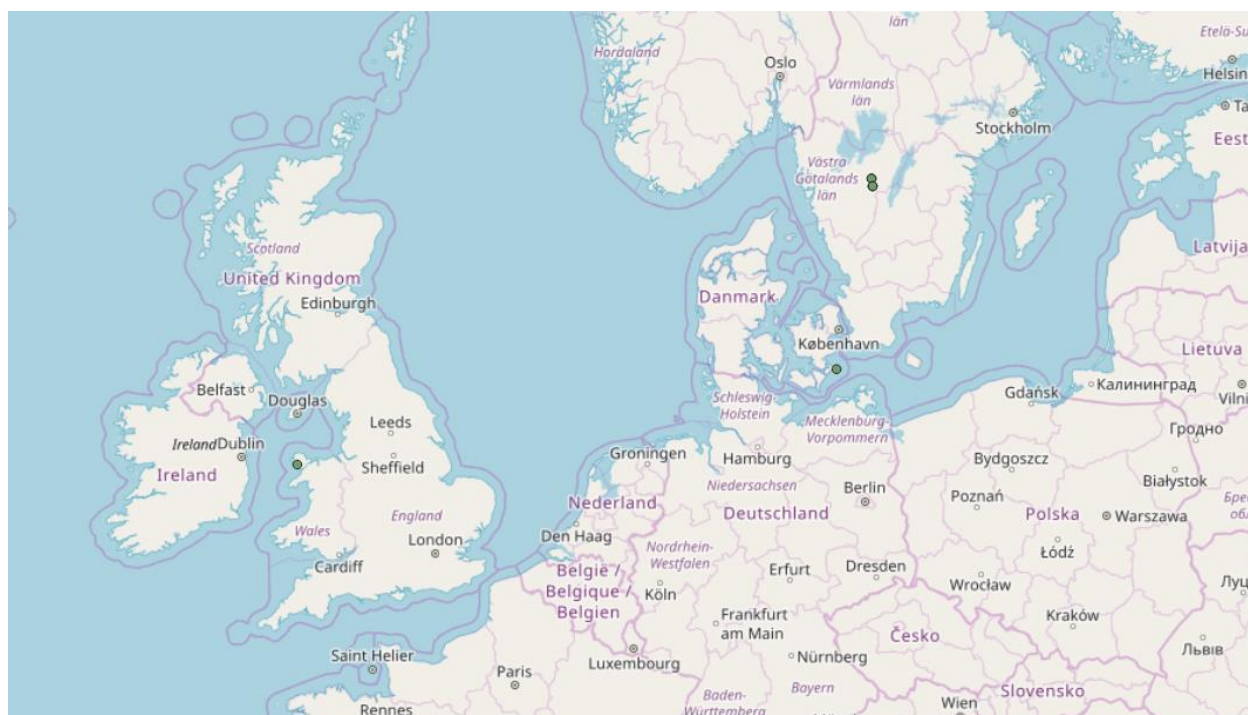
## Rock art and orthostats



*Fig 122. Map of sites where orthostats feature rock art. Maps from OpenStreetMaps and QGIS. P Foreman 2018*

This sample is skewed by the fact that some of the most prominent sites studied - Avebury, Stonehenge, and the Calderstones - comprise only of orthostats and standing stones. The sites on continental Europe are much more sporadic, and represent only single cupmarks on orthostats rather than the richer decoration seen in the Wessex sites. This would have been emphasised if the research had included other sites within the scope of the case study areas - such as Barclodiad y Gawres on Anglesey. It appears that rock art on uprights is more commonly seen in British sites - though it should be noted that some areas of significant rock art such as Brittany have not been studied as part of this research.

## Rock art and capstones



*Fig 123. Map of sites where capstones feature rock art. Maps from OpenStreetMaps and QGIS. P Foreman 2018*

Rock art on capstones generally manifests as cupmarks, and is categorised as later Bronze Age remodelling and modifications in most cases (Daniel 1950, Nash et al 2005). Seen mostly on passage graves, it has been used as justification for theories that the great capstones were not covered in earth mounds but were in fact always open air, therefore available as surfaces for art and activity. However, the lack of this rock art seen on sites in Pembrokeshire is curious, given the popularity of the idea that the capstones here were deliberate selections to reflect and represent prominent landscape features and would therefore also be open to the elements and available as canvases for art.

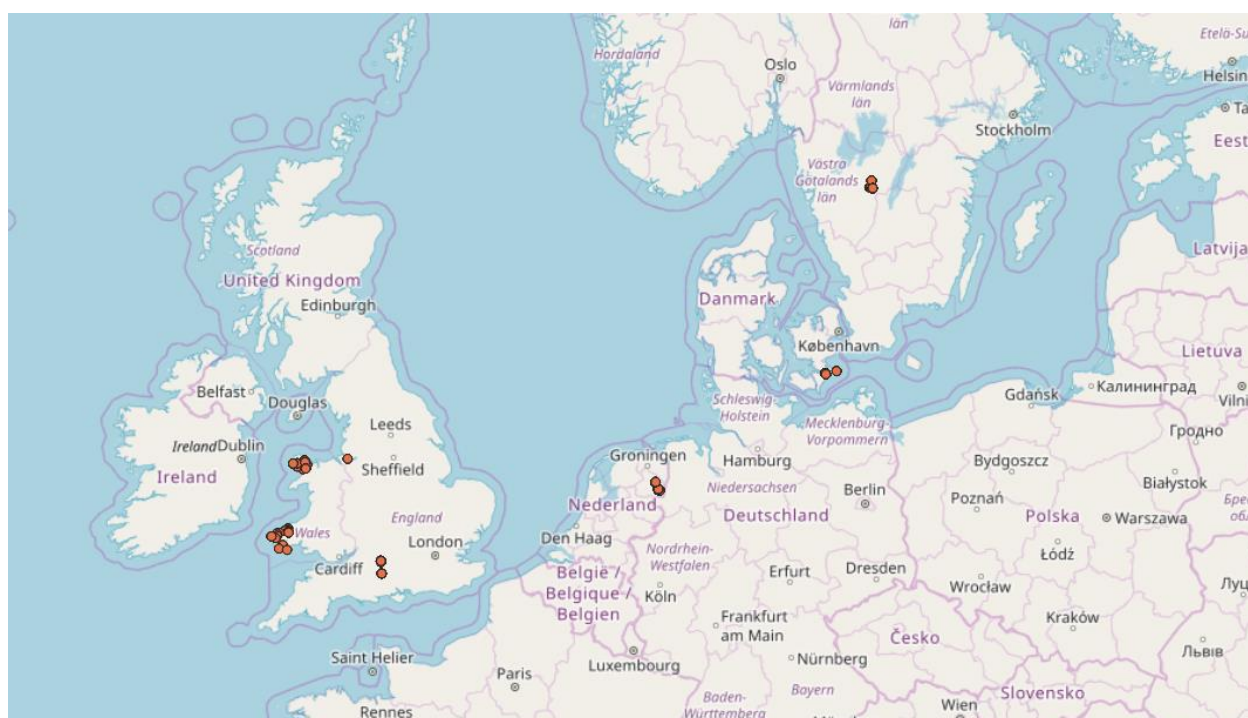
### 5.3 Mapping the sun

Though it is beyond the remit and scope of this research to undertake detailed mathematical modelling of seasonal sunrise and sunset light paths at the sites surveyed, broad patterns of alignments can be seen. This was particularly notable on Anglesey, where tombs that fall into the broad category of “passage grave” (with a caveat that many of the sites are enigmatically constructed and do not fall into neat descriptors) seem to have an alignment to summer sunrises, and correspondingly certain stones within them are notably paler and



brighter. The stone immediately to the right of the chamber entrance - in the north eastern corner - is pale, or features a significant proportion of pale surface inclusions. This was often combined with pale capstones in the “path” of this sunrise, as seen at Bryn Celli Ddu on Anglesey (see chapter 4’s case study). The following maps examine where these potential alignments exist, and where they correspond to these pale stones.

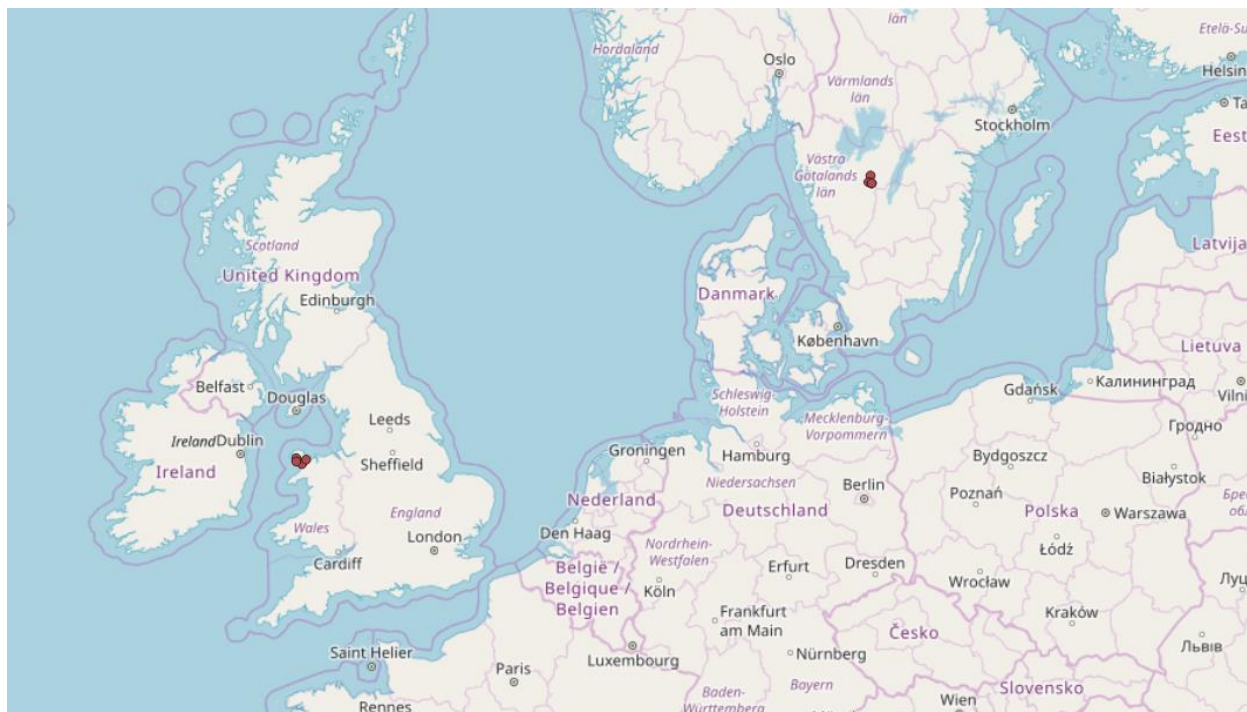
### **Sites with an entrance or passage aligned in an easterly direction compatible with a summer or midsummer sunrise alignment**



*Fig 124. Map of sites that lie on a potential summer sunrise alignment. Maps from OpenStreetMaps and QGIS. P Foreman 2018*

As can be seen from this map, across the region some monuments were constructed so their entrance, entrance passage, or theoretical entrance (in the case of some of the more poorly preserved sites), lies in an easterly direction - thereby having a potential alignment of a summer, or even midsummer sunrise. Though detailed work has been carried out on this phenomenon at certain sites, such as Bryn Celli Ddu (Burrow 2010), others have had less rigorous investigation. This research highlights the need for a wider examination of the idea of alignments and seasonality of monuments - something that archaeologists have been reticent to address and been dismissive of in the past, possibly due to the association with more fringe and unorthodox interpretations.

## Sites with pale stones in north-eastern corner of chamber as well as summer sunrise alignment



*Fig 125. Map of sites lying on a potential summer sunrise alignment with pale stones in the northeast section of the chamber. Maps from OpenStreetMaps and QGIS. P Foreman 2018*

The clustering of this phenomenon in Anglesey and Sweden - both of which have interesting, passage grave style monuments that use a rich palette of colour - is intriguing. It is tempting to state that there is a cultural connection between the two groups - not impossible, given the fact that isotope studies of burials in the Swedish sites show populations moved in to the region from the coast (Sjögren 2009), and therefore could have feasibly been part of coastal seafaring and trading communities.

### 5.4 Summary

These maps – demonstrating patterns in colour usage across the region – begin to demonstrate the commonalities in colour selection and use. Some aspects emerge as being localised, suggestive of local tradition – whilst others appear across the region, suggestive of a wider cosmological purpose. With the inclusion of sunrise alignments, the data begins to hint at a purpose at a specific time of the year, marking out an event or celebration. However, the raw data and maps alone cannot deliver any more detailed or considered

interpretation of the colour use – they must be deployed as tools in a wider theoretical arsenal. In order to quantify these data, theoretical frameworks must be deployed. As discussed in chapter 3, the appreciation of a Neolithic cosmological Assemblage is key to understanding how colour acted as part of the Neolithic world view – if it is to be understood as more than just a descriptor or an aesthetic choice, it must be examined in a way that allows for its complex symbolic nature to be appreciated.

This process combines ethnographic parallels and Assemblage modes of thought – as discussed in 2.2, 3.5, 3.6, and 3.7. Ethnographic parallels from existing studies are but one aspect of this – to quantify colour experience as a universal one, modern case studies are also required. The next chapter explores some case studies of modern colour categorisation studies, conducted as part of this study in order to draw parallels between how modern, Western, post-industrial societies and recent pre-industrial cultures approach colour.

## **6. Experiencing the colour of stones: case studies**

If colour is truly a universal experience, that we codify meaning and symbolism to both consciously and unconsciously, then this will manifest even in modern interpretations and reactions to colours. To explore this, a series of public outreach projects was devised to see how people responded to colour- both in abstract, and in relation to Neolithic monuments, to see how this reflected existing literature on colour.

### **6.1 Colour experiments: contextualising red, white, and black**

#### **6.1.1 Case study: red, white, and black as concepts at Glastonbury Festival 2016**

##### *Methodology and background*

In June 2016 the “Science Tent”, a collaborative public outreach and engagement collective lead by the University of Southampton, invited participants to bring activities related to their research to the festival-going public. The festival attracts over 150,000 people over the course of a week, and is comprised of a very diverse audience from families to groups of young adults to older, seasoned festival-goers; there is also a considerable number of visitors from overseas.

To capitalise on this opportunity, a small activity was devised where visitors to the stand could have a go at a mock-up of the original Berlin and Kay *Basic Color Terms* experiment, then once they were in the mood to discuss colour, they could move over to the next area where they were invited to write their thoughts on red, white, black. These were not introduced as “the colour red...” etc, but just the words, and any inference on how they defined them was left totally up to them. Responses were cleared from the board each hour to stop them influencing subsequent visitors to the stand.



*Fig 126. A casual experiment into colour categorisation. P Foreman 2016*

Over the course of three days, from Thursday 23rd to Saturday 25th June, several hundred respondents answered this simple question, and a broad pattern of definitions began to emerge. An accurate number of respondents has not been recorded - as some gave more than one response to each colour, and some were added outside of the official stall opening times so could not be counted. However, the number is in the region of 350. Demographics were not recorded as it was designed to be a quick, casual test where dwell time should be short in order for the “first thought” on colours to be recorded rather than a considered and drawn out response.

## Results

Black

Term	Frequency
Dark / darkness	224
Night	177
Death	154
Dog	101
Evil	99

Coffee	88
Funeral	76
Depression	68
Bats	44
Magic	38
Clouds	32
Nothing (as in, nothingness, not “no definition”)	32
Cat	31
Coal	28
Dress (usually quantified “little”)	22
Blackboard	18
Hole	18
Goths	15
Void	15
Box	13
Cauldron	13
Dark hair	13
Cave	12
Witch / Witches	11
Racism	8
Obsidian	6



Crow	6
Lace	3
Stone	3
Blackbeard	2
Eye	2
Hat	2
Swan	2
Labrador	2
Other	Cherries, Black Hawk Down, polish, <i>dementor</i> (a Harry Potter reference), black widow, bears, mascara, blackbirds, London snot, black diamond, spots, cider (possibly referring to a brand), raven, Black Sabbath, mystery, cold, Guinness vomit

Table 60. Responses to “black”

#### White

Term	Frequency
Pure, purity	202
Clouds	156
Light	144
Milk (cow, separate to human breast milk, see below)	114
Clean, cleaning	109
Good / goodness	108
Dress	105

Winter	98
Sheep	94
Wool	90
Semen and colloquial terms	89
Wedding	66
Snow	57
Innocence	55
Bones / skeleton	55
Socks	38
Teeth	35
Breast milk	32
God	31
Peace	30
White Rabbit	22
Crystal	21
Moon / moonlight	20
Heaven	20
Bread	18
Cotton	18
Goddess	16
Wine	15
Angel	12

Joy	10
Eggshell	9
Skin	9
Gold	7
Calm	4
Trainers	3
Chalk	3
Knight	3
Stars	2
Dove	2
Sails	2
Other	Temple, Cloth, Snowy Owl, Pearl, Flag, "Knights in White Satin", Emptiness, sand, Chess, Agoraphobia, skulls, wolf, paint, lightning, "The Lair of the White Worm", the Snow Queen, pills, communion wafers, fear

*Table 61. Responses to "white"*

## Red

Term	Frequency
Blood	137
Lovehearts, hearts	109
Rose	80
Danger	74
Apples	56

Love	44
Wine	38
Lips	38
Fire	37
Tomatoes	35
Dress	35
Cheeks	34
Lust	32
Vulva and colloquial terms	29
Meat	28
Postbox	28
Lipstick	27
Communism	25
Periods	22
Rage	19
Poppies	19
Romance	19
War	18
Devils	18
Strawberries	18
Manchester United	15
Sky	13

Ferrari	12
Nails	12
Murder	11
Raspberries	10
Phone Box	9
Aggression	8
Father Christmas / Santa	7
Ginger hair	7
Car	6
Hen	6
Uniform	6
Red Wedding (a reference to book and television series <i>Game of Thrones</i> )	5
Steak	5
Holly (berries)	5
Liverpool (football team)	5
Ladybird	5
Peppers	3
Red Velvet Cake	2
Mist (as in Red mist of anger)	2

Other	Bloody machete, death (in the context of the “Masque of the Red Death”, “Red Dwarf”, “Redwall” (a children’s book series), Chris de Burgh, splatter, juice, stew, ready salted crisps, feminine energy, nightshade, Virgin trains, tulips, pomegranate, the Red Arrows, balloons, “Red Shift” (Alan Garner novel), rush, leather, dead badgers, “my eyes after a heavy one”, post watermelon face.
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*Table 62. Responses to “red”*

### *Discussion*

As can be seen in the results above, a definite (and possibly unsurprising) pattern emerges - black is overwhelmingly negative, with 35% of the responses coming back as something unpleasant or negative, rising to 51% if you include dark and darkness, though these are not universally something to fear. White is overwhelmingly about pure, clean things - from the literal “purity”, to the symbolic white dress and white weddings, 27% of white words concern this, and 19% concern the iconography goodness and the stereotypical white fluffy cloud-riding angels of Christian heaven; winter and the cold is also high, with 16%; all these things have the quality of purity, separation from the normal or mundane, apartness, being above human reaction and human messiness: they are clean and clear and *good*.

Red, however, is where things get interesting. It is messy, with many words being violent or having violent connotations - some 16%, rising to 28% is “blood” as a catch-all term is included. Yet it is also strongly associated with love in its many guises - some 24%, and womanhood - 17% of the words relate to traditionally female attributes and to parts of the body (though it could be argued that “lips” are non gender specific and all genders can apply lipstick etc). Interestingly, though many makeup items are traditionally black or very dark, such as eyeliner and mascara, only one individual named mascara as a black item, whereas 27 mentioned red lipstick and 34 referenced red cheeks, which may infer the use of blusher; supporting the idea that red is more heavily associated with female sexuality and attractiveness.

The results show an interesting trend that sees red as a highly contentious category. Was it love, roses, passion, the human female reproductive system? Or was it war, murder, or “a bloody machete” (thanks to one 8 year old for that worrying sentiment). Whereas black and white are largely polarised with little nuance, red is full of confusion and contradiction; red is



humanity crashing into the world of order and simple dichotomy. Red also saw the fewest responses - as if black and white are easy to build, sparking off each other to describe polar opposites and oppositions - but red is elusive.

### **6.1.2 Case study: red, white, and black as concepts: an online follow up**

#### *Background and Methodology*

As a short follow up to the Glastonbury red/white/black definition experiment, an online survey was opened up and aimed at archaeologists and those in related disciplines, to see if similar patterns emerged and if being in the profession (and being aware, at least vaguely, of the nature of this research project) affected the responses.

The survey was posted online via Google Forms, a free platform for collecting survey responses, and the only demographic data collected was age and gender, so that it would remain anonymous. It was left to develop and be shared organically. It was opened in July 2016 and closed in August 2018. Though the number of respondents was much smaller than the Glastonbury survey, it provided an interesting snapshot of archaeologists as a group responding to colour.

Respondents were introduced to the survey with the following text:

*"This survey is an extension of the exercises I ran during outreach at the Glastonbury Festival in June 2016. I'm looking for your thoughts on what these three colours mean to you. I'm not going to guide you in any way as to what sort of answer I'm expecting - just write what comes into your head."*

37 individuals responded, many giving multiple responses for each question. The majority of respondents - 22 - identified as female, 13 male, one "mostly male" and one male transgender. The majority stated English as their first language, with one each identifying French, Russian, and Swedish, and two German.

#### *Results*

##### **Black**

Term	Frequency
Night	12
Death	6
Dark / darkness	5
Elegance	2
The night sky	3
Space (as in outer space)	2
Warm, warmth	2
Sombre	2
People	2
No light	2
Coal	2
Unique Terms	Over-fired bricks, flint, texture, lushness, possibility, non colour, jet, metal, mystery, envelopment, safety, neutrality, magicians, coffee, petroleum, gothic, engravings, "It's a Wonderful Life", deep, sleek, fear, excitement, infinity, serious, comfort, funerals, little black dress, quiet, a line,

*Table 63. Online survey responses to "black"*

Red

Term	Frequency
Blood	18
Danger	6
Sex	3

Fire	3
Wine	2
Meat	2
Energy	2
Flag	2
Holly Berries	2
Earth	2
Anger	2
Roses	2
Unique Terms	star, class, Middlesbrough FC, iron, clay, chimney, brick, passion, violence, warmth, night time, threat/promise, socialism, Sith Lord, Darth Vader, aggression, Little Red Riding Hood, MacDonalds, bright, happy, sunset, winter, cardinals, communist hammer and sickle, menstruation, pain, death, hospital, hazard, lipstick, luxury, Christmas, tomatoes, an earthy feeling, 'That awful song "lady in red"', Oxburgh Hall, noisy

*Table 64. Online survey responses to “red”*

White

Term	Frequency
Purity	9
Snow	6
Clean / cleanliness	4
Clean sheets	4

Light	3
Chalk	3
Void	2
Peace	2
Stark	2
Cold	2
Clouds	2
Paper	2
Unique Terms	Hard hats, the smell of damp plaster, good, finality, daisy, white coat with a hood and a white fur trim, a line, collar, innocence, love, nothingness, plain, crisp white shirt, a white male, obsessively clean, sterile, blinding, harsh, Victorian Ghosts, shroud, my family (surname White), milk, surrender, mourning, wine, death, heaven, clinical, softness, ice, wintry sky, plastic, blank, people

*Table 65. Online survey responses to “white”*

### *Discussion*

There were a great deal more unique answers and responses to this survey - likely a symptom of both the small sample size, and the increased dwell and thinking time afforded by an online survey rather than an in-person quick fire style quiz. A number of archaeologically specific or related terms pop up - flint, burnt brick - though the broad trends are very similar to the earlier survey.

Negative words are not as heavily represented in black - with just 15%, rising to 26% including night and darkness. White was once again dominated by purity, with 24%; and wintry cold, with 13%. Red is overwhelmingly the colour of blood and mercurial human emotion, with 18% concerning violence or violent connotations, rising to 42% to include blood; 12% were related to love and sex. This time, red was the most prolifically answered category, though only by a small margin.

The broad strokes from these two brief surveys is that black and white are easy filing systems for the phenomena of the world: black things are dark, fearful, magical, unknown, hidden. White things are higher, clean, holy, spiritual, cold, above humanity. Red things are messy, angry, lustful, romantic, warm, bloody, contradictory, and above all - human, and relatable.

## **6.2 How do people see colour – an outreach project at Bryn Celli Ddu**

### **6.2.1 Methodology**

On June 17th, 2018, CADW hosted an open day and festival at Bryn Celli Ddu, Anglesey, to mark the summer solstice and highlight the current work into the archaeology of the site and its surroundings. In attendance were a broad range of key stakeholders who could inform, engage with, and educate the several hundred visitors to the festival. These included university students and staff (notably Cardiff University's "Guerilla Archaeology" crew), the Anglesey Druid Order, living history experts, storytellers, and archaeologists working in the adjacent field on the recently revealed cairn.



*Fig 127. Background information and bilingual project notes, stall at Bryn Celli Ddu June 2017.*


An activity sheet, where participants were invited to identify the colours of the main orthostats within the chamber, was handed out to curious visitors of all ages. The sheet asked only for age and gender information, and informed participants that this was due to both change in colour vision with aging, and because colour blindness and associated colour vision irregularities are largely a male phenomenon (see literature review on colour vision, chapter 2.1.3).

Several hundred individuals attended the open day, and 28 of these were persuaded to attempt the survey over a two hour window around lunch time, the busiest period of the day. The stones were not numbered on the participants sheets, but are numbered anti clockwise from the stone on the immediate left on entering the chamber, with the pillar as stone 7, and the capstones as 8 (left hand side) and 9 respectively.

Some individuals did not complete the sheet for each stone, though the majority (89%) gave at least one answer for each.



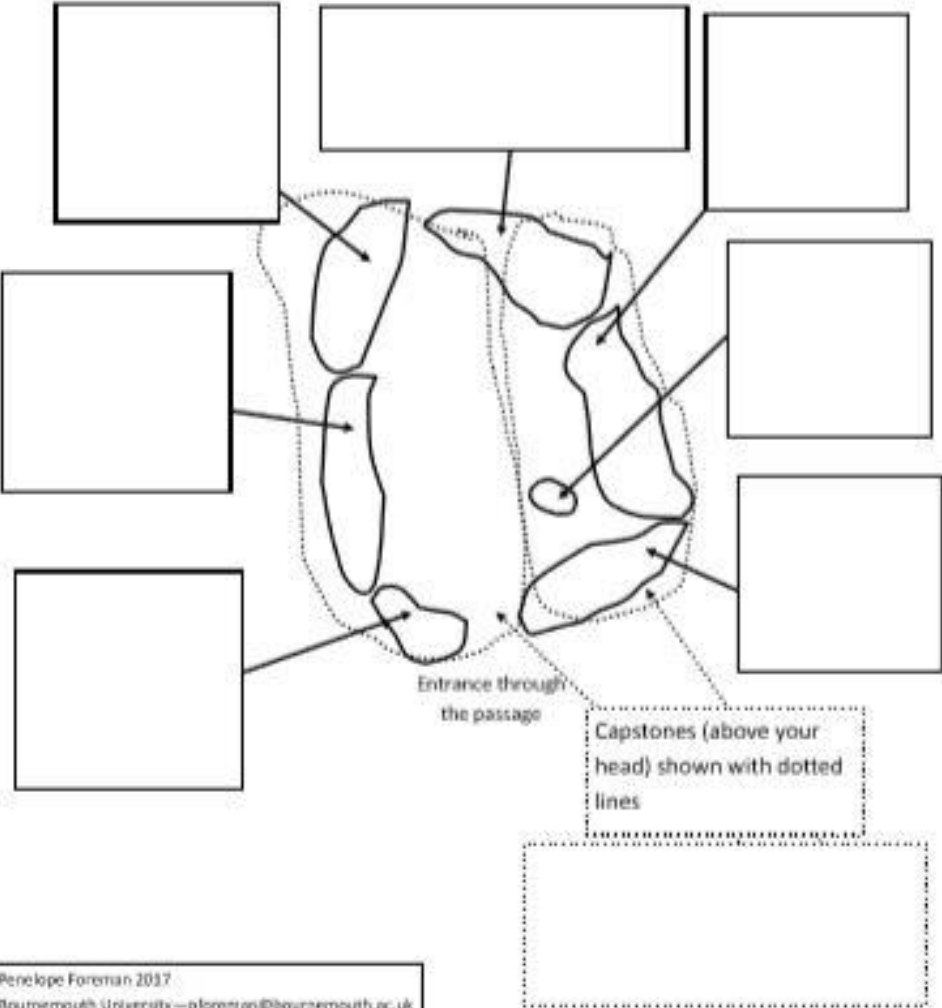
## Bryn Celli Ddu Colour Perception Survey—June 2017



This survey is looking at the differences in the way people perceive colour, and what those colours mean to them. For each stone in the diagram, please describe the colour. Please feel free to add any notes about qualities of any stone that you find especially notable, or that you feel have had an impact in the way you have perceived their colour. How have these stones made you feel? What do the colours communicate to you?

Age \_\_\_\_\_ Gender \_\_\_\_\_

(This is being recorded to see if any differences arise due to age or gender, as eyesight can shift over time—both positively and negatively—and colour vision is often affected by gender as issues with colour vision are caused by errors on the X chromosome).



Penelope Foreman 2017  
 Bournemouth University—pforeman@bournemouth.ac.uk

Fig 128. Bryn Celli Ddu colour activity sheet, from 2017 open day

## 6.2.2 Results

1	2	3	4	5	6	7	8	9	Age	Gender
Pale grey	Night	Skin grey	Grey gold	Dark dust	Orange	Blue	Stone orange	Very black	4	F
Black	Blue	Light	Grey light	Almost black	Mud	Elephant Grey	Bricks	Sky	5	F
Grey	Dark blue	Grey	Grey	Black	Brown	Blue green	Dark red	Dark grey	65	M
Grey-green	Blue-green	Grey-yellow	Grey	Dark grey	Beige-brown	Grey green	Soil?	Grey-black	34	F
Dark grey	Blue black	Green grey	Grey	Blue black	Green beige	Grey blue	Dark orange	Dark grey	36	M
Blue	Blue ("deep" crossed out)	Pale blue	Pale blue	Very dark grey	Brown	Grey	Red	Black	44	M
Grey-green	Blue-green	Shining-grey	Grey-gold	Black-orange-green	Sparkly brown	Grey-green-gold	Orange-red	Black-green-gold	7	M
Grey and green	Dark blue	Pale grey	Grey	Dark grey	Brown	Blue green	Dark brown	Dark grey	13	F
Grey	Dark grey	Grey	Grey	Black	Pale brown	Grey	Brown	Black	28	F
Grey	Black	Pale grey	Pale grey	Dark	Grey beige	Black	Rich	Deep grey	19	F
Green and dark grey	Green and blue	Grey and blue	Lilac	Green and dark grey	Green	Grey	Brown	Black	48	M
Pale blue	Midnight	Pale blue	Wolf	Slate	Taupe	Grey	Rust	Peat	46	F
Greyish	Black	Greyish	Greyish	Black	Green - silver	Green	Brown-red	Grey-orange	12	M
Dusty	Blue-green	Pale, grey, glowing	Shimmering, grey, winter	Dusty blue	Brown, green, shining	Grey-green	Brown, red, crumbling	Black, grey, smooth	13	M
Square blue	Stripey blue	Lovely silver	Bumpy grey	Shining black	Wobbly brown	Silky Blue	Pebbly brown	Smooth black	5	F
Green silver	Happy black	Shining silver	Dinosaur	Space blue	Bumpy	River	Cliffside	Midnight	7	M
Grey-dark	Black	Grey-dust	Grey-green	Navy	Pink	Grey-blue	Brown-red	Black-green	22	F
Greyish	Blue-green	Blue-grey	Greyish	Blackish	Grey-brown	Grey	Brown	Black	39	M
Dark grey	Blue grey	Pale grey	Grey	Dark	Pale	Dark	Dark brown	Dark grey blue	48	F
Grey	Black	Grey	Grey	Dark green	Brown	Grey	Red brown	Blue-grey	19	F
Green and grey	Green and blue	Grey and pale blue	Grey and blue	Black and green	Green orange	Grey and green			15	M
Blue	Dark blue	Pale blue	Pale blue	Dark grey	Light brown	Dark blue	Dark red	Dark blue	7	M
Blue	Black-blue	Pale blue	Pale	Green	Sparkle	Greenish	Red-ish	Black-ish	7	M
Dark grey-blue	Dark blue			Deep green-black	Pale brown	Deep blue-grey	Dark orange-red	Deep blue-grey	68	M
Grey	Black	Grey	Grey	Black	Brown	Grey	Brown	Black	59	F
Grey and pale	Grey	Grey and white	Pale grey	Dark dark grey	Pale brown	Dark grey	Dark brown	Dark grey	45	M
Blue-green	Navy	Pencil	Pencil	Green-blue	Cinnamon	Blue-green	Brown-red	Green-black	13	F
	Black				Yellow	Green	Brown	Black	9	M

Table 66. Results from Bryn Celli Ddu open day colour survey, June 2017

## 6.2.3 Discussion

There were broad patterns in the results - lots of grey (with qualifiers such as pale, or “greyish”, or “grey-green”) - hyphens have been preserved as written on the forms. Some respondents obviously undertook the survey together - giving bunches of similar answers - or seem to have had discussions on their thoughts and be lead to name associations rather than the colours themselves (see the two pairs of small children, at the top and middle of the results table, who named things and concepts in an imaginative manner). Some answers were terse, one word affairs - others layered all they could see into one overarching colour combination linked by hyphens into a complex fuzzy-term conglomerate of green-grey-gold-blue.

Of a possible 252 unique responses, 245 were returned. This is 9 stones per person, with 28 respondents. Most of the responses (60%) qualified their answers rather than give one word colour terms, either by using a combination of colours (ie green-black) or adding the qualifier “ish” to their colour of choice. Six individuals chose metaphor for some or all of their responses - of these, five were children or teenagers, and one adult woman.

The issue of lichen and moss cover becomes very apparent - because minimal instruction was given for this activity, in an attempt to not guide or lead answers in any particular

direction, many respondents gave green or “green ish” as part of their stone answer (16%) - commenting on the surface of the stone rather than its actual material property. Much of the green covering is due to the fact that the chamber is now subject to sunlight through the back where the mound does not form a complete enclosing mass. Though it is unlikely the stones were scrubbed clean in perpetuity during the “active” phase of the monument, they would not have taken on this green hue.

This aside, there were several interesting answers within the activity. Children showed a natural imagination, combining textural qualifiers to their answers (“pebbly brown” or “smooth black”) or used metaphor to describe the colours they saw (“River” and “elephant grey”). As this was an independent activity and not observed during the process of exploring the stones, it is impossible to say if this is a natural curiosity and imagination being expressed, or if they were coached by parents or other individuals.

The demographics of the study are interesting. The respondents were almost evenly split on gender, with a spread of ages from 4 to 68, and tended to be in groups with children or groups that had travelled together rather than lone individuals or couples. For a wider study, it would be of interest to collect more data on distance travelled, reason for visiting, and possible influences on attitude to the stones such as religious beliefs; there were a number of pagan, Druid, and other spiritualities represented on site during the day due to the presence (and upcoming camp and solstice celebration of) the Anglesey Druid Order.

Profession would also have been an interesting marker - the female identifying respondent who used terms such as “slate” and “peat” and “wolf” to define the terms is suggestive of an artistic background. When discussions of monument builders and ritual practitioners in the Neolithic occur, these past populations have a tendency to be viewed as a monolithic entity, with little distinction between them as having individual worldviews, artistic tendencies, poetic abilities, aesthetic values, and more. Giving some human context in short case studies like this one allows archaeologists to build a richer assemblage of Neolithic thought around colour and stone - to understand that not all individuals saw and used the site in the same way, that it could have been constructed by artists or colour-blind individuals, that it could have been categorised in terms of animal textures or things they feel strongly associated to rather than colour as a basic category. These themes shall be examined further when the ethnographic literature is explored in chapter 9.

## **7. Discussion**

### **7.1 Discussion of the regions of study**

#### **7.1.1 Anglesey - How the light gets in - redux**

The megalithic sites of Anglesey prove difficult to classify or lump together; they are a group of monuments linked by their depth of time but divided by their construction techniques, materials, and locations. There are a few common threads – most notably that most sites seem to have an east-west alignment with entrances to the east, with the possibility of solar alignments.

Though it is beyond the remit of this research to conduct a detailed computational analysis of precise solar alignments and seasonality, the broad definition of sunrise from ene-ese over the course of the year, as applied to the monuments recorded in this survey, begins to reveal a pattern. Pale stone, or that with a high proportion of surface quartz/mica, has been selected for the orthostat to the immediate right of chamber entrances in the monuments broadly classified as passage graves. Interestingly, at Barclodiad y Gawres this stone correlates with decorated stone C16, with its geometric lines and lozenges; could these designs correspond to the same meaning as the colour of the other passage grave stones? These stones are all “hidden” from observation to anyone limited to the passage and entrance areas, and only become visible once you are inside the chamber – therefore they are probably intended for the dead rather than the living, or for those privileged individuals deeply involved in the rituals within the monuments. Given the pale, reflective properties and closed nature of these monuments (evidenced at Bryn Celli Ddu), they could be serving as stand-ins for the sun, or light. For the dead who reside in these tombs, these stones are how the light gets in; keeping them connected to the world of the living in their long night of death.

Drawing further evidence of commonality is complicated by the unconventional and unique nature of the construction types seen in the Anglesey monuments. From Pant y Saer’s slabs to Trefignath’s multi chambered, multi temporal lifespan, there is no overarching tradition of construction, but a vast melting pot of ideas that appears to poach its influences from Ireland and the south west of England. Evidence of colour selection seems to be a phenomenon among the “passage grave” type monuments, with more eccentric outliers such as Pant Y Saer and Lligwy using more uniform, single-source stone types where the contrast is achieved more through texture than through colour. Even at these sites, however, the theatricality of colour contrast can be found - generally from pale stone strikingly rising from

the red or dark hued soils - an effect that can only have been amplified by the original covering mounds and entrance by rudimentary lamp or torchlight.

From this limited preliminary evidence, it would appear that colour grew in significance in the later Neolithic as passage graves became *de rigueur* - later case studies of other monument groupings must examine this further.

### **8.1.2           Pembrokeshire**

The monuments of Pembrokeshire form an intriguing and confusing collection - typologies that defy simple chronologies, and construction that belies the rich and diverse stone of the region. Though the geology available would lend itself to building monuments of variety and contrast, the builders generally chose stone that was uniform to a degree, at least not significantly different enough to provide a contrast that stands out or is immediately obvious. Within sites, the material chosen is carefully selected to form a uniform appearance, though not always one that matches the underlying dominant geology of the place it is built: for example at Carreg Coetan, which stands on sedimentary rocks, the builders chose boulders of weathered volcanic rhyolite, that displays highly contrasting surfaces of rough and pale to smooth blue-green.

Colour significance, then, is displayed in an altogether different way to that seen on Anglesey. Here stone is chosen for colour (or perhaps texture *and* colour), though for uniformity and contrast to the landscape than for contrast within the site itself. This, combined with the predominance of portal dolmen, earthfast and other more difficult to categorise monuments suggests a cultural divergence to Anglesey and other “local” funerary traditions; the Pembrokeshire way of doing things is distinctly different. As dating evidence is scant, it is generally the typology of the monuments themselves, along with any pottery and flint types, that leads to the consensus that these sites represent an early Neolithic, though some sources think the possible earthfast monuments are late Neolithic, perhaps even early Bronze Age (Nash 2006). If the early interpretation is the case, then the Pembrokeshire monuments represent an early Neolithic society, with burgeoning farming lifestyle and accompanying cultural shift. Though the tradition of megalith building as funerary ritual has clearly spread to the region, the interpretation is eccentric and interesting: as if the Pembrokeshire Neolithic peoples were influenced by, but not slavish to, the new ideas of death and burial.

The monuments exist in a performative landscape, one that plays tricks and generates optical illusions, elides seemingly obvious human-made places into the natural background of stone, hill, and cliff. This practice makes the people seem insular, secretive of their ritual ways - unlike other locations used as case studies in this research, the monuments use colour to identify themselves only when approached in certain ways, rather than using colour to signify important areas or perhaps important ritual aspects to a wide range of audiences (ref to other chapters). If the monuments actually represent a wider spread of dates throughout the Neolithic, then it is even more suggestive of a close-knit, insular society that retained traditions and ideas around monument construction that resisted the influence of relatively close groups, such as the Irish passage grave tradition that clearly gained at least a limited foothold on Anglesey. Though evidence from polished axe finds from sources in Cumbria and Cornwall (Nash 2006) confirm the existence of, at the very least, trade between the region and other contemporaneous centres of population, the Pembrokeshire monuments suggest this cultural connection did not displace distinct regional traditions of monument building.

### **8.1.3            Wessex**

With sites of such massive scale, and often viewed from some distance - by necessity of roped enclosure or catching a glimpse from a car window on the busy Wessex roads - it is easy to see them as a collection of grey stones. Lichen and the long process of weathering have dulled the surface of the Sarsens to a deceptively uniform colour at first glance, and it is only upon close inspection of stones that the vibrancy of their contrasting colours becomes apparent. Though it is not as flashy or showy as the contrast seen at some other sites within this study (notably the granite-rich boulder built monuments of the Netherlands, Denmark, and Sweden - see later in this chapter), making use of colour variation available, and seemingly combining it with texture, shape, and other cosmological properties we have difficulty quantifying, shows the builders of the monuments of this region placed immense importance in the material itself; they cared deeply about stone. As can be seen from the layers of information needed on each site plan, there is an interesting overlapping set of relationships and meanings woven into each colour-texture-shape combination. It is an interesting juxtaposition with the geologically bland region - largely chalk and associated limestone deposits, lacking the massive rock type variation seen in other case studies within this research - that the monument builders still managed to find stone that had intricate and fractally nested relationships with colour, texture, and shape for their sites. Once again, it is clear that Neolithic peoples had an incredibly deep relationship with stone as a material and an entity.



This region's monuments have a significant time-depth to their use as ritual sites - the long disputed chronology of Stonehenge puts the stone circle's several phases at a total active use and stone rearranging phase of some thousand years from 3100 - 2000BC (Darvill et al 2012, Darvill 2016), with Avebury (though less well carbon dated and with a less agreed upon chronology) at several hundred and the long barrow at West Kennet also seeing a thousand years of activity. Think of a contemporary site that has seen relatively continuous funerary ritual use for a similar span of time - perhaps a few churches with Saxon features would qualify, or the Saxon church at Corhampton, Hampshire - what features there signify certain ritual acts, embody certain beliefs, influence certain behaviours? The architecture, the symbology of the church, the act of repetition of prayer. It is not too far a stretch to classify the way particular stone is selected and placed at sites to act in a similar fashion. Though a thousand years is a significant portion of time, the use of specific colours and textures at certain parts of a monument could feasibly be cognitive shortcuts to certain ritual acts, cosmological beliefs, or act as memory triggers for folklore, myth, or religious motifs that would be passed on by oral tradition and enactment of ritual in lieu of written language.

Thanks to the work of archaeologists, historians, passionate antiquarians, druids, new age travellers, and those who feel a spiritual connection to the land, the Neolithic ritual (and domestic) landscape of Wessex has been studied, preserved, and subject to new and innovative interpretation more than any other of the same time period - meaning the sites can be viewed as part of a rich assemblage of Neolithic life. From the emerging narrative of Blick Mead as the cradle of significant interaction with the landscape - its springs providing transport, watering to tempt the great aurochs the Mesolithic peoples of the region hunted, and the alchemical transformation of pale flint being turned deep pink red by the native algae (Jacques, pers. comm.) - to the discovery of evidence of the vast midwinter feasting at Durrington Walls and the impact on interpretation of seasonal ritual behaviour at Stonehenge (Wright et al 2014, Craig et al 2015), the depth of knowledge of how people truly interacted with the land in this region is significant, and ever growing. It is fitting, then, that this region's monuments give such a deep record of complex colour/shape/texture relationships, and reveal insights into how these sensory motifs were used as Neolithic ritual triggers.

#### **8.1.4 Møn, Denmark**

It has already been seen at Drenthe, Anglesey, and Pembrokeshire that the peoples of many Neolithic local cultures centred their funerary monuments around regions of interesting, complex geological formations. Here at Møn the contrast of the white cliffs against the

background of dark, loamy soil is equally as dramatic, and the range of colours and textures seen in glacial erratic granites and local limestones is wide.

Though few of the original monuments still stand, this island was clearly an important funerary landscape - the lack of evidence for contemporary habitation and cultivation of the land is likely an artefact of the subsequent heavy agricultural use of this fertile landscape, and the relative lack of dedicated and thorough excavation of sites on the island - there has been little in the way of modern housing or industrial construction in this rural community, so unlike other regions in this study, there has been less opportunity for fortuitous discoveries like the Neolithic houses on Anglesey and in the opportunity for excavation and reconstruction afforded by the expansion of suburban regions in Drenthe.

Like the sites from the other island case study, Anglesey, the remaining megaliths of Møn display variation and innovation in construction and typology, though they are easier to classify and do not display the sheer range of eccentricities and adaptations seen on Anglesey.

Colour within the monuments on Møn seems to play several important cosmological roles, and denote areas of importance or significance within the sites; the use of certain materials, such as burnt flint, suggest a duality of significance that weaves colour with concepts of placing materials into different realms or states. As Midgley points out, burning of flint is unnecessary from a material properties point of view if it was merely to act as drainage material on chamber and passage floors, but the burning of a culturally and practically important resource such as flint puts it away from the realm of the living and into the realm of the dead. Not only is the colour transformed, and is then used to create a bright, shadow and reflection casting surface for the chamber floors, it also becomes a symbolic surface that belongs to those interred inside, sealing the living, fertile earth beneath it. There is a performative aspect to the materials, that lends a theatricality to human-stone-monument interactions - the colours and materials used to display them enable interplays of contrasting light and shadows, or mimic the change in light from sunrise to sunset over the change of seasons, or re enact the difference between light and dark, death and life.

The use of particular coloured stone in a landscape so littered with glacial erratics, and with ready sources of more “local” stone types, points to colour being a deeply important material property - particularly when the use of certain colours repeatedly for particular parts of megaliths emerges as a pattern. As has been shown with the Anglesey monuments and their significant pale (or art-covered) stones, and Wessex’s complex shape-texture-colour

system, even sites separated by different construction techniques (and presumably social and cultural groups) can display shared motifs. Contrasting colour, and specific colours in specific areas of megalithic sites, once again appear to contribute to a wider cultural leitmotif of colour being associated with specific actions, movements, ritual components or concepts that take place at these particular parts of the monument. Colour *becomes* communication.

#### **8.1.5 Falbygden, Sweden**

The Falbygden region was the place to be in the middle Neolithic of Sweden - for both the living and the dead. The fertile plains, dramatic landscape, and fascinating geology make for a heady combination, one that was exploited by the peoples living there at the time of the construction of the passage graves. Although there are numerous similarities in the region - the rectangular chambered, niche-filled tombs built from contrasting blocks, sometimes genuinely massive in size, of local red limestones and granite boulders - there are also small but significant differences that dovetail with the findings of genetic studies into the backgrounds and birthplaces of those interred within the monuments. Despite the variation in styles and influence from non-local monument building traditions, there persists a use of colour that adds drama and performance to the experience of being in and around the monuments, as has been seen at the other case studies within this research.

Colour here is often obvious, striking, and powerful, with red being the key. As well as the red limestone, granite boulders displaying orange and red surfaces are utilised (and one of the most numerous finds in the excavated sites are amber beads and artefacts). There is often a striking contrast between red of the passage and chamber orthostats, and the pale capstones above them. There is also a correlation between shape and colour - the pale capstones are largely naturally rounded pale granite boulders (with the exception of the limestone-built chambers of Girommen and Kung Björns Grav), and the orthostats squared or lozenge-shaped limestones. As seen more prominently at sites in the Wessex group, there is some patterning in shape between square and lozenge shape stone, that may hint towards a similar deliberate choice to display these shapes in contrast. There is, however, less of a distinction between colour of these shapes when used as orthostats within chambers and passages; this may be more of a phenomenon in open-air monuments such as stone circles and avenues, of which there are no examples within the Falbygden region.

Once again, it seems that certain areas of the sites use colours or patterns of colours, suggestive of their function as a trigger for certain actions or behaviours within the ritual space.

### 8.1.6 Drenthe, Netherlands

Of all the regions studied within this research, the monuments of Drenthe are the most uniform in typology - the long, squat, boulder-built hunebed being a template for them all, albeit with slight nuances and eccentricities, and contrasts in the scale of monuments. Though they have been somewhat neglected in the past, they are creeping back into the public and academic consciousness. The recent attempts to draw attention to this important collection of ancient monuments - from better signage, to the development of the cycle and walking trail that encompasses them, to the publishing of a new guidebook (currently only in Dutch) - are an important way to connect the public to the past, though it seems unlikely that more in depth archaeological research will take place soon, with the chambers generally being “capped off” with concrete and stone filling to deter unauthorised investigations. The paucity of finds from the sites, especially skeletal matter, means dating, population, and genetic studies are unlikely. It is in the field of landscape analysis - whether phenomenological or more GIS based - that any future developments will be made.

The landscape of Drenthe is one still drenched in stone - as seen in the introduction to this chapter, it is seen everywhere, town and countryside, garden and farmyard, museum and housing estate. Perhaps most poignantly, the relationship between stone, death, memorialisation, and the material as a time-deep near permanent reminder of the past is captured perfectly in the Holocaust memorial stone on Hunebedstaat, Borger - a monument to four families from the town that were deported and killed during the Second World War. In the Jewish tradition, stones are placed on graves to represent the permanence of memory.



*Fig 129. The Holocaust memorial of Borger, covered with the stones left in memory of the dead. P Foreman 2017*

The stones of the Neolithic sites of the region have served this purpose - we might not remember the specific dead, or know the rituals their creators abided by, but we recognise and respect the purpose and meaning of the sites. Time passes, but in some form, memory persists as stone does.

The archaeologically minded will drive down any road around Borger and think any of the many collections of boulders are suspiciously artificial and ancient looking - the truth is that these boulder clay lands are still so rich in stone that it is ubiquitous to the locals - and so it accumulates in suspicious looking piles in almost every field corner and roadside. Being in such a stone rich environment has other advantages - the ubiquity of stone as a material, in large and small boulders scattered through the landscape - means the tombs of Drenthe were not subject to the same level of stone robbing as those in some of the British sites. That is not to say they were totally free from vandalism - they were still the scene of some robbing, especially the handy dry stone wall size packing material, and then later the focus of opportunistic treasure hunters, who in all likelihood came away significantly empty handed.



*Fig 130. Though not as widespread, nor as religiously motivated as at some British sites, stone theft was still a threat to the Drenthe monuments, as depicted by this tableau from the Borger Hunebedcentrum. P Foreman 2017*

To Neolithic peoples, to whom monuments built of stone were an integral, deeply important part of their ritual life and cosmological process of thinking, the landscape must have been incredibly enticing - great boulders of granite of many different hues, with surfaces sparkling in some lights, tactile in a dozen different ways. They used this vast natural resource skillfully and with care; as can be seen from the site plans, contrast in colours is carefully selected for, and in particular is the contrast between pale beige and rich orange used in the kerbstones at Schimmeres and the capstones of several monuments; like the intricate texture/colour relationship seen at Wessex earlier in this chapter, there appears to be some co-selection for colour and texture, most noticeably at the largest surviving site, D27 in Borger.

## **8.2 Development of colour symbolism over time**

The way colour and stone interlink in cosmological manner undoubtedly shifts over time - before the Neolithic, when collective acts of mass labour were both infeasible due to a lack of sedentary lifestyle and unlikely due to the different social and cultural attitudes to landscapes, stone was a material to create portable things. No less important, practically or ritually, but certainly very different to creating massive, landscape-altering monuments.

Early Neolithic interactions with stone cross this border between stone-as-portable and stone-as-landscape; consider the flint mines of Neolithic Britain, which are largely an early Neolithic phenomenon focused around the fifth and fourth millennium BC (Russell 2000, 56). Here, underground spaces carved from brilliant white chalk were negotiated with tiny lamps and flames to retrieve the deep, black-cored flints prized for tool making. Cramped conditions and specialist knowledge requirements, combined with probable notions of ownership and strict access rites and rituals, means this pulling of stone from the earth was limited to either very small groups or individuals - possibly in a form of initiatory or rite of passage scenario, aligned with similar Australian Aboriginal and home nation American peoples as outlined in Chapter 8's ethnographic study. Red, white, and black are here encoded both very literally (red fire, white chalk, black flint) and cosmologically (the unknown but giving darkness of mine shafts and the flint they produce, redolent with magical properties - the red of fire, giving light but also making patterns in the shadows dance with menace and untold stories - the white of the chalk, hard and blistering to hack at, but also rewarding with its seams of black flint and shining brightness in the pock-marked mining landscape).



As the Neolithic progresses and monument building starts to rapidly spread as the dominant physical act of ritual behaviour upon the landscape, colour shifts along with it. No longer needing to limit access to the select few, monuments shift the ritual focus from initiatory to participatory. Though these spaces still restricted access - either to a group of people who had the knowledge to mediate access with the ancestors, or to family and direct relations - the placement in the landscape that is generally with access, if not in direct view of local habitation, means they are visible and therefore would have had regular interactions with people living in the area and visiting from outside. Red, white, and black - or variations thereof - become less of a tripartite system of initiatory rites and associations, and more of a way of signalling the ways in which sites embody certain concepts. In this way, the colour triad acts in a way very reminiscent of the way that networks are described within Actor Network Theory (Latour 2005) - the core idea behind the network, that red/white/black as a triad is significant and deeply meaningful, persists over time through a series of translations and redefinitions on the reasons *why* the triad is important - all the time maintaining the core idea that the colours convey deep, spiritual, primal meaning to the actors interacting with them. This translation means that though individual meanings differ, the core concept of “this means something, pay attention!” is maintained.

For sites that go on to straddle the Neolithic / Bronze Age border such as the Clava Cairns, colour becomes even more apparent - enough so that this is one of the few sites to have been noted as using colour deliberately in previous archaeological literature (Trevvarthen 2000). This is the last flourishing of stone in monuments, as funerary sites become barrows of earth and turf, ditch and mound - and colour becomes a feature of the flourishing art and adornment. Once again, colour is a neglected field within archaeology when it comes to examining its purpose and significance rather than its use as a simple descriptive, but studies have been conducted into the significance of colour in the Iron Age of Britain (Hoechal 2015) which should set the trend for the way colour is recorded, examined, experimented with, and hypothesised over.

### **8.3 Assembling colour of the Neolithic, redux**

With the context of the data provided in the surveying component of this research, alongside ethnographic examination of colour and stone in pre-industrial societies, an idea of the assemblage of Neolithic colour emerges. Following on from the methodological examination of Assemblage as a framework in chapter 3, it makes sense to conduct an examination of the data through the lens of assemblage in the same manner: to look at necessity;

expression of identity; availability; trends and popularity; material advances; family and friendship connections; and political and social statements.

### *Necessity*

Necessity in this case is a term that requires some definition - how necessary was it to build these megalithic constructions in the first place, and how necessary to build them from stone x and y, but not z? Rather than mere simple questions, these are heavily loaded with cultural and cosmological assumptions that it is difficult to disentangle from our own postmodern ideas on necessity, behaviour, and ritual life. It might appear, on the surface, that farming communities expending time energy on vast scales to construct, and then hang seasonal ritual frameworks around, these sites is the opposite of necessity - it's a luxury afforded to them by their sedentary and stable lifestyle. This not only makes several assumptions on the levels of labour, work, and uniformity of farming vs hunter gatherer subsistence - something that certainly went through complex phases of change and preservation, particularly in Scandinavian coastal regions (Sjögren 2009) - but also assumptions on what is necessary to different types of society. To many groups - not least some of those referenced in chapter 8's ethnographic research - the construction of ritual in relation to the dead, their continual presence in the landscape, and their need to use specific materials from specific point in the landscape are utterly necessary to their continued safety, health, and standing with powers and spirits.

Thus necessity surrounding monument construction needs to be understood as a concept that confers stronger meaning to cultures other than our own. Not only should it be a case of logistical and material necessity - that is, the necessity of using materials that withstand movement and lifting into place, necessity of materials that can be physically transported without fracture, necessity of using materials that can be relocated to the right place, even if this comes at significant human time and energy cost - but a necessity that affects life and death itself. Think of it as analogous to playing popular town building computer games such as Sim City - it is necessary for the safety of your citizens to build amenities such as hospitals, fire stations, and police stations in strategic locations that ensure rapid response to emergencies in diverse locations across your new cities. In modern town planning this is all algorithms and complex statistical modelling, and forms mathematical models into the correct locations for emergency service hubs. To Neolithic societies, the location of megalithic monuments was no less a complex calculation, taking into account an intricate web of necessities that we get some glimpse at through our understanding of the way early

societies view landscapes, view natural resources, view their relationship to the dead and to supernatural entities of various definitions.

Necessity at the sites within this study, then, is approached from two angles: material necessity, and cosmological necessity. From a material perspective, it has already been noted in the individual case studies that the monument builders chose areas of geological intensity and interest - with high stone availability - to construct their sites. This can be interpreted as either locating themselves, out of necessity, in a place where suitably sized, shaped, and strong stone was a rich resource and easily located and moved around - or that they recognised these areas as significant for reasons unknown to us, and this significance necessitated them as being the location for megalithic construction.

In all likelihood, it is likely that necessity, here, is yet another layer of assemblage - forming fractal patterns of reasoning incorporating material and cosmological, along with myriad other necessities on varying scales - from the necessity of land “ownership”, to necessities of viewshed or visibility, to necessities of labour availability and the need to work collaboratively and collectively with other groups - more of which follows.

### *Expression of identity*

The ways that the people of Neolithic Atlantic Europe defined their identity - collectively, locally, and in a wider context - are unknown to us. We don't know if they categorised themselves into binary genders, for example, or had a more complex system as seen in several societies and groups both in contemporary society and recorded in anthropological literature (Segal 2017). We don't know if they had a notion of rich and poor, and how this could be quantified.

What we can make some educated assumptions about is the fact that certain spaces were kept for special access to limited number of individuals - funerary monuments like those of the European Neolithic can only ever represent a scant few individuals from the greater whole, and even the most impressive in size cannot hold the vast collective worship involved in housing entire communities like a modern day church or other religious building. This points to the fact that there were levels of access to these “other” places - places of ritual, of the dead, where specialist knowledge of rites of access and correct ritual behaviours was essential. From Pembrokeshire's deeply performative landscape spaces to the side-by-side existence (if not contemporary usage) of vast collective spaces like the West Kennet Avenue and the West Kennet Long Barrow, the enclosure of space, and the marking of this space by

use of specific stones, colours, and textures, denotes the existence of a group of people who could negotiate access to these spaces - and instruct others in the correct construction of further sites.

The monuments form another important role in defining identity - forming a prominent point in the landscape, they define an area or location as “ours”. Whether this is a move against the natural and an effort to delineate and tame part of the landscape into a “man-made” area, or an effort to construct a microcosm of natural places on a small, human scale, where rituals of place, space, the dead, the living, seasonality and change, and other cosmological concepts could be enacted on a manageable scale - is debatable. What can be stated is that the use of specific colours of stone in combination in these sites is an expression of this identity - these colours were selected and utilised at not inconsiderable levels of effort, and this process of journey, negotiation, and procurement is communicated through the use of these stones.

### *Availability*

Touched upon under “necessity”, availability is similarly bound up in complexities surrounding the definition of just what available means. Though it is still obvious today that sites like the Drenthe region and Pembrokeshire afford a wealth of stone as building material, available in a spectrum of colours and providing an incredible range of textures and material properties, it is less clear if “availability” means the same today as it did to the peoples of the Neolithic. For example, though the sarsens of Wessex lay numerous and “free” on the landscape, only some were selected for use. Though this can reflect the desire for specific shape, colour, and other less tangible material and cosmological properties, it could also be the expression of ideas around availability - were certain stones “unavailable” due to associations with particular landscapes, events, spirits, supernatural beings, and other phenomena? As seen with the intricate journeying/access rites surrounding stone provenancing in Australian Aboriginal, native American, and other pre industrial societies (see chapter 8), stone being present in a landscape is not directly related to its availability - it must still be negotiated with, bartered for, paid for with ritual. Though megalithic construction takes place in areas where stone is available for the very practical reason that there can be no construction without material to do so, this does not mean that all stone within these places is available.

Thus the availability piece of the cosmological jigsaw must be composed of an understanding of both physical and spiritual availability. Landscapes composed of rich stone

deposits must still be negotiated with to access this resource - and travelling to distant landscapes to seek available stone also occurs (most famously in cases like the Stonehenge / Preseli bluestones).

### *Trends and popularity*

Megalithic monuments are without question one of the most significant expressions of the change in ritual behaviour from the Mesolithic to Neolithic in Atlantic Europe. Their occurrence throughout the region, despite eccentricities and variation in construction techniques, is an indication of a very broad and widespread belief structure bound up in ideas of stone as marker for specific purposes - where there are people, there are stones. A lot of stones.

This trend for expressing cosmological concepts through construction is so widespread and so universally prevalent, that it is clearly an indicator of a highly effective spread of cultural ideals through Europe. Whether this is interpreted as conquest, diffusion, cross-cultural connection and collaboration, or a gentle spread of ideas through trade and exchange, is beyond the remit of this study, however recent genetic studies seem to point to the now unfashionable (and roundly critiqued by the discipline in an attempt to address the colonialist tendencies of early interpretations) idea of widespread and rapid population replacement in line with ideas of Neolithic expansion via migration and eradication of existing Mesolithic hunter-gatherer populations (Olalde et al 2018).

Unlike the analogy of socks used in chapter 3's methodological examination of assemblage, "trends and popularity" has a very different meaning in the context of the European Neolithic. Its material culture is not directly comparable to our modern (largely) capitalist one. So trends and popularity are driven by very different motivations. Whereas trends today are fast moving, guided by market forces, and predicated on the culture of consumerism, in the Neolithic these ideals would have been largely unknown - consumerist culture can be compared to the need to "keep up" with trade partners and appear as affluent, influential, and cosmologically speaking, "in" with the non-human elements of the Neolithic world. As witnessed by the parallel spread of pottery types, the axe trade, and other consumables that criss-crossed their way across Neolithic Europe, conspicuous consumption - albeit in a very different framework to one we would recognise today - definitely occurred. So trends in monument buildings become an expression of this desire to be seen as using the right materials, constructing the right monuments, expressing the right ideals. Just like the right outfit confers layers of status, role, identity, and position in modern cultures, the use of stone

for monument building - and moreover, specifically coloured stone at that - confers the same.

### *Material advances*

The connection between material advances in the Neolithic and the construction of stone monuments is not immediately obvious - after all, the stones are rarely shaped or dressed (the massive Stonehenge Sarsens being the obvious exception), so their erection into monuments required no improvement in cutting tool technology. Instead, a more holistic idea of what is meant by “material advances” is required - one that pushes back against Ingold’s lamented loss of connection between people and materials, divorced as we most often are from the physicality and performance of the manufacturing process. “Material advances” isn’t just about perfecting the manufacture and use of a specific material, but also the developing understanding of the material itself.

In the case of stone, it underwent a transformation from being a material special for its properties as a medium for the perfect tool (practical or ritually unused) or adornment (jewellery, carved stone ball), to being one that became the desired material to build lasting monuments to the dead. This transformation is a key component of Neolithic ritual behaviour, and therefore stone must form an absolutely integral part of Neolithic cosmology. The advance from individual craftspeople flaking away a tool, or exchanging a tool for some form of return, shifted into a collective act of megalith raising - along with a refined methodology for axe making that shifted from “simple” flaking to polishing and high levels of preparation. Stone had seen a renaissance in the Neolithic; the material advance here is one of a shift in culture.

An appreciation - or perhaps better expressed as an awareness - of the colour of stone as a significant aspect of its cosmological impact is something that also seems to have developed over time. With the Pembrokeshire series of monuments generally presented as early Neolithic (Children & Nash 2002), the flourishing of passage graves and gallery grave types seen in the Anglesey, Drenthe, Mon, and Falbygden studies in this research occupying a later, colour-aware period. These later monuments have colour as an intrinsic aspect of the experience of being in and around them - as seen from the diagrams in chapter 5, there is a noticeable shift from relative uniform coloured sites, so those where colour forms contrasting, significant patterns. Suddenly, the colour - and the way that colour is used - becomes part of the material awareness of stone.



### *Family and friendship connections*

Family and friendship, two categories of personal relationship that are complex to define even to contemporary societies who live with these bonds in daily life, are difficult to conceptualise for Neolithic societies. It is evident that some kind of “family” was a recognisable unit of close bond, judging by the fact that several funerary monuments and burials contain genetically related individuals (Lee et al 2012, Meyer et al 2012). Family, then, is probably closely analogous to the generic modern definition of a group related by birth, marriage, and blood relation.

As far as slotting this into the assemblage of colour is concerned, it forms one of the smaller nested circles of the diagram found in chapter 3’s methodological examination of assemblage - where personal associations of what it means to have stone, and stone of particular colour, are formed by influence from immediate family and friends as well as a wider cosmological awareness. Ideas around colour are not often obvious or spoken of - see Chapter 8 for an examination of the way that black is sometimes erroneously disregarded in ethnographic studies of African ritual behaviours due to it being an unspoken presence, something that collectively the society are aware of and is whispered about between close relatives, but not overtly referenced and certainly not to outsiders. Attitude to colour is influenced by these close bonds, and this is how key meanings and associations are socialised into strong, persistent ideals.

### *Political and social statements*

Fewer things make more of a political statement than implanting a construction into and onto the land, announcing your presence within it in imposing, long-term fashion. It is a statement that goes out to the entire assemblage - it speaks to the land itself, to the stones used, to the peoples involved in construction and use, to the dead interred and represented within, and to local, regional, and wide-ranging neighbouring groups that can view the monument and see the statement it makes.

The nature of this statement, as touched on in the “expression of identity” section above, is a mercurial concept. It could be stating that the group involved in construction have made a dedication to honour their ancestors in the correct fashion. It could be a way of building an accessible, tameable simulacra of natural spaces, where relationships with supernatural

beings and ancestral spirits can be negotiated safely. It can denote ownership over landscape. It can denote a belonging to a particular landscape. Whichever of these, or yet further unknown statements, are the case - it is without doubt a statement of some kind of intent, writ large on the landscape.

“Political” is difficult to apply to a Neolithic context - whilst there is undoubtedly factionalism and conflict in the Neolithic of Atlantic Europe (Schulting & Fibiger 2012), this is impossible to align with modern ideas of political statement - though monuments themselves can be interpreted as a statement of how a group wants to be seen to behave, or how they wish to identify and define themselves, or how they wish to quantify their place in the landscape - physically and socially speaking. In this respect, a stone monument is the ultimate political statement - here we are, here’s what we do, and these stones are brought and placed here to let you all know it.

Colour forms an intrinsic part of this political and social statement - think of the way that specific colours are deeply entrenched in political identity, to the extent that certain colours can engender conflict and sectarian violence in certain locations. The use of specific coloured stone can be a provocation and a clear message - not just “here we are”, but “here we are and here we’ve made this point in stone - such is the nature and strength of our commitment to this message.”

### *Summary*

These categories, though not representative of the entire vast network that an assemblage comprises, give something of the idea of just how deeply colour was entrenched in cosmological concerns of the peoples of Neolithic Atlantic Europe. Deployed in funerary monuments, it becomes the expression of an immense fractal pattern of interconnected associations and meanings that lie at the heart of social and family connections, the way groups connect to neighbours and wider contacts, and the way people demonstrate their dedication to particular concepts, ritual frameworks, and behaviours demanded of them by the prevailing social mores and cultural standards.

The assemblage of Neolithic colour affords a glimpse into how Neolithic peoples conceptualised the unknowable and difficult to categorise elements of their lives into concepts that represented them. Just as extant and recent pre industrial societies have categorised elements of their world view in according to colour, and then built complex ideas up as being related to combinations and interactions with these colours in ritual frameworks

(most notably Turner 1967 and Jacobson-Widding 1979), peoples of the Neolithic used colour in similar ways. Contrasting colours express relationships between things they express - on a basic level such as life and death, but also the more intangible associations such as magic and nature, health and illness, fertility and barrenness, women and men, young and old, wisdom and innocence. Despite being unable to pinpoint specific definitions for each colour, broad associations based on how they are deployed in monumental sites, looking at the ethnographic analysis, and looking at modern day experiments into colour definitions, it is possible to gain something of an impression on the way colour influenced daily ritual and mundane life.

Thus, white/pale colours are full of life - the rising sun association in the Anglesey chambered tombs that shines light into the dead chambers at solstice sunrises, the pale, "male" stones of Avebury and West Kennet (for what is more lively than male sexual energy and semen, essential for life itself?), and the paler stones in passages of several Scandinavian sites, suggesting one region for the dead, and one for the living.

Black and dark colours are death, but also protection and magic and necessary contrast to life - dark paint on the Iberian monuments serves to highlight the bright patterns beneath, and the darkness of chambered tombs provides space for the dead and ancestral spirits to reside in peace. Magic is a difficult concept - it's generally malign and must be mediated carefully, respectfully, and correctly as seen in the ethnographic analysis - and so often it is unspoken. Black and dark things are literally hidden in shadow - all the better to appreciate the light.

Red, then, is the chaotic human element. It is nuance in the face of dichotomy. It is the way we express the feelings and emotions that make us human and subject of conflicting feelings and irrational behaviours. It is love and war and passion and sexuality and blood loss and menstruation and violence and ripeness and taste. It imbues things with the quantity of being alive, of being an agent, of having drives and needs and motivations of their own. Red stones may be an expression of the living element within the landscape - an acknowledgement of behaviours that can result in strife, or in peace. Red stone could be the vital element that makes sites alive - gives them a role as an active participant in cosmological landscapes and frameworks. Where sites display little in the way of colour variation, this contrast could be achieved through contrast to the ground soil (or artificial paving and flooring material, of which white quartz is a notable and prevalent source), or with the artefacts deposited, or with certain (temporary) acts of dressing the stones, evidence for which has not survived other than isolated evidence of pigments in Iberia (Gomes et al

2015), possibly Brittany (Bueno Ramirez et al 2012, 2015), and Orkney (Card & Thomas 2012). This may represent locations where stone of differing colours is simply not available in sufficient quantity, or is not “available” as defined above, or rites around colour are conducted in different ways.

## **8. Conclusions**

### **8.1 Colour as communication of Neolithic cosmologies**

By examining the evidence for the flourishing of deliberate colour selection and patterning in Neolithic monuments across Atlantic Europe, particularly in the middle and later Neolithic periods, and reading this in tandem with an appreciation of the role of colour as a deeply entrenched cosmological ritual framing of the world as seen in the ethnographic review, it is clear that colour performed something of a cosmological mnemonic to Neolithic peoples. From evidence emerging across Europe, the ritual behaviour of the period was seasonal, collective, and commemorative (Craig et al 2015). Diverse groups of individuals would travel to gather for midwinter or midsummer festivities, a logistical and culture-clashing challenge of significant proportions. Within the melting pot of local and regional monument building interpretations and eccentricities, with no set pattern of construction and no one way to interpret “a passage grave” or “a chambered cairn” as a distinct unit of funerary ritual behaviour, patterns in colour perform a quick mental sleight of hand to the incoming (and resident) celebrants.

Consider the tiling of the London Underground, and in particular, that of Leslie Green’s Piccadilly, Northern, and Bakerloo lines - each station a unique and intricate, but importantly bright and instantly recognisably contrasting pattern of tiles - to aid illiterate Londoners to find their way home in lieu of being able to read the station sign (Leboff 2002). Pattern and contrast in colours as communication.

This research has, at length, discussed the time-deep and ongoing significance of red, white, and black to humans. Their web of meanings, definitions, cosmological associations was no less complex in the Neolithic than it is today - and this research has built but one translation of this rich assemblage. Though each layer of the assemblage cannot be known, many can be inferred or hinted at by the ones that lie adjacent to it, and those that exist in contemporary and near contemporary pre-industrial societies. The use of coloured stone at Neolithic sites is not a constant, nor an identical pattern repeated across time and space. Instead it is a symptom of the assemblage of colour significance as a deeply embedded facet of Neolithic cosmology - one bound up, as demonstrated in Chapter 9.4, in a great many interweaving associations and connotations that form personally, locally, regionally and intercontinentally. This research set out with a big aim:

*To evaluate patterns in the use of coloured stone within the construction of monuments in Neolithic Atlantic Europe, and use it to gain an understanding of the role of colour in Neolithic cosmology.*

To this end, research has been conducted across diverse sites in Atlantic Europe, looking at colour selection, underlying geology, connections between texture, rock art, and solar alignments, and examining how societies that may have similar cosmological attitudes to stone, colour, space, and landscape behave around material of particular colours and the sourcing of that material. Whilst the research has not pinpointed precise colour category associations for red, white, and black (something that is impossible even in extant cultures, as seen in the ethnographic review, as people consciously and unconsciously limit what they reveal about the roles of certain colours, especially black, in their society), it has revealed a larger, wider, more significant concept as to the importance of colour: colour as *communication*.

As the Neolithic progressed and the individual local cultures and groups within Atlantic Europe became more intricately interwoven by trade, social exchange, and inter-marriage (Bradley and Edmonds 1993, Sjögren 2009), colour becomes more and more apparent in ritual monumentality. In this way the sites studied in Pembrokeshire are the exception that proves the rule: if they are as early as is assumed (Nash 2006), and given Pembrokeshire's isolated nature given the difficulty of land travel and the difficult seas, it seems obvious that the monuments of the region would display earlier, performative, theatrical and fundamentally insular elements of ritual behaviour. These were monuments designed to be experienced as initiation, experienced as part of ritual paths known only to the walkers and their guides - small scale and hyper-local. Pembrokeshire is Tilley's phenomenology of landscape personified: performative passage through space, physical engagement tailored and controlled in such a way to provoke action, thought, frame of mind, response. Power and control.

Compare this controlled landscape to other sites within this study - where colour is more vibrant, and routes to the individual monuments less proscribed, less playful; though significant work has been conducted on the idea of views and landscape points of interest being fundamental to Neolithic monumental construction (Devereux 1991, Cummings and Whittle 2003, Cummings 2004), this is more a case of sites being seen and wanted to be seen, rather than elided and hidden. Something about the changing attitudes to ritual meant



that sites became more “public” - meaning that they would have been subject to visitation from diverse groups of individuals as cultures traded and travelled and inter-wove across Neolithic Europe. Collective ritual - like the vast midwinter feasting at Durrington Walls, and the long term movement of people as suggested by the Swedish isotopic studies undertaken by Sjögren, seems to have become the norm. This opening up of at least some aspects of ritual behaviour necessitates clear communication to all comers about the nature of special places and sites. The stones themselves are just the surface of this: as seen in chapter 8’s examination of how pre-industrial societies approach stone and colour, there is a vastly complex web of meanings, associations, initiatory rites, roles, and relationships with the dead - that is communicated through the ritual dressing of people, things, and places in coloured pigments and cloths. All recognise what these ritual colours mean - and so colour communicates ideas at once too deep and simultaneously too obvious to be conveyed in other ways.

## **8.2 Challenges and considerations**

### **Lack of daylight readings**

Early in the development phase of the project, when the ORAC device was being refined and reconfigured, the idea of having a means of recording the stones as they would have been “seen” in daylight was mooted. The reasoning behind this was because although an average of the RGB readings taken on site gives a baseline reference of what the sensor reads under white LED light, this is clearly different to that seen under natural daylight. As this study was designed to embrace the idea of the stone’s own material agency, then getting readings close to its original appearance as seen in daylight would theoretically come closer to its appearance to the original builders, highlighting similarities and differences that are not as apparent under the white LED bulb. In order to achieve a daylight reading with the recording device, modification was needed. A simple daylight blue gel, of a type frequently used in photography to get a daylight effect when shooting images with bright lighting, was fitted over the LED and a separate set of readings taken. The results were interesting (see the Calderstones case study, chapter 4.7); whereas the white LED gave readings that were more yellow than observed by the human eye, the ones under daylight gel were closer to their apparent red colour, but unshakably with a blue tinge that could not be accommodated for by either physically altering the blue gel’s position, or by attempting to reprogramme ORAC to compensate.

Originally, two sets of readings were to be taken at each site – one white LED, one daylight. The two lighting types are not only technically very different, but give two very different accounts of the material's "voice" – by using artificial light only, the recording would be just as subject to interpretation as if recorded by a human participant, whereas natural light is more likely closer to the original material properties and therefore the original intent and influence of the material itself. With the complications over blue notes in the resultant reading, and the substantial increase in time required on site, it was decided that this was not viable under the scope of this research project. However, it would make a worthwhile springboard into further study.

### **Need for further case studies**

The Neolithic of Atlantic Europe saw flourishing farming communities construct a wealth of megalithic monuments across the region - and it was never the intention of this project to capture data about them all, rather a carefully selected sample. This approach yielded interesting results and explored some sites - notably those in Drenthe and Mon - that are not frequently written about in accessible, English language text. However, it did mean several regions were left out - including some of the "big hitters" of the Neolithic world, like the vast rock-art encrusted passage graves of the Boyne Valley, the houses and hearths of Orkney, and the early, colour-rich, painted dolmens and monuments of Evora and the rest of the Iberian Peninsula. Further study would build a yet bigger map of the known assemblage of Neolithic colour, and research into several key areas could provide not only a more vast, and therefore suitable for deeper and more intense analysis - database of stones.

Suggested sites for further study:

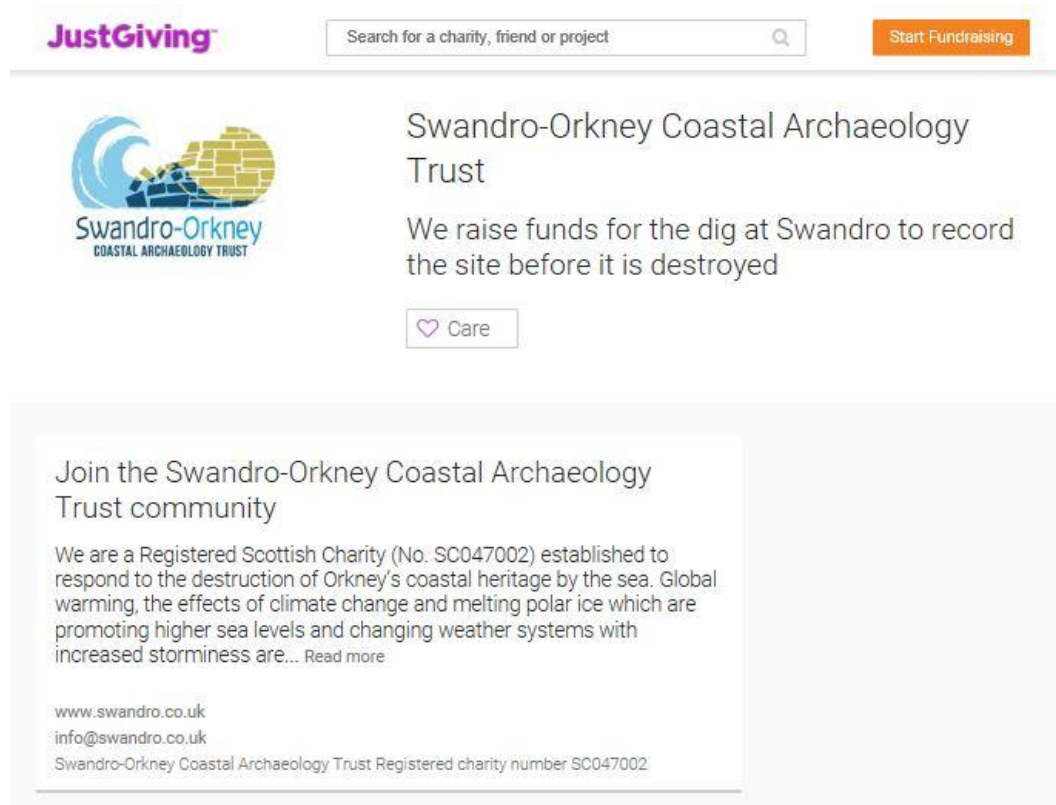
- Evora, Portugal
- Arran, Scotland
- Barnenez and Gavrinis, Brittany, France
- Orkney, Scotland
- Clava Cairns, Scotland (though bordering on the Bronze Age)
- Loughcrew, Ireland
- Carrowmore, Ireland
- Carrowkeel, Ireland
- Brú na Bóinne, Ireland
- Northern Germany

It is not solely these clusters of high profile sites that should be the focus of any further research, however. Though clusters of monuments provide interesting sounding boards for examining local behaviour patterns and local quarrying, stone procurement, and common art styles, individual tombs are also valuable in pinpointing where certain styles spread to, and how peoples in diverse regions responded to their local geology in terms of selecting their megalith materials. To make a widespread collection of data on individual sites possible, the need for crowdsourcing of data collection becomes apparent.

### **8.3 Further work and legacy**













The assemblage of colour in Neolithic cosmology continues to redefine itself and rebuild itself in the image of each archaeologist that translates the story. Though this research has presented the conclusion that this assemblage is a function of the need to communicate vastly complex and terrifyingly otherworldly concepts down to the level of individuals from an array of different backgrounds and social groups, this could be altered and refined with addition for more data, with findings from other regions rich in monuments that were, by necessity of time and resources, not covered in this study.

To that end, and to further the commitment to open data and accessibility set out in chapter 3.3.2.4 on open source software, the legacy of this research will be an open invitation to construct ORAC devices, record sites, and upload the resulting data to an accessible repository for future analysis. In this way, the data is not only accessible to other researchers, but it becomes a “citizen science” programme that enables groups to take ownership of their local heritage assets and historic sites, providing a key outlet for public outreach and fostering an attitude that such sites should be cared for, protected, studied, and engaged with.



*Fig 131. Platforms such as JustGiving are increasingly used by archaeological projects, large and small, to raise funds for resources, initiatives, and other costs. From <https://www.justgiving.com/swandro-orkneycoastalarchaeologytrust> accessed 15.08.18 21:02*

Though ORAC is a “budget” device and the costs associated with building and using the device are relatively low, a successful citizen science project must be affordable and accessible to all - and so the most effective way of getting out ORAC kits and manuals, along with guides on local Neolithic sites and background information for those engaged in the new data collection enterprise, is to raise funds to enable donation of kits to schools, clubs, institutions, and individuals involved in community archaeology. The most popular way of raising these short-term and small pot amounts of cash is to use a crowd funding service, such as Kickstarter or Just Giving - that allow groups to set their project parameters and people can donate towards it - usually in return for small rewards and project updates.

	1 <a href="#">Remove</a>	Maker Essentials - Mini Breadboards & Jumper Jerky PIM245	£9.20
	1 <a href="#">Remove</a>	Maker Essentials - Various Headers PIM247	£5.50
	1 <a href="#">Remove</a>	Arduino Uno Rev3 A000073	£19.50
	1 <a href="#">Remove</a>	9V Battery Snap COM1302	£0.50
	1 <a href="#">Remove</a>	Rocker Switch COM0415	£1
	1 <a href="#">Remove</a>	Lead Free Solder SD01373	£3
	1 <a href="#">Remove</a>	Soldering Tip Cleaner SH-1025	£10
	1 <a href="#">Remove</a>	Antex XS25 Soldering Iron (UK Plug) ANT-XS25	£30
	1 <a href="#">Remove</a>	Breadboard (830 point) COM0112	£8
	1 <a href="#">Remove</a>	Make: Getting Started with Arduino BK0205	£12.79
	1 <a href="#">Remove</a>	Adafruit RGB Colour Sensor with IR filter ADA1334	£7.20
	1 <a href="#">Remove</a>	16 x 2 LCD screen COM0506	£4.50

*Fig 132. An example kit list - some components are enough for multiple projects, and items like the book and soldering equipment can be shared across schools within clusters.*

Kits with the above components can be sent to school “code clubs”, a popular phenomenon in UK primary and secondary schools that sees young people learn basic coding skills, of which the ORAC construction and programming is certainly within the bounds of. Key areas, with high densities of Neolithic monuments that are accessible and in good state of preservation, should be targeted, but with the open invitation for anyone with an interest to download the kit list, construct their own ORAC, and upload their findings on any monument they feel drawn to. Instructions should be translated to afford contributions from sites across Atlantic Europe.

The legacy of the project, then, becomes one of collaboration and exploration of colour as a medium of communication - a translation of the original Neolithic cosmological organisation of the world into a modern day, technological approach. If the ORAC kits and data collected

cover a broad enough region, and collects enough data points, it becomes a repetition of the original spread of ideas around colour, stone, place, space, and monumentality - this time, people are trying to make sense of what it was to be Neolithic and engaged with significant colours as a method of contextualising and communicating their ritual and religious beliefs and behaviours. It is a very different way of processing around a site, but it is a processual way nonetheless - pausing at each stone, considering its surface level properties and material value, before allowing the mind to wander into other, less tangible, more divisive meanings behind the stone. The project becomes a new way for a generation of people to interact with the stone monuments of Neolithic Atlantic Europe.

## References

- Aber, J. S., 1979. Kineto-stratigraphy at Hvideklint, Møn, Denmark and its regional significance. *Bulletin of the Geological Society of Denmark*, 28, 81-93.
- Axelsson, T., Heimann, C. and Sjögren, K.-G., 2003. *Falbygdens gånggrifter -bevarande och kunskapsförmedling: Skadeinventering av gånggrifter i centrala Västergötland 1996 och 1998*. Gothenburg.
- Axelsson, T. and Jankavs, P., 2013. Stones for the ancestors - red limestone and cleft rocks. In: Bakker, J. A., Bloo, S. B. C. and Dutting, M. K., eds. *From Funeral Monuments to Household Pottery: Current advances in Funnel Beaker Culture (TRB/TBK) research, Proceedings of the Borger Meetings 2009, the Netherlands*. Oxford: Archaeopress.
- Bakker, J. A., 1992. *The Dutch hunebedden: megalithic tombs of the Funnel Beaker Culture*. Ann Arbor, Mich., U.S.A.: International Monographs in Prehistory.
- Bakker, J. A., 2013. The TRB culture in the Netherlands. In: Bakker, J. A., Bloo, S. B. C. and Dutting, M. K., eds. *From funeral monuments to household pottery: Current advances in Funnel Beaker Culture (TRB/TBK) research: Proceedings of the Borger meetings 2009, the Netherlands*. Oxford: Archaeopress, 11-24.
- Barham, L. S., 2002. Systematic pigment use in the Middle Pleistocene of South-Central Africa. *Current Anthropology*, 43 (1), 181-190.
- Barrett, J. C., 2012. Agency: A revisionist account. In: Hodder, I., ed. *Archaeological Theory Today*. Cambridge: Polity, 146-166.
- Baumann, H., 1935. *Bei Bauern und Jagern in Inner Angola*. Berlin: Wurfel-Verlag.
- Beidelman, T. O., 1980. Review: red-white-black as a mode of thought: A study of triadic classification by colours in the ritual symbolism and cognitive thought of the peoples of the lower Congo. *American Ethnologist*, 7 (2), 383-384.
- Bender, B., 1998. *Stonehenge: Making space*. Oxford, Berg.
- Bender, B., 2002. Time and landscape. *Current Anthropology*, 43 (S4), S103-S112.
- Bennett, J., 2010. *Vibrant matter: A political ecology of things*. Durham (USA): Duke University Press.



Berlin, B. and Kay, P., 1969. *Basic color terms: Their universality and evolution*. Berkeley: University of California Press.

Berlin, B., Kay, P. and Merrifield, W. R., 1985. Color term evolution: Recent evidence from the World Color Survey. *84th Annual Meeting of the American Anthropological Association*, Washington, DC.

Berlin, B., Kay, P. and Merrifield, W. R., 1991. *The world color survey*. Dallas: Academic Publications of the Summer Institute of Linguistics.

Blain, J., and Wallis, R., 2007. *Sacred sites, contested rites/rights*. Sussex: Sussex Academic Press.

Boivin, N., 2004. From veneration to exploitation: Human engagement with the mineral world. In: Boivin, N., and Owoc, M. A., eds. *Soils, Stones and Symbols: Cultural Perceptions of the Mineral World*. London, UCL Press.

Bornstein, M. H., 1973. Colour vision and colour naming: a psychophysiological hypothesis of cultural difference. *Psychological Bulletin*, 80 (4), 257-285.

Bradley, R., and Emonds, M., 1993. *Interpreting the axe trade: production and exchange in Neolithic Britain*. Cambridge, Cambridge University Press.

Bradley, R., 1998. Stone circles and passage graves - A contested relationship. In: Gibson, A. and Simpson, D., eds. *Prehistoric ritual and religion*. Stroud: Sutton, 2-13.

Brindley, A. L., 2003. The use of pottery in Dutch Hunebedden. In: Gibson, A., ed. *Prehistoric pottery: people, pattern and purpose*. BAR, 43-51.

Bruck, J., 2005. Experiencing the past? The development of a phenomenological archaeology in British prehistory. *Archaeological Dialogues*, 12 (1), 45–72.

Brumm, A., 2004. An axe to grind: Symbolic considerations of stone axe use in ancient Australia. In: Boivin, N., and Owoc, M. A., eds. *Soils, Stones and Symbols: Cultural Perceptions of the Mineral World*. London, UCL Press.

Bueno Ramirez, P., de Balbin Behrmann, R. and Barroso Bermejo, R., 2015. Graphic programmes as ideological construction of the megaliths: the south of the Iberian peninsula as case study. In: Rocha, L., Bueno Ramirez, P. and Branco, G., eds. *The II International conference of transition archaeology: Death archaeology*. Archaeopress. 51-70.

- Bukach, D., 2003. Exploring identity and place: An analysis of the provenance of passage grave stones on Guernsey and Jersey in the middle Neolithic. *Oxford Journal of Archaeology*, 22 (1), 23-33.
- Burrow, S., 2010. Bryn Celli Ddu passage tomb, Anglesey: Alignment, construction, date, and ritual. *Proceedings of the Prehistoric Society*, 76, 249-270.
- Card, N. and Thomas, A., 2012. Painting a picture of Neolithic Orkney: decorated stonework from the Ness of Brodgar. In: Jones, A. C. a. A. M., ed. *Visualising the Neolithic: Abstraction, figuration, performance, representation*. Oxford: Oxbow, 111-124.
- Cipolla, C. N., 2018. Earth flows and lively stone. What differences does 'vibrant' matter make? *Archaeological Dialogues*, 25 (1), 49–70.
- Cirlot, J. E., 1972. *A Dictionary of symbols*. Trans Sage, J. New York: Philosophical Library
- Collier, G. A., Dorflinger, G. K., Gulick, T. A., Johnson, D. L., McCorkle, C., Meyer, M. A., Wood, D. D. and Yip, L., 1976. Further evidence for universal colour categories. *Language*, 52 (4), 884-890.
- Company, M. C., 2015. *How color notation works* [online]. <http://munsell.com/about-munsell-color/how-color-notation-works/>: Available from: 23/10/2015].
- Coutts, P.J.F., 1971. Greenstone: The prehistoric exploitation of Bowenite from Anita Bay, Milford Sound. *The Journal of the Polynesian Society*, 80(1), 42-73.
- Cowell, R., 2008. *The Calderstones – A prehistoric tomb in Liverpool*. 2<sup>nd</sup> edition. Liverpool, Merseyside Archaeological Society.
- Craig, O., Shillito, L., Albarella, U., Viner-Daniels, S., Chan, B., Cleal, R., Pearson, M., 2015. Feeding Stonehenge: Cuisine and consumption at the Late Neolithic site of Durrington Walls. *Antiquity*, 89 (347), 1096-1109.
- Cullberg, C., 1963. *Megalitgraven i Rössberga: utgravningsrapport*. Stockholm: Riksantikvarieämbetet.
- Cummings, V., 2002. Experiencing texture and touch in the British Neolithic. *Oxford Journal of Archaeology*, 12 (1), 249-261.

Cummings, V., 2004. Connecting the mountains and the sea: the monuments of the eastern Irish Sea zone. In: Cummings, V. and Fowler, C., eds. *The Neolithic of the Irish Sea: Materiality and traditions of practice*. Oxford: Oxbow Press.

Cummings, V., 2012. What lies beneath: Thinking about the qualities and essences of stone and wood in the chambered tomb architecture of Neolithic Britain and Ireland. *Journal of Social Archaeology*, **12**, 29-50.

Cummings, V. and Richards, C., 2014. The essence of the dolmen: the architecture of megalithic construction. *Préhistoires Méditerranéennes. Colloque 2014. Fonctions, utilisations et représentations de l'espace dans les sépultures monumentales du Néolithique européen*, Aix-en-Provence.

da Silva, F. V., 2007. Red as blood, white as snow, black as crow: Chromatic symbolism of womanhood in fairy tales. *Journal of Fairy-Tale Studies*, **21** (2), 240-252.

Daniel, G. E., 2013. *The prehistoric chamber tombs of England and Wales*. Cambridge: Cambridge University Press.

Darvill, T., 2011. Megaliths, monuments and materiality. In Furholt, M., Luth, F. and Muller, J. (Eds.), *3rd European megalithic studies group meeting* (pp. 35-46). Kiel: Dr Rudolph Habelt GmbH.

Darvill, T., 2013. Fifty shades of red: The basic colour category red in the monuments and material culture of Neolithic and Bronze Age communities in Atlantic northwest Europe. In: Meller, H., Wunderlich, C.-H. and Knoll, F., eds. *Rot – Die Archäologie bekennt Farbe* (5. *Mitteldeutscher Archäologentag*), Halle (Saale. Landesamt für Denkmalpflege und Archäologie Sachsen-Anhalt. 229-242.

Darvill, T., 2016. *A research framework for the Stonehenge, Avebury and associated sites: Research activity in the Stonehenge landscape 2005-2012*. London, English Heritage.

Darvill, T., Marshall, P., Parker Pearson, M., and Wainwright, W., 2012. Stonehenge remodeled. *Antiquity*, **86** (334), 1021-40.

Darvil, T., and Wainwright, G., 2016. Neolithic and Bronze Age Pembrokeshire. *Pembrokeshire County History*, **1**, 55-222.

de Lumley, H., 2009. The emergence of symbolic thought: the principal steps of hominisation leading towards greater complexity. In: Refrew, C., and Morley, I., (eds.). *Becoming Human: Innovation in Prehistoric Material and Spiritual Culture*. 10-26. Cambridge, Cambridge University Press.

Deleuze, G., 1992. *Expressionism in philosophy: Spinoza*. Translated by Joughin, M. New York: Zone Books.

Devereux, P., 1991. Three-dimensional aspects of apparent relationships between selected natural and artificial features within the topography of the Avebury complex. *Antiquity*, 65 (249), 894-898.

Devereux, P., and Nash, G., 2014. Indications of an acoustic landscape at Bryn Celli Ddu, Anglesey, north Wales. *Time and Mind*, 7:4, 385-390.

Edmonds, M., 1995. *Stone tools and society: Working stone in Neolithic and Bronze Age Britain*. Batsford, London.

Eogan, G., 1983. Bryn Celli Ddu. *Antiquity*, 57, 135-136.

Fleming, A., 2005. Megaliths and post-modernism: the case of Wales. *Antiquity*, 79, 921-932.

Fowler, C., 2010. Pattern and diversity in the Early Neolithic mortuary practices of Britain and Ireland: contextualising the treatment of the dead. *Documenta Praehistorica*, 37, 1-22.

Fukui, K., 1981. Review: Red-white-black as a mode of thought: A study of triadic classification by colours in the ritual symbolism and cognitive thought of the peoples of the Lower Congo. *American Anthropologist*, 83, 944-945.

Furholt, M., 2011. A virtual and practiced Neolithic? Material culture symbolism, monumentality and identities in the Western Baltic region. In: Furholt, M., Luth, F. and Muller, J., eds. *3rd European Megalithic Studies Group Meeting*, Kiel. Dr Rudolf Habelt GmH. 107-120.

Gage, J., 1999. Did colours signify? Symbolism in the red. *Cambridge Archaeological Journal*, 9 (1), 110-112.

Gillings, M., Pollard, J., Peterson, R., and Wheatley, D., 2010. *Landscape of the megaliths: Excavation and fieldwork on the Avebury monuments, 1997-2003*. Oxford, Oxbow.

Girardot, N. J., 1977. Initiation and meaning in the tale of snow white and the seven dwarfs. *Journal of American Folklore*, 90 (357), 274-300.

Gomes, H., Collado Giraldo, H., Martins, A., Nash, G., Rosina, P., Vaccaro, C. and Volpe, L., 2015. Pigment in western Iberian schematic rock art: an analytical approach. *Mediterranean Archaeology and Archaeometry: International Scientific Journal*, 15(1), 163-175.

Gordon, J. M., Averett, E. W. and Counts, D. B., 2016. Mobile computing in archaeology: Exploring and interpreting current practices. In: Averett, E. W., Gordon, J. M. and Counts, D. B., eds. *Mobilizing the past for a digital future: The potential of digital archaeology*. North Dakota: Digital Press at University of North Dakota, 1-30.

Green, C. P., 1997. Stonehenge: geology and prehistory. *Proceedings of the Geologists' Association*, 108 (1), 1-10.

Greenly, E., 1919. *The geology of Anglesey*. London, HM Stationery Office.

Griffiths, S., Edwards, B., Wilson, A., Karl, R., Labrosse, F., LaTrobe-Batemank, E., Miles, H., Moeller, K., Roberts, J. and Tiddeman, B., 2015. Small works, big stories. Methodological approaches to photogrammetry through crowd-sourcing experiences. *Internet Archaeology*, 40.

Grillo, K.M, and Hildebrand, E. A., 2013. The context of early megalithic architecture in eastern Africa: the Turkana Basin c. 5000-4000 BP. *Azania: Archaeological Research in Africa*, 48 (2), 193-217.

Grimes, R.L., 1996. *Readings in ritual studies*. Upper Saddle River, Prentice Hall.

Grimes, W. F., 1936. The megalithic monuments of Wales. *Proceedings of the Prehistoric Society*, 2, 102-139.

Hamilakis, Y., Pluciennik, M. and Tarlow, S., 2002. Introduction. Thinking through the body. In: Hamilakis, Y., Pluciennik, M. and Tarlow, S., eds. *Thinking through the body. Archaeologies of corporeality*. New York: New York.

Hampton, O.W., 1997. *Rock quarries and the manufacture, trade, and uses of stone tools and symbolic stones in the central highlands of Irian Jaya, Indonesia: Ethnoarchaeological perspectives*. Unpublished DPhil thesis, Texas A&M University.

Hampton, O. W., 1999. *Culture of stone: Sacred and profane uses of stone among the Dani*. College Station: Texas A and M University Press.

- Hardin, C. L., 2005. Explaining basic color categories. *Cross-Cultural Research*, 39 (1), 72-87.
- Harrison, J. and Baron-Cohen, S., 1994. Synaesthesia: An account of coloured hearing. *Leonardo*, 27 (4), 343-346.
- Heider, E. R., 1972a. Probabilities, sampling, and ethnographic method: The case of Dani colour names. *Man*, 7 (3), 448-466.
- Heider, E. R., 1972b. Universals in color naming and memory. *Journal of Experimental Psychology*, 93 (1), 10-20.
- Hemming, J., 2012. Red, white, and black in symbolic thought: The tricolour folk motif, colour naming, and trichromatic vision. *Folklore*, 123 (3), 310-329.
- Hemp, W. J., 1930. The chambered cairn of Bryn Celli Ddu. *Archaeologia*, 80, 179-214.
- Hensey, R., 2015. *First light: The origins of Newgrange*. Oxford: Oxbow.
- Hering, E., 1920. *Outlines of a theory of the light sense*. Translated by Hurvich, L. M. and Jameson, D.
- Hildebrand, E.A., 2013. Is monumentality in the eye of the beholder? Lessons from constructed spaces in Africa, Azania. *Archaeological Research in Africa*, 48 (2), 155-172.
- Hoecherl, M., 2015. *Controlling colours: Function and meaning of colour in the British Iron Age*. Archaeopress, Oxford.
- Holmes, W.H., 1903. The Obsidian mines of Hidalgo, Mexico. *American Anthropologist (New Series)*, 5 (3), 503-507.
- Houlbrook, C., 2015. The penny's dropped: Renegotiating the contemporary coin deposit. *Journal of Material Culture*, 20 (2), 173-189.
- Hovers, E., Ilani, S., Bar-Yosef, O. and Vandermeersch, B., 2003. An early case of color symbolism: Ochre use by modern humans in Qafzeh Cave. *Current Anthropology*, 44 (4), 491-522.
- Howard, E., 2007. *Geology of the Liverpool district - a brief explanation of the geological map sheet explanation of the British Geological Survey*, 1:50,000 sheet 96, Liverpool.

- Howes, D., 1990. Controlling textuality: A call for a return to the senses. *Anthropologica*, 32, 55-73.
- Huggett, J., 2012. What lies beneath: Lifting the lid on archaeological computing. In: Chrysanthi, A., Murrieta Flores, P. and Papadopoulos, C., eds. *Thinking beyond the tool: Archaeological computing and the interpretive process*. Oxford: Archaeopress, 204-214.
- Hunt, D., 2006. Colour symbolism in the folk literature of the Caucasus. *Folklore*, Vol. 117 (3), 329-338.
- Hurcombe, L., 2007. A sense of materials and sensory perception in concepts of materiality. *World Archaeology*, 39 (4), 532-545.
- Hurvich, L., 1969. Hering and the scientific establishment. *American Psychologist*, 24 (5), 497-514.
- Hurvich, L. M. and Jameson, D., 1957. An opponent-process theory of color vision. *Psychological Review*, 64 (6), 384-404.
- Ingold, T., 1993. The temporality of the landscape. *World Archaeology*, 25 (2), 152-174.
- Ingold, T., 2007. Materials against materiality. *Archaeological Dialogues*, 14 (1), 1-16.
- Insoll, T., 2011. Introduction: Shrines, substances and medicine in sub-Saharan Africa: Archaeological, anthropological, and historical perspectives. *Anthropology & Medicine*, 18 (2), 145-166.
- Insoll, T., 2015. *Material explorations in African archaeology*. Oxford, OUP.
- Jacobson-Widding, A., 1979. *Red-white-black as a mode of thought: A study of triadic classification by colours in the ritual symbolism and cognitive thought of the peoples of the Lower Congo*. Stockholm, Uppsala University.
- Jacobson-Widding, A., 1980. The red corpse, or the ambiguous father. *Ethnos*, 45, 3-4
- Jameson, K. A., 2005a. Culture and cognition: What is universal about the representation of color experience? *The Journal of Cognition and Culture*, 5 (3-4), 293-347.
- Jameson, K. A., 2005b. Why GRUE? An interpoint-distance model analysis of composite color categories. *Cross-Cultural Research*, 39 (2), 159-204.



- Jameson, K. A., 2010. Where in the World Color Survey is the support for the Hering primaries as the basis for color categorization? *In: Cohen, J. and Matthen, M., eds. Color ontology and color science.* Cambridge, Massachusetts: The MIT Press, 179-202.
- Jameson, K. A., Highnote, S. M. and Wasserman, L. M., 2001. Richer color experience in observers with multiple photopigment opsin genes. *Psychonomic Bulletin and Review*, 8 (2), 244-261.
- John, B. S., 1979. *The geology of Pembrokeshire.* Aberteifi, Abercastle Publications.
- Jones, A., 1999. Local colour: Megalithic architecture and colour symbolism in Neolithic Arran. *Oxford Journal of Archaeology*, 18 (4), 339-350.
- Jones, A., 2006. Animated images: Images, agency and landscape in Kilmartin, Argyll, Scotland. *Journal of Material Culture*, 11 (1/2), 211-225.
- Jones, A. and Bradley, R., 1999. The Significance of colour in European archaeology. *Cambridge Archaeological Journal*, 9 (1), 112-114.
- Kay, P., 1975. Synchronic variability and diachronic change in basic color terms. *Language in Society*, 4 (3), 257-270.
- Kay, P., 2005. Color categories are not arbitrary. *Cross-Cultural Research*, 39 (1), 39-55.
- Kay, P., Berlin, B., Maffi, L. and Merrifield, W., 1997. Color naming across languages. *In: Hardin, C. L. and Maffi, L., eds. Color categories in thought and language.* Cambridge: Cambridge University Press, 21-56.
- Kay, P. and McDaniel, C. K., 1978. The linguistic significance of the meanings of Basic Color Terms. *Language*, 54 (3), 610-646.
- Kay, P. and Regier, T., 2003. Resolving the question of color naming universals. *Proceedings of the National Academy of Science*, 100 (15), 9085-9089.
- Keiller, A., and Piggott, S., 1936. The West Kennet Avenue, Avebury.
- Kemp, W. J., 1930. The chambered cairn of Bryn Celli Ddu. *Archaeologia*, 80, 179-214.
- Knight, C., Power, C. and Watts, I., 1995. The human symbolic revolution: a Darwinian account. *Cambridge Archaeological Review*, 5, 75-114.

- Larsson, M., 2014. A time of change. *In: Larsson, M., ed. Paths towards a new world: Neolithic Sweden.* Oxford: Oxbow, 76-102.
- Latour, B., 2007. *Reassembling the social: An introduction to Actor Network Theory.* Oxford: Oxford University Press.
- Law, J., 2008. Actor Network Theory and material semiotics. *In: Turner, B. S., ed. The new Blackwell companion to social theory.* London: Blackwell, 141-158.
- Law, J. and Hassard, J., 1999. *Actor Network Theory and after.* Oxford: Blackwell.
- Leboff, D., 2002. *The Underground stations of Leslie Green.* Harrow Weald, Capital Transport.
- Lee, E.J., Renneberg, R., Harder, M., Krause-Kyora, B., Rinne, C., Müller, J., Nebel, A., von Wurmb-Schwark, N., 2012. Collective burials among agro-pastoral societies in later Neolithic Germany: perspectives from ancient DNA. *Journal of Archaeological Science*, 51, 174-80.
- Lewis-Williams, D. and Pearce, D., 2005. *Inside the Neolithic mind: Consciousness, cosmos, and the realm of the gods.* London: Thames and Hudson.
- Lillo, J., Moreira, H., Alvaro, L. and Davies, I., 2014. Use of basic color terms by red-green dichromats. *Color Research and Application*, 39 (4), 360-371.
- Lindsey, D. T. and Brown, A. M., 2009. World Color Survey color naming reveals universal motifs and their within-language diversity. *Proceedings of the National Academy of Science*, 106 (47), 19785-19790.
- Lucy, J. A., 1997. Linguistic relativity. *Annual Review of Anthropology*, 26, 291-312.
- Lynch, F., 1972. Portal dolmens in the Nevern Valley. *In: Lynch, F. M. and Burgess, C., eds. Prehistoric man in Wales and the West.* Bath: Adams and Dart.
- Lynch, F., 1976. Towards a chronology of megalithic tombs in Wales. *In: Boon, G. C. and Lewis, J. M., eds. Welsh antiquity: Essays mainly on prehistoric topics. Presented to H.N. Savory upon his retirement as Keeper of Archaeology.* Cardiff: National Museum of Wales, 63-79.
- Lynch, F., 1998. Colour in prehistoric architecture. *In: Simpson, D. and Gibson, A., eds. Prehistoric ritual and religion: Essays in honour of Aubrey Burl.* Stroud: Sutton, 62-67.

- Lynch, F. M., 1975. Excavations at Carreg Samson megalithic tomb, Mathry, Pembrokeshire. *Archaeologia Cambrensis*, 124, 15-35.
- Macfarlane, I., 2005. *Many exchanges: Archaeology, history, community and the work of Isabel McBryde*. Canberra, Aboriginal History Inc.
- Macfarlane, R., 2012. *The old ways: A journey on foot*. London, Penguin.
- MacGregor, G., 1999. Making sense of the past in the present: A sensory analysis of carved stone balls. *World Archaeology*, 31 (2), 258-271.
- MacGregor, G., 2002. Making monuments out of mountains: The role of colour and texture in the constitution of meaning and identity at recumbent stone circles. In: Jones, A. and MacGregor, G., eds. *Colouring the past: The significance of colour in archaeological research*. Oxford: Berg, 141-158.
- MacLaury, R. E., 1992. From brightness to hue: An explanatory model of color-category evolution. *Current Anthropology*, 33 (2), 137-186.
- MacLaury, R. E., 1997. Ethnographic evidence of unique hues and elemental colors. *Behavioral and Brain Sciences*, 20 (2), 202-203.
- Marshack, A., 1981. On Palaeolithic ochre and early uses of color and symbol. *Current Anthropology*, 22 (2), 188-191.
- Marshall, C. and Rossman, G. B., 2011. *Designing qualitative research*. London: Sage.
- Marshall, S., 2016. Acoustics of the West Kennet Long Barrow, Avebury, Wiltshire. *Time and Mind*, 9 (1), 43-56.
- McBryde, I. 2000. Travellers in storied landscapes: a case study in exchanges and heritage. *Aboriginal History*, 24, 152-74.
- McLuhan, M. and McLuhan, E., 1988. *Laws of media: the new science*.
- Meaden, G. T., 2017. Stonehenge and Avebury: Megalithic shadow casting at the solstices at sunrise. *Journal of Lithic Studies*, 4 (4).
- Mens, E., 2008. Refitting megaliths in Western France. *Antiquity*, 82, 25-36.
- Meyer, C., Ganslmeier, R., Dresely, V. and Alt, K.W., 2012. New approaches to the reconstruction of kinship and social structure based on bioarchaeological analysis of

Neolithic multiple and collective graves. *Theoretical and methodological considerations in Central European Neolithic archaeology, Oxford (BAR International Series 2325)*, 11-23.

Midgley, M., 1992. *TRB culture: The first farmers of the north European plain*. Edinburgh: Edinburgh University Press.

Miles, H. C., Karl, R., Roberts, J. C., Wilson, A. T., Labrosse, F., Tiddeman, B., Griffiths, S., Edwards, B. and Ritsos, P. D., 2015. Alternative representations of 3D-reconstructed heritage data. *Journal on Computing and Cultural Heritage*, 9 (1).

Mitchell, F., 1992. Notes on some non-local cobbles at the entrances to the passage-graves at Newgrange and Knowth, County Meath. *The Journal of the Royal Society of Antiquaries of Ireland*, 122, 128-145.

Nash, G., 2006. *The architecture of death: Neolithic chambered tombs in Wales*. Almeley: Logaston Press.

Nash, G., 2010. Art in this world and art in the underworld: An appraisal of the later prehistoric menhir of Robin Hood's Stone, Allerton, Liverpool. *Journal of the Merseyside Archaeological Society* Vol, 13.

Nash, G., Brook, C. and George, A., 2005. Notes on newly discovered rock-art on and around Neolithic burial chambers in Wales. *Archaeology in Wales*, 45, 11-16.

Nash, G., and Stanford, A., 2010. Recording images old and new on the Calderstones in Liverpool. *Journal of the Merseyside Archaeological Society*, 13.

O'Kelly, M., 1982. *Newgrange, archaeology, art, and legend*. London: Thames and Hudson.

Olalde, I., Brace, S; Allentoft, ME; Armit, I; Kristiansen, K; Booth, T; Rohland, N; Mallick, S; Szécsényi-Nagy, A; Mitnik, A; Altena, E; Lipson, M; Lazaridis, I; Harper, TK; Patterson, N; Broomandkhoshbacht, N; Diekmann, Y; Faltyskova, Z; Fernandes, D; Ferry, M; Harney, E; de Knijff, P; Michel, M; Oppenheimer, J; Stewardson, K; Barclay, A; Alt, KW; Liesau, C; Ríos, P; Blasco, C; Miguel, JV; García, RM; Fernández, AA; Bánffy, E; Bernabò-Brea, M; Billoin, D; Bonsall, C; Bonsall, L; Allen, T; Büster, L; Carver, S; Navarro, LC; Craig, OE; Cook, GT; Cunliffe, B; Denaire, A; Dinwiddy, KE; Dodwell, N; Ernée, M; Evans, C; Kuchařík, M; Farré, JF; Fowler, C; Gazenbeek, M; Pena, RG; Haber-Uriarte, M; Haduch, E; Hey, G; Jowett, N; Knowles, T; Massy, K; Pfrengle, S; Lefranc, P; Lemerrier, O; Lefebvre, A; Martínez, CH; Olmo, VG; Ramírez, AB; Maurandi, JL; Majó, T; McKinley, JI; McSweeney, K; Mende, BG; Mod, A; Kulcsár, G; Kiss, V; Czene, A; Patay, R; Endrődi, A; Köhler, K; Hajdu,

T; Szeniczey, T; Dani, J; Bernert, Z; Hoole, M; Cheronet, O; Keating, D; Velemínský, P; Dobeš, M; Candilio, F; Brown, F; Fernández, RF; Herrero-Corral, A-M; Tusa, S; Carnieri, E; Lentini, L; Valenti, A; Zanini, A; Waddington, C; Delibes, G; Guerra-Doce, E; Neil, B; Brittain, M; Luke, M; Mortimer, R; Desideri, J; Besse, M; Brücken, G; Furmanek, M; Hałuszko, A; Mackiewicz, M; Rapiński, A; Leach, S; Soriano, I; Lillios, KT; Cardoso, JL; Pearson, MP; Włodarczak, P; Price, TD; Prieto, P; Rey, P-J; Risch, R; Rojo Guerra, MA; Schmitt, A; Serralongue, J; Silva, AM; Smrčka, V; Vergnaud, L; Zilhão, J; Caramelli, D; Higham, T; Thomas, MG; Kennett, DJ; Fokkens, H; Heyd, V; Sheridan, A; Sjögren, K-G; Stockhammer, PW; Krause, J; Pinhasi, R; Haak, W; Barnes, I; Lalueza-Fox, C; Reich, D., 2018. The Beaker phenomenon and the genomic transformation of northwest Europe. *Nature*, 555, 190-196.

Olsen, B., 2012. Symmetrical archaeology. In: Hodder, I., ed. *Archaeological theory today*. Cambridge: Polity, 208-228.

Olsen, B. and Witmore, C., 2015. Archaeology, symmetry, and the ontology of things: a response to critics. *Archaeological Dialogues*, 22 (2), 187-197.

Parker-Pearson, M., and Ramilisonina., 1998. Stonehenge for the ancestors: The stones pass on the message. *Antiquity*, 72, 308-26.

Pastoureau, M., 2001. *Blue: The history of a color*. Princeton: Princeton University Press.

Petru, S., 2006. Red, black or white? The dawn of colour symbolism. *Documenta Praehistorica*, 33, 203-208.

Petru, S., 2012. The power of colour. In: Clottes, J., (ed.), *L'art pléistocène dans le monde / Pleistocene art of the world / Arte pleistoceno en el mundo, Actes du Congrès IFRAO, Tarascon-sur-Ariège, septembre 2010, Symposium - Signes, symboles, mythes et idéologie. N° spécial de Préhistoire, Art et Sociétés, Bulletin de la Société Préhistorique Ariège-Pyrénées, LXV-LXVI, 2010-2011, p. 1713-1723.*

Piggott, S., 1962. *The West Kennet Long Barrow Excavations, 1955-56*. London, HM Stationary Office.

Piotto, E.L., Ross, A., Perryman, C., Ulm, S., 2018. Deliberate selection of rocks in the construction of Gummingurru stone arrangement site complex, Darling Downs, Queensland. *Queensland Archaeological Research*, 21: 27-38.

Pollard, J., & Gillings, M., 1998. Romancing the stones: Towards a virtual and elemental Avebury. *Archaeological Dialogues*, 5(2), 143-164.

Postgate, N., 1997. Mesopotamian petrology: Stages in the classification of the material world. *Cambridge Archaeological Journal*, 7(2), 205-224.

Price, T. D., 2015. *Ancient Scandinavia: An archaeological history from the first humans to the Vikings*. Oxford: Oxford University Press.

Ramírez, P. B., de Balbín Behrmann, R., Laporte, L., Gouézin, P., Cousseau, F., Bermejo, R. B., Gismero, A. H., Cela, M. I. and Quesnel, L., 2015. Natural and artificial colours: the megalithic monuments of Brittany. *Antiquity*, 89 (343), 55-71.

Reader, The., 2018. *About Calderstones* [online].

<http://www.thereader.org.uk/about/calderstones/> The Reader. [Available from: 10.09.18].

Rees, C., and Jones, M., 2016. Neolithic houses from Llanfaethlu, Anglesey. *Past*, 81, 1–3.

Regier, T., Kay, P. and Cook, R. S., 2005. Focal colors are universal after all. *Proceedings of the National Academy of Sciences*, 102, 8386–8391.

Renne, E. P., 1991. Water, spirits, and plain white cloth: The ambiguity of things in Bunu social life. *Man*, 26 (4), 709-722.

Roberson, D., 2005. Color categories are culturally diverse in cognition as well as in language *Cross-Cultural Research*, 39 (1), 56-71.

Roberson, D., Davidoff, J. and Davies, I., 2000. Color categories are not universal: Replications and new evidence from a stone age culture. *Journal of Experimental Psychology: General*, 129 (3), 369-398.

Roberts, D., 2010. Discussion of the prehistoric origins of Calderstones park. *Journal of the Merseyside Archaeological Society*, 13

Robin, G., 2010a. Spatial structures and symbolic systems in Irish and British passage tombs: the organization of architectural elements, parietal carved signs and funerary deposits. *Cambridge Archaeological Journal*, 20 (3), 373 - 418.

Robinson, D., 2004. The mirror of the sun: surface, mineral applications and interface in Californian rock-art. In: Boivin, N., and Owoc, M. A., eds. *Soils, Stones and Symbols: Cultural Perceptions of the Mineral World*. London, UCL Press.

Rowlands, H., 1723. *Mona Antiqua Restaurata*. London.

Russell, M., 2000. *Flint mines in Neolithic Britain*. Stroud, Tempus.

Sacks, O., 1997. *The island of the colorblind*. London: Vintage.

Scarre, C., 2002. Epilogue: Colour and materiality in prehistoric society. *In*: Jones, A. and MacGregor, G., eds. *Colouring the past - The significance of colour in archaeological research*. Oxford: Berg, 227-242.

Scarre, C., 2004a. Displaying the stones: the materiality of "megalithic" monuments. *In*: DeMarrais, E., Gosden, C. and Renfrew, C., eds. *Rethinking Materiality : The engagement of mind with the material world*. Cambridge: McDonald Institute for Archaeological Research, 141-152.

Scarre, C., 2004. Choosing stones, remembering places: geology and intention in the megalithic monuments of western Europe. *In*: Boivin, N., and Owoc, M. A., eds. *Soils, Stones and Symbols: Cultural Perceptions of the Mineral World*. London, UCL Press.

Schulting, R.J. and Fibiger, L., 2012. *Sticks, stones, and broken bones: Neolithic violence in a European perspective*. Oxford, Oxford University Press.

Segal, E.S., 2017. Subverting the dominant paradigm: Cross-cultural approaches to understanding gender. *In*: Demos, V., Segal, M.T., (eds.) *Gender Panic, Gender Policy (Advances in Gender Research, Volume 24)* Emerald Publishing Limited, 117 - 132

Shee Twohig, E., 1981. *The megalithic art of western Europe*. Oxford: Clarendon.

Sjogren, K.-G., 2015. Mortuary practices, bodies, and persons in Northern Europe. *In*: Fowler, C., Harding, J. and Hofmann, D., eds. *The Oxford handbook of the British Neolithic*. Oxford: Oxford University Press, 1005-1022.

Sjögren, K.-G., 2011. Megaliths, landscapes and identities: the case of Falbygden, Sweden. *In*: Furholt, M., Luth, F. and Muller, J., eds. *Megaliths and identities*. Bonn: Dr Rudolph Habelt GmbH, 155-166.

Sjögren, K.-G., Price, D. and Ahlström, T., 2009. Megaliths and mobility in south-western Sweden. Investigating relationships between a local society and its neighbours using strontium isotopes. *Journal of Anthropological Archaeology*, 28 (1), 85-101.

Sjögren, K.-G. ö. r., 1995a. Bebyggelsen under yngre stenålder - exemplet Karleby; Utställningen Forntid på Falbygden. In Museum, F. (Ed.). Falköping.



- Sjögren, K.-G. ö. r., 1995b. Det tidiga jordbruket i Västergötland. *Västergötlands fornminnesförenings tidskrift*.
- Smith, B., 1961. *British regional geology: North Wales*. London: HM Stationery Office.
- Smith, I.F., and Keiller, A., 1965. *Windmill Hill and Avebury: Excavations by Alexander Keiller, 1925-1939*. London, Clarendon Press.
- Spence, K., 1999. Red, white and black: Colour in building stone in Ancient Egypt. *Cambridge Archaeological Journal*, 9 (1), 114-117.
- Taçon, P., 1991. The power of stone: Symbolic aspects of stone use and tool development in western Arnhem Land, Australia. *Antiquity*, 65 (247), 192-207.
- Taçon, P., 2004. Ochre, clay, stone and art: The symbolic importance of minerals as life-force among aboriginal peoples of northern and central Australia. In: Boivin, N., and Owoc, M. A., eds. *Soils, Stones and Symbols: Cultural Perceptions of the Mineral World*. London, UCL Press.
- Teather, A., 2015. *The first British Neolithic representational art? The chalk engravings at Cissbury flint mine* [online]. <http://antiquity.ac.uk/projgall/teather347>: Antiquity. Available from: 14.10.15].
- Thomas, J., 1991. *Understanding the Neolithic*. London: Routledge.
- Thomas, J., 2004. Materiality and traditions of practice in Neolithic south-west Scotland. In: Cummings, V. and Fowler, C., eds. *The Neolithic of the Irish Sea: Materiality and the traditions of practice*. Oxford: Oxbow, 174-184.
- Thompson, E., 1995. *Colour vision: A study in the cognitive science and philosophy of perception*. London: Routledge.
- Tilley, C., 1996. *An Ethnography of the Neolithic*. Cambridge: Cambridge University Press.
- Tilley, C., 1999. *The dolmens and passage graves of Sweden*. London: Institute of Archaeology.
- Trevarthen, D., 2000. Illuminating the monuments: Observation and speculation on the structure and function of the cairns at Balnuran of Clava. *Cambridge Archaeological Journal*, 10 (2), 295-315.

Turner, V., 1967. *The forest of symbols: Aspects of Ndembu ritual*. Ithaca, New York: Cornell University Press.

van der Sanden, W., 2017. *Gids voor de hunebedden in Drenthe en Groningen*. Zwolle: W Books.

Ward, J., 1918. Some prehistoric sepulchral remains near Pendine, Carmarthenshire. *Archaeologia Cambrensis*, 18, 64-79.

Watson, A., 2001. Composing Avebury. *World Archaeology*, 33 (2), 296-314.

Westphal, J., 2016. In the eye of the beholder: key architectural elements in 25 years of visual analysis of Danish megalithic tombs. In: Laporte, L. and Scarre, C., eds. *The megalithic architectures of Europe*. Oxford: Oxbow, 89-100.

Whittle, A., 1997. Remembered and Imagined belongings: Stonehenge in its traditions and structures of meaning. In: Renfrew, C., and Cunliffe, B., eds. *Science and Stonehenge, Proceedings of the British Academy 92*, Oxford: OUP,

Whittle, A., 2004. Stones that float to the sky: portal dolmens and their landscapes of memory and myth. In: Cummings, V. and Fowler, C., eds. *The Neolithic of the Irish Sea: Materiality and traditions of practice*. Oxford: Oxbow, 81-90.

Wozniak, P., Knaving, K., Obaid, M., Gonzalez-Carcedo, M., Unluer, A. and Fjeld, M., 2015. ChromaGlove: A wearable haptic feedback device for colour recognition. *Proceedings of the 6th Augmented Human International Conference*, Singapore. 219-220.

Wreschner, E. E., 1976. The red hunters: Further thoughts in the evolution of speech. *Current Anthropology*, 17 (4), 717-719.

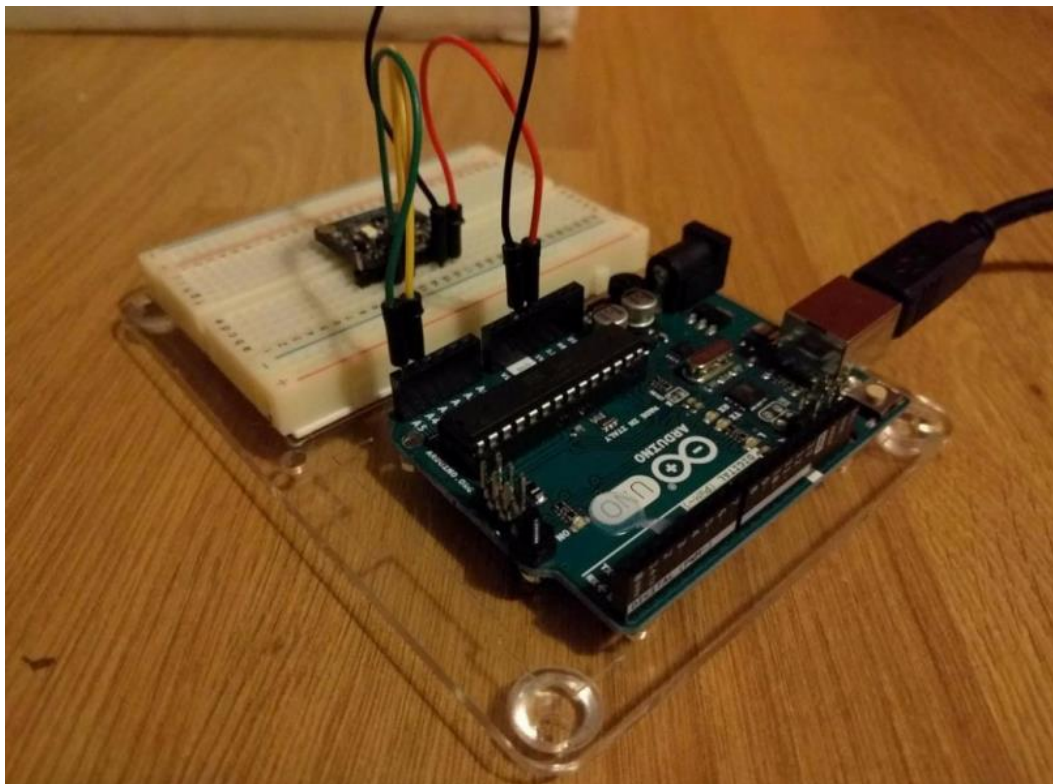
Wreschner, E. E., 1980. Red ochre and human evolution: A case for discussion. *Current Anthropology*, 21 (5), 631-644.

Wyndham, H. P., *A Gentleman's tour through Monmouthshire and Wales in the months of June and July 1774*. London.

## Appendix 1 - ORAC technical data and programming files

The colour sensor chosen was the Adafruit TCS34725. With an inbuilt white LED, it has a constant light source, meaning readings recording the hue of material placed before the sensor would be consistent regardless of lighting conditions on site. The sensor itself is very sensitive, and gives RGB values for colour as 16bit readings -i.e., a value between 0 and 16555. As there is not a standard colour chart for 16bit RGB values, these readings must be converted into 8bit values, so they can be put into a standard RGB chart and return a recognised value; this was achieved through programming of the device (see later in this appendix for further details).

The sensor itself comes with a standard code, or “sketch”, that is designed to allow familiarity with the device and test its capabilities. For this early stage of prototyping, the device is connected to a laptop or desktop PC via USB, for both the uploading of coding and power. The results from the sensor are fed back via this USB and displayed on the desktop.



The initial iteration of the sensor - dubbed ORAC (Optical Reader of Accurate Colours) - was constructed on a specifically designed prototyping board, and still drew its power from USB connection to a laptop computer - data output was also to this laptop. Though the eventual device needed to be portable and self powered, this prototyping stage allowed for flexibility in the layout of individual components, and quick reprogramming to refine the function of ORAC. In an early test of public outreach styles, this prototyping stage was recorded and presented as a YouTube video.

Once this stage was successfully tested, field requirements were considered, to see what kinds of alterations were needed. The basic requirements were:

Portable; LCD screen to give instant feedback of results; allow a consistent distance from the sensor to the surface being recorded; block out external light sources; internal power source; easily accessible to allow for field repairs.

With new set of components and a basic plan in mind, the coding for the device now needed altering to reflect the changed nature of its performance. Firstly, the results now had to be displayed to the integral LCD screen, and secondly, the data needed to be compressed from 16bit to 8bit so as to be readily converted to universally recognisable RGB hues.

The following illustrations show important sections of the code, and explains their purpose.

## Section 1 – Initialising

```
#include <Wire.h>
#include "Adafruit_TCS34725.h"
#include <LiquidCrystal.h>
LiquidCrystal lcd(8, 9, 4, 5, 6, 7);

Adafruit_TCS34725 tcs = Adafruit_TCS34725(TCS34725_INTEGRATIONTIME_50MS, TCS34725_GAIN_4X);
```

*Coding for ORAC, initialisation stage*

This section of the code is telling the Arduino which “libraries” of code it draws on to run this programme –in this case, the code for the colour sensor, the LCD screen, and the basic wiring of the Arduino itself. It has the default settings for integration time and gain, important settings that can be altered to find truer colour matches in the prototyping stage.

As the LCD can take input from a number of sources, the string of numbers above are instructing it which pins to activate for the purposes of this programme. These concern the input of data, the input of power, and the output of light and data to the screen itself.

## Section 2 – Setup

```
void setup() {
  lcd.begin(16, 2);
  Serial.begin(9600);
  Serial.println("Color View Test!");

  if (tcs.begin()) {
    Serial.println("Found sensor");
  } else {
    Serial.println("No TCS34725 found ... check your connections");
    while (1);
  }
}
```

### *Coding for ORAC, component check stage*

This section is telling the components how to behave – for the LCD screen, it must initialise. The colour sensor is feeding back information on the status of the device. This stage is only viewed on the desktop if the device is connected via USB, and is used to check the device is functioning correctly prior to taking it out in the field. The “Serial.println” denotes that it is displayed via a serial port rather than via the LCD; this data is not displayed on the LCD screen as it would interfere with the display of the colour sensor results.

## Section 3 – Capture

```
void loop() {
  uint16_t clear, red, green, blue;

  tcs.setInterrupt(false);

  delay(60);

  tcs.getRawData(&red, &green, &blue, &clear);

  green=map(green,0,16555,0,255);
  red=map(red,0,16555,0,255);
  blue=map(blue,0,16555,0,255);

  //red = red >> 8;
  //green = green >> 8;
  //blue = blue >> 8;

  tcs.setInterrupt(true);

  lcd.print("R="); lcd.print(red); lcd.print(" ");
  lcd.setCursor(7, 0);
  delay(500);
  lcd.print("G="); lcd.print(green); lcd.print(" ");
  lcd.setCursor(0, 1);
  delay(500);
  lcd.print("B="); lcd.print(blue); lcd.print(" ");
  lcd.setCursor(0, 0);
  delay(500);
}
```

### *Coding for ORAC, determining values and output stage*

This final section determines the functions that occur over the course of the programme. The colour sensor is commanded to record red, green, and blue values, and the inbuilt LED light initialises. The “delay(60)” gives the device a 60ms delay in between initialising and feedback, as the sensor takes 50ms to take a reading. The next section maps the 16bit RGB values onto 8bit ones, allowing compression of the data into a usable form (the grey shaded text below, preceded by //, is not active; it is another method of compressing the data that was trialled, and found to give poor results – it has been left in as a reminder of previous coding iterations a failed solutions). The final section is commanding the LCD to display the results, with a 500ms delay. This delay was found to be necessary to make the readings stable, and not shift with minute movements during holding the sensor up to a surface.

This is the first stage of coding, and following on from the Bryn Celli Ddu pilot study (see chapter 4.1), minor tweaks were made to default settings variables such as gain, in order to have truer hue readings.

## Appendix 2 - Reflexive Journal Entries


Date	Type	Entry
22.09.15	General - Written	<p>Blogging - valid research output?</p> <p>I have started a blog as a research outlet - <a href="https://suspiciousmounds.wordpress.com/">https://suspiciousmounds.wordpress.com/</a> - informal, infrequent, but a place to air general ideas on the research project and methodologies. Nothing detailed enough to impinge on the research project's potential publications, but enough to get myself out there in the online research-sphere.</p> <p>Is this a valid research output? There are some excellent blogs out there, notably Colleen Morgan's from York University, or Howard Williams from Chester. I can't aspire to their level, but I acknowledge it is a useful way to get my face online.</p>

Date	Type	Entry
02.11.15	Conference	<p>Neolithic Studies Group Autumn Meeting 2015</p> <p>To be in the company of a significant proportion of your literature review is an intimidating thing indeed.</p>

Date	Type	Entry
26.11.15	Conference report	<p>NEBARSS conference, Newcastle University</p> <p>First poster presentation (Research Questions)</p> <p>My first conference as a full time researcher, as an official PhD student. This is a "friendly" event - we're all early career researchers and PhD students, so this is all about sharing our work, but also our shared experience as peers. I feel that familiar dread of being unmasked as someone who doesn't belong!</p> <p>There are a friendly contingent from a local history society, who invite me to speak for them - Newcastle isn't exactly local to me and I don't think I'll be doing any work on the Neolithic of the north east, but it is flattering to be asked.</p> <p>Key take homes from this:</p>



		<p>Assemblage theory and ideas of scale - a way to explain why sites do things differently and yet the same?</p> <p>A woman here has experience of digging at Evora, Portugal, and offered to send me some papers and photographs.</p> <p>Blog post:  <a href="https://suspiciousmounds.wordpress.com/2015/11/26/phd-journey-2-poster-girl/">https://suspiciousmounds.wordpress.com/2015/11/26/phd-journey-2-poster-girl/</a> 26.11.15</p> <p>My first impressions of Newcastle University were mostly governed by the proximity to a Blackwell's bookshop and the fact it looked very charming in the snowfall (about 18 flakes but still very briefly beautiful). This train of thought was clearly my mind's attempt to distract me from the thought of <i>there will be people there who know Things about archaeology, and they will realise that you are an Idiot</i>. I'm no stranger to Imposter Syndrome, in fact I have previously counselled friends and colleagues about it during my teaching days, but when it happens to you it's an entirely insidious, sneaky feeling. <i>They will Know</i>.</p> <p>Thankfully, I was relatively confident that my poster at least looked pretty good and read well, as I'd guinea pigged it on a couple of colleagues and had diligently followed advice from several excellent blog posts on creating decent conference posters.</p> <p>It was early in proceedings that I started to feel less like a numpti, too. People were actually TALKING about my work, in an interested way that leads to the kind of conversations you don't want to stop. I got invited to give a lecture to a local archaeological society, by some wonderful women who had worked at Evora in the 1980s – I plan to survey there so their first hand knowledge of the earlier excavations was a gold mine.</p> <p>I got chatting to a fine art student who is working with a stone on Ilkley Moor to try and give it back its agency as a living landmark through her art; I actually had cause to talk about a paper I read last week about the agency of contentious sites such as Nuremberg and how sites maintain their influence and power even in the face of ideological change or attempted destruction of their previous intent. There was me thinking I was procrastinating rather than doing some relevant reading! I fell back in love with Deleuze and Guattari, and reminded myself I need to write up all my thoughts on assemblage into my methodology and lit review. I developed a mad notion to get into pottery so I could recreate some Bronze Age funerary wares. Once more, I felt the need to trek to Orkney and live there like some mad archaeologist hermit. Above all, I felt once more like part of an academic world that has the sense of "home". Sharing passions and frustrations and discoveries – that's pure joy. The setting was casual enough to</p>
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		<p>be comfortable, but academic enough to feel like I'd broadened my mind.</p> <p>Also I managed to look fairly normal (although apparently from 1978) in my snapshot, which is an achievement in itself.</p> 
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Date	Type	Entry
28.12.15	General - written	<p>Thoughts on writing a literature review</p> <p>From blog post "literature review buckaroo" :  <a href="https://suspiciousmounds.wordpress.com/2015/11/05/phd-journey-1-literature-review-buckaroo/">https://suspiciousmounds.wordpress.com/2015/11/05/phd-journey-1-literature-review-buckaroo/</a> 05.11.2015</p> <ul style="list-style-type: none"> <li>• Read outside your comfort zone – get into other fields, translate articles (even just with Google translate), go off on tangents.</li> <li>• Enjoy exploring the landscape – find hilarious academic spats, the pained retractions, the grudging admissions of respect, the fascinating new research, the hidden gems of half-forgotten studies. A literature review is a treasure hunt.</li> <li>• Set targets and stick to them (flexibly) – I decided I would read 3 papers a day and add at least 350 words a day in the first 4 weeks, just to get into the swing of things. Some days I'd do 700, some only a few, if I was tweaking what had gone before. Targets should be an inspiration, not a punishment.</li> <li>• Allow yourself to go down the rabbit hole – I found some truly fascinating journals during this initial research stage, and now I save articles from them for a "treat" if I'm a good archaeologist.</li> </ul>

		<ul style="list-style-type: none"> <li>• Never be afraid to say “I need help” – ask anyone and everyone for leads on a good article. It not only gets you some quality reading material but also gets your face about as “someone who shares the good stuff”.</li> </ul> <p>The reason this appears here and not in November in this journal is because I revisited, and rewrote large sections of my literature review over the Christmas holidays of 2015. I had not yet learned the value of time off, and spent much of this holiday away from my family because I perceived time off as deeply negative and something I couldn't afford to do. By the end of the holidays, I reminded myself of these tenets, and added a further one:</p> <p><b>Take time out - self care is stepping back when you need to, and recognising your writing will improve for this enforced temporary distance.</b></p>
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Date	Type	Entry
26.01.18	Outreach - written	<p>Bournemouth University CAA department talk</p> <p>The first public airing of my research, and the first public outing for the ORAC prototype. He's still on the test board and carefully cradled in his protective metal case - but I was interested to see the reaction to him.</p> <p>A wonderful email of feedback from Katherine Barker!</p>

Date	Type	Entry
05.04.16	Site - audio transcript	<p>Pilot Study - Bryn Celli Ddu, Anglesey</p> <p>PF: Site visit record, April 5th, 2016. It has been several years since my last visit to the site, and the route to access it has changed - there is now a new processual way, from car park over gravelled path, through gorse and hawthorn hedge, over stream and farm track. Today is a fine clear spring day, mild with a nippy wind, and clouds chasing overhead to make the sunlight patchy and weak. Conditions are dry, though it has rained recently, and the soil is damp. I can't help but think that the nearby farm walls look chock full of suspicious looking stones. How many have been dragged from ground to chamber to farm gate?</p> <p>&lt;Pause, sound of rustling.&gt;</p>

		<p>PF: Initial pilot study, testing of ORAC. Device initialised and battery checked, charge full. All circuits clear. This study will focus upon the stones of the passage, chamber, and section of kerb closest to the entrance. It should be noted that the breeze is making paper recording a significant challenge. The contrast of the breeze and the still of the passage and chamber is palpable, even today in its open and tamed state. I can already see, the colours here.</p> <p>&lt;Pause, further rustling. Mumbled sounds. Distant low voices.&gt;</p> <p>PF: There are visitors to the site, so I have left ORAC inside the chamber and I am conducting survey of the stone shapes and surface inclusions. There are significant pale veins here - quartz of some kind - that thread their way across some stones like snail trails, or constellations.</p> <p>&lt;louder voices, a dog barking&gt;</p> <p>PF: &lt;very loud&gt; For f*** sake! &lt;quieter, at a distance&gt; Excuse me, sorry, yes it's mine. 1,low voices&gt; It's a computer &lt;low voices&gt; No, no I think it's ok. Serves me right for making it out of &lt;low voices&gt;- yes, wooden. It's just a prototype. For colour reading - I'm a researcher. &lt;low voices, receding&gt; Device check - all wiring intact, box worse for wear - their enthusiastic puppy decided it was delicious. Check against initial reading on clipboard - clear. It's fine, it's fine. Next iteration, no wood.</p>
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Date	Type	Entry
27.04.16	Blog post	<p>PhD Journey #3 - Field Agent (pilot study trip to Bryn Celli Ddu)</p> <p><a href="https://suspiciousmounds.wordpress.com/2016/04/27/phd-journey-3-field-agent/">https://suspiciousmounds.wordpress.com/2016/04/27/phd-journey-3-field-agent/</a></p> <p>When you've decided to do the pilot study for your research model, that will form the basis of your upcoming work in the field and all that it entails, here are my top tips:</p> <ul style="list-style-type: none"> <li>• Don't plan it in the first three months of the year in a country famed for wet weather, especially if your main piece of equipment is not waterproof,</li> <li>• Do not succumb to those "you know, it would be better if you did it *this* way..." 4AM thoughts, especially if it is two days before said pilot study and the improvements will involve several hours cutting, drilling, and soldering in a shed,</li> </ul>

		<ul style="list-style-type: none"> <li>• Don't go during the school holidays unless you are prepared to answer the same seven irrelevant questions over and over and over and over (as a primary school teacher, I was equipped for this, but I recognise others might prefer a little more peace and quiet).</li> <li>• DO – go to a place as wonderful, atmospheric, and as fascinating as Bryn Celli Ddu.</li> </ul> <p>So, I finally got my feet wet again with that wonderful Welsh morning dew, and found a single dry day in the Easter holidays to do some in depth poking around of a good Neolithic site. I feel like I had to pick Bryn Celli Ddu – not only for sound research reasons (lots of material, significant parts likely in original positions, fantastic example of a passage grave), but also because it probably the archaeological site I am most familiar with. Inside the chamber I'm no longer bothered by the dark (and I have been inside at night), and the memories of various visits right from childhood through to my teens, then as part of my undergraduate thesis; it's like an old friend.</p> <p>I'll not talk at length about findings here – it was largely an exercise in testing myself, seeing how well things (including Orac) worked in the field, and just how viable this whole idea is. Bryn Celli Ddu certainly has some interesting things going on with colour, and I'll be writing up a poster to highlight them soon. In the mean time, suffice to say Stuff was Found, and hopefully I will now find further Stuff at other sites to corroborate it!</p> <p>What struck me most about visiting this site is that it is still the focus of some kind of reverence and, to some extent, pilgrimage. When I entered the passage on this visit for the first time, the wonderful smell of lavender hit me; a dried bunch had been placed on one of the stones in the chamber, carefully in a dry spot, and the smell permeates the site. On a natural ledge on one of the stones in the chamber, numerous little offerings have been placed; crystals of various kinds, ribbons of many colours, coins from various nations, shells, pebbles, and tiny bunches of herbs.</p> <p>Glowsticks, still with the barest of chemical glows, were stuck between the infill rocks – it must have recently seen intrepid overnight visitors. Many would criticise this kind of "use" of the monument, perhaps with concerns of preservation. I am of the opposite opinion, and feel that the agency of these old stones acts upon modern visitors – placed once by Neolithic peoples for some kind of monument, now refreshing modern memories still as to old landscapes, old practices, old ways of seeing and being in the world.</p>
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		 <p>They draw us to them, and together we create new ideas.</p>
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Date	Type	Entry
15.05.16	Site - Written	<p>Neolithic Studies Group Spring Meeting 2016 - Anglesey</p> <p>The Neolithic Studies Group trip - I was excited and terrified. Excited to be on Anglesey again, to be among my favourite stones - but nervous of how green a researcher I am, to be surrounded by a who's who of my literature review. Instead it was a relief - an immersion into commonality, the ease of shared passion, the smirk of shared experiences. Bryn Celli Ddu featured large on the itinerary, and once comments about the car park's own henge-cum-picnic spot and the quiet joys of ministry of works signage, and we're exploring these deeply familiar sounds. Conversations buzz - had I heard about theories on the archaeoacoustics of the site? Had I seen the original carved stone in Cardiff's National Museum? What did I think of the interpretation panels? Could I spot the spiral carved within?</p> <p>It was unsettling, almost, to see others pay the site as close attention as I had previously done, and continue to. I'm used to half interested family members and slightly more interested walkers and families. It's strange to hear familiar, words-from-a-book-only phrases like viewsheds and phenomenology uttered so matter of factly here. Almost like they don't belong.</p>

Date	Type	Entry
30.05.16	General - written	<p>Musings on ANT</p> <p>KEY DISCUSSION IDEA: Neolithic Cosmology as an actor-network; utilises colour as coloured stone/pottery/art etc as a part of the evolving network, in order to retain actors and recruit new ones. Colour acts as concepts that feed into the network by creating significant spaces or objects, and being used by the dominant hegemony to create levels of access to certain mysteries/cosmology/sacred spaces and therefore preserve the burgeoning hierarchy that is developing in Neolithic Europe. THE ACTOR NETWORK ULTIMATELY WANTS TO PRESERVE IT'S POWER - I.E., INFLUENCE OVER AS MANY AS POSSIBLE. Drawing on existing meaning for colours as well as the near-universal experience of viewing them, gives a powerful extra dimension to ritual and religious life that expands the power of the network.</p> <p>Key issues:          -Why some sites and not others?          -Why some regions and not others?          -Why some monument types and not others?</p> <p>Answer to all: Cosmology is a complex web that is not simply defined along the lines of "they believed x". It is an actor-network that will, at different times through its evolution, employ different SPOKESPERSONS to retain and recruit actors. In some places and situations, these spokespersons include coloured stone, coloured artefacts, or those with the symbolic knowledge of what these colours meant. In some circumstances this could have been a powerful spokesperson, in others, different factors could be more important.</p>

Date	Type	Entry
03.06.16	Conference	<p>BRAG 2016, Liverpool University</p> <p>Rarely have I felt as much of a fish out of water than here at BRAG: a conference where most of the speakers are presenting a retrospective of several decades of extremely influential and important research into rock art, cultures that use rock art, and anthropological studies that have fundamentally changed our understanding of rock art and society. And I - talked about coloured rocks.</p>



		<p>However, the vital aspects of this conference, as ever, were the connections made. Here in Liverpool there are the magnificent, if sadly long divorced from context Calderstones - and at BRAG their custodian, the historian for Calderstones Park's Reader Project, Richard Macdonald, was there to talk about them, and get me access to record their colour.</p> <p>There was also the opportunity to play with Liverpool's experimental rock art wall - a fibreglass rock face built by a climbing wall company, that can be painted on with authentic tools and pigments in flickering (but sadly artificial) firelight.</p>
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Date	Type	Entry
02.07.16	Outreach - Written	<p>Glastonbury Festival 2016</p> <p>Is r/w/b how humans contextualise their place in the world? Colours of primal natural forces (blood, night, bone etc) but also in nature (stone, earth), also created in art (firing pottery, pigments, charcoal on clay etc).</p> <p>R/w/b becomes a map of cosmology itself.</p> <p>What becomes clear is that red is mercurial in nature; the contrast between individual meanings is interesting in the extreme. Love, passion, desire to death, murder, blood. Why? Because red does not just mean "life" - it means *human*.</p> <p>Black and white, those first two contrasts, define the world; the dichotomy between the dark and the light, the night and the day, alive and dead, family or stranger, magic or mundane. It is the way to frame experiences and to explain the contradictory and sometimes confusing clashes in life - life can be miraculous, and tragic. It can be bountiful or poor. It can provide and take away. Black and white symbolise these polar opposites and give a way to understand the world in terms that can be communicated across cultures.</p> <p>Red - that first, vital colour to be realised after the harsh polarity of black and white - is something very different. TD suggests it symbolises life, and that putting red into burials eg red ochre gives life to the dead. I agree, but go further still - to be red is to be human. The reason the responses were so different and so redolent of all the various human emotions is because the colour red is us painting our humanity onto the world - communicating the very fabric of our consciousness and humanity. It is love, passion, desire - but it is also murder, sacrifice, bloodloss. It is hearts and</p>

		<p>roses, but also machetes and scalpels. It is childbirth and fertility and menstruation, but is also death and violent assaults and assassinations. It's a warning, and an enticement. It's the apple in Eden and the dreaded corrections in an exercise book. The reason it is so chameleonic and contradictory is because it is human; we are creatures of unknowable depths and unfathomable intricacies in behaviour. Red is everything we are, and everything we want to display about ourselves. It's our celebration of the birth of our next generation, the mourning of the death of the ones past, the glory of our ferocious nature, and the proclamation of our romantic hearts. Red is the colour of us.</p>
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Date	Type	Entry
05.08.16	General - written	<p>Red for Spartans = colour of their cloth so as not to show bloodshed, but also, inspires fear and awe in opponents. Symbol of their prowess and strength.</p> <p>Red chalk in Yorkshire used in adornments and in burial sites late Iron Age</p>

Date	Type	Entry
02.09.16	Conference / Workshop	<p>Dialogues with the Past - "Theorising Digital Archaeology" - Norwegian Institute, Athens</p> <p>I cannot emphasise enough what a turning point this week has been for my PhD, my writing, and myself as a researcher and academic.</p> <p>The grilling after my presentation was tough - like a tiny and very fast Viva - I was heavily quizzed on the "objective" nature of ORAC and the way I thought about the data it created, the life cycle of this data, and how to democratise the results. I have never thought so hard about the "life" of digital creations before - isn't it logical though that they are also part of any assemblage that I develop? The archaeological interpretation, digital or otherwise, is just another part of the chain.</p> <p>Re purpose GIS tools to look at things like quality of life, social interactions etc - see Kwan 2006 paper on post 9/11 study on Muslim women in Ohio. (Can I use this to use my database to build a GIS model of influences on colour use etc? Shifts over time? Relation to natural sources etc)</p>

		<p>Portable XRF to compare to colour perception - can compare actual stone type etc and colour it currently presents. Also possible showing if stones are actually different or just appear so for whatever reason? Get in touch with Claudia to do this in Sweden.</p> <p>Don't refer to objective work via ORAC - actually reproducibility. Careful with language.</p> <p>Don't be afraid to put ideas forward! Explore what colours mean as well as what their use and change over use over time indicates in terms of wider influences and changes in Neolithic society etc. It's OK to have opinions and findings. Email Delia and thank her.</p>
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Date	Type	Entry
01.02.17	Site - audio transcript	<p>On Pembrokeshire</p> <p>Pembrokeshire - insular, influenced by but not slavish to other monument traditions: sites about performative nature of landscape rather than communal, communicable ritual.</p>

Date	Type	Entry
03.02.17	General - written	<p>I concur with Hensey's idea of how we truly get to know sites: "There is, I believe, a kind of knowledge that can be acquired through examining a great many related sites, seeing them at different times of the year, in different weather conditions, from different perspectives." First Light p.vii</p> <p>Function of monuments? Some kick-back to idea of mortuary (see Cummings and Richards on SW Wales portal dolmens, plus Carnes' work on stone rows "evolution of neolithic and early bronze age landscapes). What is the function? None in a vernacular (practical) sense - "they are simply the inscrutable results of human inventiveness and creativity" (Carnes 2014, 91). Some defined "functions" include territory marking, making a home for the dead, ancestor worship (also Carnes). To me this is a very modern way of assuming function. To us religion, ritual, and worship are often distant, non-essentials, not requirements; especially in NW Europe it is not a priority, therefore of course these monuments can be seen to have no "Function". But when ritual is deeply ingrained into your daily life and culture, when it is a tangible entity, then these monuments become eminently functional.</p>

Date	Type	Entry
02.03.17	Site - written	<p>Stonehenge</p> <p><i>The Night Stones</i></p> <p>As deep as time, the chasm between Mind and voice, dusk and dark.</p> <p>In the night another world is made, cold as starlight, Breath as solid as stone.</p>

Date	Type	Entry
17.06.17	Outreach - written	<p>A baking day at Bryn Celli Ddu for the CADW open day <b>[nb see chapter 7.2]</b>, where hundreds of interested members of the public came to see the site in all its finery, attended to by a swarm of archaeologists, reenactors, druids, historians, and enthusiasts. It was a strange kind of affair, almost like a coronation - we came to the monument, brought our gifts of time and storytelling and long lines of the curious to witness its hidden and not so hidden depths, crowning the stones in a ring of seated people on its brow, all photographing the view or scribbling onto activity sheets or trailing crumbs of tinfoiled sandwiches and scotch eggs.</p> <p>My activity - asking people to record the colours of stone in the main chamber - drew an interesting range of responses. Some used smartphones or torches to illuminate the dark within, some used intriguing qualifiers to their answers ("elephant grey", "sky blush pink", "blood maroon"), and some described in depth the colour of the creeping lichen. Whole families worked together, and all on the promise of a free pen.</p> <p>I was given a pentacle wand made of willow by a Druid boy, who told me his name was Gwidion - I asked him if he knew where his name came from and he regaled me with his own wild retellings of the Mabinogion and other Welsh myths. I may have missed a few stone colour seekers, absorbed in his stories - but his wide-eyed seven year old enthusiasm for the night-long drumming and fire parties to mark the solstice were worth it. He told me the stones were silver.</p>

Date	Type	Entry
21.06.17	Site - written	<p>Hunebed D27, Borger, Drenthe, NL</p> <p>Bright sunlight, many tourists! Attached to the Hunebedcentrum, NL, this is a highly visited monument, and park organisers encourage people to explore, climb, and touch. Now in a wooded glade, the light plays patterns across the stones, gives intense shadows and bright shafts of light. Immediately it is obvious that colours are at play here - rich reds, nestled amid pale rocks in contrast. Today is the midsummer solstice and the light is bright. The stones have smooth patches worn by the attention of visitors. The stone shape is different here to the Welsh and British sites seen before: this feels more like boulders (unsurprising given we are on boulder clay?), more like natural stone brought together in a long, low hill.</p>

Date	Type	Entry
22.06.17	Site - written	<p>Hunebed D43, Drenthe, NL</p> <p>The heat of the day is intense, thankfully trees shade most of this huge site. Another giant's bed in a wooded glade, this one slightly off the main tourist radar but still seeing a steady stream of curious visitors as I record the stones. The stones here are less hand and feet smoothed, more moss covered. The kerb contains stones that embody some of the classic Neolithic "shapes" often seen selected for at megalithic sites. Again a pink-grey-orange granite is prevalent, dispersed between its paler siblings.</p> <p>NB compass was stolen here - sites after this use phone GPS for directional information!</p> <p>&lt;later&gt;</p> <p>The extensive kerb and sheer number of stones made this a long session, interrupted frequently by visitors, all of who spoke perfect English with their polite queries as to my work! Unlike British sites, many said they had often looked at the colours here - the granite is more obviously varied in hue than the Sarsen, limestone, and schist of the UK!</p>

Date	Type	Entry
22.06.17	Site - written	<p>D47, Drenthe, NL</p> <p>A Hunebed in a housing estate.</p> <p>Early evening visit</p> <p>Surrounded by a ring of trees, and by the drone of roadworks, children playing, and moped zooming by. Mopeds share public footpaths and cycle paths here rather than the road, an alarming realisation for the unprepared tourist. The site feels awkward in the land here - the ring of trees should give it the air of a grove, of a separate space, but it fails. It is a small oasis of calm in the busy suburb, the orderly buzz of the active Dutch public walking, cycling, and running by - but despite the new signage and obvious attempt to maintain a sense of heritage space here, it feels neglected. There are squirrel-left offerings of empty acorn cups nestled between the stones, but surprisingly little litter of the human variety - perhaps not so neglected after all.</p> <p>Regarding colour, there are immediate and obvious variations, particularly in the capstones.</p>

Date	Type	Entry
22.06.17	Site - written	<p>D46, Drenthe, NL</p> <p>Early evening visit</p> <p>Unlike D4y, there is no attempt at a sacred tree grove here, no oaks grow to accompany the site or create its own special space. In the middle of squat housing blocks, it stands at the junction of several footpaths, like modern day processual ways snaking across the dried grass.</p> <p>The capstones here are mighty - the orthostats more imposing than at the near neighbour D47. Still the contrasting colours are present.</p>

Date	Type	Entry
23.06.17	Site - written	<p>D40, Drenthe, NL</p> <p>The most immediately visible of a trio of hunebed, now in a gorse and scrub glade surrounded by dense woodland. It would seem intensely isolated but for the regular whizzing by of cyclists - this is alongside a popular designated route.</p> <p>The capstones are huge and imposing, though this is clearly a spot that is somewhat less than respected - discarded cigarette butts and beer cans abound.</p> <p>The monument is surrounded by a low hill or mound.</p>

Date	Type	Entry
23.06.17	Site - written	<p>D39, Drenthe, NL</p> <p>A diminutive little hunebed, Nestled in its hump, Baking in the just-past-midsummer sun - Sing your colours to me, tell me, The song long left unsung.</p> <p>This small site is very degraded, having but one capstone remaining. Again it is littered by the evidence of modern activity on site - a collective ritual of a very different kind!</p> <p>The stones here seem more familiarly "megalith" than those of the other two in this clearing - more obviously placed with their flat side facing the interior, less like random boulders.</p>

Date	Type	Entry
23.06.17	Site - written	<p>D38, Drenthe, NL</p> <p>Recording of this site was hurried due to the enormous population of giant ants who didn't take kindly to their home being disturbed. It's clearly usually the less visited of the three sites, with paths less clearly worn into the scrubland, and far less litter.</p>



Date	Type	Entry
24.06.17	Site - written	<p>D21 Drenthe, NL</p> <p>Down a gravel road that feels distinctly like it shouldn't be driven upon, and in a small wooded hollow, D21 and 22 stand, looking at home in their tree-shaded bower.</p> <p>The imposing capstones of D21 give it a solid, earthy air of power. The day is wind, cold in contrast to the recent still heatwave stickiness, and the light is gloomy and glowering despite it being early afternoon. The shadow and light of recent days is absent and replaced by a uniform grey light.</p> <p>The hunebed has been given an extra layer of gothic dramatic photograph credentials by the fact that a tree grows through it - literally encapsulating some of the stones - land and stone melding together.</p> <p>During the visit a young couple came and conducted a photoshoot on the stones, probably highly irritated by my constant lying on the floor waving a plastic box of electronic components when they were trying to get a good shot.</p>

Date	Type	Entry
27.06.17	Site - written	<p>King Askers Hoj, Denmark</p> <p>A landscape far removed from Drenthe, full of undulations and ripples and hidden hollows and - hills!</p> <p>This site rises from the fields like a gentle giant, open portal beckoning you in. The only sounds here are the trill of skylarks, droning insects, and the wind in the meadow and cropfields. A desire path winds its way in a lazy spiral up the hill to take in the vantage point it offers over the land, sea, and crossing point to the mainland. The air is perfumed with wildflowers.</p> <p>Inside the hill, silence.</p> <p>The capstones in particular are difficult to get a reading from because, though the hill is remarkably well sealed and there has been a warm, dry spell, there is some damp and mineral seepage from the above soil. It is incredibly dry inside given the nature of the site. The soil lends an orange tint, so clear spots must be found on each stone.</p>

		It is nerve wracking, despite the decent height and feeling of open space within the chamber, to enter - not least because of the venomous looking arachnids that have set up home here. <i>(As an aside, is another reason that "ritual" hearths are found inside the entrances of passage graves a form of pest control - to keep the insect and arachnid population at bay?)</i>
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Date	Type	Entry
27.06.17	Site - written	<p>Sprovedyssen, Denmark</p> <p>More than just the neighbour of grand King Askers Hoj, this passage grave sits like a contented, curled up cat - coiled in the sun on top of a gentle slope overseeing a slight valley below to the east. A beautifully preserved monument, with passage and kerb, overgrown and clearly overlooked by many visitors.</p> <p>The spell is only broken by the rumble of farm machinery in a very close field, and the way a local farmstead peeps over the low hedge at different intervals as you make your way around the site, appearing and disappearing playfully in the landscape. Once again, inside the chamber itself is a calm silence, a feeling of stillness that is hard to describe rationally. An otherworld, a calm state beyond thought.</p> <p>Much of the kerb is too occluded and overgrown to record, and so only the visible are noted for this survey.</p> <p>The stones of the passage rise gently in stature, until the ones closest the chamber are almost as tall as the chamber itself.</p> <p>It is perhaps the single best example of how colour and texture contrasts are played with in the construction of these sites - the chamber is full of obvious, tactile, visually striking contrasts that beg to be seen and felt to be experienced. Combined with the changing passage height and the location at the head of the valley, this is a deeply performative and theatrical site, a feast for the eyes and hands - and given the stillness still able to be felt, possibly a feast for the ears too - a feast of silence.</p>

		<p><i>The Feast of Silence</i></p> <p>Waves, waves; or wind in leaves before its time,  Summer squalls doing autumn's early job, rage,  Drumming through the tissue-thin blood  The rhythm of living, bathing you in the feast  That waits in silence: all this, the inner thumping of it,  Rests in your head as you feel your way -  Rough, smooth, rippled, rugged,  Stone sings in the deep, in the dark,  You feel the colour of the living, and the darkness of the dead,  And before them you wait, listening to their only song,  Sung in no words but every word,  In all voices but none:  You are mute, and yet screaming out, and in your hands and heart  bring them a dozen dozen courses of  The feast of silence.</p>
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Date	Type	Entry
28.06.17	Site - written	<p>Klekkendehoj, Denmark</p> <p>As high as you can get in this landscape, lies this hill. A double passage channels through it, though it feels underworldly rather than otherworldly, each passage gloomy and uninviting. The passages are somewhat more of a squeeze than King Asker's Hoj, and I am shamed into action by the enthusiastic entry and crawling in with aplomb of two American octogenarians.</p> <p>One passage now functions as a museum exhibit, blocking the chamber off from my recording, and providing a somewhat terrifying example of a possible method of interring the dead.</p> <p>It feels like a reminder of why the Neolithic happened - surrounded by great wheat fields, the wind rustling the unripe heads of grain in a symphony of agricultural prowess. A steady line of tourists tiptoe their way through the fields and crawl in to the chambers - most choosing the right one first and declining to enter the left afterwards.  Sinister/Dexter!</p>

Date	Type	Entry
28.06.17	Site - written	<p>Somarkedysen, Denmark</p> <p>The ruined hill - unlike many of Mon's surviving megaliths, this stands a ruin, with a chequered past. The great capstone has been rent asunder, the mound denuded, the kerb destroyed.</p> <p>The cool stillness here still has power. The stones speak, if quietly. The capstone of the passage is covered in cupmarks - asserted by the accompanying interpretation panel to be "fertility symbols" and show that the site was exposed in the Bronze Age. Perhaps this is the case - or perhaps cupmarks and Neolithic tombs are an earlier phenomenon (see what comes out of the Bryn Celli Ddu landscape project!)</p>

Date	Type	Entry
29.06.17	General - written	<p><b>On Denmark</b></p> <p>In a different way to Drenthe, this is an island built on stone - the church foundations rammed full of boulders, the painted stone stall on a tiny rural road, hoping for passing trade, the tourism predicated on the white cliffs and geopark. It is an island still defined by its geology, and yet, the ancient stones are curiously missing in most narratives - the museum in Stege doesn't feature them, focusing on history of medieval Mon and later. There is no guide leaflet or trail to follow from the tourist information desk, very little signage, and nobody in the vicinity of any of the sites to ask how they interact with them or feel about them. They are more apart in time than any Neolithic monument I have visited before - like they exist in another world than the rest of Mon, who have no time for them. A curiosity indeed.</p>

Date	Type	Entry
01.07.17	Site - written	<p>Girommen, Ekornavallen, Sweden</p> <p>My first Swedish monument and here it is in a field of death - monuments to the dead stretching across thousands of years, crammed together like the world's most niche theme park.</p> <p>The meadow at Ekornavallen is home to 4000 years' worth of graves, burial traditions going back generations unremembered and unknown. And yet this incredible site is curiously un-lauded, un-celebrated. The crumbling ruins have alight and spurious signs</p>

		<p>surrounding them, with scant explanations. Grimmonen, the “giant’s oven”, is a jumble of fallen and possibly mis-placed stones. More of interest to me is the infilling of red and pink stone - how much is original, and how much latterly dumped by imaginative antiquarians and visitors?</p> <p>The stone of the monument itself is rugged, eroded, sarsen-like in its shape, stature, and colour.</p> <p>Weather - sunny spells</p> <p>I find it hard to shake the idea that these stones once stood as menhirs, or as a stone circle. Has anyone compared their shapes, and size, with known stone circles in vicinity? Post holes? Is reason stone circles don’t occur here as much as in British Neolithic because the stones have been extensively reused?</p>
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Date	Type	Entry
02.07.17	Site - written	<p>Kykeror, Falkoping, Sweden</p> <p>It is only after my painstaking recording that I find the site was reconstructed heavily after yearslong wrangling about whether it should be dynamited and destroyed or not to make way for impending transport infrastructure advancements...</p> <p>A grave by a building site! Here, by the road, on the fringe of the park, stands the “gangriff”, the passage grave. Next door building work is occurring - hardly imaginable in such close proximity to sites in Britain with their strict protection and scheduled status.</p> <p>Texture here seems a big feature - the stones contrast in tactile ways. The sun is peeking through occasionally, but largely the day is gloomy, so the slight sparkle on the granite capstone is infrequent, but all the more dazzling when it does occur.</p> <p>The signage to go with the site is old, generic, and poorly phrased - in contrast with the very local Falbygdens museum which is excellently laid out and thoroughly well researched. A curious juxtaposition.</p>

Date	Type	Entry
02.07.17	Museum visit - written	<p>Falbygdens Museum, Falköping, Sweden</p> <p>An unimaginative, boxy roadside building hides a gem of a museum. Free to enter, the polished limestone stairs (bearing fossils as seen on one of the passage orthostats in Kykeror examined this morning) lead up to a sensory experience that many paid-for, bigger, and “better” museums cannot seek to emulate. The dark is peppered with the sound of dripping water, glacial melt - and early rock art is splashed across the walls, projected by laser, showing the evolution of forms and designs. The exhibits recreate burials, demonstrate facial recognition of local prehistoric celebrity the “Raspberry Girl”, trigger soft flute music as you gaze at the Neolithic flute found in the region.</p> <p>The staff seem amused that I want to visit the megaliths of the region - it seems incongruous that an area so rich in stone should be so dismissive of them - compare this to the stone-drenched Avebury landscape in England, a huge draw to tourists, spiritualists, historians, archaeologists, and the curious - here visiting the stones is almost an afterthought. I find nothing on local legends or myths around the stones - a curious gap in the mythological record. Research needed.</p>

Date	Type	Entry
02.07.17	Site - written	<p>Lusithushigens, Falköping, Sweden</p> <p>A miserable site, perched unceremoniously on top of a mound on a roundabout, with only the peaks of capstones and a couple of orthostats visible over the scrubby ground. Covered in litter and deeply un-Scandinavian mess, with a sign that bears no relation to the specific monument itself.</p>

Date	Type	Entry
03.07.17	Site - written	<p>Angshogens Södra, Falköping, Sweden</p> <p>Perched in the hinterland between a manicured suburban garden and a busy road, this grave is tidy, well kept, but somewhat ambiguous as to its nature. Its sign does not even bear its name.</p>

		<p>According to the museum leaflet, it was almost destroyed in 1909 but roads were instead redirected around it, hence its place in a slight kink in the road today - so at least it was spared the fate of many of its near neighbours. Its position by the roadside has also spared it the fate of some of its close cousins, especially Angshogens Norra and Westerbergsgata - both overgrown, barely seen, languishing domesticated as exotic rockeries in private gardens.</p> <p>The topiary of the attached garden mirrors the domed undulations of rock and mound perfectly.</p> <p><i>Topiary</i></p> <p>A map in a foreign language is a misheard story.  The path broken by translation. The betrayal of truth  That slips in, knife-quick, between the fireside and the forgetting,  Stripping the stones of all but cautions to take care  As you step between the constructed cracks, the topiary-shaded grass,  Of gardens grown from the bones of unremembered past.</p> <p>The paper creases with the the grim grip of disappointment,  Lines bend and meld together, new tracklines between  The dead-living things. And so, new stories begin.  Time has slid away from you here,  Paths well trodden and unseen through the depth of years,  Local tales sing little of your legacy,  The trail an ephemeral, skin-thin thing;  Your mounds made a mockery, mirrored in  suburban topiary.</p>
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Date	Type	Entry
03.07.17	Site - written	<p>King Bjorn's Grave / Glasthall, Falkoping, Sweden</p> <p>Truly a kingly grave. The mighty capstone - and the triple layered capstone/keystone arrangement at the entrance to the chamber, is a sight to behold. It manages to impress and awe, despite sitting in poorly mown grass between two suburban gardens and nestled between two parallel roads busy with traffic - another megalith domesticated. And yet this one feels different - not hemmed in by formal topiary or used as a rockery, with its sign vandalised by arson and the scrubby ground around it half wild and unkempt, it maintains an air of untameable strength.</p> <p>The limestone here is friable and covered in jagged edges, presumably frost and heat damaged, and is a range of colours right up to a rich orange red, with the main capstones/keystones being notably red.</p>



Date	Type	Entry
4.07.17	Site - written	<p>Attagardens, Falkoping, Sweden</p> <p>From a distance this site appears incoherent, jumbled - but its position on a low mound, in manicured grass by a quiet roadside, gives it a quiet dignity not much seen in the monuments of this region. The mighty capstone and scarcity of orthostats almost makes it reminiscent of Pembrokeshire portal sites, but this is a trick of the eye - the scant remains of a passage make it clear this is some variety of passage grave. Granite boulders are the order of the day here - from the same glacial action that carried them across Atlantic Europe to Drenthe.</p>

Date	Type	Entry
04.07.17	Site - written	<p>Hjelmsror, Falkoping, Sweden</p> <p>For a moment I am back in the Netherlands among the boulder clay granite <i>hunebeds</i> - this site is deeply reminiscent of those sites, a gallery grave of the domed, orange-beige granite. The sun peeped out regularly during recording and the distinct surface shimmer of the stones raised them from lichen-covered mundanity.</p> <p>Whilst surveying, a car slowly circles around the lane next to the site. It is the fringe of an industrial estate with a car showroom and is empty at the time I visit, so clearly I am a deeply suspicious individual. The driver winds down his window and as if I am lost or need a lift - neither. He is insistent and peculiar and it is the first time I have felt unsafe on the trip. Eventually he drives away, but the atmosphere of the site is spoiled. Data collected, I leave. This is the final site in Falkoping.</p>

Date	Type	Entry
05.07.17	Site - written	<p>Karleby, Falbygden, Sweden</p> <p>Three mounds in a line (actually four, but the other more distant and less accessible) make the Karleby group a visual treat - snaking across farmland from the church and yard, sitting amidst rich crop growth.</p> <p>What is most beautiful about these sites is the caretaking done by locals. There is a low drone of a petrol mower on my approach to the central and largest megalith, Ragnvalds Kull, and on spotting me the elderly man pauses to greet me, and ask me what I want to know</p>

		<p>about the site. He tends the path here and keeps it trim; he checks and maintains the visitor log; he cleans the signage and replaces the wooden posts when they are rotten. It is difficult to quantify the way he speaks about the site - not quite pride, but certainly with warmth, and with appreciation for its value as "theirs".</p> <p>There is a magical quality here - the first time monuments in Sweden have felt like they have agency over their own presentation, their own living space. These three are crowned with wildflowers, of a dozen varieties - clearly the mounds suffer little in the way of disruption or footfall, for flowers to flourish so.</p>
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Date	Type	Entry
15.07.17	General - written	<p><b>On Sweden</b></p> <p>How curious, these tamed megaliths. The small photocopied map from the Falbygdens museum lists the gentle walk around Falköping township that encompasses them - warning the walker to be respectful of the private gardens that several now reside in. How many British megaliths wallow in private gardens rather than open farmland and public spaces? It seems alien to me, having grown up with monuments having their very definite Own Space, whether it be legal protection or more general folk-horror folkloric memory passed down to separate these spaces from the lives of the living.</p> <p>Colour is often subtle here - not the garish contrasts of Mon or Netherlands, but not the uniformity of Pembrokeshire - there is often slight variation, then something that shouts out its difference proudly - often the keystone or first chamber capstone on a site, which tend to be red or richly coloured, and often of a different stone type; a literal gateway? An indicator of being disallowed in a certain space?</p> <p>Falköping is a place where time has slid away from the megaliths, and the mythology of the land has crumbled. Although highly visible and in common access, it is a passing, ephemeral, skin-thin thing; the spirits of place feel absent, or very deeply sleeping. Where are the druids, the offerings of flowers, the pilgrim paths? Where are the whispered tales of those under the hill? Where have the ancestors gone?</p>

Date	Type	Entry
11.09.17	Outreach	<p>Bournemouth University Public Lecture Day 2017</p> <p>Held primarily for the benefit of Bournemouth (and wider Dorset) University of the Third Age members - an engaged, curious, and enthusiastic audience. Never before have I been heckled about having photographs that were too artistic, or asked if I had considered the vibrations of stones when looking at Avebury circle.</p> <p>The opportunity to give a long, but general talk was an excellent one - pitching my research to people who had little to no knowledge of assemblage, of material agency, of phenomenology. It became something of a travelogue of stones - but thankfully not a slide show of the many hundreds I have visited during the course of the research!</p>

Date	Type	Entry
06.11.17	Conference	<p>Neolithic Studies Group Autumn Meeting 2017</p> <p>It feels odd not to be presenting here, given the theme of stone and stone provenancing - however, my research feels at that crucial stage in between the doing and the telling that means it isn't quite at the point I want to shout about it at conference right now.</p> <p>Plenty of food for thought here - particularly in Katy Whittaker's excellent paper on Sarsens. My own experiences with these stones have taught me a lot about their mercurial coloured nature - deeply affected by light and weather, and how they are like mythology magnets - they are some of the most thoroughly storied landscapes in my entire study.</p>

Date	Type	Entry
06.11.17	General - written	<p>Colour as coded meaning, in a time without written language - like patterns in the underground to help illiterate people recognise their stop.</p>

Date	Type	Entry
06.11.17	General notes	<p>Middle Neolithic - what happened? Mention re: change from early RWB initiatory flint mines etc ritual, to late neo wide scale mass worship (monument complexes etc)</p>

		<p>Back to kin-groups rather than such wide scale in chalcolithic/eba - people no longer to work for "the man"!! Huge influx of a new culture that did not do things on such a wide scale.</p> <p>Bluestone - plague healed/stopped in West Wales, so transport stones to Stonehenge (pre existing important gathering place) as place if healing??</p> <p>Late neolithic monument changes as a response to the spread of Yersinia Pestis across Europe - large monuments and group ritual as healing/warding off the plague? (re-arranging of Stonehenge, stone circle of Avebury, avenue etc)??</p> <p>therefore late neolithic monuments use colour to signify healing energies or significant places of healing?? Look for ethnographic sources.</p> <p>Early neo = initiatory?? Mid = ?? Late = healing?? Read Tim's work on the healing nature of bluestones.</p> <p>Often it is said that archaeologists are storytellers, retelling the past. Not so. Matter is the storyteller. It has been telling stories since the beginning of the universe and will continue to the end when we are not even a memory. It is crystallized into stone, charred in flames, frozen in glaciers, flows as seas, pumps as hearts, self-cognates in neural networks. Matter weaves every story ever told - we are merely translators.</p>
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Date	Type	Entry
24.02.18	General - written	Psychogeography seems caught in the event horizon of nostalgia - though the desire to subvert and politicize the act of walking through (generally urban) spaces gives enormous momentum for innovative practice, artistic creativity and the embracing of new ideas, it is not enough to achieve escape velocity from the vast black hole of "the golden age" - the city-that-was in the minds eye, the fondly remembered architectural and social "peak" of a place that could be reclaimed if only the city were rebuilt, remade, redesigned along never-defined, wildly conceptualised Psychogeographical designs.

Date	Type	Entry
08.05.18	General - written	<p>New job!</p> <p>From all the work put in to outreach projects, teaching, and getting myself out to do things beyond my PhD and in the wider world of heritage, has come my role. I'm "Unloved Heritage Project Officer" at Clwyd-Powys Archaeological Trust - back to beloved Wales, into a role that combines archaeology and teaching and social conscience and wellbeing and fundamental Welshness and industrial heritage and transport nerdery - bliss.</p> <p>Careful timetabling of research output is now required.</p>

Date	Type	Entry
02.09.18	General - written	<p>A matter of days until the hand in time, and it occurs to me my journal entries have tailed off the deeper I have sunk into the writing of the thing - am I then less reflective? Or has adequate reflection happened to mean the process of writing has developed naturally?</p>

### Appendix 3 - Conference, Outreach, Publications

Date	Type	Title
20.11.2015	Conference poster, NEBARSS Newcastle 2015	"The Colour Out of Space: Research Questions"
26.01.16	Lecture - Bournemouth University Centre for Archaeology and Anthropology lecture series	"The Colour Out of Space: early research into colour use in the monuments of Neolithic Atlantic Europe"
09.03.16	7 Minute Lecture; part of Bournemouth University Annual Postgraduate Conference	"The Colour Out of Space: early research into colour use in the monuments of Neolithic Atlantic Europe"
18.05.16	Conference Poster for Bournemouth University Sci Tech conference 2016	"The Colour Out of Space: Initial Research Findings of the Colour Use in the Monuments of Neolithic Atlantic Europe"
03.06.16	Conference paper, BRAG (British Rock Art Group) Liverpool 2016	"The Colour Out of Space: early research into colour use in the monuments of Neolithic Atlantic Europe"
June 2016	Outreach - stall at Glastonbury Festival as part of the "Science Tent" led by Southampton University	"Colour of Antiquity - looking at the significance of colour in the past and present"
August 2016	Workshop and seminar, Dialogues with the Past: Theorising Digital the Digital Turn in Archaeology, Norwegian Institute, Athens	"The Colour Out of Space: Recording Colour in Neolithic Monuments"
18.11.16	Conference paper, NEBARSS 2016 UCL	"The Colour Out of Space: Colour in the Monuments of Neolithic Atlantic Europe"
December 2016	Conference paper, TAG 2016 Southampton	"Another Brick in the Wall: Archaeological Outreach in Schools as a Political Act"
March 2017	Conference paper, CAA 2017 Atlanta	"'Well, actually...': The othering of women in the computing and programming communities and its effects on digital archaeology"
March 2017	Conference paper, CAA 2017 Atlanta	"The Colour Out of Space: Digital Media as Mouthpieces for Material Agency"
08.03.17	Conference poster, Bournemouth University Postgraduate annual conference 2017	"The Colour Out of Space: Digital Media as Mouthpieces for Material Agency"

24.05.17	Conference poster, Bournemouth University Sci Tech annual conference 2017	"The Colour Out of Space: Assembling the colour of cosmology"
17.06.17	Outreach - stand at Bryn Celli Ddu open day with CADW	Bryn Celli Ddu public colour survey
August 2017	Session organiser, EAA 2017 Maastricht	"Stone is the Storyteller. The materiality of stone through time (and mind)?"
August 2017	Conference paper, EAA 2017 Maastricht	"Stone is the Storyteller - The materiality of stone through time (and mind)?"
11.09.2017	Public lecture (general) - for Bournemouth University's programme of public lectures aimed at U3A	"The Colour Out of Space: Colour in the monuments of Neolithic Atlantic Europe"
December 2017	Session organiser - TAG 2017 Cardiff	"Unstuck in Time: science fiction, speculative futures, and archaeological imaginings"
December 2017	Conference paper - TAG 2017 Cardiff	"Do humans dream of analogue sheep? The ethics of memory generation in archaeology and science fiction"
21.06.2018	Public lecture (general) as part of Women's Adventure Expo "Heritage of Women in Exploration" RGS, London	"Pioneering Women in Archaeology - a very short introduction" - mentioned many prehistorians working on colour and landscapes, especially Barbara Bender
September 2018	Book section on Bryn Celli Ddu and wider colour research	"The Old Stones: A field guide to the megalithic sites of Britain and Ireland", ed. Andy Burnham, Watkins Media
November 2018	Conference paper at NEBARSS 2018 Manchester (TBC)	"The Colour Out of Space: Colour in the monuments of Neolithic Atlantic Europe"
December 2018	Conference session organisation at TAG 2018 (TBC)	<i>"Haunt This Place: Fantasy, Archaeology, and the Ghosts of the Land"</i>
December 2018	Conference paper, TAG 2018 (TBC)	<p>"Songs of the Land: poetic engagements with the landscape as heritage outreach"</p> <p>And</p> <p>"Unloved Heritage? Presenting the voices of young people from Wales and their interpretation of unloved things."</p>